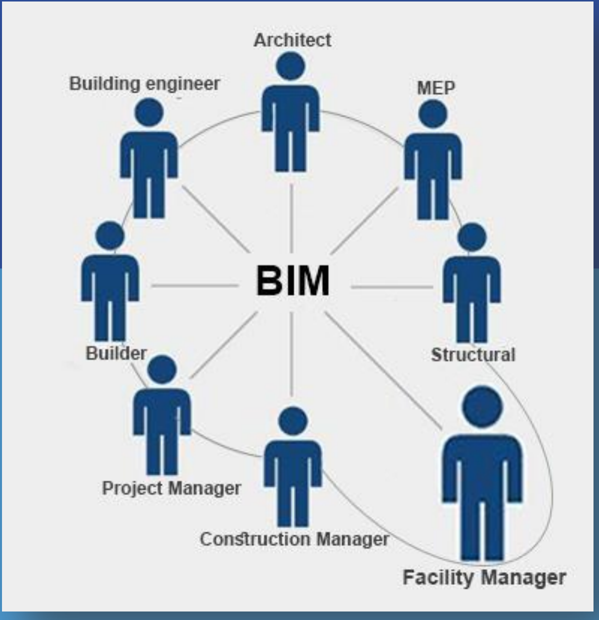
École polytechnique de Louvain

Data Requirements to Support BIM-enabled Facilities Management



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Chapitre 1

Introduction

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1. Introduction

1.1 Context of Building Information Modeling for Facility Management

Nowadays, the construction stakeholders have an increasing interest in the effective transmission of information to the client once the construction of the building is over and is ready to be operated.

BESIX, a general contractor, is also looking to develop this specific information management. For this purpose, they proposed a thesis topic to develop the subject with a Building Information Modeling (BIM) approach.

Given my interest in BIM during a project study, I considered the research and development of this topic as highly relevant. Currently, BIM is revolutionizing the way buildings, infrastructure and technical networks are planned, designed, created and managed.

In this research study, there will be an introductory explanation about the Building Information Modeling process and the reasons why it should be considered as an appropriate solution to provide an effective transmission of information.

This subject is often called “BIM for FM” by different stakeholders. Indeed, all services related to the different use of buildings and its resources are called “Facility Management” (FM).

As “BIM for FM” is an innovative and very broad subject, this research focus on which information must be transmitted to the facility managers so that they may perform an effective operation and maintenance for buildings. Indeed, the study compared to other sectors (maritime work, infrastructure, environment,..) will be a next step.

Several countries, including Belgium, are trying to classify all this information, which generates a real market demand regarding this topic.

Therefore, the purpose of this thesis is to propose a classified database that will allow the construction industry to progress in "BIM for FM".

1.2 Research method

In order to reach the purpose stated in chapter 1.1, we focus on which information must be transmitted to the facility managers of buildings and attempt to understand the current context in construction and BIM. Many sources had to be crossed, such as literature and human statements, to get a complete database.

I started this thesis by reading many articles on the subject to understand its related issues. The first goal was to know the needs of each stakeholder (architects, engineers, subcontractors but also facility managers) as well as the different difficulties they face.

When I began to read all related literature, I had the chance to attend an international workshop on "BIM for FM". It allowed me to get different points of view from several European countries and understood their information needs.

After that and for almost five months, I carried on my bibliographic research while meeting stakeholders interested in BIM for FM. At first, the meetings were conducted in order to learn more on the subject (six interviews) and later, to expose my research to the stakeholders so that they could challenge it and provide feedbacks (four interviews). Due to their deep interest in moving this topic forward, lots of their insights improved this research.

To validate my work and to receive the latest reviews, I organized a workshop bringing together most of the interviewees as well as other stakeholders. I presented my study and we discussed the next steps of BIM for FM. Indeed, one of the goals was for them to meet each other and to share about the subject.

Thanks to this presentation, I had a month to make the latest improvements on my thesis.

To resume, my research method was as follows:

- Introduction of the topic by BESIX and establishment of a work schedule (appendix 8.1)
- Reading bibliographic research
- Participation in an international workshop to get different European points of view on BIM for FM
- Six interviews to better understand the issues of this subject
- Realization of first research's version
- Four interviews to get feedbacks
- Work improvements
- Workshop (twelve stakeholders attended) to confirm the thesis and get last feedbacks
- Last modifications
- Submission of the thesis

Chapitre 2

Context of BIM

SOMMAIRE

2. Context of BIM

This research project focuses on the effective transmission of information between the world of construction (architects, engineers, contractors…) and the world of operation (facility managers,…). While this transmission could be fully carried out by a non-BIM approach, BIM has been proven to be the most suitable solution. Through this chapter, the characteristics of this process will briefly be introduced so that anyone interested in this topic could easily understand its added values and issues.

2.1 What is BIM?

First of all, the acronym « BIM » means « Building Information Modeling ». It was defined by the US National Building Information Model Standard Project Committee as «a digital representation of physical and functional characteristics of a facility. A BIM is a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle; defined as existing from earliest conception to demolition » [1].

We can observe different keywords in this definition that we will develop: “digital representation”, “shared knowledge” and “physical and functional characteristics”.

2.1.1 Digital representation

In the construction industry, this notion is also called “digital model” or “BIM model”. Whereas the design of a traditional construction is generally made with two-dimensional technical drawings (plans, elevations, sections), a BIM model is created in three dimensions as shown on Figure 1.

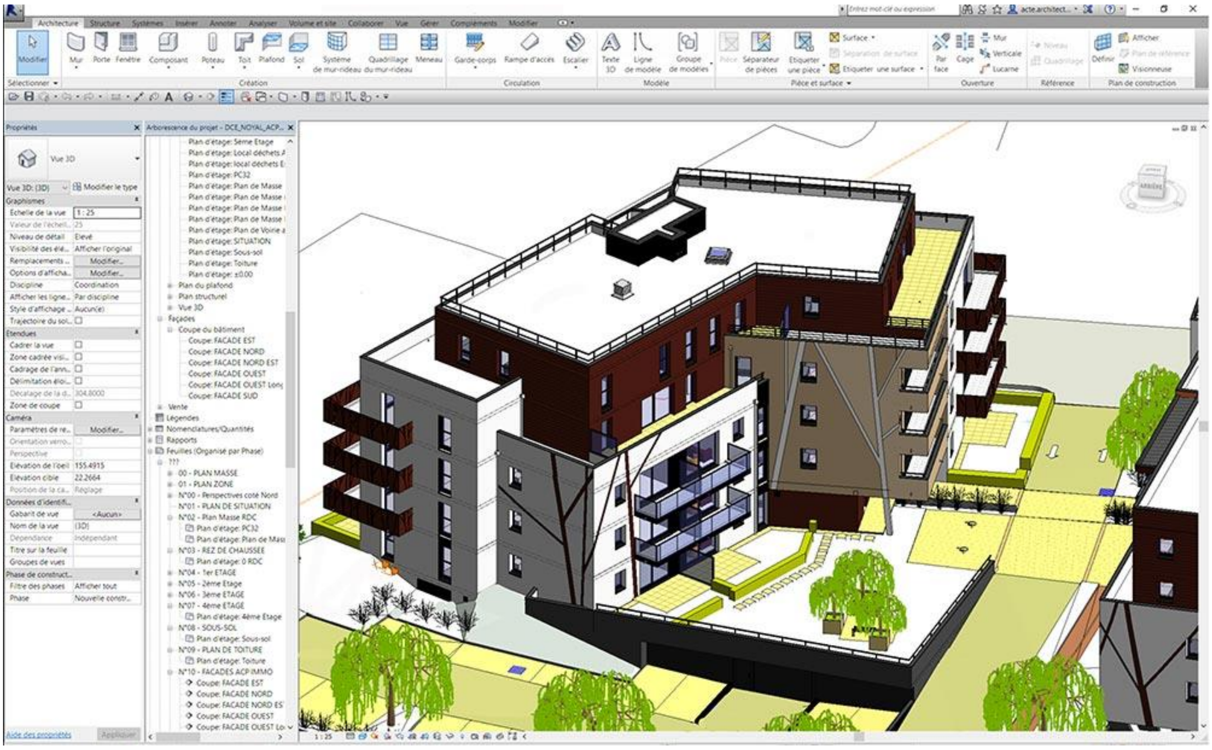

Figure 1 : BIM model in an architecture BIM software

More than a usual 3D representation, the digital model consists of different objects, each of them with several properties. These objects, or graphic elements, are representations of existing building elements (walls, doors, windows, technical equipment's, coatings,...). Objects are characterized by intelligent properties and functions. This allows a dynamic interaction between all graphic elements of the model [2].

Mr. Axel Tasiaux offered a good visual example to illustrate the difference between designing with the traditional method or with a BIM model. It simply consists in representing a house with a door and a window, as illustrated on Figure 2. He said that, with the traditional method, we would draw several lines, thus creating squares, rectangles and triangles. It is only through the gathering of these shapes that we perceive a final drawing, being a house. However, with the BIM object-oriented method, the model is made as if we had to create a Lego house. We would take some cubes of Lego, representing wall bricks, and we would place two others Lego pieces for the door and the window. A few more different elements might be used to form the roof. Therefore, we would place different objects that would then form a house [3].

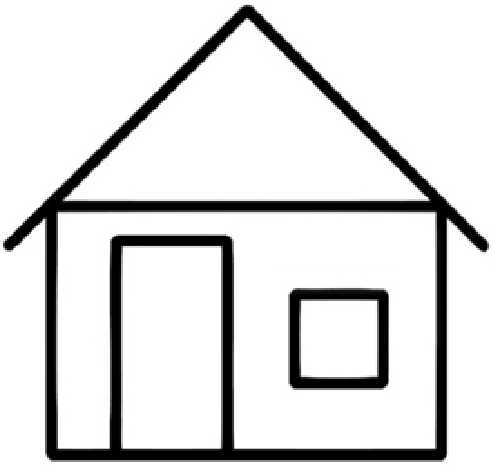

Figure 2 : 2D Drawing

Figure 3 : 3D (Lego) Model

If we now take the time to imagine the roof drawn lower in the 2D drawing, the representation would only slightly vary. However, through the construction of a Lego house, we will not be able to lower the roof because it will be blocked by the wall.

Like in our Lego house situation, a BIM software can detect if building components are not spatially rightly co-ordinated through the model. This particular situation is called clash detection. Moreover, given a minimum of information, the software can analyse or simulate certain behaviours (mechanics, stability, energy performance, environmental impact ...). These particular processes are not available in the traditional method.

As a final difference between both methods, it has to be specified that people who make CAD[1] drawings are called "drawer" while people who design a BIM model are now called "modeller".

2.1.2 Shared knowledge

The parametric BIM model is a central piece of the process allowing every stakeholder of a project to work collaboratively. Thus, they can share information from the design to the demolition stage of a same project. The fact that BIM models enable construction actors to work better together can be listed as one of its main advantages.

[1] Computer Aided Design. CAD and hand drawings follow the traditional method.

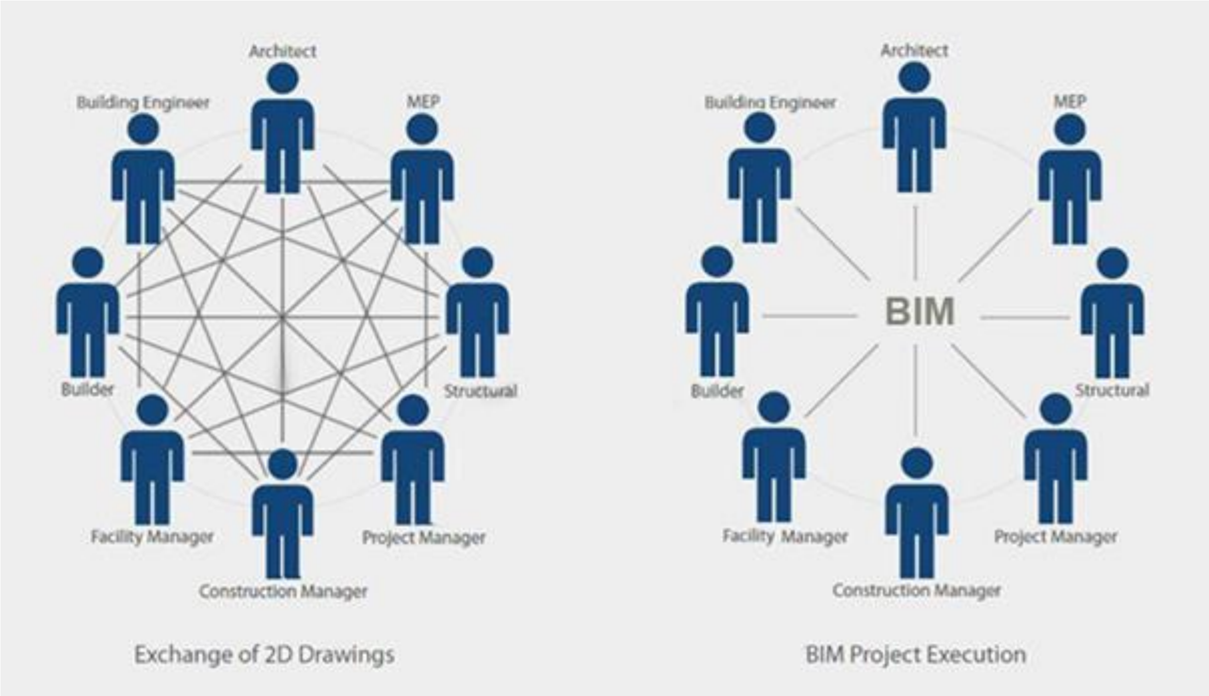

Figure 4 : Difference in information sharing between traditional and BIM methods

Moreover, a main characteristic of the construction industry is that, for most of the projects, a new organization has to be put in place. This means new stakeholders, working together for one or two years. It requires strong flexibility and a good information sharing. BIM technology allows generating an overwhelming amount of information which requires to be structured and sorted out in order to be manageable. Actually, the goal of BIM is the management of information [4].

2.1.3 Physical and functional characteristics

Also called geometric and non-geometric information. As the different assets are designed in three dimensions, gathering them in a final model allows us to observe and receive direct geometric information (shape, size, orientation,…).

Besides, characteristics can be directly added to the different objects. The composition of a wall, the location of a piece of equipment or furniture in a room, are all parts of BIM [5]. These pieces of information complete their existing geometric description. In practice, we can click on an object, and see these non-geometrical data, as shown on Figure 5.

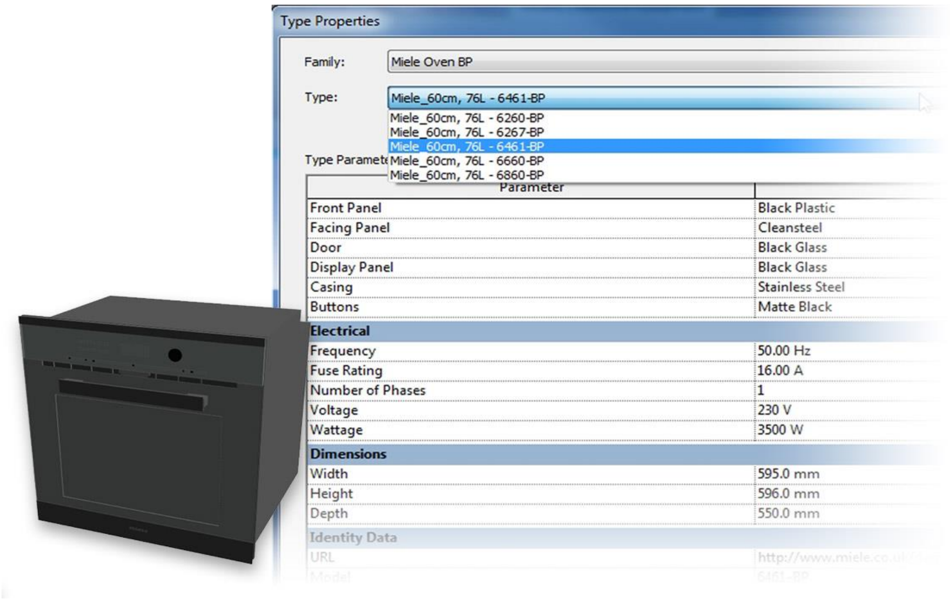

Figure 5 : Non-geometric information of a BIM object (dishwasher)

All the technical sheets or other specific documents such as the interview guides can be linked to the objects. To simulate certain behaviours of the construction, intelligent data have to be indicated. For example, if we want to simulate the global insulation of a building or the luminosity in each room, we would have to provide non-geometrical information to the model, such as the thermal resistance, the air infiltration, the shading coefficient, the solar heat gain, the visible light transmission,…

2.2 Advantages of BIM

The main advantages of using BIM can be considered as following:

- It offers visualizations, in 3D, of a construction through all its stages. This helps all stakeholders (owners, clients, engineers, architects, subcontractors,…) to better understand the project by offering an easy observation through the use of computers, tablets or with virtual reality masks;
- These visualizations are also used for marketing purposes. Graphically enhanced, these give a very realistic presentation of the ended construction, when nothing has been built yet [6];
- With a traditional CAD method, getting a truly global view of a project has been proven to be difficult as lots of unconnected documents are in play. By gathering all project's documents into one centralized single model, BIM enables teams to collaborate and communicate more effectively, which decreases fragmentation;

- BIM reduces conflicts and unexpected changes during construction. As mentioned above, the software can perform clash detection of elements, such as an electrical tray, or a ductwork, which would run into a beam. Therefore, modellers verify if all elements manufactured off site fit together beforehand, by modelling them. This allows to avoid any expensive on-site modifications, due to an unexpected clash [7];
- Collaboration is also a direct advantage. It allows all disciplines to share their own skills and experiences, leading to less duplication of drawings or redone works;
- The different kinds of simulations are another benefit for engineers and other project team members. In addition to structural, mechanical, acoustic or environmental simulations, BIM is also able to make financial, health and security analysis [8].

As a summary, the BIM method allows to have a better understanding of the project during its first stages in order to avoid unneeded additional work or issues throughout its construction.
This aspect of the process creates a different allocation of effort and labour during the construction, compared with the traditional method. This leads to several questions about how costs might vary through the different design phases, when using BIM process.

2.3 Study cost

The evolution of the costs related to the design and the construction phases will briefly be introduced. Moreover, a study relating the specific costs associated with the BIM approach will be displayed.

2.3.1 Evolution of effort

Figure 6 shows the evolution of the required efforts when using the BIM or the traditional method.

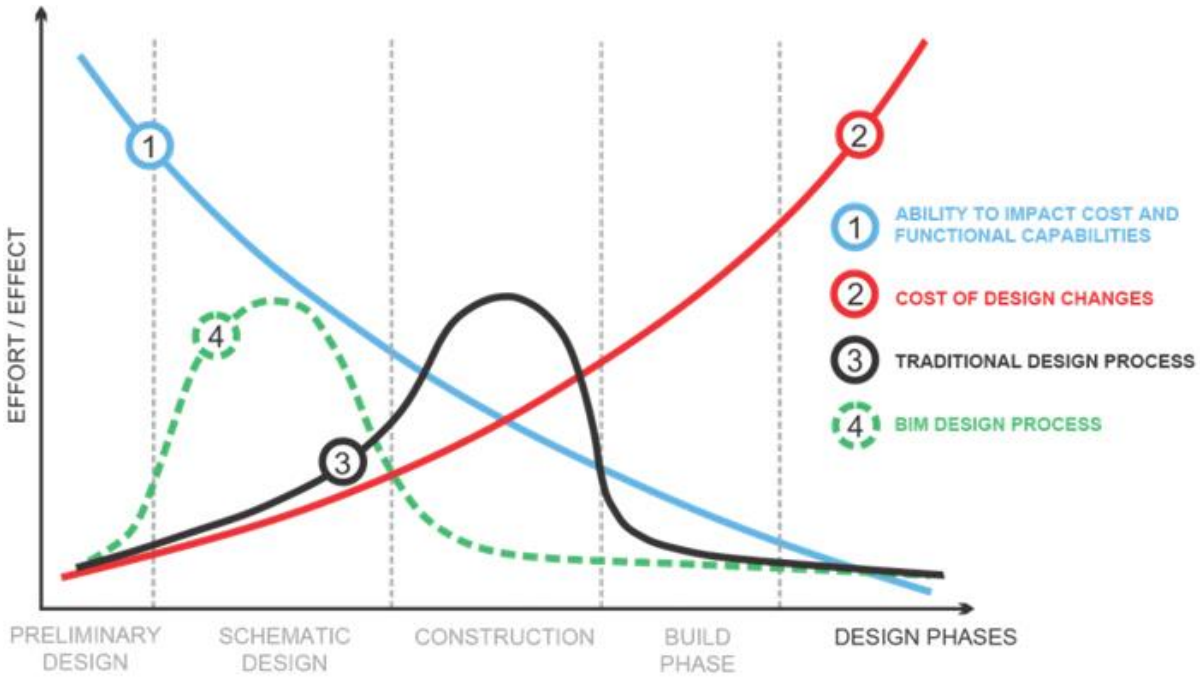

Figure 6 : Evolution of effort through the design phases

As expected, the use of BIM (in green on Figure 6) generates more effort than the traditional method during the first stages of construction. Indeed, there will be a larger study to better understand the project from the beginning (through the 3D model).
For the traditional method, more effort will be generated during the construction. This peak of effort is due to modifications, lacks or errors of design to be corrected during building works.

Both methods therefore require roughly the same efforts but at different times. The fact that BIM can better understand the project from the beginning can reduce costs for two reasons:

- The ability to modify the project, and thus to impact its costs (in blue) is higher in the design phases.
- The fact that it is more expensive to operate changes (in red) in the more advanced [9].

2.3.2 Cost of a BIM process

Using the BIM method when managing a construction project requires different costs. These include:

- Investing in an upgraded hardware. Indeed, running a BIM software requires a huge amount of resources and, therefore, powerful computers;
- Software licensing [10]. For the good implementation of a BIM process, a higher number of software are required (architecture software, plugins, collaborative platform,…). The associated licenses are mostly more expensive than CAD software;
- Increased data storage requirements (hard drives, hard drives facilities);
- Employment of people with BIM practice;
- Training for current employees;
- Overcoming the current closed mentality of the industry towards changes for new processes and technologies. Indeed, all actors of the construction do not use BIM and might struggle to perceive its direct advantages.

Through this research, we read and heard different opinions related to the following question: "Does BIM cost less than the traditional method?"

Some of these opinions stated that most people or companies which claim that BIM saves time and money are entities using the so-called benefits of BIM to sell either their software or their services.

Others, who believed that BIM was more expensive, considered that this extra cost was compensated by the advantages it offers, especially for complex projects.

As the last ones, some companies still wanted to experience the BIM-process even if they ignored if it would, or not, be more expensive throughout the all life of a building. They based their decision on their confidence for certain of its advantages.

In practice, however, the technology surrounding BIM processes still needs to be refined and get mature enough to offer a structured process throughout the life of a construction. Only then would it properly allow saving money and time.

The number of stakeholders currently using BIM for the phases of design and construction is constantly increasing, leading to a market gaining in experience. However, the life of a construction, and thus the need for BIM, does not end when the contractor hands over the building to its client.

2.4 The life of a construction

Throughout most of the literature, “the lifecycle of the construction” has been used as the usual name to describe the life of a building, as displayed on Figure 7.

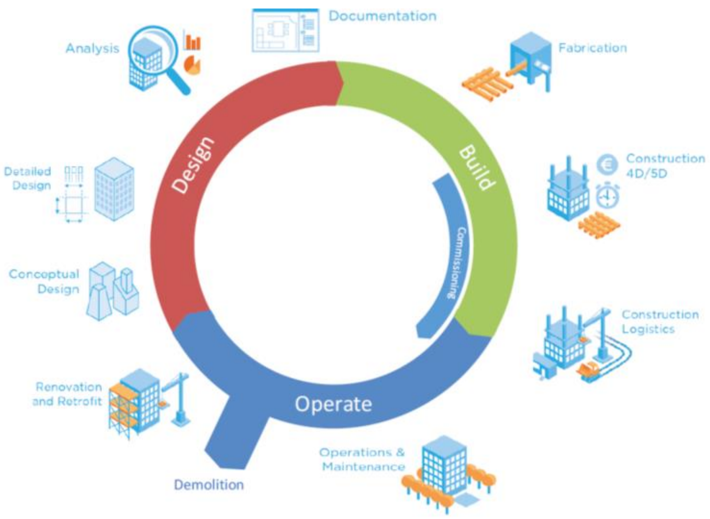

Figure 7: Lifecycle of construction

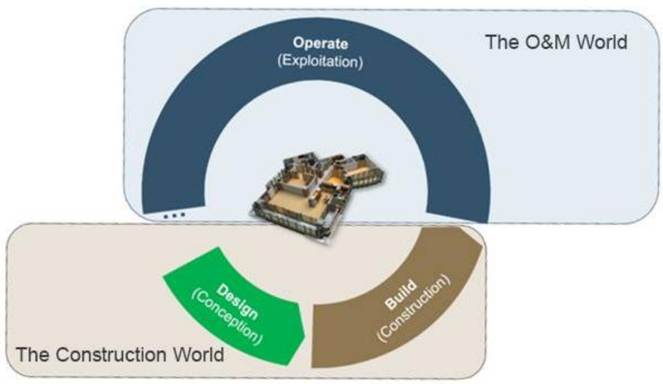

Figure 8 : Junction between construction and O&M worlds

This term does not fit for a BIM approach because after the end of the construction, the BIM model is no longer used effectively or used at all. It is then more relevant to describe the life of a construction as a junction between the construction world and the O&M[2] world, as displayed on Figure 8.

The breaking points between these two worlds can be defined as following:

- Within the construction world, all the actors of the AEC[3] industry have been used to work together for years, even more when using BIM processes. It is unusual to see engineers or architects discussing with facility managers about how to manage the building after its construction. Indeed, the AEC industry must understand the needs of FMs[4], and integrate them as soon as they can in the construction process;
- It cannot be considered as a lifecycle as it is the junction of two finite worlds. Indeed, the design and the construction of the project is clearly defined by a starting date and an ending date. At the ending date, the building is handed to the client and the work of

[2] Operation and Maintenance.
[3] Architecture, Engineering and Construction.
[4] In this thesis, FM means Facility Management and FMs means Facility Managers.

the different actors of the AEC industry is done. Later, the building will be demolished as soon as its final purpose has been met. A new building will then be constructed; which is another life. Finally, if a building is renovated, it can be considered as a specific event of his life and not as a new beginning [2];

- There will be a different BIM manager in both worlds, each of them with a different goal. The one from the construction world will ensure that the different documents and information of all actors are present and synthesized. The second one will ensure that the BIM model is continuously updated throughout the life of the building, allowing a suitable maintenance. Thus, their goals are respectively to provide and use accurate information.

This division depicts the BIM process as not yet fully developed or effective for the operation phase of a construction. The construction industry, with the BIM method, tries to improve the transition between these two worlds. To make it effective, engineers must know the job of FMs and the potential of BIM in their everyday life.

Chapitre 3

BIM potential for facility management

SOMMAIRE

3 BIM potential for facility management

The International Organization for Standardization defines the facility management as the "organizational function which integrates people, place and process within the built environment with the purpose of improving the quality of life of people and the productivity of the core business." [11]

Facility managers can have many different titles and reach their profession through a variety of career paths. They are responsible for verifying that the systems of the built environment, or facilities, work harmoniously by managing the largest and most valuable assets, such as properties, buildings, equipment,… [12]

While BIM can help facility management for O&M, it must be noted that it is only a part of the work of a facility manager. Indeed, they must also ensure the technological evolution management, risk management, communication, strategies,…

It is also important, to understand the following potential application, to explain how the BIM model can be used with FMIS[5].

3.1 Communication between BIM model and FMIS

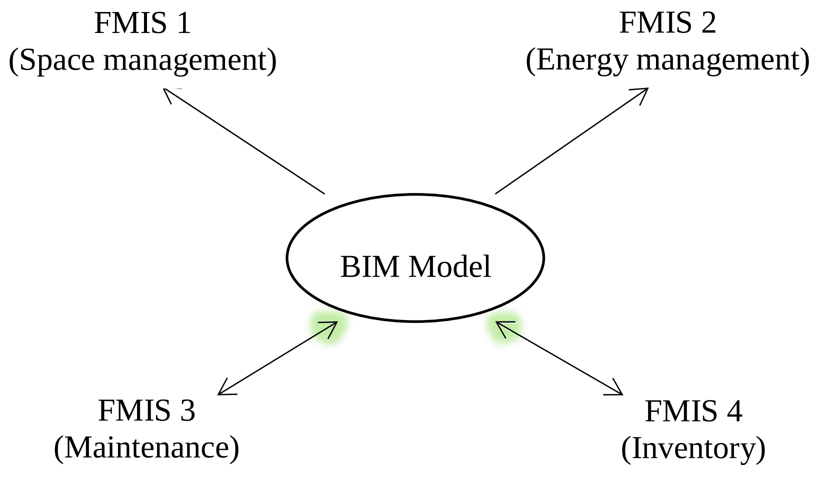

Figure 9 : BIM Model central with FMIS

The first possibility is that FMs works in a BIM software. By this way, the information will then be directly updated in the model and available in the other linked software. For example, it will probably be the case for a renovation or expansion of the building.

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[5] Facility Management Information System.

The second possibility is that facility managers work on the linked FM software. It will be the case when a software offers specific uses (space management, emergency management, ...). For this possibility:

- As displayed on the top of the Figure 9, either the FMIS simply uses the model without sending back the information it creates (because there is no need to have these information in the model, for example: who works in such office). In this case, the FMIS can have a plug in to support the source format of the BIM software or can use IFC formats[6].
- Or, as displayed on the bottom of the Figure 9, the FMIS communicate with the BIM model and can update information into it. This last process is quite rare due to interoperability[7] problems. Only one of the interviewees begins using it for non-geometric information. Both programs can import and export Excel files that can be modified. Moreover, this process via Excel allows stakeholders that do not know how to use BIM software to update non-geometrical information in the model.

Currently, FMs work with several FMIS, it would be better if this number of software is reduced (up to 1).

3.2 Application areas

In order to analyse the benefits of BIM for FM, we will study the application areas of the Operation and Maintenance phase and check if, within these application areas, BIM would be beneficial.

The examples mentioned show the potential that the process may reach if it evolves and become mature enough. Currently, except for some cases of innovation, these examples cannot be found in practice.

3.2.1 Locating Building Components

Knowing the location of the elements is important for different purposes:

- A precise inventory/asset register. The facility manager will know where and how such types of components are present in the building(s). These components can be

[6] IFC format is explained in appendix 8.2.
[7] Interoperability of a software is his capacity to work with other software or systems.

mobile (equipment, furnishings,…) or fixed (electricity outlets, lights,…). The location of objects will also be more accurate.

The working group 7 (WG7) of CT/TC – BIM&ICT[8] recently studied the impact of using BIM in a building.

Without BIM, they have 5655 elements in the inventory while using BIM, there are 24736. Moreover, with BIM, the elements had between 10 and 15 information attributes since without BIM there were between 2 and 4.

And finally, the information management is faster because the data transfer in a FMIS software was 10 days against 40 days without BIM [13].

	Number of elements	Number of attributes	Data transfer
Without BIM	5655	2 - 4	40 days
Using BIM	24736	10 - 15	10 days

Table 1 : BBRI study about information management using or not BIM

The conclusions are that BIM allow:

- an inventory composed of more elements that can be rigorously classified if the number of items becomes important: better data analyse in term of quantity;
- a better quality of information in relation to each element;
- a more manageable inventory with FMIS.

- A more efficient maintenance. To perform commissioning or preventive and corrective maintenance, FM personnel regularly need to locate building components and related information for prompt problem detection and resolution. [14]

  Being able to use as-built three-dimensional BIM models to see where the mechanical, plumbing, and electrical components are in a facility enables the localization of this equipment on-site. This helps lower the cost of maintenance by taking the guesswork out of locating equipment for commissioning, repair, or replacement.

  We can also take the example of cleaning glazed windows. Instead of counting the number of windows and their surfaces, we will find this information in the model. It is the same time saver for cleaning floor surfaces; with BIM, no need to count every room surface depending on the flooring to check that cleaning bills are not overestimated.

[8] BIM & ICT committee is part/has been created by the Belgian Building Research Institute (BBRI).

3.2.2 Creating and Updating Digital Assets

Currently, “FM personnel need access to vast amounts of information and log into multiple databases, sometimes toggle between them, locate the information needed, and print the information to perform a certain job” [15]. Once this job is finished, the possible modifications are not necessarily updated.

Having a digital BIM model allows to centralize the information. Working with a shared database also allows that different stakeholders can update it. The information is then more easily accessible, modifiable and sustainable.

An interesting example can also be mentioned here for the replacement of a door in a secure area:

For now, the repairer must go first time to see what equipment can replace the door. After that, he orders what is needed and comes back a second time to replace the door. If a few years later, the door must be replaced again, all these steps will have to be reiterate because the information of the door are not noted or updated; pass twice the security checks, plan twice for the arrival and wait for an order time.

With BIM, the repairer can receive all the information he needs thanks to the shared model. He will come once with the right material to replace the door. Then, the modelling of the door and its information will be updated. It will be a saving of time and money.

3.2.3 Visualization and Marketing

“With its three-dimensional graphical interface and ability to integrate material texture, light sources, landscaping, and so on, BIM provides improved visualizations of the space to facility managers during design and construction of renovations and remodels.” [15]. FMs can prepare presentations for decision-making sessions where departmental buy-in or approval is needed.

They can also help the marketing department to provide interesting graphic renderings. For now, showing ultra realistic images or videos of the construction is an added value but with the new technologies, it will certainly become a standard in few years. It is a reason why virtual reality using BIM is growing more and more, like applications with drones or visits in a building with augmented reality glasses.

3.2.4 Checking Maintainability

“Maintainability is defined as the ability to achieve optimum performance throughout the life span of a facility with a minimum life cost.” [15]. As we said before, with BIM, the information is more accessible and sustainable. It also allows a more automated maintenance and a preventive/predictive maintenance.

Facility managers will prevent slipping and falling of components. They can protect and maintain them or make them accessible for quick repair. Prevention will help avoid costs, have better performance and then, have optimized maintenance.

3.2.5 Space Management

Space management is the management of the inventory of the physical spaces of an organization. It has evolved considerably in recent years and continues to change. The corporate real estate ecosystem is evolving towards more collaborative, dispersed and multiple spaces. It is then necessary to precisely monitor the number of spaces, to have an information management relating to the occupation and the development of strategies of arrangement of the spaces.

Some software already do this job very well and it is not interesting to update occupancy information in the BIM model. BIM will rather be useful because the spaces will already be created with the installations. As seen on Figure 10, FMIS software has simply to create an overlay on these spaces. Ground space modeling costs can therefore be avoided and the space management in relation to the facilities will also be facilitated [14].

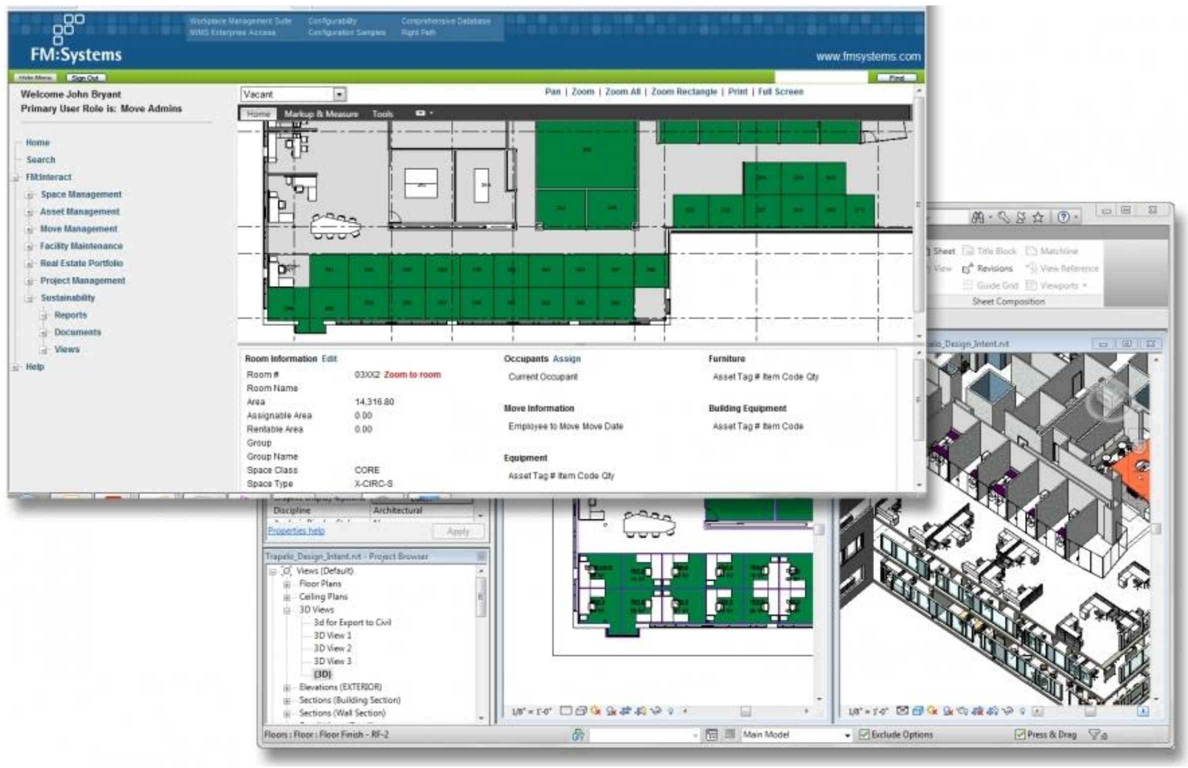

Figure 10 : Overlay on FMIS from the BIM model

3.2.6 Safety/emergency management

Spatial information contains most of the requirements needed for emergency management [16]. Once more, BIM model contains this updated information in its graphical interface. Therefore, BIM can assist facility managers in identifying potential emergency problems and pinpoint hazards.

Acting quickly during an emergency is also a key point. FMs can also have a better view to provide quick and effective access to rescue units.

3.2.7 Controlling and Monitoring Energy

In the United States, buildings account for 69% of electricity consumption, 41% of energy use, and 35% of all carbon dioxide emissions [17]. In United Kingdom, buildings account also for around 40% of global energy consumption and 30% of carbon gas emissions [18]. Improving energy efficiency in the built environment can make significant contributions to a sustainable economy. “For controlling and monitoring energy, FM personnel rely on energy management systems, which measure the energy usage at a building or zone level over a period of time and sometimes in real-time.” [15]

Building information modeling helps to keep an updated graphical model since the earliest stages of construction. As the spaces and the monitored equipment are already present in this model (and if the energy system uses it), there is no need to model all these elements in the energy system. This can be a saving of time and money.
As for space management, it is possible to work with an overlay on the BIM model by using monitoring energy software. However, it can be interesting by monitoring the energy in the model because non-graphical information are attached to objects, such as thermal resistance, air infiltration, solar heat gain,…

3.2.8 Personnel Training and Development

Facility managers have to get familiar with the building. Currently, training is handled through presentations and site visits that requires intensive preparation, takes a lot of time, and experience of the trainers.
With BIM, they have a 3D model to study all the spaces and the installations. They could virtually walk through facilities, investigate building spaces, components and equipment. Morevover, they can locate facilities they cannot see in real because it is hidden in the walls, the floor or the ceilings [19].

3.3 Potential in these application areas

Different facility managers (that already use or not BIM) were asked to know in which application areas BIM could have an added value. We can see the results on Figure 11.

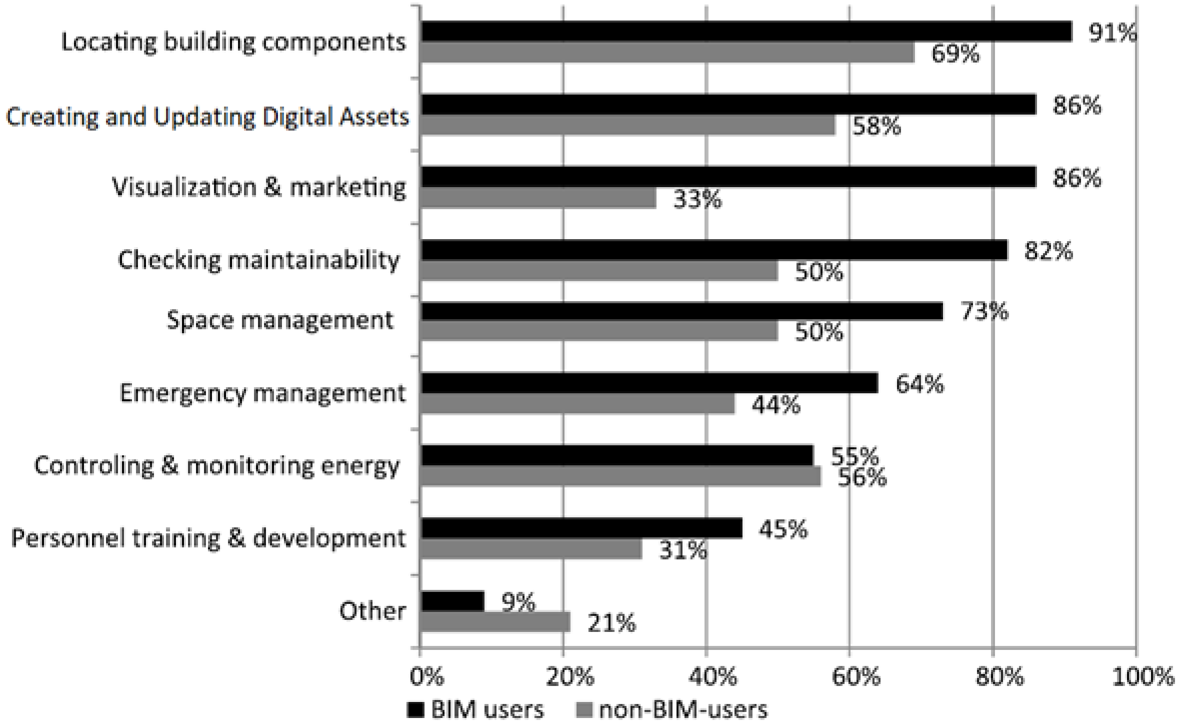

Figure 11 : Potential FM application areas that BIM can be used for

Overall, BIM users were more optimistic than non-BIM-users except for “controlling and monitoring energy”. The reason for this exception is that there are software that already do this job very well. However, as said, the BIM model saves time by using its 3D graphical representation in the monitoring software.

On average, more than 50% of facility managers responded positively to the areas of application except for “personnel training & development”. The reason is probably that facility managers have to get familiar with the real building and in any case, they will make several complete on-site visits.

3.4 Economic potential for O&M to use BIM

When looking at the different costs of BIM for FM, the first noticeable thing is that the O&M phase is the most expensive. Proportionally, the different costs surrounding the life of a building can be distributed as follow [20]:

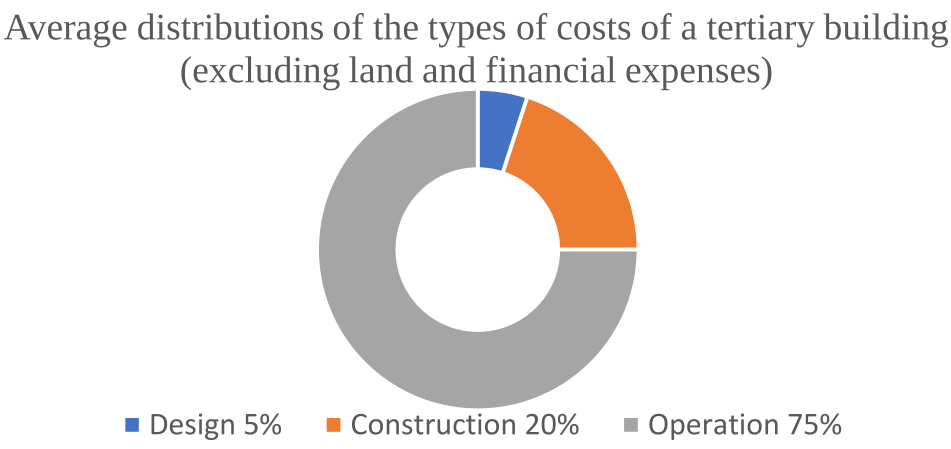

Figure 12 : Average distributions of the types of costs according to the phases

It is important to remain critical when analysing this distribution, as the O&M phase (Displayed in grey on Figure 12) includes many different types of fees on which BIM has no influence. On the contrary, the design and construction phases (Displayed in blue and orange on Figure 12**)** involve mostly costs associated with construction services related to the building. Therefore, BIM, as seen in chapter 2.3, could highly influence costs for these two first phases.

We will take an example (Table 2) of an office building located in Paris [21].

Category	**Cost**	**%**	**Total**
RE	Rent free of charge	36%	
RE	Municipal tax	2%	
RE	Participation in the property tax	3%	42%
RE	Regional tax	1%	
RE	Insurance	0%	
BS	Security	7%	
BS	Technical maintenance of the building	5%	
BS	Energy	5%	
BS	Cleaning and removal of waste	5%	26%
BS	Small building work	2%	
BS	Removals	2%	
BS	Water	0%	
ES	Catering	9%	
ES	Mail	5%	
ES	Document prints	4%	22%
ES	Reception	2%	
ES	Archiving	2%	
AS	Administrative salaries	10%	10%

Table 2 : Costs during the operation of a building

BIM cannot affect the costs of real estate (RE), employees services (ES) or administrative salaries (AS), wich accounts for almost 75% of the expenses for this typical case.
It can influence some costs related to the building services (BS) but only by a few percent. It could not significantly reduce the costs of safety, energy, cleaning or water, for example.
In other words, BIM could only impact a very small part of the costs related to the O&M phase, which is the most expensive stage, while it could more importantly impact the costs of the construction phases, which includes less charges.
Otherwise, the distribution of costs on Figure 11 does not consider the few costs taking place between the construction phase and the O&M phase. As an example, it is common to use several FMIS on a same project, depending on its needs (HVAC, energy, water,… management). Thus, after the acquisition of the building, the facility managers would still have to redesign the building in several software. This inefficient and expensive process could be avoided by using a BIM model.
In conclusion, using BIM for O&M will not necessarily reduce costs during the O&M phase but will bring added value and new opportunities, as shown in chapter 3.2. However, the transition between the construction phase and the operation phase can be more efficient and save time and money.

3.5 Challenges for FM to use BIM

The different barriers for FM can be defined as follow:

- The requirements for rigorous information, needed for the good implementation of BIM in FM (e.g. what information must be provided, when and by whom; level of detail (LOD) needed);
- The lack of defined roles. A specific definition of the different working positions and their related responsibilities has still to be done [15];
- The lack of open systems and standardised data libraries that can be used throughout BIM and FMIS technologies;
- Lack of FMs input during the early stages of the project;
- FMs function is underestimated [14];
- Interoperability between BIM and FM technologies; Problems in information exchanges and transfers;

- Overcoming the current closed mentality of the industry towards changes for new processes and technologies. Indeed, all actors of the construction do not use BIM and might struggle to perceive its direct advantages;
- The current number of operational systems managing the same building;
- The lack of projects that demonstrate the tangible benefits of BIM in FM;
- The shortage of BIM skills in the FM industry;
- Juridical problems about responsibilities and copyrights.

Within the next pages of this study, we attempt to offer a few solutions to the first seven issues.

Chapitre 4

Transition between the construction world and the operation world

SOMMAIRE

4 Transition between the construction world and the operation world

The transition is carried out with the delivery of the as-built folder. As shown on Figure 13 and according to the facility managers, this folder contains a large amount of information in several formats and is hardly manageable. The search for a piece of information can easily be both a hassle and time consuming. It is also likely the face missing information.

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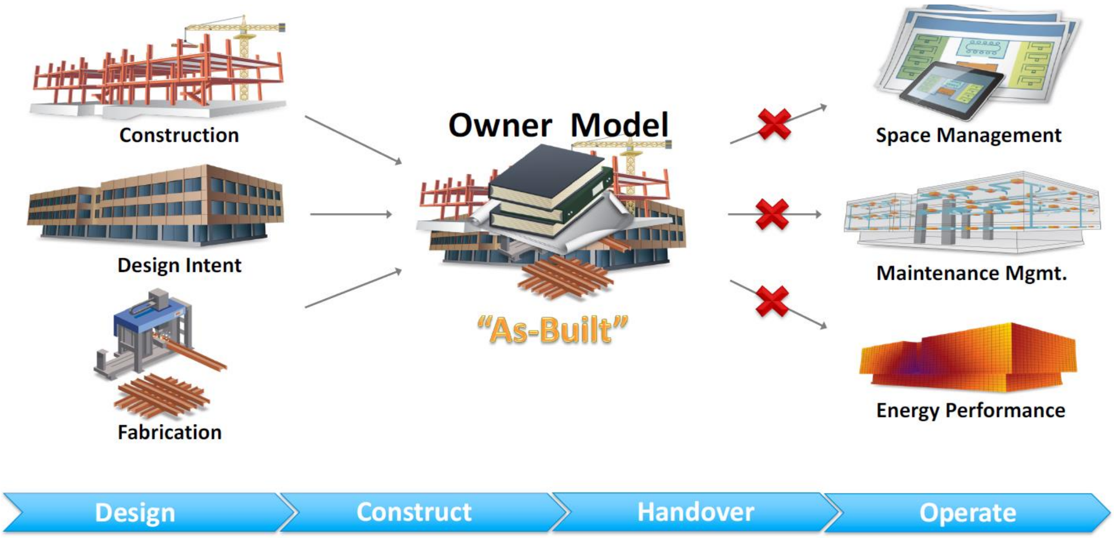

Figure 13 : As-built folder is not manageable for FM

Moreover, this folder is often made from a large gathering of sheets of paper. Thus, to digitally manage the building, it would be necessary to copy and encode all the useful information which comes either from this folder or directly from the building. It is almost an impossible work as it would require too much effort, time and money speaking. This is the reason why we focus on new buildings through this thesis, to have an available BIM model for the operation phase.

BIM stands out as an appropriate solution, thanks to its information management, when performing a good transition and reaching an efficient as-built folder.

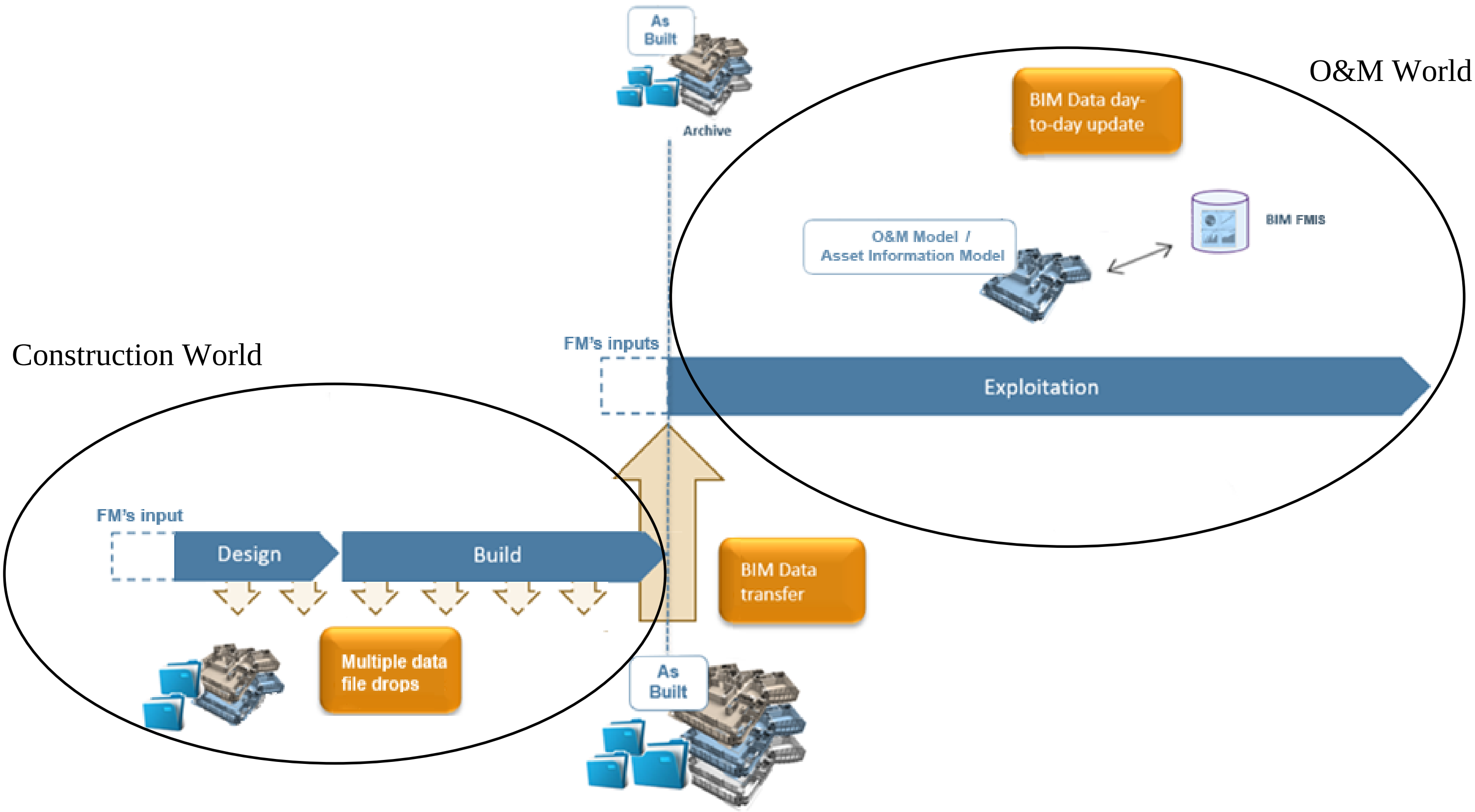

Figure 14 : Diagram of a BIM process for all the life of a construction

As shown on Figure 14, a data transfer appears after the construction. The collect of these data starts from the beginning of the design phase by multiple data file drops. The goal is to save all information as soon as it appears. This allows making regular data quality check.

The two dotted squares before the design phase and exploitation phase show the involvement that the facility managers must have in order for the model to meet their needs.

The idea is that they must establish their specifications to transmit it to the general contractor with the construction contract. Then, before the exploitation, they will verify that the information collected and checked by the BIM coordinator during the construction are exploitable and complete.

At the end of the construction, the client will receive the as-built folder which contains all the information about the building. This one will include the as-built BIM model, plans, data sheets, the post-intervention dossier … However, facility managers do not need all these pieces of information to manage the building on a daily basis. They will use, and regularly update, a simplified version of the as-built model.

4.1 As-built model VS O&M model/Asset Information Model

For a short time, the general contractors occasionally transmit (at a certain price) their BIM model to the customer for the O&M. The problem is that the model does not fit the needs of the Facility managers. Indeed, many objects of little interest for the facility managers are particularly geometrically detailed, making the all model too heavy and not manageable anymore. On the opposite, many crucial pieces of information are missing, thus needing to be added later on.

An interviewed company informed me that, since they bought the BIM model from the general contractor, more than a year ago, a BIM modeller removed and added information from the model, both geometrically and non-geometrically. The model was so heavy that they had to cut it into 16 different files (depending on the zone of the building and on if it was structural or not).

Indeed, during the construction, some design offices integrated some of the geometric data needed during the building process. These were not useful for the facility managers.

In this example, one of the design offices worked with a very high LOG[9] 500 on some of the metal structures. This implied that any bolt, ring or nut was modelled, making the model particularly heavy. As mentioned before, a modeller must simply the model by hand, which is a huge waste of time and money.

For the geometric data (which are the ones that make the model heavier), it is complicated to easily move from a particular level to a lower one. Thus, at the beginning of the project, a discussion must be put in place between the client and the general contractor to find out if:

- the general contractor refines the model himself, if he worked with a higher LOG (more manageable but cost time and money) or;
- the client mentions the minimum level of LOG he wants (he will probably receive detailed geometry for elements for which he does not attach importance. This will make the model less manageable but does not cost time and money). He can still simplify the model himself later on (which will also generate costs).

In any case, all the information of the as-built folder (as-built model included) must be saved in archives. No data should be lost. The simplified version that FMs will use, and update, is

[9] Level Of Geometry.

called the O&M model or the Asset Information Model (AIM). For infrequent cases, like renovation, FMs will consult the as-built model.

To avoid an inefficient transfer of non-geometrical information, it is necessary to structure the data required by the facility managers. While attempting to increase efficiency, several main questions arise regarding the pieces of information which have still to be collected.

4.2 Main questions about the information

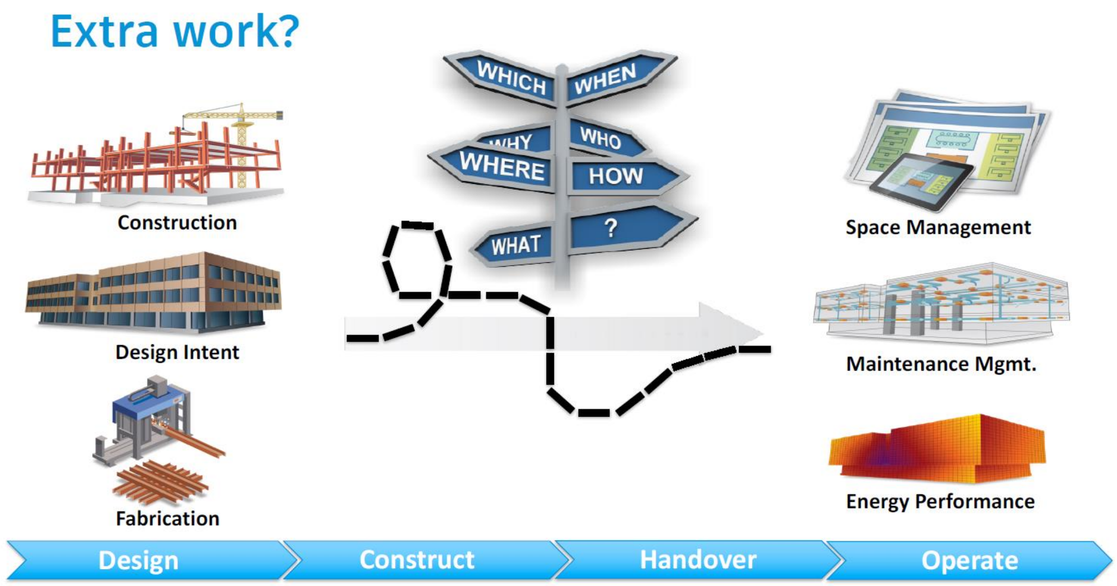

Figure 15 : Questions to get to an effective transfer

- Which/What information will be useful to operate and maintain the building? It means that we know why we provide it;
- Who will give and encode this data? It may be important to put responsibilities so that all information will be present;
- Where provide it? In the BIM model, on a technical sheet, in an Excel sheet,…?
- How to write it? What will be the format, the data type and the units?
- When should this metadata be incorporated into the BIM model?

An answer will be proposed below.

4.3 Classifications

The different stakeholders within a project need to structure the data. Using a classification system is a key basis to make BIM for FM. Indeed, classifying (the components of a digital model) is necessary if one wants to work in a well-organized environment and communicate effectively with other actors [22].

A classification is a structured list that contains all the elements of a construction, from the foundations to the finishes passing by the structure, the equipment and furnishings. It has a codification that refers to a category of elements. This codification has different levels. For example, as shown on Table 3, for the Omniclass classification, a wall foundation will have the codification 01-01 10 10 which means that it is part of standard foundations (01-01 10) that is a foundation (01-01) from the category substructure (01). We will see the advantages of these/this levels/structure in the chapter 5.

Omniclass Level							
1	**2**	**3**	**4**	**5**	**6**		
01							**SUBSTRUCTURE**
01	**01**						**Foundations**
01	**01**	**10**					**Standard Foundations**
01	**01**	**10**	**10**				Wall Foundations

Table 3 : Codification

4.3.1 Context of classifications

Different classifications for construction exist. As needs of the market differ depending on the country or on the project, it exist different classification because these one must meet these needs.

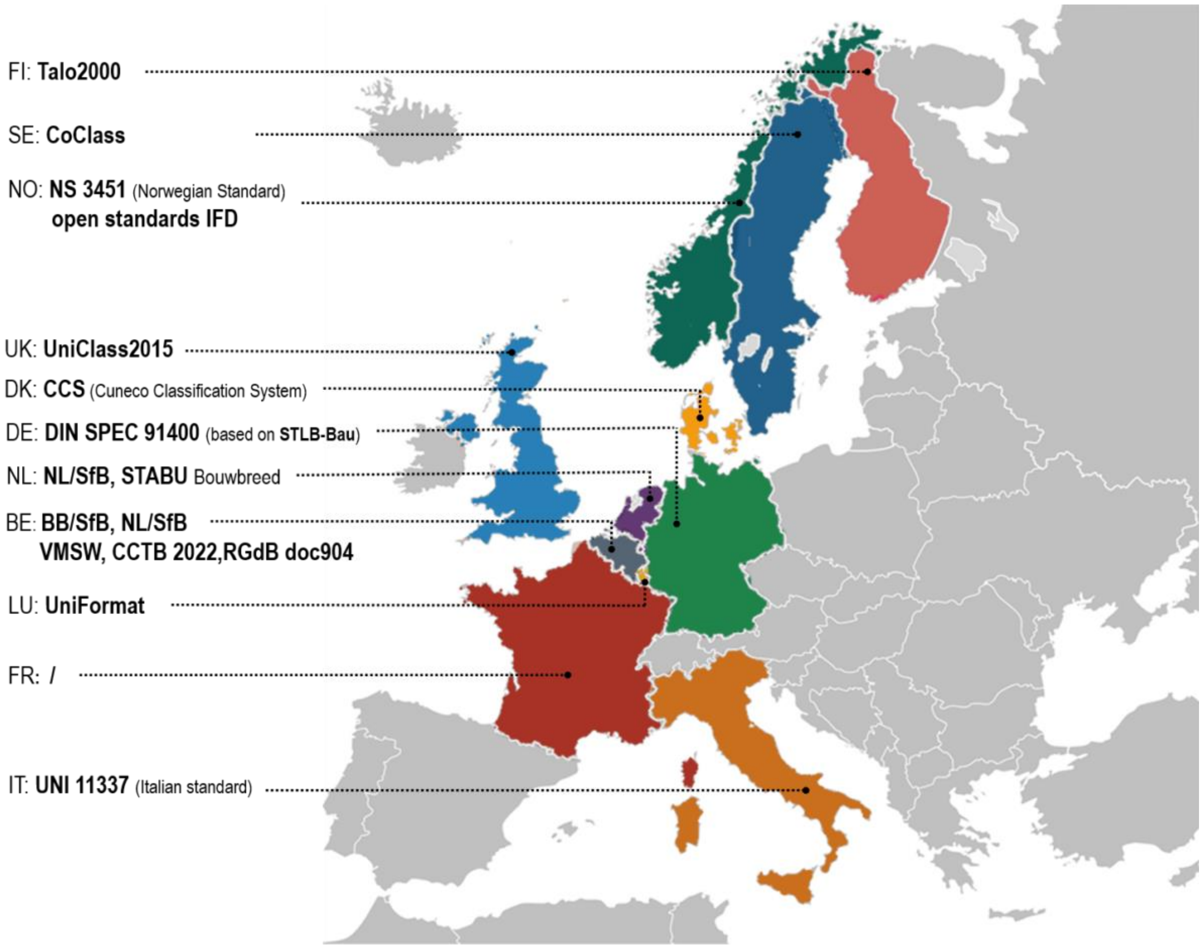

Figure 16 : Most used classification in Europe

Figure 16 is a map that shows all the main classification used in Europe [22]. As one of the main goals of using a classification is to establish a common language, this disparity makes work more difficult, especially for companies working abroad.

Some interviewees hope that it will become uniform to reduce disparity and have a smaller number of classifications. To achieve this result, some choose not to use the classification most used in their country but the most used internationally. The most used are Omniclass (United States) and the UniClass (United Kingdom) [23].

For example, the construction company that helped me to achieve this study, BESIX, is an international company that construct in Europe, North America, Middle East, Africa,…

A discussion had taken place to choose which classification to use; UniClass or Omniclass. Indeed they dismissed the possibility to use SfB because is not broad enough, even if it is one of the best structured and easiest to read. Indeed, elements can be easily illustrated for basic users, and can (after a little time of use) be filled-in without having to always refer to tables.

As some of their software use the Omniclass and that Middle East region also prefer this standard classification, they made the choice to use the Omniclass.

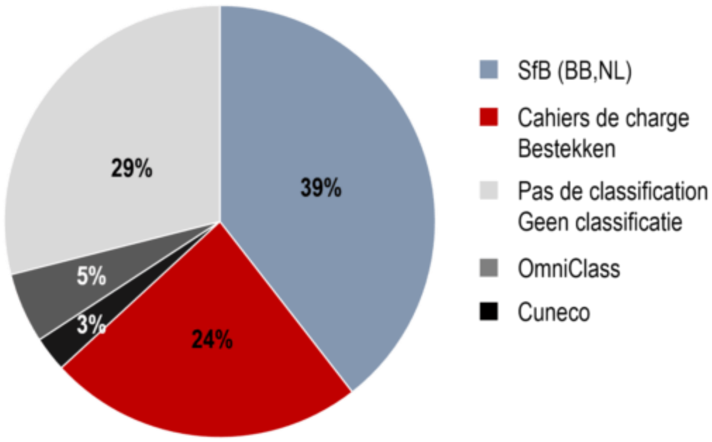

Figure 17 : Most used classification in Belgium

Figure 17 shows that in Belgium, for the construction phase, the two most used are BB/SfB and NL/SfB, which also complicates the problem, especially for a small area like this country. It is also important to note that half of the projects do not use classifications, making the implementation of BIM for FM impossible.

4.3.2 Choice of classification

The classifications are based on different norms and depend on the needs of the market. As each project is different, it is hard to answer the question "Do I make the right choice of classification?". Just keeping in mind that more there are classifications, more there will be problems to communicate with other actors but also between software. If two stakeholders use different codification, there will be problems of interoperability.

Moreover, the native classification of software is usually international (in general OmniClass ou Uniclass), even if software try more and more to accept every (personalised) classification.

Lastly, if a foreign subcontractor works for part of the construction and does not know the used classification, he will take more time to understand it.

In order to give answers elements, Table 4 can be analysed [13]:

	Tables recommandées par l'ISO 12006-2: 2015	BB/SfB	CCS	CCTB	VMSW	Uniclass	OmniClass
CONSTRUCTION RESOURCE	Construction information	***	***	***	***	***	***
	Construction product	***	***	***	***	***	***
	Construction agent	***	***	***	***	***	***
	Construction aid	***	***	***	***	***	***
CONSTRUCTION PROCESS	Management	***	***	***	***	***	***
	Construction process	***	***	***	***	***	***
CONSTRUCTION RESULT	Construction complex	***	***	***	***	***	***
	Construction entity	***	***	***	***	***	***
	Built space	***	***	***	***	***	***
	Construction element	***	***	***	***	***	***
	Work result	***	***	***	***	***	***
PROPERTIES	Construction property	***	***	***	***	***	***

Table 4 : Analyse of most used classifications

We see that Omniclass receives the most points (33), followed by Uniclass (26) and CCS[10] (24). However, it is important to note that these last two answers better to the European market whereas the Omniclass is more specific to the North American construction system.

I continue this thesis with the Omniclass given these results and the choice of BESIX, who leaded me for this study.

[10] Cuneco Classification Standard, Danish classification developed especially for BIM based on ISO 12006-2 that defines a framework for the development of built environment classification systems.

4.4 Level Of Detail

One of the biggest confusions in the context of BIM regarding terminology is the Level Of Detail. Most of the people call this term “LOD”. The problem is that it is confused with the level of Development that has the same abbreviation. Some entities define the Level of Development as a Level Of Detail and a Level Of Information (LOD = LOD + LOI). This definition is confused.

In this study, the Level Of Detail is defined as a Level Of Geometry and a Level Of Information (LOD = LOG + LOI). This division will help to have less confusion.

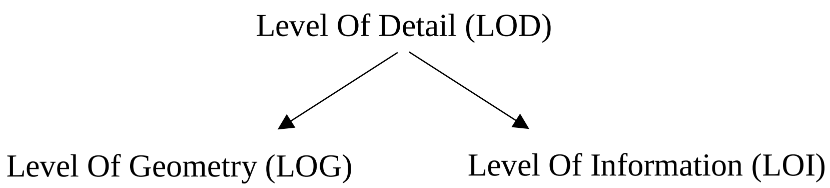

Figure 18 : Definition of LOD

Just before the end of this thesis and after defining the different LOI, I was warned that Switzerland had published a new definition of LOD. They call this LOD "LOIN" (Level of Information Need) that they also define as LOIN = LOG + LOI. This definition is supported by different European countries so that the technical committee CEN[11] / TC 442 proposes it as a standard at European level [24].

LOIN was created from different basic principles that I also used [25]:

1) There are always different LOG and LOI, making it impossible to obtain a global model at uniform LOD at a time T.

   For example, a project participant may work at an advanced level of detail for a certain discipline while others expect this model to start their own work.
2) LOG and LOI can be different.

   For example, in the case of a graphical collision check, only the LOG is important; an LOI of 0 would be quite appropriate, as only the absence of collision is checked, and not the other information of the object.
3) LOG and LOI are neither a temporal indication nor a phase indication.
4) LOI and LOG are a superposition and not a sequence.

[11] European Committee for Standardization.

> It means that we do not replace 100 by 200, but that "200" completes the information already available in the LOG or LOI 100.

It confirms that the way of defining, in this study research, the Level Of Detail, the LOI as well as the table of information explained below seems correct.

A Luxemburgish BIM application guide also published in 2017 its own definition of Level Of Detail [26]. The notation they propose to express a LOD is interesting and take the form LOD XYZ:

X : LOG (100, 200, 300,...)

Y : LOI (10, 20, 30,…)

Z : Level of Documentation[12] (1, 2, 3,…)

So, for example, for an element with LOG 300, LOI 20 and LODocumentation 2, they note: LOD 322.

Their choice, like the most tables released before 2018, was to match each level to a construction stage. (LOI 10 and LOI 20 for design, LOI 30 for calls for tenders, LOI 40 for the actual information on products and works implemented and LOI 50 for Operation and Maintenance (same principle for LOG)).

This choice does not respect the third basic principle mentioned above. The problem with this proposal is that the client has no choice about the final non-geometrical information he will have; it will be LOI 50. Also, as mentioned in chapter 4.1, having a LOG 500 for all the elements is not relevant for FM.

However, it is specified at the beginning of the document that “The proposal of the Levels Of Details have no normative character: each user can modify as he wishes for each project“.

Also, in terms of non-geometrical information, this Luxembourgish work remains interesting and, while it could be compared with my own study in terms of outcomes, I did not rely on it during my research. Thus, it is an independent database to that developed in this thesis.

By looking at the needs of the facility managers and comparing this study with the various stakeholders met, these four basic principles seem fundamental for moving towards to an effective BIM for FM.

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[12] Level showing the composition of the documentary corpus of the project, from the first schematic diagrams to the details of execution and data sheets. This level is integrated in the LOI defined in chapter 4.4.2.

4.4.1 Level Of Geometry

As my study focuses on the non-geometrical information (and LOI) needed for FM to use BIM and as this level is internationally defined, I simply note the different LOG that exist and their definition in Table 5. To illustrate it, I show the example of a precast structural double tee (concrete). It is important to remember the basic principle 3: contrary to what we often see in the literature, LOG are neither a temporal indication nor a phase indication.

Also, LOG 350 prevents the use of the Luxembourgish notation LOD XYZ and causes sometimes confusion. It would be simpler and clearer to have only LOG 100, 200, 300, 400 and 500.

It is important to note these LOG because it will be used in parallel of the LOI [27].

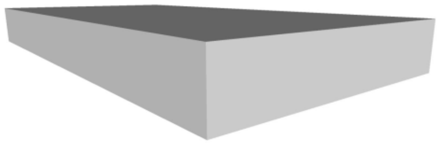
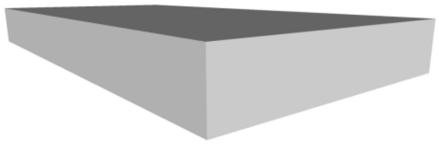
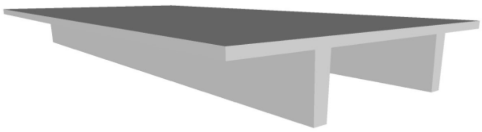
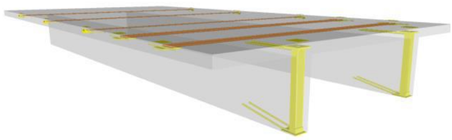
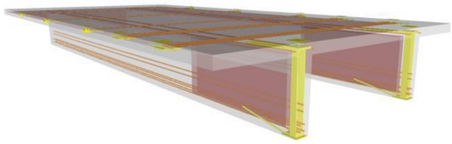
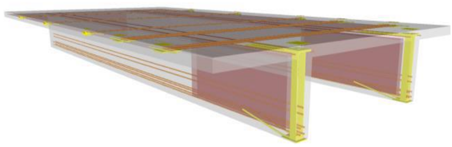
LOG 100	
The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. LOD 100 elements must be considered approximate.	
LOG 200	
The Model Element is graphically represented within the Model as a generic system, object, or assembly with approximate quantities, size, shape, location, and orientation. Any information derived from LOD 200 elements must be considered approximate.	
LOG 300	
The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation. The project origin is defined and the element is located accurately with respect to the project origin.	
LOG 350	
The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other building systems. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.	
LOG 400	
The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.	
LOG 500	
The Model Element is a field verified representation in terms of size, shape, location, quantity, and orientation.	

Table 5 : Level Of Geometry from BIM Forum

4.4.2 Level Of Information

The Level Of Information is a subject that developed in this study because there is no clear definition that exists about it.

BIMForum took out its 2017 LOD Workshop "BIMForum Level of Development (LOD) Specification" [28] by proposing five different LOI, still without clear definition (these five LOI are no longer available in the 2019 version, probably because it was unclear). The LOI of the spreadsheet in Appendice 8.4 is based on these five levels but I rearranged them to be logic, to define them, after studying FM requirements:

- LOI 1: Element does not require maintenance.
  Operation such as the inventory of all the objects is possible.
- LOI 2: Element does not require maintenance except for cleaning.
  Establish a cleaning plan depending on the surface and the coating is possible.
- LOI 3: Information required to perform general maintenance.
- LOI 4: Information to perform precise maintenance.
  Some simulation can be done at this level.
- LOI 5: Very detailed information to perform very precise maintenance.

In the three following pyramids (Figures 19, 20 and 21), you can see examples of a structural steel (structure), an exterior door (architecture) and a plumbing pump (MEP).

For structural elements, we will see in chapter 4.4.3 that LOI 3 is rarely reached.

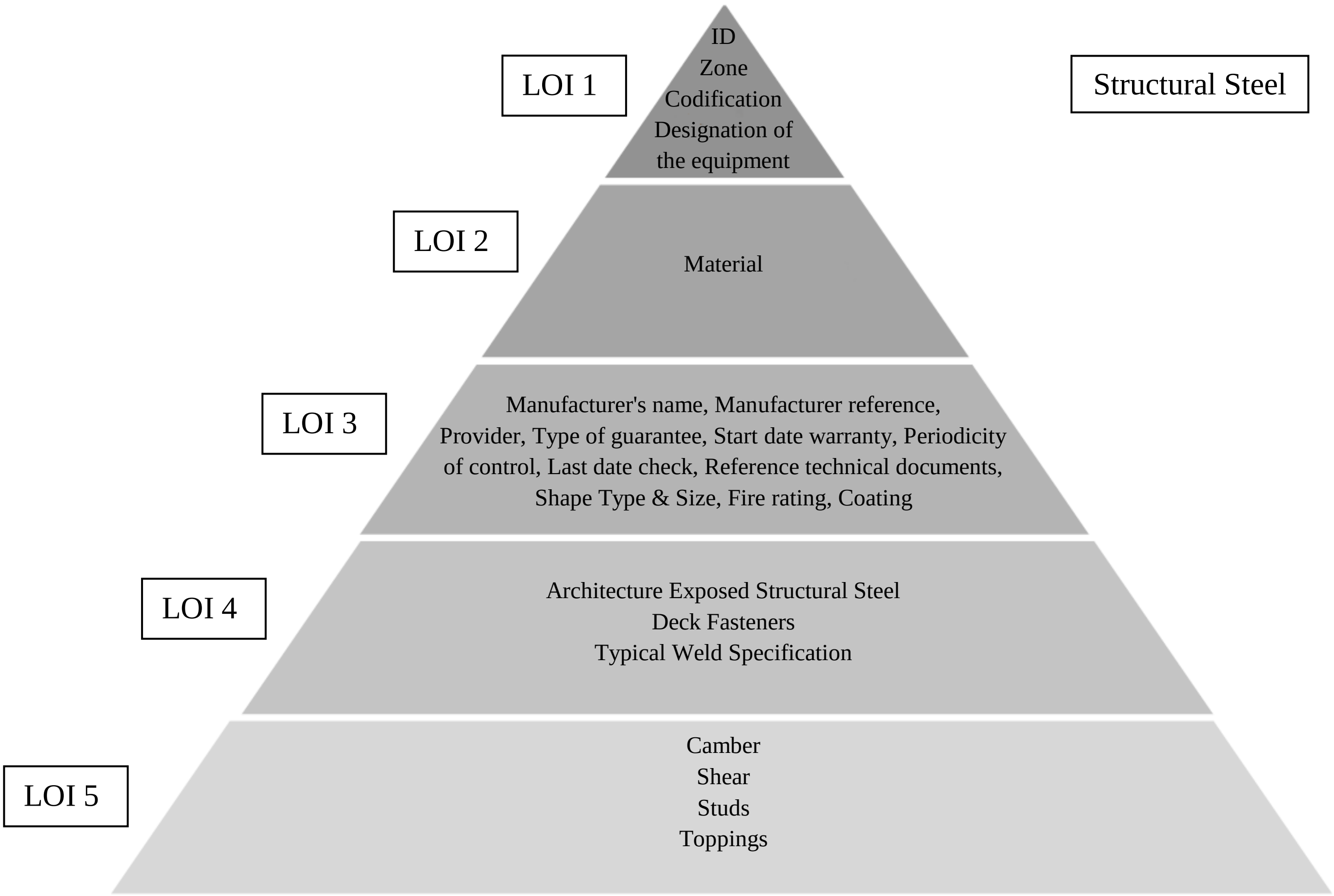


Figure 19 : Information related to structural steel

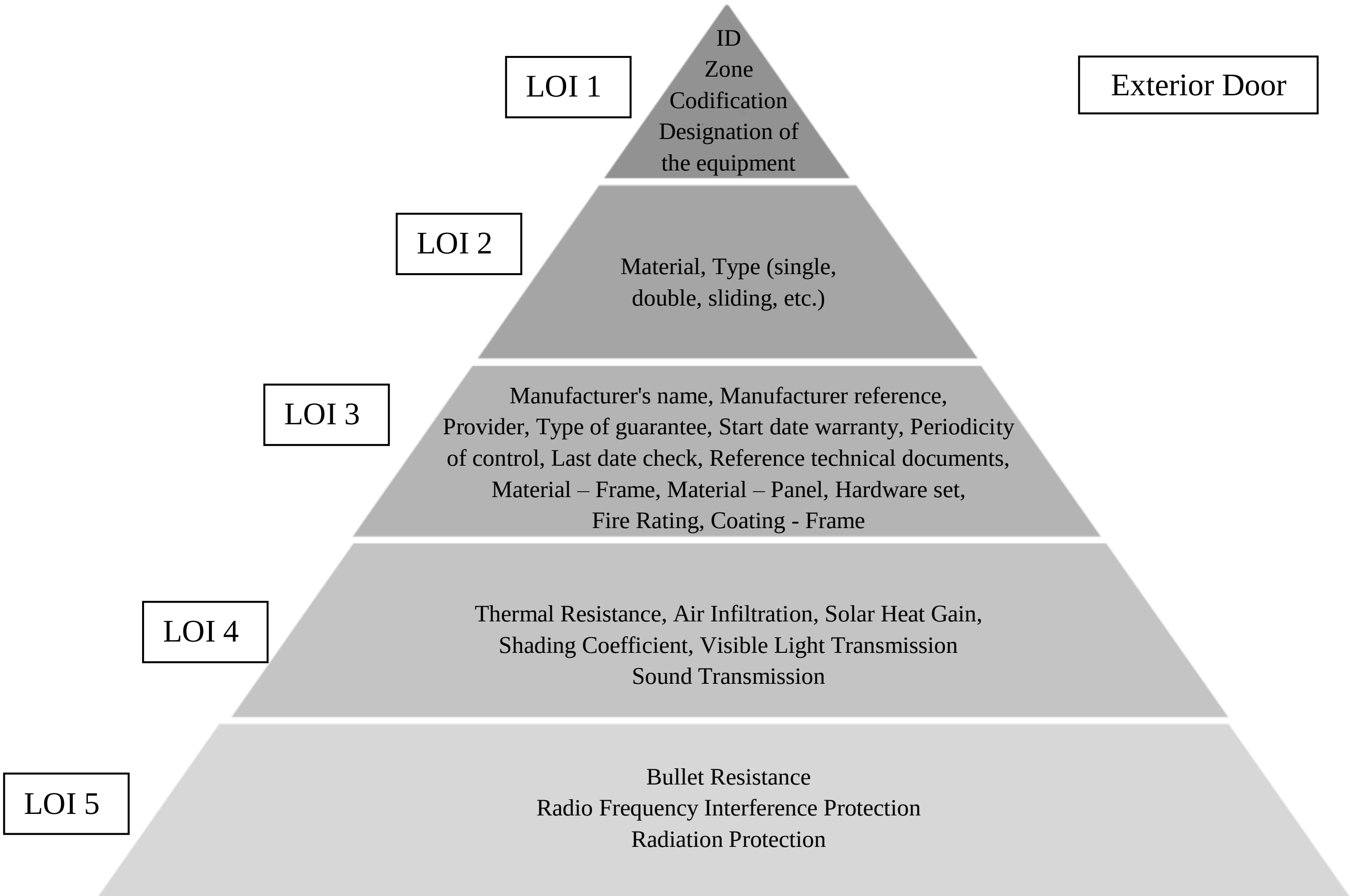


Figure 20 : Information related to an exterior door

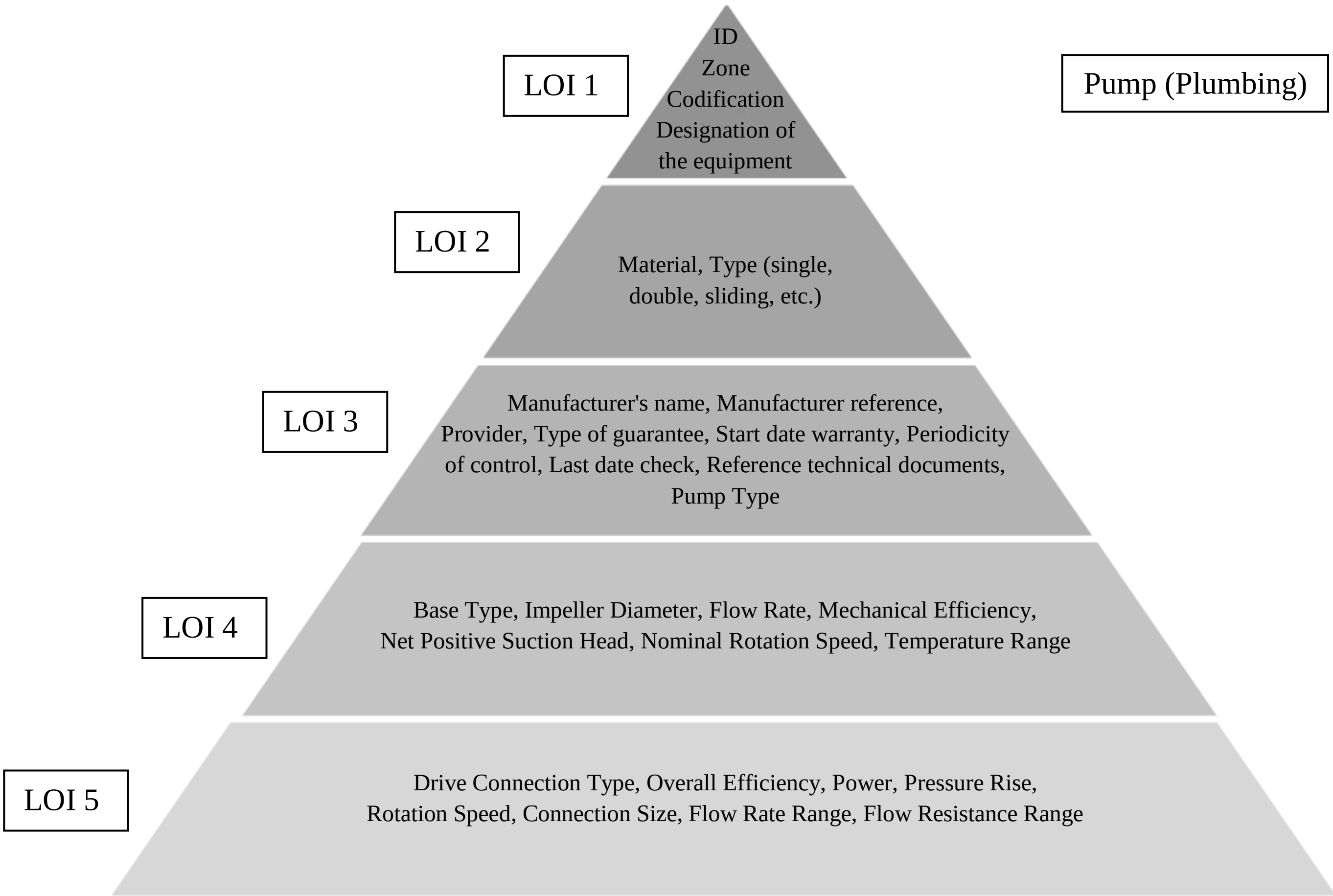


Figure 21 : Information related to a pump

Figure 22 shows a pyramid that the American Society of Civil Engineers developed in a study about BIM for FM in 2011 [15]. At this point, some stakeholders started to focus on this subject but in a theoretical way. They did not mention the term “Level Of Information” in the article.

We can see correlations between the LOI and how they classified the information according to their importance.

- The first three categories correspond to LOI 1;
- The fourth category corresponds almost to LOI 3;
- The fifth category corresponds to LOI 4 and LOI 5. It is possible to have so many specifications that it is better to reclassify it in two different levels;
- Some pieces of information of the sixth category are grouped in LOI 3. The other information of this category is information that FMs can add because these data’s will appear during the phase O&M.

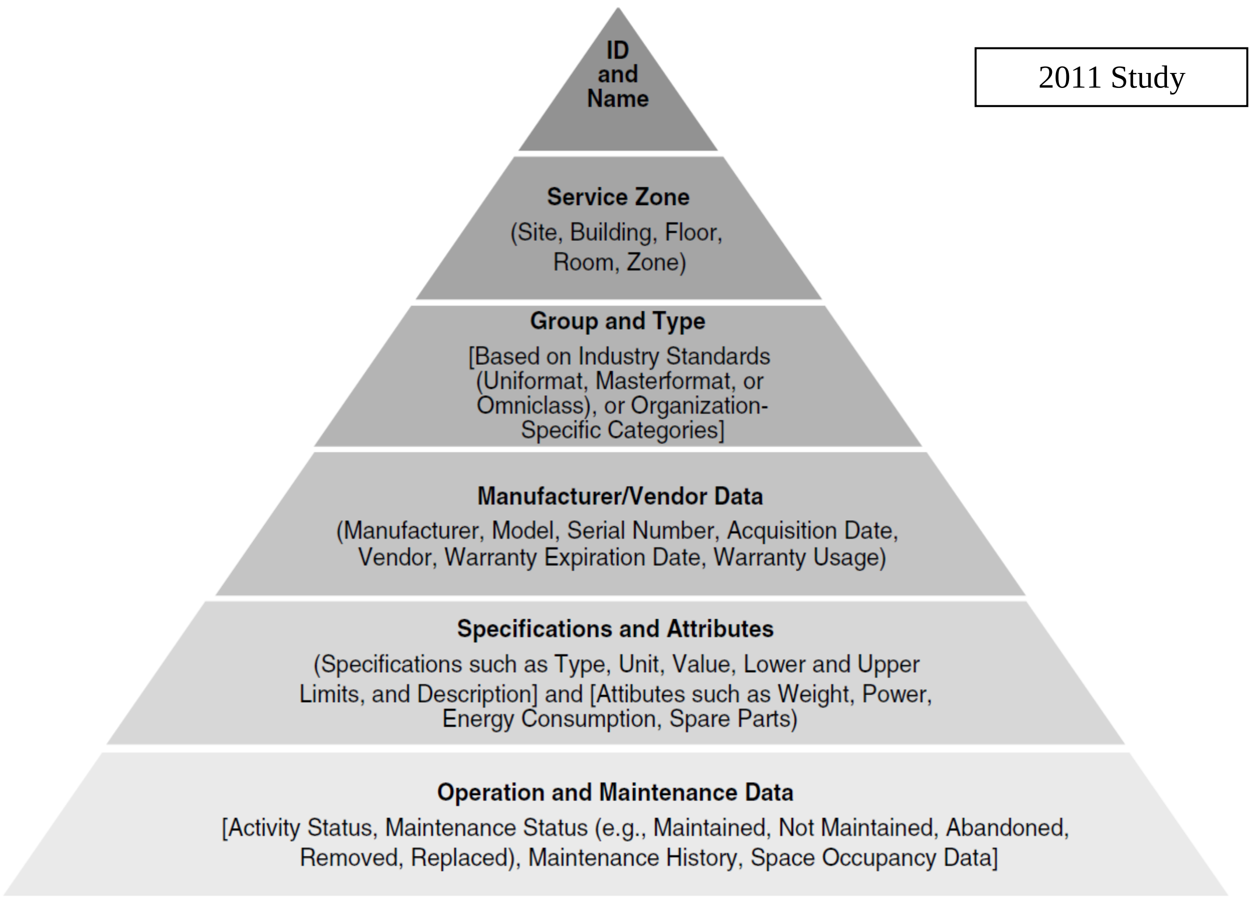


Figure 22 : Information related to the 2011 study

Finally, we note that our choice of LOI follows the theory of the American Society of Civil Engineers. All the types of information that they had identified are taken back, except the pieces of information that appears only after the construction of the building (data's that will not be in the as-built model).

It is important to note that most of the elements of a project may not exceed the information level 3. Levels 4 and 5 will be reached rarely depending on usage.

4.4.3 Example of choice of LOI

Before the beginning of the construction, the client will inform the general contractor about the LOG and LOI that will be used for the Operation and Maintenance. Table 6 is a typical example of choice they can made:

Omniclass Level								O&M	
Table	1	2	3	4	5	6		LOG	LOI
21-									
21-	01						SUBSTRUCTURE	300	2
21-	01	10					Foundations	300	2
21-	01	20					Subgrade Enclosures	300	2
21-	01	40					Slabs-on-Grade	300	2
21-	01	60					Water and Gas Mitigation	300	2
21-	01	90					Substructure Related Activities	300	2
21-	02						SHELL	300	2
21-	02	10					Superstructure	300	2
21-	02	20					Exterior Vertical Enclosures	300	2
21-	02	30					Exterior Horizontal Enclosures	300	2
21-	03						INTERIORS	300	2
21-	03	10					Interior Construction	300	2
21-	03	20					Interior Finishes	300	2
21-	04						SERVICES	350	3
21-	04	10					Conveying	350	3
21-	04	20					Plumbing	350	3
21-	04	30					HVAC	350	3
21-	04	40					Fire Protection	350	3
21-	04	50					Electrical	350	3
21-	04	60					Communications	350	3
21-	04	70					Electronic Safety and Security	350	3
21-	04	80					Integrated Automation	350	3
21-	05						EQUIPMENT & FURNISHINGS	350	3
21-	05	10					Equipment	350	3
21-	05	20					Furnishings	350	3
21-	06						SPECIAL CONSTRUCTION &	300	2
21-	06	10					Special Construction	300	2
21-	06	20					Facility Remediation	300	2
21-	06	30					Demolition	300	2
21-	07						BUILDING SITEWORK	300	2
21-	07	10					Site Preparation	300	2
21-	07	20					Site Improvements	300	2
21-	07	30					Liquid and Gas Site Utilities	300	2
21-	07	40					Electrical Site Improvements	300	2
21-	07	50					Site Communications	300	2
21-	07	90					Miscellaneous Site Construction	300	2

Table 6 : Choice of LOI

All the structure and architecture elements will often be LOI 1 or 2 because in general, it doesn't require maintenance (except cleaning for LOI 2).
All the mechanical, electrical and plumbing elements (MEP), as well as the equipment and furnishings element will often be LOI 3 because in general, it requires maintenance.
The categories 21-06 and certain subcategories of 21-07 will be rarely used for a project (in fact, demolition, site preparation,… are not modelled).
As said in the previous point, LOI 4 and 5 will be reached occasionally.
We can imagine a client that wants to have very technical information to maintain precise temperatures for the use of computer servers. To achieve that goal, he could ask a LOI 4 for HVAC distribution and LOI 5 for the cooling systems in the zones of computer servers.
This example is illustrated on Table 7.

21-	04							SERVICES	350	3
21-	04	10						Conveying	350	3
21-	04	20						Plumbing	350	3
21-	04	30						HVAC		
21-	04	30	10					Facility Fuel Systems	350	3
21-	04	30	20					Heating Systems	350	3
21-	04	30	30					Cooling Systems	400	5
21-	04	30	50					Facility HVAC Distribution	400	4
21-	04	30	60					Ventilation	350	3
21-	04	30	70					Special Purpose HVAC Systems	350	3

Table 7 : Example of LOI 4 and 5

We can also note that if all the LOG or LOI are not the same for sub-categories, we will not note these one for the upper category. It allows not missing these higher levels if we look only at higher categories.

Chapitre 5

Data Requirements to Support BIM-Enabled Facilities Management

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5 Data Requirements to Support BIM-Enabled Facilities Management

This chapter corresponds to the Excel table displayed in appendix 8.4.

Data requirements are one of the biggest needs of BIM to be used effectively after the construction of a building. Some studies were released a few years ago [29] to give the process to go forward but they were theoretical, general and don't list all the information of all the element.

Having all this information, classified according to different levels (LOI) is a precious database because it requires the expertise of many different trades, especially for all the MEP elements (electrician, heating engineer, plumber,…).

Some interviewed people tried to create their own table or obtained tables from other companies. Each table had its limits:

- Not complete enough
- No clear definition of LOI
- Too much information were needed and were not always useful

To get a complete table, I had to cross these tables and other found on the internet. After studying the needs of facility managers, I also had to make sure there either not too much information, either that this table remains manageable.

An exchange format, COBie[13], exists for the transmission of non-geometric information. However, for different reasons explained in appendix 8.3, stakeholders are still looking for a more efficient way to better fit the requirement of FM.

It is important to be precise about the information and to answer the questions mentioned in chapter 4.2.

[13] COBie is explained in appendix 8.3.

5.1 When, how, who, where share the information?

5.1.1 When?

Once the general contractor, the client and his facility managers have set the desired LOD for the O&M, the GC[14] then decides what LOD have to be completed for every stage of construction and for a fixed date, as shown on Table 8.

-	Concept Design		Schematic Design		Design Develop		Constr. Develop		O&M	
	Date		Date		Date		Date		Date	
	LOD		LOD		LOD		LOD		LOD	
	LOG	LOI	LOG	LOI	LOG	LOI	LOG	LOI	LOG	LOI
ELEMENTS										
SUBSTRUCTURE	100	1	200	2	300	2	350	2	350	2
SHELL	100	1	200	2	300	2	350	2	350	2
INTERIORS	100	1	200	2	300	2	350	2	350	2
SERVICES	100	1	200	2	300	2	350	3	350	3
EQUIPMENT & FURNISHINGS	100	1	200	2	300	2	350	3	350	3
SPECIAL CONSTRUCTION & DEMOLITION	100	1	200	2	300	2	350	2	350	2
BUILDING SITEWORK	100	1	200	2	300	2	350	2	350	2

Table 8 : Multiple file data drop checked at different stages

The goal is to ensure a cumulative process: avoid having a one-time file drop but promote multiple file data drops[15]. As soon as the information is available, it can be added in the model (then it can be shared and useful for all users). This process helps to reduce the amount of work at the end of the construction development and ensure that the information is well filled at several times.

It also answers the question "When should this metadata be incorporated into the BIM model?"

[14] General Contractor.
[15] "To ensure projects are properly validated and controlled as they develop, data is extracted from the evolving building information model and submitted to the client at key milestones (project stages). This submission of data is described as a 'data drop'" [31]

5.1.2 How, who, where?

As shown on Table 9, the columns present in the Excel sheets help to answer to the remaining questions: How? Who? Where?

Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage
Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model
ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model
Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model
Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model
Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model

Table 9 : How, who, where complete an information?

The data type and the units show how to fill the information in a standardized way.
One of the interviewees told me that for one of their projects, they had subcontracted a part abroad. They worked with a dd-mm-yyyy date format while the subcontractors noted all the dates with mm-dd-yyyy. As a result, the schedule was completely erratic and all the received dates had to be changed.
An example and a commentary/description is also given in order to avoid mistakes of misunderstanding.
The column "Responsible" indicates who should complete the information. Put a responsibility is important to make sure all the information will be filled.
Finally, informing the storage of the data help to know where it has been filled.

5.2 Information ranking

In the Excel sheet, all the construction elements are classified in the 30 following different relevant attribute tables, in addition to the pages “spaces” and "generic":

Architecture and structure (22 pages)	**Services, equipment and furnishings (8 pages)**
Structural Steel Concrete Precast Concrete Wood Masonry Cold Formed Metal Framing Seel Joist Metal Deck Miscellaneous Steel Grating Helical Piers Ext. Openings Ext. Doors Cladding Roof Ext. Wall Louvers and Vents Int. Openings Int. Doors Partitions Raised Floor Suspended Ceiling	Conveying Plumbing HVAC Air Distribution Fire Protection Fluid/Gas Distribution Electrical Electrical Distribution

Table 10 : All the different relevant attribute tables

For every Excel sheet, the information required is divided in generic and additional information.

Generic information is common to all elements of the classification. It means that we will find this information in all the attribute pages of the table.

Additional information is dependent on the object. For example, “Typical Weld Specifications” can be a useful piece of information for a structural steel element but is incompatible for an exterior door.

A, B - Structural Steel		LOI				
Category	**Attribute**	**1**	**2**	**3**	**4**	**5**
Generic	Codification	x	x	x	x	x
	ID	x	x	x	x	x
	Designation of the equipment	x	x	x	x	x
	Name of Building	x	x	x	x	x
	Zone (Floor and Room name)	x	x	x	x	x
	Material		x	x	x	x
	Manufacturer's name			x	x	x
	Manufacturer's reference			x	x	x
	Provider			x	x	x
	Type of guarantee			x	x	x
	Start date warranty			x	x	x
	Periodicity of control			x	x	x
	Last date check			x	x	x
	Reference technical documents			x	x	x
Additional	Shape Type & Size			x	x	x
	Fireproofed			x	x	x
	Coating			x	x	x
	Archtectural Exposed Structural Steel				x	x
	Deck Fasteners				x	x
	Typical Weld Specifications				x	x
	Camber					x
	Shear Studs					x
	Toppings					x

Table 11 : Information for structural steel elements

A, B - Ext. Doors		LOI				
Category	**Attribute**	**1**	**2**	**3**	**4**	**5**
Generic	Codification	x	x	x	x	x
	ID	x	x	x	x	x
	Designation of the equipment	x	x	x	x	x
	Name of Building	x	x	x	x	x
	Zone (Floor and Room name)	x	x	x	x	x
	Material		x	x	x	x
	Manufacturer's name			x	x	x
	Manufacturer's reference			x	x	x
	Provider			x	x	x
	Type of guarantee			x	x	x
	Start date warranty			x	x	x
	Periodicity of control			x	x	x
	Last date check			x	x	x
	Reference technical documents			x	x	x
Additionnal	Type		x	x	x	x
	Material - frame			x	x	x
	Material - panel			x	x	x
	Hardware set			x	x	x
	Fire Rating			x	x	x
	Coating - frame			x	x	x
	Thermal Resistance				x	x
	Air Infiltration				x	x
	Shading Coefficient				x	x
	Solar Heat Gain				x	x
	Visible Light Transmission				x	x
	Sound Transmission				x	x
	Bullet Resistance					x
	Radio Frequency Interference Protection					x
	Radiation Protection					x

Table 12 : Information for exterior doors

As every project is different, as every use/operation of building, the table has to be well balanced and manageable.

We will take two examples: firstly, a building in an area exposed to radiation, and secondly a building in a secure area.

For the first case, it will be easy to add a boolean generic information to know if the element is irradiated or not and specify the desired LOI.

For the second case, the client will want to know if the walls, windows and doors are bulletproof. It is also easy to add a boolean additional information for the sheets "Exterior walls, "Exterior openings" and "Exterior Doors".

The Excel sheet "Spaces" is important to note to know which information to provide for a space. It's the only one that depends on table 13[16] of the Omniclass while everything else in the Excel depends on the table 21.

The sheet "Generic" is a sheet with only the generic information. This allows classifying some specific elements that are not listed in the table.

[16] The Omniclass is divided in different tables. Table 13 : Spaces by Function, Table 21 – Elements (includes Designed Elements).

The relevant attribute tables for MEP elements are arranged slightly differently. Given the number of MEP elements, these are grouped by use (HVAC, fire protection, electricity,...) and the generic information is only noted once at the beginning of the page.

Some tables used to achieve this work were too complete with too many relevant attributes tables, especially for architecture and structure elements that are not the most important for facility managers in term of non-geometric information. Keeping categories such as "structural steel", "concrete" or "wood" helps to avoid having too many relevant attributes tables comparing to have sheets like "Foundation", "Column", "Retaining Walls",…
Also, if the client decides to have a LOI 1 or 2 for all the structural and architecture elements, which will often be the case, the 22 first relevant attribute tables can be summarized in one single sheet because it will contain the same generic information.

5.3 User friendliness

Using it digitally, it is possible to click on shortcuts (underlined in blue on tables 13 and 14) to navigate easily between the relevant attribute tables and get back to the classification.

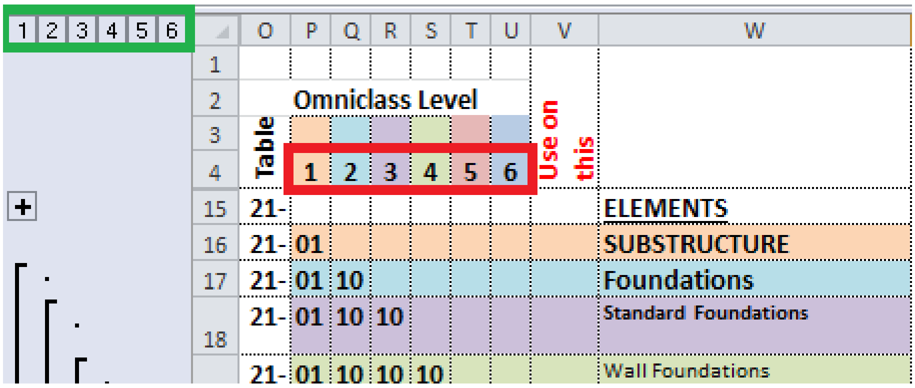
Table	Omniclass Level 1	2	3	4	5	6	Use on this		Relevant Attribute Tables
21-	03							INTERIORS	
21-	03	10						Interior Construction	
21-	03	10	10					Partitions	C - Partitions
21-	03	10	10	10				Interior Fixed Partitions	C - Partitions
21-	03	10	10	10	10			Masonry	A, B Masonry
21-	03	10	10	10	20			Cold-Form Metal Framing	A, B Cold Formed Metal Framing
21-	03	10	10	10	30			Wood	A, B Wood
21-	03	10	10	20				Interior Glazed Partitions	C - Partitions

Table 13 : Navigating from the classification

M	N	O	P	Q	R	S
LOI					Back to Table	
1	2	3	4	5		
x	x	x	x	x		
x	x	x	x	x		
x	x	x	x	x		
x	x	x	x	x		
x	x	x	x	x		
	x	x	x	x		
		x	x	x		

Table 14: Navigating from the relevant attribute tables

Also, by clicking top left of the sheet "Model Element Table" on one of the six numbers (surrounded in green on Table 15), you can directly sorting the Omniclass classification depending on his level (surrounded in red).



	O	P	Q	R	S	T	U	V	W
1									
2		Omniclass Level							
3	Table							Use on this	
4		1	2	3	4	5	6		
15	21-								ELEMENTS
16	21-	01							SUBSTRUCTURE
17	21-	01	10						Foundations
18	21-	01	10	10					Standard Foundations
	21-	01	10	10	10				Wall Foundations

Table 15 : Sorting the classification depending on his level

Chapitre 6

Conclusion

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6 Conclusion

6.1 Next steps

The workshop that was organised to confirm and present this research was also intended to reflect on the next steps. Indeed, as it is a new and very broad subject, it is not possible to propose an answer to all questions in a single thesis. Consequently, this chapter will be divided into two parts. The first one, to show the next steps about the specific subject of this thesis: the information table. And the second one, to explain what are the next steps for the general subject “BIM for FM”.

6.1.1 Next steps about the information table

During the last workshop (and after asking various stakeholders (architects, engineers and facility managers) to check the data base), we debriefed one last time about the table.
Stakeholders agreed that the table is a valuable base of information and that it is complete in terms of data. They also agreed that this table must remain manageable because each project and each way of operating are different. Some have already used the beta versions to create a table that perfectly fits their needs.
Some minor remarks were stated, which were corrected in the last version, but two major remarks came out.

Firstly, the idea of organizing the table according to different application areas can be interesting. This way, the client or the facility managers could simply mention the operation and maintenance services that they will use, so that, the general contractor knows which information should be provided to them. The structure would look like a shopping list.
Personally, I agree that it would be easier for facility managers to choose what they need by mentioning the services they will perform, rather than choosing levels of information in relation to various elements of the construction.
However, all organizations that develop BIM for FM are using levels of information and these LOI will probably be a standard within a few years.
Moreover, listing all possible application areas and knowing which information to associate is a painstaking work. In addition, as mentioned above, the way of operating is different for each project and for each company.

To arrange the table according to a list of application areas could be an interesting future approach.

To resume, here are the pros and cons of sorting the table as a shopping list:

+	-
- Easier for FMs to choose what they need; - Effective solution while waiting for an international standard; - The classified database of the current table is a precious help to create this type of structure.	- Future standards will probably be classified according to LOI and not structured depending on O&M services; - Hard job because the information which depends on an application area will certainly be different for each project; - Many different O&M services.

Table 16 : Pros and cons of sorting like a shopping list

For information and as an example, if someone wants to create this type of structure, Mrs Isabelle Artus listed some O&M services that can appear in the shopping list:

- Management of infrastructures and technical installations: Measurements, inventories of equipment and their condition / obsolescence;
- Key management;
- Management of the operation and maintenance of infrastructures / technical installations (preventive, corrective, evolutionary);
- Legal controls and remediation after control;
- Energy management and water consumption;
- Cleaning management (surfaces);
- Green Maintenance Management;
- ...

Secondly, each piece of information has to be linked to the corresponding IFC parameter. It is important to avoid interoperability problems. To achieve this, a column of IFC parameters has to be added in the different Excel sheets. However, as the remark was made only a month before the submission of this thesis and as there is no tool to easily filter the thousands of existing IFC parameters, I did not have time to add them to the table.

The Luxemburgish BIM application guide mentioned in chapter 4.4 has a column of IFC parameters. It is possible to copy/paste some attributes of the common information but since it was desired that these two tables remain two independent sources of information, this has not been done.

6.1.2 Next steps about BIM for FM

At the end of the workshop, we also discussed together what needs to be further developed for BIM for FM to become effective. We can compare these next steps to chapter 3.5:

- In terms of rigorous information requirements for the implementation of BIM in FM, we now get a valuable database;
- Having international standards in relation to the LOI would help to have less confusion and less different definitions;
- A strong international classification can also help stakeholders to use a common one;
- Continue to correct interoperability issues that are still present and remain a major problem to continue to use BIM after construction with FMIS. However, software can increasingly use multiple classifications or accept more and more BIM source formats or IFC formats;
- The major point debated was the integration of FMs in the process. To get an effective BIM for FM, it is imperative to integrate FM's input during the early stages of the project. It will allow the AEC actors to not underestimate the O&M phase and prepare the as-built model at its best. On the other side, FM will be ready to receive this model. Indeed, they will know what will be the content and will prepare themselves to use BIM.
- In addition to using BIM effectively after the construction of a building, it will also be necessary to study the transition in the other sectors: maritime work, infrastructure, environments, ...

6.2 Personal contribution

This thesis has been developed with several bibliographic and human resources. We will see, in addition to these supports, what was my personal contribution through the different chapters.

Firstly, for the description of BIM, I tried to be original so that each person understands what it is by developing its definition. The rest of the chapter 2 is based on bibliographic resources except the description of the life of a construction. Indeed, this chapter opposes what is generally described in the literature. I understood during the first six interviews that the term "life cycle" was not appropriate for the subject BIM for FM.

Secondly, for chapter 3, I developed the first part (communication between BIM software and FMIS) and his Figure 9 to show how FMs can use the BIM model. Then, the developments of the application areas and the challenges for FMs are a mix of bibliographic research illustrated with examples that interviewees suggested me. The study of the economic potential is an example from a presentation on the first workshop. I completed it because it did not show the transfer costs between the last two stages.

In addition, the first three parts of chapter 4 are also a mix of bibliographic research illustrated with examples of interviewees. From the chapter 4.4, the content of the thesis is mainly composed of personal contributions responding to the needs and issues of the market and the stakeholders. Indeed, I proposed a personal definition of LOI and created the information table. This table is still based on several resources but strongly modified according to the feedback and my own critical sense developed with the preceding chapters.

In fact, from chapter 4.4, the thesis is the practical part that responds to the previously theoretical part.

Also, my supervisor Juan Nolet helped me to get me in touch with some key stakeholders who could help me on the subject. In addition to that, I managed to meet other people interested by the subject. The workshop I organized was also a personal contribution and one of the goals was also to get stakeholders to meet each other. As a conclusion of this workshop, participants proposed to reiterate this kind of workshop every three to six months.

6.3 General conclusion

The construction industry has a lot of expectation towards BIM. Many stakeholders are thinking that this process is a solution to get an effective information transmission after the construction of a building, for the facility management. As BIM for FM is a broad subject, this thesis focused on a basic issue of the topic: the data requirements.

Indeed, the purpose of this study research is to propose an information table (classified database) on what information must be transmitted to the facility managers. This last is based on in-depth knowledge of the context, needs and issues of the market and stakeholders.

To achieve this purpose, we first studied what would be the potential of BIM for FMs. We concluded that it can bring significant added value. However, the process will not significantly reduce costs during the operation phase. On the other hand, it will allow a more efficient transition between the construction world and the O&M world. This transition can save time and money.

We also gathered many feedbacks from construction and FM stakeholders to understand their respective needs and issues.

Moreover, we investigated how to transmit the information to the FM. We came up with solutions to the problem of knowing how to choose the most suitable classification for a project by giving the context and a table of results. Due to the lack of clear definitions, we proposed a logical definition of LOI based on four key principles. We illustrated it by an example.

Furthermore, we studied the fundamentals of the table. Indeed, this tool was created so that each piece of information answers several questions to remain sustainable (where, when, how,… to provide the information?).

A key point is also that this information table has to be manageable. In fact, every project and every use of a building is different so it must be easy to modify it for its own convenience.

This last point was the conclusion of the workshop about the research. Participants that are owners of a project said that the table is a valuable and complete database to create their own information table, depending on their needs. Some have already used the beta version of the table to create their own.

From the general contractor perspective, they could know what they need to provide in terms of non-geometric information.
Then, the as-built BIM folder could be efficient in terms of data requirements.

In addition, we saw the next steps. On the one hand, those concerning the information table and on the other hand, those related to the other challenges on BIM for FM.
For the first point, it is possible to organize the table for FMs to transmit their needs more easily. The database would take the form of a shopping list of FM services. It will also be important to add a column with the corresponding IFC parameters to the information to avoid interoperability problems.
For the second point, we listed the main remaining challenges. In almost eight months working on this subject, I have already seen some developments such as some solutions for interoperability problems. A key step for the future will be to integrate FMs during the early stages of the project. This will allow FM and construction stakeholders to better understand the needs of each other and the as-built file to be prepared as early as possible.

Finally, as a student, responding to a market need that interests and is useful to stakeholders through an innovative process, BIM, was an exciting challenge. I recommend to universities but also to companies with research and development departments to propose this type of thesis. As long as it is supervised in an available way as it was the case for this research.

Chapitre 7

Bibliography

7 Bibliography

[1] The US National Building Information Model Standard Project Committee, “What is a BIM?,” 2014. [Online]. Available: https://web.archive.org/web/20141016190503/http://www.nationalbimstandard.org/faq.php#faq1.

[2] J.-B. Jacquemin, “Le Building Information Modeling : Impact sur le cycle de vie du bâtiment. Garantir la continuité des données du bâtiment vers l’exploitation.,” 2017.

[3] A. Tasiaux, Interviewee, *Interview with Director, (Make) Innovation (Happen), AREMIS Group.*. [Interview]. 2018.

[4] T. Vandenbergh, Interviewee, *Interview : Thomas Vandenbergh, président du nouveau Comité technique BIM & ICT.* [Interview]. 2017.

[5] O. Celnik and E. Lebègue, BIM & Maquette numérique pour l’architecture, le bâtiment et la construction, Paris: Editions Eyrolles, 2014.

[6] Digital School Canada, “Advantages of Revit’s Building Information Modeling,” 2018. [Online]. Available: https://www.digitalschool.ca/advantages-of-revits-building-information-modeling/.

[7] M. Ball, “Building Information Modeling: Top 11 Benefits of BIM,” 2018. [Online]. Available: https://www.autodesk.com/redshift/building-information-modeling-top-11-benefits-of-bim/.

[8] T. Goubau, “What is BIM? What are its Benefits to the Construction Industry?,” 2016. [Online]. Available: https://www.aproplan.com/blog/quality-management-plan-construction/what-is-bim-what-are-its-benefits-to-the-construction-industry.

[9] Revit, “BIM,” 2017. [Online]. Available: https://www.revit4you.com/en/bim-en/.

[10] Alinea Cost Consulting, “BIM: Cost vs benefits,” 2016. [Online]. Available: https://www.building.co.uk/data/bim-cost-vs-benefits/5081845.article.

[11] International Organization for Standardization, “ISO 41011:2017 Facility management -- Vocabulary,” 2017. [Online]. Available: https://www.iso.org/standard/68167.html.

[12] International Facility Management Association, “What is Facility Management?,” 2018. [Online]. Available: https://www.ifma.org/about/what-is-facility-management.

[13] CT/TC - BIM&ICT, *Groupes de travail: résultats et perspectives 2019,* 2019.

[14] A. Nicał and W. Wodyński, “Enhancing facility management through BIM 6D,” *Procedia Engineering,* 2016.

[15] B. Becerik-Gerber, F. Jazizadeh, N. Li and C. Gulben, “Application areas and data requirements for BIM-enabled facilities management,” *Journal of construction engineering and management,* pp. 431-442, 2011.

[16] N. D. Aziz, A. H. Nawawi and N. R. M. Ariff, “Building Information Modelling (BIM) in Facilities Management: Opportunities to be considered by Facility Managers,” *Science Direct,* 2016.

[17] U. S. Energy Information Administration, “Energy consumption by sector in USA,” 2019.

[18] UK Green Building Council, “Key Statistics: International,” 2015.

[19] K. Kensek, “BIM Guidelines Inform Facilities Management Databases:,” *Buildings*

5.3, pp. 899-916, 2015.

[20] C. Wijekoon, M. Anupa and R. A. David, “Enhancing the value of facilities information management (FIM) through BIM integration,” *Engineering, Construction and Architectural Management,* 2018.

[21] A. Tasiaux, “The "BIM" transition between the "Design & Build" world and the "Use & Facility Management" world,” 2018.

[22] Le Comité Technique BIM & ICT, “Analyse des systèmes de classification dans le cadre du BIM,” 2018. [Online]. Available: https://www.bimportal.be/fr/projets/ct/publications-resultats/analyse-des-systemes-classification-dans-le-cadre-du-bim/.

[23] Building Smart France, “Systèmes de classification,” 2018. [Online]. Available: https://bimstandards.fr/data-bim/systemes-de-classification/.

[24] Centre Scientifique et Technique du Bâtiment français, “Stratégie française pour les actions de pré-normalisation et normalisation BIM appliquées au bâtiment,” December 2018. [Online]. Available: http://www.batiment-numerique.fr/uploads/DOC/Normalisation/PTNB_Rapport%20final_FDR%20Normalisation_D%C3%A9cembre%202018.pdf.

[25] Building Smart Switzerland, “Définition swiss BIM LOIN- (LOD) Compréhension,” 2018. [Online]. Available: https://bauen-digital.ch/assets/Downloads/fr/LOIN-LOD-FR-web.pdf.

[26] Digital Building Luxembourg, “Guide d'application BIM Luxembourg,” 2017. [Online]. Available: http://www.digitalbuilding.lu/content/2-guide-application-bim/Guide-BIM-Luxembourg__V1-0.pdf.

[27] BIM Forum, “Level Of Development (LOD) Specification Part I,” April 2019. [Online]. Available: https://bimforum.org/wp-content/uploads/2019/04/LOD-Spec-2019-Part-I-and-Guide-2019-04-29.pdf.

[28] BIM Forum, “Level Of Development (LOD) Specification Part I,” 7 November 2017. [Online].

[29] H. Burak Cavka, S. Staub-French and E. Poirier, “Developing owner information requirements for BIM-enabled project,” *Automation in Construction,* 2017.

[30] C. Bogen and B. East, “COBieLite: A lightweight XML format for COBie data,” National institue of building sciences, 2013. [Online]. Available: www.nibs.org/page/bsa_cobielite.

[31] Designing Building Wiki, “Data drops for BIM,” 2019. [Online]. Available: https://www.designingbuildings.co.uk/wiki/Data_drops_for_BIM.

Chapitre 8

Appendices

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8 Appendices

8.1 Work schedule

The following schedule was established on October 18 (2018) with Juan Nolet and Thomas Vandenbergh:

October	November	December	January
Read litterature	Read litterature	Meet people & understand challenge	Meet people & understand challenge
February	March	April	May
Make proposal (technological & process oriented)	Make proposal (technological & process oriented)	Collect feedback & confirm solution	Adapt thesis based on conclusions

8.2 IFC

IFC format (Industry Foundation Class) is a standardized object-oriented file format used by the building industry to exchange and share information between software programs.

It has been designed for all types of data throughout the life of a building, from initial design studies to demolition. IFC is probably the most known and used OpenBIM format. IFCs are used to represent the geometry of objects, the relationship and the link with other objects, properties, metadata needed for information management, and non-graphical information.

Currently IFC is the only open format developed enough for BIM. This format has established itself as the global standard and is now an ISO standard (16739: 2013). The main BIM applications can import and export IFC.

Some interviewees told me that the import/export of the BIM model in this format has been working well for about a year. Before that, some information was lost (for example, some facades disappeared). The reason is that software developers have worked on compatibility and that users are certainly better at setting the software.

This format is often compared to PDF. Indeed, (free) IFC viewer make it possible to visualize the model without being able to modify it. This can be very useful because every construction actor can see the model without having license fees.

Some (paid) viewers are also able to make modifications to the model.

8.3 COBie

COBie (Construction Operations Building Information Exchange) is an exchange format which focuses on the transmission of non-graphical information of the building. It is used at certain well-defined stages of design and especially handover because it contains information for the O&M of the building. It helps capture and record important project data at the point of origin, including equipment lists, product data sheets, warranties, and preventive maintenance schedules.

COBie, which can be compared to a giant Excel sheet, can be exchanged in Excel and XML formats.

In June 2007, the US Army Corps of Engineers designed this deliverable framework. In December 2011, it was approved by the US National Institute of Construction Sciences. In 2016, it becomes a contractual obligation for deliverables in the UK.

However, COBie is not unanimous. Stakeholders do not understand why working on a 3D model that contains structured information to ultimately convert the information into an excel table. Moreover, COBie don't share the information as an IFC format.

Also, a modest project will contain about 600000 lines of non-geometric information. A more complex project like a hospital will easily contain more than a million lines which is above the limits of Excel.

In addition, the information does not fit the requirements of the facility managers either as it has been done for this thesis.

These are the reasons why many stakeholders are still interested in working in another way.

A lightweight version became available in 2013; COBieLite. This version is not lighter because there is less information to provide but because the COBieLite does not include data for the structure, format and layout required for a spreadsheet. This format, which looks like a computer code, is more complicated to understand than the old one. The main advantage is that "programmers do not have to filter through the various COBie project pages and COBie spreadsheet examples to begin programming applications that exchange COBie data" [30]

It also allows that there is no more limit like the maximum number of lines in Excel.

However, COBieLite within BIM authoring applications is not widely supported.

8.4 Information Table

The following pages display the Excel information table (classified database).

The first sheet, called “Model Element table” is ranked at a level 2 as explained in chapter 5.3. We see that with this level, the sheet can be printed on one sheet of paper. Level 2 is then appropriate to decide what LOI and LOG the client want for his building.

Uniformat Level 1	Uniformat Level 2	Uniformat Level 3	Uniformat Level 4	Uniformat Level 5	Uniformat Level 6	Table	Omniclass Level 1	Omniclass Level 2	Omniclass Level 3	Omniclass Level 4	Omniclass Level 5	Omniclass Level 6	Use on this project		Relevant Attribute Tables	Concept Design Date LOG	Concept Design Date LOI	Schematic Design Date LOG	Schematic Design Date LOI	Design Develop Date LOG	Design Develop Date LOI	Construction Develop Date LOG	Construction Develop Date LOI	O&M Date LOG	O&M Date LOI
						36-								INFORMATION											
						36-	51							OFFICE RESOURCES											
						36-	51	73						Office Model Templates											
						21-								ELEMENTS											
A						21-	01							SUBSTRUCTURE		100	1	200	2	300	2	350	2	350	2
A	10					21-	01	10						Foundations		100	1	200	2	300	2	350	2	350	2
A	20					21-	01	20						Subgrade Enclosures		100	1	200	2	300	2	350	2	350	2
A	40					21-	01	40						Slabs-on-Grade		100	1	200	2	300	2	350	2	350	2
A	60					21-	01	60						Water and Gas Mitigation		100	1	200	2	300	2	350	2	350	2
A	90					21-	01	90						Substructure Related Activities		100	1	200	2	300	2	350	2	350	2
B						21-	02							SHELL		100	1	200	2	300	2	350	2	350	2
B	10					21-	02	10						Superstructure		100	1	200	2	300	2	350	2	350	2
B	20					21-	02	20						Exterior Vertical Enclosures		100	1	200	2	300	2	350	2	350	2
B	30					21-	02	30						Exterior Horizontal Enclosures		100	1	200	2	300	2	350	2	350	2
C						21-	03							INTERIORS		100	1	200	2	300	2	350	2	350	2
C	10					21-	03	10						Interior Construction		100	1	200	2	300	2	350	2	350	2
C	20					21-	03	20						Interior Finishes		100	1	200	2	300	2	350	2	350	2
D						21-	04							SERVICES		100	1	200	2	300	2	350	3	350	3
D	10					21-	04	10						Conveying		100	1	200	2	300	2	350	3	350	3
D	20					21-	04	20						Plumbing		100	1	200	2	300	2	350	3	350	3
D	30					21-	04	30						HVAC		100	1	200	2	300	2	350	3	350	3
D	40					21-	04	40						Fire Protection		100	1	200	2	300	2	350	3	350	3
D	50					21-	04	50						Electrical		100	1	200	2	300	2	350	3	350	3
D	60					21-	04	60						Communications		100	1	200	2	300	2	350	3	350	3
D	70					21-	04	70						Electronic Safety and Security		100	1	200	2	300	2	350	3	350	3
D	80					21-	04	80						Integrated Automation		100	1	200	2	300	2	350	3	350	3
E						21-	05							EQUIPMENT & FURNISHINGS		100	1	200	2	300	2	350	3	350	3
E	10					21-	05	10						Equipment		100	1	200	2	300	2	350	3	350	3
E	20					21-	05	20						Furnishings		100	1	200	2	300	2	350	3	350	3
F						21-	06							SPECIAL CONSTRUCTION & DEMOLITION		100	1	200	2	300	2	350	2	350	2
F	10					21-	06	10						Special Construction		100	1	200	2	300	2	350	2	350	2
F	20					21-	06	20						Facility Remediation		100	1	200	2	300	2	350	2	350	2
F	30					21-	06	30						Demolition		100	1	200	2	300	2	350	2	350	2
G						21-	07							BUILDING SITEWORK		100	1	200	2	300	2	350	2	350	2
G	10					21-	07	10						Site Preparation		100	1	200	2	300	2	350	2	350	2
G	20					21-	07	20						Site Improvements		100	1	200	2	300	2	350	2	350	2
G	30					21-	07	30						Liquid and Gas Site Utilities		100	1	200	2	300	2	350	2	350	2
G	40					21-	07	40						Electrical Site Improvements		100	1	200	2	300	2	350	2	350	2
G	50					21-	07	50						Site Communications		100	1	200	2	300	2	350	2	350	2
G	90					21-	07	90						Miscellaneous Site Construction		100	1	200	2	300	2	350	2	350	2

Spaces							LOI				
Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	1	2	3	4	5
Codification	Classification	Sequence	Table 13	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
Designation of the space	String	Text	Cafetaria		Exploitant	BIM Model	x	x	x	x	x
Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
Material - soil	String	Text	Wood		GC/subcontractor	BIM Model		x	x	x	x
Material - ceilings	String	Text	Concrete		GC/subcontractor	BIM Model		x	x	x	x
Material - walls	String	Text	Glazed		GC/subcontractor	BIM Model		x	x	x	x
Interior/exterior	String	Text			GC/subcontractor	BIM Model			x	x	x
Disabled acces	Boolean	yes/no			GC/subcontractor	BIM Model			x	x	x
Emergency exit	Boolean	yes/no			GC/subcontractor	BIM Model			x	x	x
Reference technical documents	Classification	Sequence	123456789		GC/subcontractor	BIM Model			x	x	x

Generic								LOI				
Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC/subcontractor	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC/subcontractor	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC/subcontractor	BIM Model			x	x	x
	Provider	String	Text	Kone		GC/subcontractor	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC/subcontractor	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC/subcontractor	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC/subcontractor	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC/subcontractor	BIM Model			x	x	x

A, B - Structural Steel

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Shape Type & Size	String	Text	options: [specific “HSS 6x6x1/4”]		GC	BIM Model			x	x	x
	Fireproofed	String	Text	RF…		GC	BIM Model			x	x	x
	Coating	String	Text	options: [galvanized, painted for exterior exposure, etc]		GC	BIM Model			x	x	x
	Archtectural Exposed Structural Steel	String	Text	SSS, AESS-1, AESS-2, AESS-3, AESS-4, Custom	Note the five options are Standard Strucural Steel, AESS-1, AESS-2, AESS-3, AESS-4, Custom. These	GC	BIM Model				x	x
	Deck Fasteners	String	Text			GC	BIM Model				x	x
	Typical Weld Specifications	String	Text			GC	BIM Model				x	x
	Camber	String	Text			GC	BIM Model					x
	Shear Studs	String	Text			GC	BIM Model					x
	Toppings	String	Text			GC	BIM Model					x

A, B - Concrete

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Member Type	Integer		(0) Foundation (1) Beam (2) Column (3) Slab (4) Wall		GC	BIM Model		x	x	x	x
	Concrete Compression Strength	Integer	Pa		Example: 3000 Pa	GC	BIM Model			x	x	x
	Reinforcing Steel Flexture	Integer	Pa		Example: 60,000 Pa	GC	BIM Model			x	x	x
	Reinforcing Steel Shear	Integer	Pa		Example: 60,000 Pa	GC	BIM Model			x	x	x
	Aggregate Size	String	Text			GC	BIM Model				x	x
	Finish	Character		A,B,C per ACI 117	Specify by face of concrete	GC	BIM Model				x	x
	Moisture Retarder	String	Text			GC	BIM Model					x
	Air Entrainment	String	Text			GC	BIM Model					x
	Specific Deck Material	String	Text			GC	BIM Model					x
	Deck Fasteners	String	Text			GC	BIM Model					x
	Typical Weld Specifications	String	Text			GC	BIM Model					x
	Camber	String	Text			GC	BIM Model					x
	Shear Studs	String	Text			GC	BIM Model					x
	Toppings	String	Text			GC	BIM Model					x
	Embeds and Anchor Rods	String	Text			GC	BIM Model					x
	Aggregate, Clear cover	String	Text			GC	BIM Model					x
	Reinforcing Spacing	String	Text			GC	BIM Model					x
	Live Loads	Integer	Pa			GC	BIM Model					x
	Shear Reinforcing and Stud Rails	String	Text			GC	BIM Model					x
	Reinforcing Post-Tension Profiles and Strand Locations	String	Text			GC	BIM Model					x
	Chamfers	String	Text			GC	BIM Model					x
	Post-tension profile	String	Text			GC	BIM Model					x

A, B - Precast Concrete								LOI				
Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Member Type	Integer		(0) Foundation (1) Beam (2) Column (3) Slab (4) Wall		GC	BIM Model		x	x	x	x
	Coating	String	Text	options: [galvanized, painted for exterior exposure, etc]		GC	BIM Model			x	x	x
	Concrete Compression Strength	Integer	Pa		Example: 3000 Pa	GC	BIM Model			x	x	x
	Reinforcing Steel Flexture	Integer	Pa		Example: 60,000 Pa	GC	BIM Model			x	x	x
	Reinforcing Steel Shear	Integer	Pa		Example: 60,000 Pa	GC	BIM Model			x	x	x

A, B - Wood

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Member Type	Integer		(0) Foundation (1) Beam (2) Column (3) Deck (4) Wall		GC	BIM Model		x	x	x	x
	Coating	String	Text	options: [galvanized, painted for exterior exposure, etc]		GC	BIM Model			x	x	x
	Deck Material	String	Text			GC	BIM Model			x	x	x
	Flextural Strength (Fb)	Integer	Pa			GC	BIM Model				x	x
	Shear Strength (Fv)	Integer	Pa			GC	BIM Model				x	x
	Deck Orientation	String	Text			GC	BIM Model				x	x
	Deck Material Layer thickness	Integer	mm			GC	BIM Model				x	x
	Diaphragm Load and Deflection Criteria	String	Text			GC	BIM Model					x
	Deck Fasteners	String	Text			GC	BIM Model					x

A, B - Masonry

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Wall Type	Integer		(0) Foundation (1) Beam (2) Column (3) Deck (4) Wall		GC	BIM Model		x	x	x	x
	Wall Total Thickness	Integer	mm	7 5/8"		GC	BIM Model			x	x	x
	Wall Core Masonry Thickness	Integer	mm	7 5/8"		GC	BIM Model			x	x	x
	Wall Finish Face 1	String	Text	3 5/8"		GC	BIM Model				x	x
	Wall Finish Face 2	String	Text			GC	BIM Model				x	x
	Wall Is Load Bearing	Bool	Yes / No		IsLoadBearning	GC	BIM Model					x
	Block Type	String	Text			GC	BIM Model					x

A, B Cold Formed Metal Framing

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Member Type	Integer		(0) Beam (1) Column (2)Wall		GC	BIM Model		x	x	x	x
	Coating	String	Text	options: [galvanized, painted for exterior exposure, etc]		GC	BIM Model			x	x	x
	Compression Strength	Integer	Pa		Example: 3000 Pa	GC	BIM Model				x	x

A, B - Steel Open Web Joists								LOI				
Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	1	2	3	4	5
	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
Generic	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
	Type	String	Text	K, LH, DLH, Joist Girder	{JoistType}	GC	BIM Model		x	x	x	x
	SJI Joist Designation	String	Text	options: [specific "18K3"]	{JoistDesignation}	GC	BIM Model			x	x	x
	Overall Length	Integer	mm		{OAL}	GC	BIM Model			x	x	x
	Joist Depth	Integer	mm		{JoistDepth}	GC	BIM Model			x	x	x
	Fireproofed	String	Text	RF...	{JoistFireproofed}	GC	BIM Model			x	x	x
	Archtectural Exposed Structural Steel	bool	True / False	options: [yes, no]	{JoistAESS}	GC	BIM Model				x	x
	Approx. Wt	Integer	N		{JoistApproxWt}	GC	BIM Model				x	x
	LRFD Load Total Safe	Integer	N		{Total_Load_LRFD_Safe} safe factored uniformly distributed load-carrying capacities	GC	BIM Model					x
	LRFD Load Deflection 1/360	Integer	mm		{Total_Load_LRFD_360} unfactored uniform load, which will produce an approximate joist deflection of 1/360 of the span	GC	BIM Model					x
	ASD Load Total Safe	Integer	N		{Total_Load_ASD_Safe}	GC	BIM Model					x
	ASD Load Deflection 1/360	Integer	mm		{Total_Load_ASD_360}	GC	BIM Model					x
	Span, Base Length	Integer	mm		{SpanBase}	GC	BIM Model					x
	Design Span	String	Text		{SpanDesign}	GC	BIM Model					x
	Approximate Camber Based on Top Chord Length	String	Text		{Camber}	GC	BIM Model					x
	Extentions (Y/N)	String	Text		{}	GC	BIM Model					x
	Top Chord Extentions Left (Start End)	bool	True / False		{TCXL}	GC	BIM Model					x
	Top Chord Extentions Right (Stop End)	bool	True / False		{TCXR}	GC	BIM Model					x
	Bottom Chord Extension Left	bool	True / False		{BCXL}	GC	BIM Model					x
	Bottom Chord Extension Right	bool	True / False		{BCXR}	GC	BIM Model					x
	Bottom Chord Extension Left Length	Integer	mm		{BCXLL}	GC	BIM Model					x
	Bottom Chord Extension Right Length	Integer	mm		{BCXRL}	GC	BIM Model					x
	Top Chord Extentions Left Length	Integer	mm		{TCXLL}	GC	BIM Model					x
	Top Chord Extentions Right	Integer	mm		{TCXRL}	GC	BIM Model					x
	Recycle Content	Integer	%		{RecycleContent}	GC	BIM Model					x
	Distance From Piont of Fabrication to Site	Integer	km		{FabDistToSite}	GC	BIM Model					x
	Joist Moment Of Inertia	Integer	mm^4		{Ij}	GC	BIM Model					x
	Section Modulous	Integer	mm^3		{Sx}	GC	BIM Model					x
	Slope "X" Low End ("X": 12")	Integer	mm		{SlopeXLow}	GC	BIM Model					x
Addiotional	Slope "X" High End ("X": 12")	Integer	mm		{SlopeXHigh}	GC	BIM Model					x
	Bearing Depth Left	Integer	mm		{BearingDepthLeft}	GC	BIM Model					x
	Bearing Depth Right	Integer	mm		{BearingDepthRight}	GC	BIM Model					x
	Approximate Duct Opening Size Round	Integer	mm		{}	GC	BIM Model					x

Approximate Duct Opening Size Square	Integer	mm		{}	GC	BIM Model					x
Approximate Duct Opening Size Rectangular (Width x Highth)	Integer	mm		{}	GC	BIM Model					x
Approximate Duct Opening Size Rectangular (Width x Highth)	Integer	mm		{}	GC	BIM Model					x
Chord Yield Strength	Integer	N		{FyChord} Refer to SJI Specifiation.	GC	BIM Model					x
All Other Yield Strength	Integer	N		{FyOther} Refer to current SJI Specification	GC	BIM Model					x
Number Of Rows Of Top Chord Bridging (Estimated per SJI Table)	Integer			{TopChordBrdRowReqEst}	GC	BIM Model					x
Bearing Seat Attachment Left (start end)	Integer	(1) Masonry or Concrete (2) Steel (3) Other		{BearingTypeLeft} Bearing Seat Attachemnt	GC	BIM Model					x
Bearing Seat Attachment Right (stop end)	Integer	(1) Masonry or Concrete (2) Steel (3) Other		{BearingTypeRight} Bearing Seat Attachemnt	GC	BIM Model					x
Bearing Seat Uplift Left	bool	True / False		{BrUpliftLeft} Is the joist seat in uplift	GC	BIM Model					x
Bearing Seat Uplift Right	bool	True / False		{BrUpliftRight} Is the joist seat in uplift	GC	BIM Model					x
Laterally Unbraced Top Chords (Y/N)	Integer	y/n		{LatUnbacedTopChord}	GC	BIM Model					x
Wood Nailers on Top Chored (Y/N)	Integer	y/n		{WoodNailers}	GC	BIM Model					x
LRFD Load Total Safe	Integer	N		{} safe factored uniformly distributed load-carrying capacities	GC	BIM Model					x
LRFD Load Deflection 1/360	Integer	mm		{} unfactored uniform load, which will produce an approximate joist deflection of 1/360 of the span	GC	BIM Model					x
ASD Load Total Safe	Integer	N		{}	GC	BIM Model					x
ASD Load Deflection 1/360	Integer	mm		{}	GC	BIM Model					x
Top Chord Extention Type (None, S or R) Left	Integer		(0) None (1) "S", top angles of top chord (2) top and bottom angle of top chord	{TCExTypeLeft} Top Chord Extention Type:	GC	BIM Model					x
Top Chord Extention Type (None, S or R) Right	Integer		(0) None (1) "S", top angles of top chord (2) top and bottom angle of top chord	{TCExTypeRight} Top Chord Extention Type:	GC	BIM Model					x

A, B - Metal Deck

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Deck Type	Integer		(0) Foundation (1) Beam (2) Column (3) Slab (4) Wall		GC	BIM Model		x	x	x	x
	Coating	String	Text	options: [galvanized, painted for exterior exposure, etc]		GC	BIM Model			x	x	x
	Deck Material	String	Text			GC	BIM Model			x	x	x
	Yield Strength (Fy)	Integer	Pa			GC	BIM Model				x	x
	Deck Thickness	Integer	in		Example 1.5"	GC	BIM Model				x	x
	Deck Flute Width	Integer	in		Example 1.5"	GC	BIM Model				x	x
	Deck Fasteners	String	Text			GC	BIM Model					x
	Diaphragm Load and Deflection criteria	String	Text			GC	BIM Model					x
	Typical Weld Specifications	String	Text			GC	BIM Model					x

A, B - Miscellaneous Steel								LOI				
Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Shape Type & Size	String	Text	options: [specific “HSS 6x6x1/4”]		GC	BIM Model			x	x	x
	Fireproofed	String	Text	RF…		GC	BIM Model			x	x	x
	Coating	String	Text	options: [galvanized, painted for exterior exposure, etc]		GC	BIM Model			x	x	x

A, B - Grating								LOI				
Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Grating Type	String	Text			GC	BIM Model			x	x	x
	Coating	String	Text	options: [galvanized, painted for exterior exposure, etc]		GC	BIM Model			x	x	x

A, B - Helical Priers								LOI				
Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Grating Type	String	Text			GC	BIM Model			x	x	x
	Coating	String	Text	options: [galvanized, painted for exterior exposure, etc]		GC	BIM Model			x	x	x

A, B - Ext. Openings

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Construction	String		options:[Unitized (combined glass and frame), Stick Built, Structural Glass]		GC	BIM Model			x	x	x
	Function	String		options, fixed, casement, double/single hung, awning/project out, pivot, sliding)		GC	BIM Model			x	x	x
	Thermal Resistance	Integer	R-Value			GC	BIM Model				x	x
	Air Infiltration	Integer	R-Value			GC	BIM Model				x	x
	Shading Coefficient	Integer	R-Value			GC	BIM Model				x	x
	Solar Heat Gain	Integer	R-Value			GC	BIM Model				x	x
	Visible Light Transmission	Integer	R-Value			GC	BIM Model				x	x
	Sound Transmission	Integer	R-Value			GC	BIM Model				x	x
	Condensation Resistance	Integer	R-Value			GC	BIM Model				x	x
	Wind Load Capacity	Integer	N			GC	BIM Model				x	x
	Glazing Method	String		options:[Conventional, Two Sided, Three Sided, Four Sided, Pint Supported]		GC	BIM Model					x
	Glass - Configuration	String		options:[Monolithic, Insulating]		GC	BIM Model					x
	Glass - Condition	String		options, multiple:[Annealed, Heat Strengthend, Tempered, Laminated, Bent]		GC	BIM Model					x
	Glass - Coatings	String		options, multiple:[Purolytic (hard coat), Sputter (soft coat), Low E, Metallic, Ceramic Frit, Opaci Coat, Digital Printed]		GC	BIM Model					x

	Glass - Use	String		options, multiple:[Glazing into conventional application, Glazing into structurally glazed application, Mirror, Decorative, Fire Resistant, Huricane Resistant, Cable Suspended, Switchable Glass, Elecrronically Controlled switchable Glass, Pressure Resistant, Radiation Resistant, Security, Ballistics Resistant]		GC	BIM Model					x
	Bullet Resistance	Bool	Yes / No	options:[yes, no, class]		GC	BIM Model					x

A, B - Ext. Doors								LOI				
Category	**Attribute**	**Data Type**	**Units**	**Option Examples**	**Commentary**	**Responsable**	**Stockage**	**1**	**2**	**3**	**4**	**5**
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additionnal	Type	String	Text	single, double, sliding, etc.		GC	BIM Model		x	x	x	x
	Material - frame	String	Text	wood, metal, glass, etc.		GC	BIM Model			x	x	x
	Material - panel	String	Text	solid core / hollow core, wood/metal, etc.		GC	BIM Model			x	x	x
	Hardware set	String	Text			GC	BIM Model			x	x	x
	Fire Rating	String	Text	RF...		GC	BIM Model			x	x	x
	Coating - frame	String		options, multiple:[Purolytic (hard coat), Sputter (soft coat), Low E, Metallic, Ceramic Frit, Opaci Coat, Digital Printed]		GC	BIM Model			x	x	x
	Thermal Resistance	Integer	R-Value			GC	BIM Model				x	x
	Air Infiltration	Integer	R-Value			GC	BIM Model				x	x
	Shading Coefficient	Integer	R-Value			GC	BIM Model				x	x
	Solar Heat Gain	Integer	R-Value			GC	BIM Model				x	x
	Visible Light Transmission	Integer	R-Value			GC	BIM Model				x	x
	Sound Transmission	Integer	R-Value			GC	BIM Model				x	x
	Bullet Resistance	Integer	R-Value			GC	BIM Model					x
	Radio Frequency Interference Protection	Integer	R-Value			GC	BIM Model					x
	Radiation Protection	Integer	R-Value			GC	BIM Model					x

B - Cladding

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Construction	String		options:[Unitized (combined glass and frame, Stick Built, Structural Glass]		GC	BIM Model			x	x	x
	Coatings	String		options, multiple:[Purolytic (hard coat), Sputter (soft coat), Low E, Metallic, Ceramic Frit, Opaci Coat, Digital Printed]		GC	BIM Model			x	x	x
	Fire Rating	String	Text	RF...		GC	BIM Model				x	x
	Thermal Resistance	Integer	R-Value			GC	BIM Model				x	x
	Condensation Resistance	Integer	R-Value			GC	BIM Model				x	x
	Water Resistance	Integer	R-Value			GC	BIM Model				x	x
	Sound Transmission	Integer	R-Value			GC	BIM Model				x	x
	Bullet Resistance	Integer	R-Value			GC	BIM Model					x
	Radiation Protection	Integer	R-Value			GC	BIM Model					x

B - Roof

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Material - skin	String	Text	tiles, composite, sheet metal, etc.		GC	BIM Model			x	x	x
	Material - substrate	String	Text	corrugated metal, plywood, composite panels, etc.		GC	BIM Model			x	x	x
	Fire Rating	String	Text	RF...		GC	BIM Model			x	x	x
	Material - insulation	String	Text	Batt, rigid, etc.		GC	BIM Model				x	x
	Thermal Resistance	Integer	R-Value			GC	BIM Model				x	x
	Water Resistance	Integer	R-Value			GC	BIM Model				x	x
	Air Infiltration	Integer	R-Value			GC	BIM Model				x	x
	Wind Load Capacity (drag)	Integer	N			GC	BIM Model					x
	Radio Frequency Interference Protection	Integer	R-Value			GC	BIM Model					x
	Radiation Protection	Integer	R-Value			GC	BIM Model					x
	Impact resistance (hail)	Integer	R-Value			GC	BIM Model					x

B - Ext. Wall								LOI				
Category	**Attribute**	**Data Type**	**Units**	**Option Examples**	**Commentary**	**Responsable**	**Stockage**	**1**	**2**	**3**	**4**	**5**
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Construction	String	Text	framed, unit masonry, panelized, EFIS, etc.		GC	BIM Model			x	x	x
	Material - skin	String	Text	tiles, composite, sheet metal, etc.		GC	BIM Model			x	x	x
	Material - substrate	String	Text	corrugated metal, plywood, composite panels, etc.		GC	BIM Model			x	x	x
	Fire Rating	Integer	R-Value			GC	BIM Model			x	x	x
	Material - insulation	Integer	R-Value			GC	BIM Model				x	x
	Thermal Resistance	Integer	R-Value			GC	BIM Model				x	x
	Water Resistance	Integer	R-Value			GC	BIM Model				x	x
	Air Infiltration	Integer	R-Value			GC	BIM Model				x	x

B,C Louvers and Vents

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Type	String	Text	Intake, Exhaust		GC	BIM Model			x	x	x
	Net Free Area	Integer	mm^2			GC	BIM Model				x	x
	Wind Load Capacity	Integer	N			GC	BIM Model				x	x
	Adjustable	Bool	Yes / No			GC	BIM Model				x	x
	Air Flow	Integer	R-Value			GC	BIM Model				x	x
	Storm Proof	Bool	Yes / No			GC	BIM Model				x	x

C - Int. Openings

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Construction	String		options:[Unitized (combined glass and frame), Stick Built, Structural Glass]		GC	BIM Model			x	x	x
	Function	String		options, fixed, casement, double/single hung, awning/project out, pivot, sliding)		GC	BIM Model			x	x	x
	Thermal Resistance	Integer	R-Value			GC	BIM Model				x	x
	Air Infiltration	Integer	R-Value			GC	BIM Model				x	x
	Shading Coefficient	Integer	R-Value			GC	BIM Model				x	x
	Solar Heat Gain	Integer	R-Value			GC	BIM Model				x	x
	Visible Light Transmission	Integer	R-Value			GC	BIM Model				x	x
	Sound Transmission	Integer	R-Value			GC	BIM Model				x	x
	Condensation Resistance	Integer	R-Value			GC	BIM Model				x	x
	Glazing Method	String		options:[Conventional, Two Sided, Three Sided, Four Sided, Pint Supported]		GC	BIM Model					x
	Glass - Configuration	String		options:[Monolithic, Insulating]		GC	BIM Model					x
	Glass - Condition	String		options, multiple:[Annealed, Heat Strengthend, Tempered, Laminated, Bent]		GC	BIM Model					x
	Glass - Coatings	String		options, multiple:[Purolytic (hard coat), Sputter (soft coat), Low E, Metallic, Ceramic Frit, Opaci Coat, Digital Printed]		GC	BIM Model					x

	Glass - Use	String		options, multiple:[Glazing into conventional application, Glazing into structurally glazed application, Mirror, Decorative, Fire Resistant, Huricane Resistant, Cable Suspended, Switchable Glass, Elecrronically Controlled switchable Glass, Pressure Resistant, Radiation Resistant, Security, Ballistics Resistant]		GC	BIM Model					x
	Bullet Resistance	Bool	Yes / No	options:[yes, no, class]		GC	BIM Model					x

C - Int. Doors

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Type	String	Text	single, double, sliding, etc.		GC	BIM Model		x	x	x	x
	Material - frame	String	Text	wood, metal, glass, etc.		GC	BIM Model			x	x	x
	Material - panel	String	Text	solid core / hollow core, wood/metal, etc.		GC	BIM Model			x	x	x
	Hardware set	String	Text	reference to schedule		GC	BIM Model			x	x	x
	Fire Rating	String	Text	RF...		GC	BIM Model			x	x	x
	Sill Height	Integer	mm			GC	BIM Model				x	x
	Frame Setback	Integer	mm			GC	BIM Model					x
	Frame Type	String	Text			GC	BIM Model					x
	Glazing Type	String	Text			GC	BIM Model					x
	Jamb Detail	String	Text			GC	BIM Model					x
	Head Detail	String	Text			GC	BIM Model					x
	Head Height	String	Text			GC	BIM Model					x
	Undercut	Bool	Yes / No			GC	BIM Model					x
	Panel Thickness	Integer	mm			GC	BIM Model					x
	Rought Width	Integer	mm			GC	BIM Model					x
	Rought Height	Integer	mm			GC	BIM Model					x

C - Partitions								LOI				
Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Fire Rating	String	Text	RF...		GC	BIM Model			x	x	x
	Wall Type	String	Text			GC	BIM Model			x	x	x
	Structural	Bool	Yes / No	options:[yes, no]		GC	BIM Model			x	x	x
	Framing	String	Text			GC	BIM Model				x	x
	Cladding	String	Text	2-layers Type x GWB		GC	BIM Model				x	x
	Moisture Resistance	Integer	R-Value			GC	BIM Model					x
	Length	Integer	mm			GC	BIM Model					x
	Height	Integer	mm			GC	BIM Model					x
	Base Offset	Integer	mm			GC	BIM Model					x
	Top Offset	Integer	mm			GC	BIM Model					x
	Width	Integer	mm			GC	BIM Model					x

C - Raised Floor								LOI				
Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Grid	String	Text	12x12, etc.		GC	BIM Model			x	x	x
	Height	Integer	mm			GC	BIM Model			x	x	x
	Material Thickness	Integer	mm			GC	BIM Model				x	x
	Material Types	String	Text	options:[Concrete, Steel, Aluminum]		GC	BIM Model				x	x
	Height Offset from Level	Integer	mm			GC	BIM Model					x
	Room Bounding	Bool	Yes / No	options:[yes, no]		GC	BIM Model					x
	Area	Integer	mm^2			GC	BIM Model					x
	Perimeter	Integer	mm			GC	BIM Model					x

C - Susp. Clg.

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Grid	String	Text	24x24, etc		GC	BIM Model			x	x	x
	Material	String	Text			GC	BIM Model			x	x	x
	Seismic Bracing	Integer	N			GC	BIM Model			x	x	x
	Material Thickness	Integer	mm			GC	BIM Model				x	x
	Ceiling Attenuation Class (CAC)	Integer		options:[33, 35, 40, etc.]		GC	BIM Model					x
	Surface Burning Characteristics (SBC)	String	Text	options:[ASTM E84, etc.]		GC	BIM Model					x

D10 Conveying

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		Subcontractor	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		Subcontractor	BIM Model			x	x	x
	Provider	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		Subcontractor	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		Subcontractor	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		Subcontractor	BIM Model			x	x	x
	Item-Specific Attributes											
	Electrical											
	Riser Fuses for Separate Lighting	Integer	R-Value			Subcontractor	BIM Model					x
	Riser Fuses	Integer	R-Value			Subcontractor	BIM Model					x
	Nominal Line Current	Integer	R-Value			Subcontractor	BIM Model				x	x
	Max. RMS acc. Line Current, Ia	Integer	R-Value			Subcontractor	BIM Model					x
	Main Supply Voltage	Integer	Volts			Subcontractor	BIM Model				x	x
	Main Fuses	Integer	R-Value			Subcontractor	BIM Model					x
	Lighting Fuses	Integer	R-Value			Subcontractor	BIM Model					x
	Frequency	Integer	Hz			Subcontractor	BIM Model				x	x
	Mechanical											
	Pit Floor Load	Integer	N			Subcontractor	BIM Model					x
	Lifting Hook Capacity	Integer	N			Subcontractor	BIM Model					x
	Force z Cwt	Integer	N			Subcontractor	BIM Model					x
	Force z Car	Integer	N			Subcontractor	BIM Model					x
	Force y Cwt	Integer	N			Subcontractor	BIM Model					x
	Force y Car	Integer	N			Subcontractor	BIM Model					x
	Force x Cwt	Integer	N			Subcontractor	BIM Model					x
	Force x Car	Integer	N			Subcontractor	BIM Model					x
	Dimensions											
	Travel Distance	Integer	mm			Subcontractor	BIM Model		x	x	x	x
	shaft depth	Integer	mm			Subcontractor	BIM Model			x	x	x
	shaft width	Integer	mm			Subcontractor	BIM Model			x	x	x
	Overhead height	Integer	mm			Subcontractor	BIM Model			x	x	x
	Pit Depth	Integer	mm			Subcontractor	BIM Model			x	x	x
	Clear Width	Integer	mm			Subcontractor	BIM Model				x	x
	Clear Height	Integer	mm			Subcontractor	BIM Model				x	x
	Clear Depth	Integer	mm			Subcontractor	BIM Model				x	x
	Elevator											
	Speed	Integer	m/s			Subcontractor	BIM Model			x	x	x
	Capacity	Integer	N			Subcontractor	BIM Model			x	x	x
	Machine Type	String	Text			Subcontractor	BIM Model				x	x
	Cwt Orientation	String	Text			Subcontractor	BIM Model				x	x
	Main Entrance Level	String	Text			Subcontractor	BIM Model			x	x	x
	Total Floors Served	Integer	R-Value			Subcontractor	BIM Model		x	x	x	x
	Floors served front side	String	Text			Subcontractor	BIM Model			x	x	x
	Number of Accesses front side	Integer	R-Value			Subcontractor	BIM Model			x	x	x
	Floors served back side	String	Text			Subcontractor	BIM Model			x	x	x
	Number of Accesses back side	Integer	R-Value			Subcontractor	BIM Model			x	x	x
	Landing Door Clear Width front side	Integer	R-Value			Subcontractor	BIM Model				x	x

				Landing Door Clear Height front side	Integer	R-Value			Subcontractor	BIM Model				x	x
				Landing Door Clear Width back side	Integer	R-Value			Subcontractor	BIM Model				x	x
				Landing Door Clear Height back side	Integer	R-Value			Subcontractor	BIM Model				x	x
				Type of door front side	String		1-leaf 2-leaf telescopic 3-leaf telescopic 2-leaf central 4-leaf central 6-leaf central Other		Subcontractor	BIM Model				x	x
				Type of door back side	String		1-leaf 2-leaf telescopic 3-leaf telescopic 2-leaf central 4-leaf central 6-leaf central Other		Subcontractor	BIM Model				x	x
				Drive Principle	String	Text	traction, hydraulic		Subcontractor	BIM Model			x	x	x
				Position of drive in shaft	String	Text	left, right, other		Subcontractor	BIM Model					x
				Drive position	String	Text	in top of elevator shaft, in pit of elevator shaft, on top of elevator shaft		Subcontractor	BIM Model				x	x
				Buffer Type	String	Text			Subcontractor	BIM Model				x	x

D20 Plumbing

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		Subcontractor	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		Subcontractor	BIM Model			x	x	x
	Provider	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		Subcontractor	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		Subcontractor	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		Subcontractor	BIM Model			x	x	x
	Fixture-Specific Attributes											
	Bath Tub				Sanitary appliance for immersion of the human body or parts of it.							
	Bath Type	String	Text	Domestic, Domestic Corner, Foot, Jacuzzi, Plunge, Sitz, Treatment, Whirlpool, User Defined	The property enumeration defines the types of bath that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
	Color	String	Text	White, Almond, User Defined	Principal color of the object.	Subcontractor	BIM Model				x	x
	Drain Size	Integer	mm		The size of the drain outlet connection from the object.	Subcontractor	BIM Model				x	x
	Has Grab Handles	Bool	yes/no		Indicates whether the bath is fitted with handles that provide assistance to a bather in entering or leaving the bath.	Subcontractor	BIM Model				x	x
	Nominal Depth	Integer	mm		Nominal or quoted depth of the object.	Subcontractor	BIM Model				x	x
	Nominal Length	Integer	mm		Nominal or quoted length of the object.	Subcontractor	BIM Model				x	x
	Nominal Width	Integer	mm		Nominal or quoted width of the object.	Subcontractor	BIM Model				x	x
	Bidet				Waste water appliance for washing the excretory organs while sitting astride the bowl							
	Bidet Type	String	Text		The property enumeration defines the types of bidet that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
	Color	String	Text	White, Almond, User Defined	Color selection for this object.	Subcontractor	BIM Model				x	x
	Drain Size	Integer	mm		The size of the drain outlet connection from the object.	Subcontractor	BIM Model				x	x
	Mounting	String	tring	BackToWall, Pedestal, Wall Hung	The property defines sanitary terminals mounting type	Subcontractor	BIM Model				x	x
	Nominal Depth	Integer	mm		Nominal or quoted depth of the object.	Subcontractor	BIM Model				x	x
	Nominal Length	Integer	mm		Nominal or quoted length of the object.	Subcontractor	BIM Model				x	x
	Nominal Width	Integer	mm		Nominal or quoted width of the object.	Subcontractor	BIM Model				x	x
	Spillover Level	Integer	mm		The level at which water spills out of the object.	Subcontractor	BIM Model				x	x
	Culvert				Covered channel or large pipe that forms a watercourse below ground level, usually under a road or railway.							
	Culvert Type	String	Text		The property enumeration defines the types of culvert that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
	Clear Depth	Integer	mm		The clear depth of the culvert.	Subcontractor	BIM Model				x	x
	Internal Width	Integer	mm		The internal width of the culvert.	Subcontractor	BIM Model				x	x
	Drinking Fountain				A sanitary terminal that provides a low pressure jet of water for a specific purpose.							
	Fountain Type	String	Text	Drinking Water, Eyewash, User Defined	Selection of the type of fountain	Subcontractor	BIM Model			x	x	x
	Color	String	Text	White, Almond, Stainless, User Defined	Color selection for this object.	Subcontractor	BIM Model				x	x
	Drain Size	Integer	mm		The size of the drain outlet connection from the object.	Subcontractor	BIM Model				x	x
	Mounting	String	Text	BackToWall, Pedestal, Countertop, WallHung, User Defined	Selection of the form of mounting of the fountain	Subcontractor	BIM Model				x	x
	Nominal Depth	Integer	mm		Nominal or quoted depth of the object.	Subcontractor	BIM Model				x	x

Nominal Length	Integer	mm		Nominal or quoted length of the object.	Subcontractor	BIM Model				x	x
Nominal Width	Integer	mm		Nominal or quoted width of the object.	Subcontractor	BIM Model				x	x
Floor Drain				Pipe fitting, set into the floor, that collects waste water and discharges it to a separate trap.							
Drain Type	String	Text		Identifies the predefined types of drain from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Cover Length	Integer	mm		The length measured along the x-axis in the local coordinate system or the radius (in the case of a circular shape in plan) of the cover	Subcontractor	BIM Model				x	x
Cover Width	Integer	mm		The length measured along the y-axis in the local coordinate system of the cover of the waste.	Subcontractor	BIM Model				x	x
Nominal Body Depth	Integer	mm		Nominal or quoted length measured along the z-axis in the local coordinate system of the waste.	Subcontractor	BIM Model				x	x
Nominal Body Length	Integer	mm		Nominal or quoted length measured along the x-axis in the local coordinate system or the radius (in the case of a circular shape in plan) of the waste.	Subcontractor	BIM Model				x	x
Nominal Body Width	Integer	mm		Nominal or quoted length measured along the y-axis in the local coordinate system of the waste.	Subcontractor	BIM Model				x	x
Outlet Connection Size	Integer	mm		Size of the outlet connection from the object.	Subcontractor	BIM Model				x	x
Floor Sink				Pipe fitting or assembly of fittings to receive surface water or waste water, fitted with a grating or sealed cover.							
Sink Type	String	Text		Identifies the predefined types of sink from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Back Inlet Pattern Type	String	Text	0,1,2,3 or 4: inlet connections and arrangement may vary. The outlet is either vertical or is placed at the bottom (south side) of the trap (when viewed in plan). Position 1 is to the left (west), position 2 is to the top (north), position 3 is to the right (east) and position 4 is to the bottom (south).	Identifies the pattern of inlet connections to a trap	Subcontractor	BIM Model				x	x
Cover Length	Integer	mm		The length measured along the x-axis in the local coordinate system or the radius (in the case of a circular shape in plan) of the cover of the trap.	Subcontractor	BIM Model				x	x
Cover Width	Integer	mm		The length measured along the y-axis in the local coordinate system of the cover of the trap.	Subcontractor	BIM Model				x	x
Inlet Connection Size	Integer	mm		Size of the inlet connection(s)	Subcontractor	BIM Model				x	x
Nominal Sump Depth	Integer	mm		Nominal or quoted length measured along the z-axis in the local coordinate system of the sump.	Subcontractor	BIM Model				x	x
Nominal Sump Length	Integer	mm		Nominal or quoted length measured along the x-axis in the local coordinate system or the radius (in the case of a circular shape in plan) of the sump.	Subcontractor	BIM Model				x	x
Nominal Sump Width	Integer	mm		Nominal or quoted length measured along the y-axis in the local coordinate system of the sump.	Subcontractor	BIM Model				x	x
Outlet Connection Size	Integer	mm		Size of the outlet connection from the object.	Subcontractor	BIM Model				x	x
Floor Trap				Pipe fitting or assembly of fittings to receive surface water or waste water, fitted with a grating or sealed cover and discharging through a trap							
Trap Type	String	Text		Identifies the predefined types of trap from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Back Inlet Pattern Type	Integer	mm	0,1,2,3 or 4: inlet connections and arrangement may vary. The outlet is either vertical or is placed at the bottom (south side) of the trap (when viewed in plan). Position 1 is to the left (west), position 2 is to the top (north), position 3 is to the right (east) and position 4 is to the bottom (south).	Identifies the pattern of inlet connections to a trap	Subcontractor	BIM Model				x	x

Cover Length	Integer	mm		The length measured along the x-axis in the local coordinate system or the radius (in the case of a circular shape in plan) of the cover	Subcontractor	BIM Model				x	x
Cover Width	Integer	mm		The length measured along the y-axis in the local coordinate system of the cover of the trap.	Subcontractor	BIM Model				x	x
Sink Type	String	Text		Identifies the predefined types of sink from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Has Strainer	Bool	yes/no	True or False	Indicates whether the trap has a strainer	Subcontractor	BIM Model				x	x
Inlet Connection Size	Integer	mm		Size of the inlet connection(s)	Subcontractor	BIM Model				x	x
Nominal Body Depth	Integer	mm		Nominal or quoted length measured along the z-axis in the local coordinate system of the chamber of the trap.	Subcontractor	BIM Model				x	x
Nominal Body Length	Integer	mm		Nominal or quoted length measured along the x-axis in the local coordinate system or the radius (in the case of a circular shape in plan) of the chamber of the trap.	Subcontractor	BIM Model				x	x
Nominal Body Width	Integer	mm		Nominal or quoted length measured along the y-axis in the local coordinate system of the chamber of the trap.	Subcontractor	BIM Model				x	x
Outlet Connection Size	Integer	mm		Size of the outlet connection from the object.	Subcontractor	BIM Model				x	x
Flow Meter				A flow meter is a device that is used to measure the flow rate in a system.							
Meter Type	String	Text	Energy, Gas, Oil, Water, User Defined	Identifies the predefined types of meter from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Purpose	String	Text	Master, Submaster, Submeter, Other, Unknown	Enumeration defining the purpose of the flow meter occurrence.	Subcontractor	BIM Model			x	x	x
Read Out Type	String	Text	Dial, Digital, Other, Not Known, Unset	Indication of the form that readout from the meter takes. In the case of a dial read out, this may comprise multiple dials that give a cumulative reading and/or a mechanical odometer.	Subcontractor	BIM Model				x	x
Remote Reading	Bool	yes/no	True or False	Indicates whether the meter has a connection for remote reading through connection of a communication device (set TRUE) or not (set FALSE).	Subcontractor	BIM Model				x	x
Energy Meter				**Device that measures, indicates and sometimes records, the energy usage in a system.**							
Maximum Current	Integer	Amps		The maximum allowed current that a device is certified to handle.	Subcontractor	BIM Model					x
Multiple Tariff	Bool	yes/no	True or False	Indicates whether meter has built-in support for multiple tariffs (variable energy cost rates).	Subcontractor	BIM Model					x
Nominal Current	Integer	Amps		The nominal current that is designed to be measured.	Subcontractor	BIM Model				x	x
Gas Meter				**Device that measures, indicates and sometimes records, the volume of gas that passes through it without interrupting the flow.**							
Connection Size	Integer	mm		Defines the size of inlet and outlet pipe connections to the meter.	Subcontractor	BIM Model				x	x
Gas Type	String	Text		Defines the types of gas that may be specified.	Subcontractor	BIM Model			x	x	x
Maximum Flow Rate	Integer	Cubic Feet per Minute		Maximum rate of flow which the meter is expected to pass.	Subcontractor	BIM Model				x	x
Maximum Pressure Loss	Integer	Pa		Pressure loss expected across the meter under conditions of maximum flow.	Subcontractor	BIM Model				x	x
Oil Meter				**Device that measures, indicates and sometimes records, the volume of oil that passes through it without interrupting the flow.**							
Connection Size	Integer	mm		Defines the size of inlet and outlet pipe connections to the meter.	Subcontractor	BIM Model				x	x
Maximum Flow Rate	Integer	m³/s		Maximum rate of flow which the meter is expected to pass.	Subcontractor	BIM Model				x	x
Water Meter				**Device that measures, indicates and sometimes records, the volume of water that passes through it without interrupting the flow.**							
Backflow Preventer Type	String	Text	Atmospheric Vacuum breaker, Anti Siphon valve, Double Check Backflow Preventer, Pressure Vacuum breaker Reduced Pressure Backflow Preventer Other Not known Unset	Identifies the type of backflow preventer installed	Subcontractor	BIM Model				x	x
Connection Size	Integer	mm		Defines the size of inlet and outlet pipe connections to the meter.	Subcontractor	BIM Model				x	x
Maximum Flow Rate	Integer	m³/s		Maximum rate of flow which the meter is expected to pass.	Subcontractor	BIM Model				x	x
Maximum Pressure Loss	Integer	Pa		Pressure loss expected across the meter under conditions of maximum flow.	Subcontractor	BIM Model					x

Type	String	Text	Compound, Inferential, Piston, Other, Not Known, Unset	Defines the allowed values for selection of the flow meter operation type.	Subcontractor	BIM Model			x	x	x
Garbage Disposal				Electrically operated device that reduces kitchen or other waste into fragments small enough to be flushed into a drainage system.							
Disposal Type	String	Text		Identifies the predefined types of disposal from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Drain Connection Size	Integer	mm		Size of the drain connection inlet to the waste disposal unit.	Subcontractor	BIM Model				x	x
Nominal Depth	Integer	mm		Nominal or quoted depth of the object measured from the inlet drain connection to the base of the	Subcontractor	BIM Model				x	x
Outlet Connection Size	Integer	mm		Size of the outlet connection from the waste disposal unit.	Subcontractor	BIM Model				x	x
Gutter				Gutter segment type common attributes.							
Gutter Type	String	Text		Identifies the predefined types of gutter from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Flow Rating	Integer	m^3/s		Actual flow capacity for the gutter. Value of 0.00 means this value has not been set.	Subcontractor	BIM Model					x
Slope	Integer	Degrees		Angle of the gutter to allow for drainage.	Subcontractor	BIM Model					x
Heat Exchanger				A heat exchanger is a device used to provide heat transfer between non-mixing media such as plate and shell and tube heat exchangers.	Subcontractor	BIM Model					
Exchanger Type	String	Text		Identifies the predefined types of exchanger from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Arrangement	String	Text	Counterflow, Crossflow, Parallelflow, Multipass, User Defined	Defines the basic flow arrangements for the heat exchanger	Subcontractor	BIM Model				x	x
Plate Exchanger				**Common attributes of plate heat exchanger**							
Number Of Plates	Integer		1,2,3,…	Number of plates used by the plate heat exchanger.	Subcontractor	BIM Model					x
Interceptor				An interceptor is a device designed and installed in order to separate and retain deleterious, hazardous or undesirable matter while permitting normal sewage or liquids to discharge into a collection system by gravity.							
Interceptor Type	String	Text		Identifies the predefined types of interceptor from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Cover Length	Integer	mm		The length measured along the x-axis in the local coordinate system or the radius (in the case of a circular shape in plan) of the cover	Subcontractor	BIM Model				x	x
Cover Width	Integer	mm		The length measured along the y-axis in the local coordinate system of the cover	Subcontractor	BIM Model				x	x
Inlet Connection Size	Integer	mm		Size of the inlet connection.	Subcontractor	BIM Model				x	x
Nominal Body Depth	Integer	mm		Nominal or quoted =length, measured along the z-axis of the local coordinate system of the object, of the body of the object.	Subcontractor	BIM Model				x	x
Nominal Body Length	Integer	mm		Nominal or quoted length, measured along the x-axis of the local coordinate system of the object, of the body of the object.	Subcontractor	BIM Model				x	x
Nominal Body Width	Integer	mm		Nominal or quoted length, measured along the y-axis of the local coordinate system of the object, of the body of the object.	Subcontractor	BIM Model				x	x
Outlet Connection Size	Integer	mm		Size of the outlet connection.	Subcontractor	BIM Model				x	x
Ventilating Pipe Size	Integer	mm		Size of the ventilating pipe(s).	Subcontractor	BIM Model				x	x
Pump				A pump is a device which imparts mechanical work on fluids or slurries to move them through a channel or pipeline.							
Pump Type	String	Text		Identifies the predefined types of pump from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Base Type	String	Text	Frame, Base, None, User Defined	Defines Generic types of pump bases	Subcontractor	BIM Model				x	x
Drive Connection Type	String	Text	Directdrive, Beltdrive,	The way the pump drive mechanism is connected to the pump	Subcontractor	BIM Model					x
Impeller Diameter	Integer	mm		Diameter of pump impeller	Subcontractor	BIM Model				x	x
Flowrate	Integer	m^3/s		The actual operational fluid flowrate.	Subcontractor	BIM Model				x	x
Mechanical Efficiency	Integer	Percent		The pumps operational mechanical efficiency.	Subcontractor	BIM Model				x	x
Overall Efficiency	Integer	Percent		The pump and motor overall operational efficiency.	Subcontractor	BIM Model					x
Power	Integer	Horsepower		The actual power consumption of the pump.	Subcontractor	BIM Model					x
Pressure Rise	Integer	Pa		The developed pressure.	Subcontractor	BIM Model					x
Rotation Speed	Integer	RPM		Pump rotational speed.	Subcontractor	BIM Model					x
Connection Size	Integer	mm		The connection size of the to and from the pump.	Subcontractor	BIM Model					x
Flow Rate Range	Integer	m^3/s		Allowable range of volume of fluid being pumped against the resistance specified.	Subcontractor	BIM Model					x
Flow Resistance Range	Integer	Pa		Allowable range of frictional resistance against which the fluid is being pumped.	Subcontractor	BIM Model					x
Net Positive Suction Head	Integer	mm		Minimum liquid pressure at the pump inlet to prevent cavitation.	Subcontractor	BIM Model				x	x
Nominal Rotation Speed	Integer	RPM		Pump rotational speed under nominal conditions.	Subcontractor	BIM Model				x	x
Temperature Range	Integer	Degrees C°		Allowable operational range of the fluid temperature.	Subcontractor	BIM Model				x	x
Roof Drain				Pipe fitting, set into the roof, that collects rainwater for discharge into the rainwater system.							

Drain Type	String	Text		Identifies the predefined types of drain from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Cover Length	Integer	mm		The length measured along the x-axis in the local coordinate system or the radius (in the case of a	Subcontractor	BIM Model				x	x
Cover Width	Integer	mm		The length measured along the y-axis in the local coordinate system of the cover of the drain.	Subcontractor	BIM Model				x	x
Nominal Body Depth	Integer	mm		Nominal or quoted length measured along the z-axis in the local coordinate system of the drain.	Subcontractor	BIM Model				x	x
Nominal Body Length	Integer	mm		Nominal or quoted length measured along the x-axis in the local coordinate system or the radius (in	Subcontractor	BIM Model				x	x
Nominal Body Width	Integer	mm		Nominal or quoted length measured along the y-axis in the local coordinate system of the drain.	Subcontractor	BIM Model				x	x
Outlet Connection Size	Integer	mm		Size of the outlet connection from the object.	Subcontractor	BIM Model				x	x
Shower				Installation or waste water appliance that emits a spray of water to wash the human body.							
Shower Type	String	Text	Drench, Individual, Tunnel, User Defined	Identifies the predefined types of shower from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Color	String	Text	White, Almond, User Defined	Color selection for this object.	Subcontractor	BIM Model				x	x
Drain Size	Integer	mm		The size of the drain outlet connection from the object.	Subcontractor	BIM Model				x	x
Has Tray	Bool	yes/no	True or False	Indicates whether the shower has a separate receptacle that catches the water in a shower and directs it to a waste outlet.	Subcontractor	BIM Model				x	x
Nominal Depth	Integer	mm		Nominal or quoted depth of the object.	Subcontractor	BIM Model				x	x
Nominal Length	Integer	mm		Nominal or quoted length of the object.	Subcontractor	BIM Model				x	x
Nominal Width	Integer	mm		Nominal or quoted width of the object.	Subcontractor	BIM Model				x	x
Shower Head Description	String	Text		A description of the shower head(s) that emit the spray of water.	Subcontractor	BIM Model				x	x
Sink or Lavatory				Waste water appliance for receiving, retaining or disposing of domestic, culinary, laboratory or industrial process liquids.							
Sink Type	String	Text	Belfast, Bucket, Cleaners, Combination_Left, Combination_Right, Combination_Double, Drip, Laboratory, Plaster, Pot, Rinsing, Preparation, Bar, User Defined	Identifies the predefined types of sink from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Color	String	Text	White, Almond, User Defined	Color selection for this object.	Subcontractor	BIM Model				x	x
Drain Size	Integer	mm		The size of the drain outlet connection from the object.	Subcontractor	BIM Model				x	x
Mounting	String	Text	BackToWall, Pedestal, CounterTop, WallHung, User Defined	Selection of the form of mounting of the sink	Subcontractor	BIM Model				x	x
Mounting Offset	String	Text		For counter top mounted sinks, the vertical offset between the top of the sink and the counter top.	Subcontractor	BIM Model				x	x
Nominal Depth	Integer	mm		Nominal or quoted depth of the object.	Subcontractor	BIM Model				x	x
Nominal Length	Integer	mm		Nominal or quoted length of the object.	Subcontractor	BIM Model				x	x
Nominal Width	Integer	mm		Nominal or quoted width of the object.	Subcontractor	BIM Model				x	x
Tank				A tank is a vessel or container in which a fluid or gas is stored for later use							
Tank Type	String	Text	Fuel, Oil, Water, Rain Water,	Identifies the predefined types of tank from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Nominal Capacity	Integer	m³		The total nominal or design volumetric capacity of the tank.	Subcontractor	BIM Model			x	x	x
Access Type	String	Text	Manhole, User Defined	Defines the types of access (or cover) to a tank that may be specified	Subcontractor	BIM Model				x	x
Effective Capacity	Integer	m³		The total effective or actual volumetric capacity of the tank.	Subcontractor	BIM Model					x
End Shape Type	String	Text	Semi-Elliptical, ASMEFlanged_Dished,	Defines the types of end shapes that can be used for preformed tanks	Subcontractor	BIM Model					x
First Curvature Radius	Integer	mm		FirstCurvatureRadius should be defined as the base or left side radius of curvature value.	Subcontractor	BIM Model					x
Has Ladder	Bool	yes/no	True or False	Indication of whether the tank is provided with a ladder	Subcontractor	BIM Model				x	x
Has Visual Indicator	Bool	yes/no	True or False	Indication of whether the tank is provided with a visual indicator	Subcontractor	BIM Model				x	x
Nominal Depth	Integer	mm		The nominal depth of the tank. Note: Not required for a horizontal cylindrical tank.	Subcontractor	BIM Model					x
Nominal Length Or Diameter	Integer	mm		The nominal length or, in the case of a vertical cylindrical tank, the nominal diameter of the tank.	Subcontractor	BIM Model					x

Nominal Width Or Diameter	Integer	mm		The nominal width or, in the case of a horizontal cylindrical tank, the nominal diameter of the tank. Note: Not required for a vertical cylindrical tank.	Subcontractor	BIM Model					x
Number Of Sections	Integer		1,2,3..	Number of sections used in the construction of the tank. Default is 1. Note: All sections assumed to be the same size.	Subcontractor	BIM Model				x	x
Operating Weight	Integer	N		Operating weight of the tank including all of its contents.	Subcontractor	BIM Model					x
Pattern Type	String	Text	Horizontal Cylinder,Vertical Cylinder, Rectangular, Other, Not Known	Defines the types of pattern (or shape of a tank that may be specified.	Subcontractor	BIM Model				x	x
Second Curvature Radius	Integer	mm		SecondCurvatureRadius should be defined as the top or right side radius of curvature value.	Subcontractor	BIM Model					x
Tank Composition	String	Text	Complex, Element, Partial, User Defined	Defines the level of element composition where	Subcontractor	BIM Model				x	x
Expansion Tank				**Common attributes of an expansion type tank.**							
Charge Pressure	Integer	Pa		Nominal or design operating pressure of the tank.	Subcontractor	BIM Model				x	x
Pressure Regulator Setting	Integer	Pa		Pressure that is automatically maintained in the tank.	Subcontractor	BIM Model				x	x
Relief Valve Setting	Integer	Pa		Pressure at which the relief valve activates.	Subcontractor	BIM Model				x	x
Pressure Vessel				**Common attributes of a pressure vessel.**							
Charge Pressure	Integer	Pa		Nominal or design operating pressure of the tank.	Subcontractor	BIM Model				x	x
Pressure Regulator Setting	Integer	Pa		Pressure that is automatically maintained in the tank.	Subcontractor	BIM Model				x	x
Relief Valve Setting	Integer	Pa		Pressure at which the relief valve activates.	Subcontractor	BIM Model				x	x
Sectional Tank				**Fixed vessel constructed from sectional parts with one or more compartments for storing a liquid. Note (1): All sectional construction tanks are considered to be rectangular by default. Note (2): Genericly, it is not expected that sectional construction tanks will be used for the purposes of gas storage.**							
Number Of Sections	Integer		1,2,3..	Number of sections used in the construction of the tank	Subcontractor	BIM Model					
Section Length	Integer	mm		The length of a section used in the construction of the tank.	Subcontractor	BIM Model					
Section Width	Integer	mm		The width of a section used in the construction of the tank.	Subcontractor	BIM Model					
Toilet Bowl				Soil appliance for the disposal of excrement.							
Toilet Type	String	Text	BedPanWasher, Chemical, CloseCoupled, LooseCoupled, SlopHopper, User Defined	Identifies the predefined types of toilet from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Color	String	Text	White, Almond, User Defined	Color selection for this object	Subcontractor	BIM Model				x	x
Nominal Depth	Integer	mm		Nominal or quoted depth of the object.	Subcontractor	BIM Model				x	x
Nominal Length	Integer	mm		Nominal or quoted length of the object.	Subcontractor	BIM Model				x	x
Nominal Width	Integer	mm		Nominal or quoted width of the object.	Subcontractor	BIM Model				x	x
Pan Mounting	String	Text	BackToWall, Pedestal, WallHung, User Defined	The property defines the forms of mounting or fixing of the sanitary terminal	Subcontractor	BIM Model				x	x
Spillover Level	Integer	mm		The level at which water spills out of the terminal.	Subcontractor	BIM Model				x	x
Toilet Pan Type	String	Text	Siphonic, Squat, WashDown, WashOut, User Defined	The property defines the types of toilet pan	Subcontractor	BIM Model				x	x
Toilet Tank				A water storage unit attached to a sanitary terminal that is fitted with a device, operated automatically or by the user, that discharges water to cleanse a water closet (toilet) pan, urinal or slop hopper.							
Tank Capacity	Integer	m^3		Volumetric capacity of the tank	Subcontractor	BIM Model				x	x
Tank Color	String	Text	White, Almond, User Defined	Color of the object.	Subcontractor	BIM Model				x	x
Tank Height	Integer	mm	Integer Value or None	Enumeration that identifies the height of the tank or no tank	Subcontractor	BIM Model				x	x
Flush Rate	Integer	m^3		The minimum and maximum volume of water used at each flush.	Subcontractor	BIM Model				x	x
Flush Type	String	Text	Lever, Pull, Push, Sensor, User Defined	The types of flushing mechanism that may be specified for tanks and sanitary terminals	Subcontractor	BIM Model			x	x	x
Is Automatic Flush	Bool	yes/no	True or False	Value that determines if the tank is flushed automatically either after each use or periodically	Subcontractor	BIM Model				x	x

Is Single Flush	Bool	yes/no	True or False	Indicates whether the tank is single flush	Subcontractor	BIM Model				x	x
Urinal				Soil appliance that receives urine and directs it to a waste outlet.							
Urinal Type	String	Text	Bowl, Slab, Stall, Trough, Wall Mounted, User Defined	Identifies the predefined types of urinal from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Color	String	Text	White, Almond, User Defined	Color of the urinal.	Subcontractor	BIM Model				x	x
Mounting	String	Text	BackToWall, Pedestal, WallHung, User Defined	Selection of the form of mounting	Subcontractor	BIM Model				x	x
Nominal Depth	Integer	mm		Nominal or quoted depth of the object.	Subcontractor	BIM Model				x	x
Nominal Length	Integer	mm		Nominal or quoted length of the object.	Subcontractor	BIM Model				x	x
Nominal Width	Integer	mm		Nominal or quoted width of the object.	Subcontractor	BIM Model				x	x
Spillover Level	Integer	mm		The level at which water spills out of the object.	Subcontractor	BIM Model				x	x
Valve				A valve is used in a building services piping distribution system to control or modulate the flow of the fluid.							
Valve Type	String	Text		Identifies the predefined types of valve from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Valve Pattern	String	Text	Singleport, Angled_2 Port, Straight_2_Port, Straight_3 _Port, Crossover_4_Port	The configuration of the ports of a valve according to either the linear route taken by a fluid flowing through the valve or by the number of ports	Subcontractor	BIM Model			x	x	x
Body Material	String	Text		Material from which the body of the valve is constructed.	Subcontractor	BIM Model				x	x
Close Off Rating	Integer	Pa		Close off rating.	Subcontractor	BIM Model					x
Flow Coefficient	Integer	Kv or Cv		Flow coefficient	Subcontractor	BIM Model				x	x
Measured Flow Rate	Integer	GPM		The rate of flow of a fluid measured across the valve.	Subcontractor	BIM Model				x	x
Measured Pressure Drop	Integer	Pa		The actual pressure drop in the fluid measured across the valve.	Subcontractor	BIM Model					x
Percentage Open	Integer	%		The ratio between the amount that the valve is open to the full open position of the valve.	Subcontractor	BIM Model					x
Size	Integer	mm		The size of the connection to the valve (or to each connection for faucets, mixing valves, etc.).	Subcontractor	BIM Model				x	x
Test Pressure	Integer	Pa		The maximum pressure to which the valve has been subjected under test.	Subcontractor	BIM Model					x
Valve Mechanism	String	Text	Ball, Butterfly, Gate, Globe,	The mechanism by which the valve function is achieved	Subcontractor	BIM Model				x	x
Valve Operation	String	Text	Dropweight, Float, Hydraulic,	The method of valve operation	Subcontractor	BIM Model				x	x
Working Pressure	Integer	Pa		The normally expected maximum working pressure of the valve.	Subcontractor	BIM Model					x
Air Vent				**Valve used to release air from a pipe or fitting. Note that an air release valve is constrained to have a single port pattern**							
Is Automatic	Bool	yes/no	True or False	Indication of whether the valve is automatically operated	Subcontractor	BIM Model				x	x
Faucet				**A small diameter valve, with a free outlet, from which water is drawn.**							
Faucet Function	String	Text		Defines the operating temperature of a faucet that may be specified.	Subcontractor	BIM Model				x	x
Faucet Operation	String	Text	CeramicDisc, LeverHandle, NonConcussiveSelfClosing,	Defines the range of ways in which a faucet can be operated that may be specified	Subcontractor	BIM Model				x	x
Faucet Top Description	String	Text		Description of the operating mechanism/top of the faucet.	Subcontractor	BIM Model				x	x
Faucet Type	String	Text	Bib, Globe, Diverter, Divided Flow Combination, Pillar,	Defines the range of faucet types that may be specified	Subcontractor	BIM Model				x	x
Finish	String	Text	Chrome, Bronze, User Defined	Description of the finish applied to the faucet.	Subcontractor	BIM Model				x	x
Flush Valve				Valve that flushes a predetermined quantity of water to cleanse a WC, urinal or slop hopper. Note that a flushing valve is constrained to have a 2 port pattern.							
Flushing Rate	Integer	GPM		The predetermined quantity of water to be flushed.	Subcontractor	BIM Model				x	x
Has Integral Shut Off Device	Bool	yes/no	True or False	Indication of whether the flushing valve has an integral shut off device fitted	Subcontractor	BIM Model				x	x
Is High Pressure	Bool	yes/no	True or False	Indication of whether the flushing valve is suitable for use on a high pressure water main	Subcontractor	BIM Model				x	x
Gas Tap Valve				A small diameter valve, used to discharge gas from a system.							
Has Hose Union	Bool	yes/no	True or False	Indicates whether the gas tap is fitted with a hose union connection	Subcontractor	BIM Model				x	x
Hose Bib				A small diameter valve, used to drain water from a tank or water filled system.							
Has Hose Union	Bool	yes/no	True or False	Indicates whether the drawoff cock is fitted with a hose union connection	Subcontractor	BIM Model				x	x
Isolation Valve				Valve that is used to isolate system components.							
Is Normally Open	Bool	yes/no	True or False	If TRUE, the valve is normally open. If FALSE is normally closed.	Subcontractor	BIM Model				x	x
Isolating Purpose	String	Text		Defines the purpose for which the isolating valve is used since the way in which the valve is identified as an isolating valve may be in the context of its use.	Subcontractor	BIM Model				x	x
Mixing Valve				A valve where typically the temperature of the outlet is determined by mixing hot and cold water							

Mixer Control	String	Text		Defines the form of control of the mixing valve.	Subcontractor	BIM Model				x	x
Outlet Connection Size	Integer	mm		The size of the pipework connection from the mixing valve.	Subcontractor	BIM Model				x	x
Pressure Reducing Valve				Valve that reduces the pressure of a fluid immediately downstream of its position in a pipeline to a							
Downstream Pressure	Integer	Pa		The operating pressure of the fluid downstream of the pressure reducing valve.	Subcontractor	BIM Model				x	x
Upstream Pressure	Integer	Pa		The operating pressure of the fluid upstream of the pressure reducing valve.	Subcontractor	BIM Model				x	x
Pressure Relief Valve	String			Spring or weight loaded valve that automatically discharges to a safe place fluid that has built up to excessive pressure in pipes or fittings.							
Relief Pressure	Integer	Pa		The pressure at which the spring or weight in the valve is set to discharge fluid.	Subcontractor	BIM Model				x	x
Vibration Isolator				A vibration isolator is a device used to minimize the effects of vibration transmissibility in a building							
Height	Integer	mm		Height of the vibration isolator before the application of load.	Subcontractor	BIM Model				x	x
Isolator Compressibility	String	Text		The compressibility of the vibration isolator.	Subcontractor	BIM Model					x
Isolator Static Deflection	Integer	mm		Static deflection of the vibration isolator.	Subcontractor	BIM Model				x	x
Maximum Supported Weight	Integer	N		The maximum weight that can be carried by the vibration isolator.	Subcontractor	BIM Model					x
Vibration Transmissibility	Integer	%		The vibration transmissibility percentage.	Subcontractor	BIM Model				x	x
Wash Basin or Lavatory				Waste water appliance for washing the upper parts of the body.							
Wash Hand Basin Type	String	Text	DentalCuspidor, HandRinse, Hospital, Tipup, Vanity, Washfountain, WashingTrough, User Defined	Identifies the predefined types of wash basin or lavatory from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Color	String	Text	White, Almond, User Defined	Color of the object.	Subcontractor	BIM Model				x	x
Drain Size	Integer	mm		The size of the drain outlet connection from the object.	Subcontractor	BIM Model				x	x
Mounting	String	Text	BackToWall, Pedestal, CounterTop, WallHung, User Defined	Selection of the form of mounting	Subcontractor	BIM Model				x	x
Mounting Offset	Integer	mm		For counter top mounted basins the vertical offset between the top of the sink and the counter top.	Subcontractor	BIM Model				x	x
Nominal Depth	Integer	mm		Nominal or quoted depth of the object.	Subcontractor	BIM Model				x	x
Nominal Length	Integer	mm		Nominal or quoted length of the object.	Subcontractor	BIM Model				x	x
Nominal Width	Integer	mm		Nominal or quoted width of the object.	Subcontractor	BIM Model				x	x
Waste Floor Trap				Pipe fitting, set into the floor, that retains liquid to prevent the passage of foul air.							
Trap Type	String	Text		Identifies the predefined types of waste trap used in combination with the floor trap from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Cover Length	Integer	mm		The length measured along the x-axis in the local coordinate system or the radius (in the case of a circular shape in plan) of the cover	Subcontractor	BIM Model				x	x
Cover Width	Integer	mm		The length measured along the y-axis in the local coordinate system of the cover of the trap.	Subcontractor	BIM Model				x	x
Cover Material	String	Text	SS, Aluminum, User Defined	Material from which the cover or grating is constructed.	Subcontractor	BIM Model				x	x
Has Strainer	Bool	yes/no	True or False	Indicates whether the trap has a strainer	Subcontractor	BIM Model				x	x
Inlet Connection Size	Integer	mm		Size of the inlet connection(s)	Subcontractor	BIM Model				x	x
Inlet Pattern Type	String	Text	0,1,2,3 or 4: inlet connections and arrangement may vary.	Identifies the pattern of inlet connections to a trap	Subcontractor	BIM Model				x	x
Is For Grey Water	Bool	yes/no	True or False	Indicates if the purpose of the floor trap is to receive grey water	Subcontractor	BIM Model				x	x
Nominal Body Depth	Integer	mm		Nominal or quoted length measured along the z-axis in the local coordinate system of the chamber of the trap.	Subcontractor	BIM Model				x	x
Nominal Body Length	Integer	mm		Nominal or quoted length measured along the x-axis in the local coordinate system or the radius (in the case of a circular shape in plan) of the chamber of the trap.	Subcontractor	BIM Model				x	x
Nominal Body Width	Integer	mm		Nominal or quoted length measured along the y-axis in the local coordinate system of the chamber of the trap.	Subcontractor	BIM Model				x	x
Outlet Connection Size	Integer	mm		Size of the outlet connection from the object.	Subcontractor	BIM Model				x	x
Spillover Level	Integer	mm		The level at which water spills out of the terminal.	Subcontractor	BIM Model				x	x
Waste Trap				Pipe fitting, set adjacent to a sanitary terminal, that retains liquid to prevent the passage of sewer gases							
Waste Trap Type	String	Text		Identifies the predefined types of waste trap from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Inlet Connection Size	Integer	mm		Size of the inlet connection(s)	Subcontractor	BIM Model				x	x

			Outlet Connection Size	Integer	mm		Size of the outlet connection from the object.	Subcontractor	BIM Model				x	x
			Water Filter				A filter is an apparatus used to remove particulate or gaseous matter from fluids and gases							
			Water Filter Type	String	Text	Filtration, Purification, Softening, User Defined	Identifies the predefined types of water filter from which the type required may be set.	Subcontractor	BIM Model			x	x	x

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Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		Subcontractor	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		Subcontractor	BIM Model			x	x	x
	Provider	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		Subcontractor	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		Subcontractor	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		Subcontractor	BIM Model			x	x	x
	Item-Specific Attributes											
	Air Conditioning Unit				**A unitary packaged air-conditioning unit typically used in residential or light commercial applications.**							
	AC Unit Type	String	Text		The property enumeration defines the types of air conditioning unit that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
	Air Handler Construction	String	Text	Manufactured item, constructed on site,	Enumeration defining how the air handler might be fabricated.	Subcontractor	BIM Model				x	x
	Air Handler Fan Coil Arrangement	String	Text	Blow Through, Draw Through, unknown	Enumeration defining the arrangement of the supply air fan and the cooling coil.	Subcontractor	BIM Model				x	x
	Condenser Entering Temperature	Integer	Degree C°		Temperature of fluid entering condenser.	Subcontractor	BIM Model				x	x
	Condenser Flowrate	Integer	m³/s		Flow rate of fluid through the condenser.	Subcontractor	BIM Model				x	x
	Condenser Leaving Temperature	Integer	Degree C°		Temperature of fluid leaving condenser.	Subcontractor	BIM Model				x	x
	Cooling Efficiency	Integer	None		Coefficient of Performance: Ratio of cooling energy output to energy input under full load operating conditions.	Subcontractor	BIM Model					x
	Dual Deck	Bool	yes/no	True or False	Does the Air Handler have a dual deck? TRUE = Yes, FALSE = No.	Subcontractor	BIM Model				x	x
	Heating Capacity	Integer	R-Value		Heating capacity.	Subcontractor	BIM Model				x	x
	Heating Efficiency	Integer	None		Heating efficiency under full load heating conditions.	Subcontractor	BIM Model					x
	Latent Cooling Capacity	Integer	Tonnage		Latent cooling capacity.	Subcontractor	BIM Model				x	x
	Outside Air Flowrate	Integer	m³/s		Flow rate of outside air entering the unit.	Subcontractor	BIM Model				x	x
	Sensible Cooling Capacity	Integer	R-Value		Sensible cooling capacity.	Subcontractor	BIM Model				x	x
	Air Terminal Box				**an air terminal box typically participates in an HVAC duct distribution system and is used to control or modulate the amount of air delivered to its downstream ductwork**							
	Terminal Type	String	Text	VAV, CAV, User Defined	The property enumeration defines the types of air terminal box that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
	Arrangement Type	String	Text	Single Duct, Dual Duct	Terminal box arrangement. Single Duct: Terminal box receives warm or cold air from a single air supply duct. Dual Duct: Terminal box receives warm and cold air from separate air supply ducts.	Subcontractor	BIM Model			x	x	x
	Airflow Rate Range	Integer	m³/s		Range of airflow that can be delivered.	Subcontractor	BIM Model					x
	Air Pressure Range	Integer	m³/s		Allowable air static pressure range at the entrance of the air terminal box.	Subcontractor	BIM Model				x	x
	Has Fan	Bool	yes/no	True or False	Terminal box has a fan inside (fan powered box).	Subcontractor	BIM Model				x	x
	Has Return Air	Bool	yes/no	True or False	Terminal box has return air mixed with supply air from duct work.	Subcontractor	BIM Model				x	x
	Has Sound Attenuator	Bool	yes/no	True or False	Terminal box has a sound attenuator.	Subcontractor	BIM Model				x	x
	Housing Thickness	Integer	mm		Air terminal box housing material thickness.	Subcontractor	BIM Model					x
	Nominal Air Flow Rate	Integer	m³/s		Nominal airflow rate.	Subcontractor	BIM Model				x	x
	Nominal Damper Diameter	Integer	mm		Nominal damper diameter.	Subcontractor	BIM Model				x	x
	Nominal Inlet Air Pressure	Integer	Pa		Nominal airflow inlet static pressure.	Subcontractor	BIM Model				x	x
	Operation Temperature Range	Integer	Degree C°		Allowable operational range of the ambient air temperature.	Subcontractor	BIM Model				x	x
	Reheat Type	String	Text		Terminal box reheat type.	Subcontractor	BIM Model				x	x
	Return Air Fraction Range	Integer	None		Allowable return air fraction range as a fraction of discharge airflow.	Subcontractor	BIM Model					x
	Airflow Curve	Integer	m³/s		Air flowrate versus damper position relationship; airflow = f (valve position).	Subcontractor	BIM Model					x
	Atmospheric Pressure	Integer	Pa		Ambient atmospheric pressure.	Subcontractor	BIM Model					x

Damper Position	Integer	None	1,2,3…	Control damper position, ranging from 0 to 1.	Subcontractor	BIM Model					x
Sound Rating	Integer	dB		Sound performance.	Subcontractor	BIM Model					x
Air Terminal				**An air terminal is a terminating or origination point for the transfer of air between distribution system(s) and one or more spaces. It can also be used for the transfer of air between adjacent spaces.**							
Air Terminal Type	String	Text		The property enumeration defines the types of air terminal that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Air Diffusion Performance Index	Integer	None		The Air Diffusion Performance Index (ADPI) is used for cooling mode conditions. If several measurements of air velocity and air temperature are made throughout the occupied Zone (Floor and Room name) of a space, the ADPI is the percentage of locations where measurements were taken that meet the specifications for effective draft temperature and air velocity.	Subcontractor	BIM Model					x
Airflow Rate Range	Integer	m^3/s		Air flowrate range within which the air terminal is designed to operate.	Subcontractor	BIM Model				x	x
Air Flowrate Versus Flow Control Elem	Integer	m^3/s		Air flowrate versus flow control element position at nominal pressure drop.	Subcontractor	BIM Model					x
Core Set Horizontal	Integer	Degrees		Degree of horizontal (in the X-axis of the Local Placement) blade set from the centerline.	Subcontractor	BIM Model					x
Core Set Vertical	Integer	Degrees		Degree of vertical (in the Y-axis of the Local Placement) blade set from the centerline.	Subcontractor	BIM Model					x
Core Type	Text			Identifies the way the core of the Air Terminal is constructed.	Subcontractor	BIM Model				x	x
Discharge Direction	String	Text	Parallel, Perpendicular, Adjustable	Discharge direction of the air terminal. Parallel: discharges parallel to mounting surface designed so that flow attaches to the surface. Perpendicular: discharges away from mounting surface. Adjustable: both parallel and perpendicular discharge.	Subcontractor	BIM Model				x	x
Effective Area	Integer	mm^2		Effective discharge area of the air terminal.	Subcontractor	BIM Model					x
Face Type	String	Text		Identifies how the terminal face of an Air Terminal is constructed.	Subcontractor	BIM Model				x	x
Finish Color	String	Text		The finish color for the air terminal.	Subcontractor	BIM Model				x	x
Finish Type	String	Text		The type of finish for the air terminal.	Subcontractor	BIM Model				x	x
Flow Control Type	String	Text		Type of flow control element that may be included as a part of the construction of the air terminal.	Subcontractor	BIM Model				x	x
Flow Pattern	String	Text		Flow pattern.	Subcontractor	BIM Model				x	x
Has Integral Control	Bool	yes/no	True or False	If TRUE, a self powered temperature control is included in the Air Terminal.	Subcontractor	BIM Model				x	x
Has Sound Attenuator	Bool	yes/no	True or False	If TRUE, the air terminal has sound attenuation.	Subcontractor	BIM Model				x	x
Has Thermal Insulation	Bool	yes/no	True or False	If TRUE, the air terminal has thermal insulation.	Subcontractor	BIM Model				x	x
Mounting Type	String	Text	Surface, Flat flush, Lay-in	The way the air terminal is mounted to the ceiling, wall, etc.	Subcontractor	BIM Model				x	x
Neck Area	Integer	mm^2		Neck area of the air terminal.	Subcontractor	BIM Model					x
Number Of Slots	Integer	None	1,2,3…	Number of slots.	Subcontractor	BIM Model					x
Shape	String	Text		Shape of the air terminal. Slot is typically a long narrow supply device with an aspect ratio Genericly greater than 10 to 1.	Subcontractor	BIM Model					x
Slot Length	Integer	mm		Slot length.	Subcontractor	BIM Model					x
Slot Width	Integer	mm		Slot width.	Subcontractor	BIM Model					x
Temperature Range	Integer	Degree C°		Temperature range within which the air terminal is designed to operate.	Subcontractor	BIM Model				x	x
Throw Length	Integer	mm		The horizontal or vertical axial distance an airstream travels after leaving an Air Terminal before the maximum stream velocity is reduced to a specified terminal velocity under isothermal conditions at the upper value of the Air Flow rate Range.	Subcontractor	BIM Model					x
Air Flow Rate	Integer	m^3/s		Volumetric flow rate.	Subcontractor	BIM Model				x	x
Centerline Air Velocity	Integer	m/s		Centerline air velocity versus distance from the diffuser and temperature differential	Subcontractor	BIM Model					x
Induction Ratio	Integer	None		Induction ratio versus distance from the diffuser and its discharge direction; induction ratio (or	Subcontractor	BIM Model					x
Neck Air Velocity	Integer	m/s		Air velocity at the neck.	Subcontractor	BIM Model					x
Pressure Drop	Integer	mm of water		Drop in total pressure between inlet and outlet at nominal air-flow rate.	Subcontractor	BIM Model				x	x
Supply Air Temperature Cooling	Integer	Degree C°		Supply air temperature in cooling mode.	Subcontractor	BIM Model				x	x
Supply Air Temperature Heating	Integer	Degree C°		Supply air temperature in heating mode.	Subcontractor	BIM Model				x	x
Air Flow Rate	Integer	m^3/s		The actual airflow rate as designed.	Subcontractor	BIM Model				x	x
Airflow Type	String	Text		Enumeration defining the functional type of air flow through the terminal.	Subcontractor	BIM Model				x	x
Location	String	Text		Location (a single type of diffuser can be used for multiple locations); high means close to ceiling.	Subcontractor	BIM Model					x
Air to Air Heat Exchanger				**An air-to-air heat recovery device employs a counter-flow heat exchanger between inbound and outbound air flow.**							
Heat Exchanger Type	String	Text		The property enumeration defines the types of heat exhanger that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Has Defrost	Bool	yes/no	True or False	The heat exchanger has defrost function or not.	Subcontractor	BIM Model				x	x

Heat Transfer Type	String	Text		Type of heat transfer between the two air streams.	Subcontractor	BIM Model			x	x	x
Operational Temperature Range	Integer	Degree C°		Allowable operation ambient air temperature range.	Subcontractor	BIM Model				x	x
Primary Airflow Rate Range	Integer	m³/s		possible range of primary airflow that can be delivered..	Subcontractor	BIM Model				x	x
Secondary Airflow Rate Range	Integer	m³/s		possible range of secondary airflow that can be delivered.	Subcontractor	BIM Model				x	x
Air Pressure Drop Curves	Integer	Pa		Air pressure drop as function of air flow rate.	Subcontractor	BIM Model					x
Defrost Temperature Effectiveness	Integer	Degree C°		Temperature heat transfer effectiveness when defrosting is active.	Subcontractor	BIM Model					x
Humidity Effectiveness	Integer	None		Humidity heat transfer effectiveness: The ratio of primary airflow absolute humidity changes to maximum possible absolute humidity changes.	Subcontractor	BIM Model					x
Latent Heat Transfer Rate	Integer	R-Value		Latent heat transfer rate.	Subcontractor	BIM Model					x
Sensible Effectiveness	Integer	None		Sensible heat transfer effectiveness, where effectiveness is defined as the ratio of heat transfer to maximum possible heat transfer.	Subcontractor	BIM Model					x
Sensible Effectiveness Table	Integer	None		Sensible heat transfer effectiveness curve as a function of the primary and secondary air flow rate.	Subcontractor	BIM Model					x
Sensible Heat Transfer Rate	Integer	R-Value		Sensible heat transfer rate.	Subcontractor	BIM Model					x
Temperature Effectiveness	Integer	None		Temperature heat transfer effectiveness: The ratio of primary airflow temperature changes to maximum possible temperature changes.	Subcontractor	BIM Model					x
Total Effectiveness	Integer	None		Total heat transfer effectiveness: The ratio of heat transfer to the maximum possible heat transfer.	Subcontractor	BIM Model					x
Total Effectiveness Table	Integer	None		Total heat transfer effectiveness curve as a function of the primary and secondary air flow rate.	Subcontractor	BIM Model					x
Total Heat Transfer Rate	Integer	R-Value		Total heat transfer rate.	Subcontractor	BIM Model					x
Boiler				**A boiler is a closed, pressure-rated vessel in which water or other fluid is heated using an energy source such as natural gas, heating oil, or electricity. The fluid in the vessel is then circulated out of the boiler for use in various processes or heating applications.**							
Boiler Type	String	Text		The property enumeration defines the types of boiler that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Energy Source	String	Text		Enumeration defining the energy source or fuel combusted to generate heat.	Subcontractor	BIM Model				x	x
Heat Transfer Surface Area	Integer	mm²		Total heat transfer area of the vessel.	Subcontractor	BIM Model				x	x
Is Water Storage Heater	Bool	yes/no	True or False	This is used to identify if the boiler has storage capacity (TRUE). If FALSE, then there is no storage capacity built into the boiler, such as an instantaneous hot water heater.	Subcontractor	BIM Model				x	x
Nominal Energy Consumption	Integer	R-Value		Nominal fuel consumption rate required to produce the total boiler heat output.	Subcontractor	BIM Model				x	x
Nominal Part Load Ratio	Integer	None		Allowable part load ratio range.	Subcontractor	BIM Model				x	x
Operating Mode	String	Text		Identifies the operating mode of the boiler.	Subcontractor	BIM Model				x	x
Outlet Temperature Range	Integer	Degree C°		Allowable outlet temperature of either the water or the steam.	Subcontractor	BIM Model				x	x
Partial Load Efficiency Curves	Integer	Percent		Boiler efficiency as a function of the partial load factor; E = f (partial Load factor).	Subcontractor	BIM Model					x
Pressure Rating	Integer	Pa		Nominal pressure rating of the boiler as rated by the agency having jurisdiction.	Subcontractor	BIM Model				x	x
Water Inlet Temperature Range	Integer	Degree C°		Allowable water inlet temperature range.	Subcontractor	BIM Model				x	x
Water Storage Capacity	Integer	m³		Water storage capacity.	Subcontractor	BIM Model				x	x
Auxiliary Energy Consumption	String	Text		Boiler secondary energy source consumption pumps).	Subcontractor	BIM Model					x
Combustion Efficiency	Integer	Percent		Combustion efficiency under nominal condition.	Subcontractor	BIM Model					x
Combustion Temperature	Integer	Degree C°		Average combustion chamber temperature.	Subcontractor	BIM Model					x
Energy Source Consumption	Integer	R-Value		Energy consumption.	Subcontractor	BIM Model					x
Load Real	Integer	R-Value		Boiler real load.	Subcontractor	BIM Model					x
Operational Efficiency	Integer	Percent		Operational efficiency: boiler output divided by total energy input (electrical and fuel).	Subcontractor	BIM Model					x
Part Load Ratio	Integer	None		Ratio of the real to the nominal capacity.	Subcontractor	BIM Model					x
Primary Energy Consumption	Integer	R-Value		Boiler primary energy source consumption (i.e., the fuel consumed for changing the thermodynamic state of the fluid).	Subcontractor	BIM Model					x
Working Pressure	Integer	Pa		Boiler working pressure.	Subcontractor	BIM Model					x
Steam Boiler	Text			Steam boiler type Specific Baseline Attributes.							
Heat Output	Integer	R-Value		Total nominal heat output as listed by the Boiler manufacturer. For steam boilers, it is a function of inlet temperature versus steam pressure.	Subcontractor	BIM Model					x
Maximum Outlet Pressure	Integer	Pa		Maximum steam outlet pressure.	Subcontractor	BIM Model				x	x
Nominal Efficiency	Integer	Percent		The nominal efficiency of the boiler as defined by the manufacturer. For steam boilers, a function of inlet temperature versus steam pressure.	Subcontractor	BIM Model					x
Water Boiler				Water boiler type Specific Baseline Attributes.							
Heat Output	Integer	R-Value		Total nominal heat output as listed by the Boiler manufacturer. For water boilers, it is a function of inlet versus outlet temperature. For steam boilers, it is a function of inlet temperature versus steam pressure	Subcontractor	BIM Model					x
Nominal Efficiency	Integer	Percent		The nominal efficiency of the boiler as defined by the manufacturer. For water boilers, a function of inlet versus outlet temperature.	Subcontractor	BIM Model					x

Chiller				**A chiller is a device used to remove heat from a liquid via a vapor-compression or absorption refrigeration cycle to cool a fluid, typically water or a mixture of water and glycol. The chilled fluid is then used to cool and dehumidify air in a building.**							
Chiller Type	String	Text		The property enumeration defines the types of chiller that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Capacity Curve	Integer	None		Chiller cooling capacity is a function of condensing temperature and evaporating temperature.	Subcontractor	BIM Model				x	x
Coefficient Of Performance Curve	Integer	None		Chiller coefficient of performance (COP) is function of condensing temperature and evaporating temperature.	Subcontractor	BIM Model					x
Full Load Ratio Curve	Integer	None		Ratio of actual power to full load power as a quadratic function of part load	Subcontractor	BIM Model					x
Nominal Capacity	Integer	Ton		Nominal cooling capacity of chiller at standardized conditions as defined by the agency having jurisdiction.	Subcontractor	BIM Model				x	x
Nominal Condensing Temperature	Integer	Degree C°		Chiller condensing temperature.	Subcontractor	BIM Model				x	x
Nominal Efficiency	Integer	Percent		Nominal chiller efficiency under nominal conditions.	Subcontractor	BIM Model				x	x
Nominal Evaporating Temperature	Integer	Degree C°		Chiller evaporating temperature.	Subcontractor	BIM Model				x	x
Nominal Heat Rejection Rate	Integer	R-Value		Sum of the refrigeration effect and the heat equivalent of the power input to the compressor.	Subcontractor	BIM Model					x
Nominal Power Consumption	Integer	Horsepower		Nominal total power consumption.	Subcontractor	BIM Model				x	x
Capacity	Integer	Ton		The product of the ideal capacity and the overall volumetric efficiency of the compressor.	Subcontractor	BIM Model					x
Coefficient Of Performance	Integer	None		The Coefficient of performance (COP) is the ratio of heat removed to energy input.	Subcontractor	BIM Model					x
Energy Efficiency Ratio	Integer	R-Value		The Energy efficiency ratio (EER) is the ratio of net cooling capacity to the total input rate of electric power applied	Subcontractor	BIM Model					x
Coil				**A coil is a device used to provide heat transfer between non-mixing media.**							
Coil Type	String	Text		The property enumeration defines the types of coil that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Airflow Rate Range	Integer	m^3/s	For cases where there is no airflow across the coil (e.g.	Possible range of airflow that can be delivered.	Subcontractor	BIM Model				x	x
Nominal Latent Capacity	Integer	R-Value		Nominal latent capacity.	Subcontractor	BIM Model				x	x
Nominal Sensible Capacity	Integer	R-Value		Nominal sensible capacity.	Subcontractor	BIM Model				x	x
Nominal U A	Integer	None		Nominal UA value.	Subcontractor	BIM Model				x	x
Operational Temperature Range	Integer	Degree C°		Allowable operational air temperature range.	Subcontractor	BIM Model				x	x
Placement Type	String	Text	Floor, Ceiling, Unit	Indicates the placement of the coil	Subcontractor	BIM Model				x	x
Air Pressure Drop Curve	Integer	Pa		Air pressure drop curve, pressure drop – flow rate curve	Subcontractor	BIM Model					x
Atmospheric Pressure	Integer	Pa		Ambient atmospheric pressure.	Subcontractor	BIM Model					x
Face Velocity	Integer	m/s		Air velocity through the coil.	Subcontractor	BIM Model					x
Sound Curve	Integer	Decibel		Regenerated sound versus air-flow rate.	Subcontractor	BIM Model					x
Sound Attenuation	Bool	yes/no	True or False	TRUE if the coil has sound attenuation, FALSE if it does not.	Subcontractor	BIM Model					x
Water Coil	String	Text		Hydronic coil type attributes.	Subcontractor	BIM Model					x
Bypass Factor	Integer	None	between 0-1	Fraction of air that is bypassed by the coil .	Subcontractor	BIM Model					x
Coil Connection Direction	String	Text		Coil connection direction (facing into the air stream).	Subcontractor	BIM Model					x
Coil Coolant	String	Text		The fluid used for heating or cooling used by the hydronic coil.	Subcontractor	BIM Model					x
Coil Face Area	Integer	mm^2		Coil face area in the direction against air the flow.	Subcontractor	BIM Model					x
Coil Fluid Arrangement	String	Text	Cross Counter Flow, Crossflow, Cross Parallel Flow	Fluid flow arrangement of the coil	Subcontractor	BIM Model					x
Fluid	String	Text		The properties of the hydronic fluid used for heat transfer within the coil tubes.	Subcontractor	BIM Model					x
Fluid Pressure Range	Integer	Pa		Allowable water working pressure range inside the tube.	Subcontractor	BIM Model					x
Heat Exchange Surface Area	Integer	mm^2		Heat exchange surface area associated with U-value.	Subcontractor	BIM Model					x
Primary Surface Area	Integer	mm^2		Primary heat transfer surface area of the tubes and headers.	Subcontractor	BIM Model					x
Secondary Surface Area	Integer	mm^2		Secondary heat transfer surface area created by fins.	Subcontractor	BIM Model					x
Sensible Heat Ratio	Integer	None		Air-side sensible heat ratio, or fraction of sensible heat transfer to the total heat transfer.	Subcontractor	BIM Model					x
Total U A Curves	Integer	None		Total UA curves, UA - air and water velocities	Subcontractor	BIM Model					x
Water Pressure Drop Curve	Integer	Pa		Water pressure drop curve, pressure drop – flow rate curve	Subcontractor	BIM Model					x
Wet Coil Fraction	Integer	None	between 0-1	Fraction of coil surface area that is wet (0-1).	Subcontractor	BIM Model					x
Compressor				**A compressor is a device that compresses a fluid typically used in a refrigeration circuit.**							
Compressor Type	String	Text		The property enumeration defines the types of compressor that may be specified within the property set.	Subcontractor	BIM Model			x	x	x

Compressor Speed	Integer	R-Value		Compressor speed.	Subcontractor	BIM Model				x	x
Has Hot Gas Bypass	Bool	yes/no	True or False	Whether or not hot gas bypass is provided for the compressor	Subcontractor	BIM Model				x	x
Ideal Capacity	Integer	Ton		Compressor capacity under ideal conditions.	Subcontractor	BIM Model				x	x
Ideal Shaft Power	Integer	Horsepower		Compressor shaft power under ideal conditions.	Subcontractor	BIM Model				x	x
Impeller Diameter	Integer	mm²		Diameter of compressor impeller - used to scale performance of geometrically similar compressors.	Subcontractor	BIM Model					x
Maximum Part Load Ratio	Integer	None		Maximum part load ratio as a fraction of nominal capacity.	Subcontractor	BIM Model				x	x
Minimum Part Load Ratio	Integer	None		Minimum part load ratio as a fraction of nominal capacity.	Subcontractor	BIM Model				x	x
Nominal Capacity	Integer	Ton		Compressor nameplate capacity.	Subcontractor	BIM Model					x
Power Source	String	Text		Type of power driving the compressor.	Subcontractor	BIM Model				x	x
Refrigerant Class	String	Text	CFC, HCFC, HFC	Refrigerant class used by the compressor.	Subcontractor	BIM Model				x	x
Refrigerant Type	String	Text		Refrigerant material.	Subcontractor	BIM Model				x	x
Coefficient Of Performance	Integer	None		Coefficient of performance (COP).	Subcontractor	BIM Model					x
Compression Efficiency	Integer	Percent		Ratio of the work required for isentropic compression of the gas to the work delivered to the gas within the compression volume	Subcontractor	BIM Model					x
Compressor Capacity	Integer	Ton		The product of the ideal capacity and the overall volumetric efficiency of the compressor.	Subcontractor	BIM Model					x
Compressor Total Efficiency	Integer	Percent		Ratio of the thermal cooling capacity to electrical input.	Subcontractor	BIM Model					x
Compressor Total Heat Gain	Integer	R-Value		Compressor total heat gain.	Subcontractor	BIM Model					x
Energy Efficiency Ratio	Integer	None		Energy efficiency ratio (EER).	Subcontractor	BIM Model					x
Friction Heat Gain	Integer	R-Value		Friction heat gain.	Subcontractor	BIM Model					x
Full Load Ratio	Integer	None		Ratio of actual power to full load power as a quadratic function of part load, at certain condensing and evaporating temperature	Subcontractor	BIM Model					x
Input Power	Integer	R-Value		Input power to the compressor motor.	Subcontractor	BIM Model					x
Isentropic Efficiency	Integer	Percent		Ratio of the work required for isentropic compression of the gas to work input to the compressor	Subcontractor	BIM Model					x
Lubricant Pump Heat Gain	Integer	R-Value		Lubricant pump heat gain.	Subcontractor	BIM Model					x
Mechanical Efficiency	Integer	Percent		Ratio of the work (as measured) delivered to the gas to the work input to the compressor shaft.	Subcontractor	BIM Model					x
Shaft Power	Integer	R-Value		The actual shaft power input to the compressor.	Subcontractor	BIM Model					x
Volumetric Efficiency	Integer	Percent		Ratio of the actual volume of gas entering the compressor to the theoretical displacement of the compressor.	Subcontractor	BIM Model					x
Condenser				**A condenser is a device that is used to dissipate heat, typically by condensing a substance such as a refrigerant from its gaseous to its liquid state.**							
Condenser Type	String	Text		The property enumeration defines the types of condenser that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
External Surface Area	Integer	mm²		External surface area (both primary and secondary area).	Subcontractor	BIM Model					x
Internal Refrigerant Volume	Integer	mm³		Internal volume of condenser (refrigerant side).	Subcontractor	BIM Model					x
Internal Surface Area	Integer	mm²		Internal surface area.	Subcontractor	BIM Model					x
Internal Water Volume	Integer	m³		Internal volume of condenser (water side).	Subcontractor	BIM Model					x
Nominal Heat Transfer Area	Integer	mm²		Nominal heat transfer surface area associated with nominal overall heat transfer coefficient.	Subcontractor	BIM Model				x	x
Nominal Heat Transfer Coefficient	Integer	None		Nominal overall heat transfer coefficient associated with nominal heat transfer area.	Subcontractor	BIM Model				x	x
Refrigerant Class	String	Text	CFC, HCFC, HFC	Refrigerant class used by the condenser.	Subcontractor	BIM Model				x	x
Refrigerant Material	String	Text		The refrigerant material used for heat transfer purposes.	Subcontractor	BIM Model				x	x
Compressor Condenser Heat Gain	Integer	R-Value		Heat gain between condenser inlet to compressor outlet.	Subcontractor	BIM Model					x
Compressor Condenser Pressure Drop	Integer	Pa		Pressure drop between condenser inlet and compressor outlet.	Subcontractor	BIM Model					x
Condenser Mean Void Fraction	Integer	None		Mean void fraction in condenser.	Subcontractor	BIM Model					x
Condensing Temperature	Integer	Degree C°		Refrigerant condensing temperature.	Subcontractor	BIM Model					x
Exterior Heat Transfer Coefficient	Integer	None		Exterior heat transfer coefficient associated with exterior surface area.	Subcontractor	BIM Model					x
Heat Rejection Rate	Integer	R-Value		Sum of the refrigeration effect and the heat equivalent of the power input to the compressor.	Subcontractor	BIM Model					x
Interior Heat Transfer Coefficient	Integer	None		Interior heat transfer coefficient associated with interior surface area.	Subcontractor	BIM Model					x
Logarithmic Mean Temperature Differ	Integer	Degree C°		Logarithmic mean temperature difference between refrigerant and water or air.	Subcontractor	BIM Model					x
Refrigerant Fouling Resistance	Integer	None		Fouling resistance on the refrigerant side.	Subcontractor	BIM Model					x
U A curves	Integer	None		UV = f (VExterior, VInterior), UV as a function of interior and exterior fluid flow velocity at the entrance.	Subcontractor	BIM Model					x
Water Fouling Resistance	Integer	R-Value		Fouling resistance on water/air side.	Subcontractor	BIM Model					x

Chilled Beam				**A cooled beam (or chilled beam) is a device typically used to cool air by circulating a fluid such as chilled water through exposed finned tubes above a space**							
Chilled Beam Type	String	Text	Active, Passive, User Defined	The property enumeration defines the types of chilled beam that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Coil Length	Integer	mm		Length of coil.	Subcontractor	BIM Model					x
Coil Width	Integer	mm		Width of coil.	Subcontractor	BIM Model					x
Finish Color	String	Text		Finish color for cooled beam.	Subcontractor	BIM Model				x	x
Integrated Lighting Type	String	Text		Integrated lighting in cooled beam.	Subcontractor	BIM Model				x	x
Is Free Hanging	Bool	yes/no	True or False	Is it free hanging type (not mounted in a false ceiling)?	Subcontractor	BIM Model				x	x
Nominal Cooling Capacity	Integer	R-Value		Nominal cooling capacity.	Subcontractor	BIM Model				x	x
Nominal Heating Capacity	Integer	R-Value		Nominal heating capacity.	Subcontractor	BIM Model				x	x
Nominal Return Water Temperature C	Integer	Degree C°		Nominal return water temperature (refers to nominal cooling capacity).	Subcontractor	BIM Model				x	x
Nominal Return Water Temperature H	Integer	Degree C°		Nominal return water temperature (refers to nominal heating capacity).	Subcontractor	BIM Model				x	x
Nominal Supply Water Temperature C	Integer	Degree C°		Nominal supply water temperature (refers to nominal cooling capacity).	Subcontractor	BIM Model				x	x
Nominal Supply Water Temperature H	Integer	Degree C°		Nominal supply water temperature (refers to nominal heating capacity).	Subcontractor	BIM Model				x	x
Nominal Surrounding Humidity Coolir	Integer	Percent		Nominal surrounding humidity (refers to nominal cooling capacity).	Subcontractor	BIM Model				x	x
Nominal Surrounding Temperature Co	Integer	Degree C°		Nominal surrounding temperature (refers to nominal cooling capacity).	Subcontractor	BIM Model				x	x
Nominal Surrounding Temperature He	Integer	Degree C°		Nominal surrounding temperature (refers to nominal heating capacity).	Subcontractor	BIM Model				x	x
Nominal Water Flow Cooling	Integer	m³/s		Nominal water flow (refers to nominal cooling capacity).	Subcontractor	BIM Model				x	x
Nominal Water Flow Heating	Integer	m³/s		Nominal water flow (refers to nominal heating capacity).	Subcontractor	BIM Model				x	x
Pipe Connection	String	Text		The manner in which the pipe connection is made to the cooled beam.	Subcontractor	BIM Model				x	x
Water Flow Control System Type	String	Text		Factory fitted water flow control system.	Subcontractor	BIM Model					x
Active Chilled Beam Configuration	String	Text		Active (ventilated) cooled beam	Subcontractor	BIM Model				x	x
Air Flow Configuration	String	Text		Air flow configuration type of cooled beam.	Subcontractor	BIM Model					x
Air Flow Rate	Integer	R-Value		Air flow rate.	Subcontractor	BIM Model				x	x
Air Pressure Drop Curves	Integer	mm of Water		Air pressure drop as function of air flow rate.	Subcontractor	BIM Model					x
Airflow Rate Range	Integer	R-Value		Possible range of airflow that can be delivered.	Subcontractor	BIM Model					x
Beam Cooling Capacity	Integer	R-Value		Cooling capacity of beam. This excludes cooling capacity of supply air.	Subcontractor	BIM Model					x
Beam Heating Capacity	Integer	R-Value		Heating capacity of beam. This excludes heating capacity of supply air.	Subcontractor	BIM Model					x
Connection Size	Integer	mm		Duct connection diameter.	Subcontractor	BIM Model					x
Cooling Water Flow Rate	Integer	m³/s		Water flow rate for cooling.	Subcontractor	BIM Model					x
Correction Factor For Cooling	Integer	None		Correction factor k as a function of water flow rate (used to calculate cooling capacity).	Subcontractor	BIM Model					x
Correction Factor For Heating	Integer	None		Correction factor k as a function of water flow rate (used to calculate heating capacity).	Subcontractor	BIM Model					x
Heating Water Flow Rate	Integer	m³/s		Water flow rate for heating.	Subcontractor	BIM Model					x
Return Water Temperature Cooling	Integer	Degree C°		Return water temperature in cooling mode.	Subcontractor	BIM Model					x
Return Water Temperature Heating	Integer	Degree C°		Return water temperature in heating mode.	Subcontractor	BIM Model					x
Supply Air Connection Type	String	Text		The manner in which the pipe connection is made to the cooled beam.	Subcontractor	BIM Model					x
Supply Water Temperature Cooling	Integer	Degree C°		Supply water temperature in cooling mode.	Subcontractor	BIM Model					x
Supply Water Temperature Heating	Integer	Degree C°		Supply water temperature in heating mode.	Subcontractor	BIM Model					x
Throw	Integer	mm		Distance cooled beam throws the air.	Subcontractor	BIM Model					x
Total Cooling Capacity	Integer	R-Value		Total cooling capacity. This includes cooling capacity of beam and cooling capacity of supply air.	Subcontractor	BIM Model					x
Total Heating Capacity	Integer	R-Value		Total heating capacity. This includes heating capacity of beam and heating capacity of supply air.	Subcontractor	BIM Model					x
Water Pressure Drop Curves	Integer	mm of Water		Water pressure drop as function of water flow rate.	Subcontractor	BIM Model					x
Cooling Tower				**A cooling tower is a device which rejects heat to ambient air by circulating a fluid such as water through it to reduce its temperature by partial evaporation.**							
Circuit Type	String	Text	Open Circuit, Close Circuit, Wet, Dry, Dry Wet, User Defined	Open Circuit: Exposes water directly to the cooling atmosphere. Close Circuit: The fluid is separated from the atmosphere by a heat exchanger. Wet: The air stream or the heat exchange surface is evaporatively cooled. Dry: No evaporation into the air stream. Dry Wet: A combination of a dry tower and a wet tower.	Subcontractor	BIM Model			x	x	x
Ambient Design Dry Bulb Temperatur	Integer	Degree C°		Ambient design dry bulb temperature used for selecting the cooling tower.	Subcontractor	BIM Model				x	x
Ambient Design Wet Bulb Temperatu	Integer	Degree C°		Ambient design wet bulb temperature used for selecting the cooling tower.	Subcontractor	BIM Model				x	x
Basin Reserve Volume	Integer	Gallons		Volume between operating and overflow levels in cooling tower basin.	Subcontractor	BIM Model					x

Capacity Control	String	Text	Fan Cycling, Two Speed Fan, Variable Speed Fan, Dampers Control, Bypass Valve Control, Multiple Series Pumps, Two Speed Pump, Variable Speed Pump, User Defined	Fan Cycling: Fan is cycled on and off to control duty. Two Speed Fan: Fan is switched between low and high speed to control duty. Variable Speed Fan: Fan speed is varied to control duty. Dampers Control: Dampers modulate the air flow to control duty. Bypass Valve Control: Bypass valve modulates the water flow to control duty. Multiple Series Pumps: Turn on/off multiple series pump to control duty. Two Speed Pump: Switch between high/low pump speed to control duty. Variable Speed Pump: vary pump speed to control duty.	Subcontractor	BIM Model				x	x
Control Strategy	String	Text	Fixed Exiting Water Temp, Wet Bulb Temp Reset	Fixed Exiting Water Temp: The capacity is controlled to maintain a fixed exiting water temperature. Wet Bulb Temp Reset: The set-point is reset based on the wet-bulb temperature.	Subcontractor	BIM Model				x	x
Flow Arrangement	String	Text	Counter Flow, Crossflow, Pparallel Flow, User Defined	Counter Flow: Air and water flow enter in different directions. Crossflow: Air and water flow are perpendicular. Parallel Flow: air and water flow enter in same directions.	Subcontractor	BIM Model				x	x
Lift Elevation Difference	Integer	mm		Elevation difference between cooling tower sump and the top of the tower.	Subcontractor	BIM Model					x
Nominal Capacity	Integer	Ton		Nominal cooling tower capacity in terms of heat transfer rate of the cooling tower between air stream and water stream at nominal conditions.	Subcontractor	BIM Model				x	x
Number Of Cells	Integer	None		Number of cells in one cooling tower unit.	Subcontractor	BIM Model					x
Operation Temperature Range	Integer	Degree C°		Allowable operation ambient air temperature range.	Subcontractor	BIM Model				x	x
Spray Type	String	Text	Spray Filled, Splash Type Fill, Film Type Fill, User Defined	Water Spray Fill Type	Subcontractor	BIM Model				x	x
Water Requirement	Integer	m³/s		Make-up water requirements.	Subcontractor	BIM Model					x
Capacity	Integer	Ton		Cooling tower capacity in terms of heat transfer rate of the cooling tower between air stream and water stream.	Subcontractor	BIM Model					x
Heat Transfer Coefficient	Integer	None		Heat transfer coefficient-area product.	Subcontractor	BIM Model					x
Sump Heater Power	Integer	Watts		Electrical heat power of sump heater.	Subcontractor	BIM Model					x
U A Curve	Integer	None		UA value as a function of fan speed at certain water flow rate, UA = f (fan speed).	Subcontractor	BIM Model					x
Water Delta	Integer	Degree C°		Water temperature change as a function of wet-bulb temperature, water entering temperature,	Subcontractor	BIM Model					x
Damper				**A damper typically participates in an HVAC duct distribution system and is used to control or modulate the flow of air.**							
Damper Type	String	Text	Manual, Control, Fire, Fire Smoke, Smoke, User Defined	The property enumeration defines the types of damper that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Blade Action	String	Text		Blade action.	Subcontractor	BIM Model				x	x
Blade Edge	String	Text		Blade edge.	Subcontractor	BIM Model					x
Blade Material	String	Text		The material from which the damper blades are constructed.	Subcontractor	BIM Model				x	x
Blade Shape	String	Text		Blade shape. Flat means triple V-groove.	Subcontractor	BIM Model					x
Blade Thickness	Integer	mm		The thickness of the damper blade.	Subcontractor	BIM Model					x
Close Off Rating	String	Text		Close off rating.	Subcontractor	BIM Model				x	x
Face Area	Integer	mm²		Face area open to the airstream.	Subcontractor	BIM Model				x	x
Frame Depth	Integer	mm²		The length (or depth) of the damper frame.	Subcontractor	BIM Model					x
Frame Material	Text			The material from which the damper frame is constructed.	Subcontractor	BIM Model				x	x
Frame Thickness	Integer	Inches		The thickness of the damper frame material.	Subcontractor	BIM Model					x
Frame Type	String	Text	Standard, Single Flange, Single Reversed Flange, Double Flange, User Defined	The type of frame used by the damper	Subcontractor	BIM Model				x	x
Leakage Curve	Integer	None		Leakage versus pressure drop; Leakage = f (pressure).	Subcontractor	BIM Model					x
Leakage Fully Closed	Integer	R-Value		Leakage when fully closed.	Subcontractor	BIM Model					x
Loss Coefficient Curve	Integer	None		Loss coefficient – blade position angle curve; ratio of pressure drop to velocity pressure versus blade angle; C = f (blade angle position).	Subcontractor	BIM Model					x
Maximum Air Flow Rate	Integer	m³/s		Maximum allowable air flow rate.	Subcontractor	BIM Model				x	x
Maximum Working Pressure	Integer	Pa		Maximum working pressure.	Subcontractor	BIM Model				x	x
Nominal Air Flow Rate	Integer	m³/s		Nominal air flow rate.	Subcontractor	BIM Model				x	x
Number of Blades	Integer	None	1,2,3…	Number of blades.	Subcontractor	BIM Model					x
Open Pressure Drop	Integer	mm of Water		Total pressure drop across damper.	Subcontractor	BIM Model					x
Operation	String	Text		The operational mechanism for the damper operation.	Subcontractor	BIM Model					x

Orientation	String	Text		The intended orientation for the damper as specified by the manufacturer.	Subcontractor	BIM Model					x
Regenerated Sound Curve	Integer	R-Value		Regenerated sound versus air flow rate.	Subcontractor	BIM Model					x
Seal Material	String	Text		The material from which the damper seals are constructed.	Subcontractor	BIM Model					x
Temperature Range	Integer	Degree C°		Temperature range.	Subcontractor	BIM Model				x	x
Sizing Method	String	Text		Identifies whether the damper is sized nominally or with exact measurements: NOMINAL: Nominal sizing method. EXACT: Exact sizing method.	Subcontractor	BIM Model					x
Air Flow Rate	Integer	m³/s		Air flow rate.	Subcontractor	BIM Model				x	x
Blade Position Angle	Integer	Degrees	0-90	Blade position angle; angle between the blade and flow direction (0 - 90).	Subcontractor	BIM Model					x
Damper Position	Integer	None	0-1	Damper position (0-1); damper position (0=closed=90deg position angle, 1=open=0deg position	Subcontractor	BIM Model					x
Leakage	Integer	R-Value		Air leakage rate.	Subcontractor	BIM Model					x
Pressure Drop	Integer	mm of Water		Pressure drop.	Subcontractor	BIM Model					x
Pressure Loss Coefficient	Integer	None		Pressure loss coefficient.	Subcontractor	BIM Model					x
Control Damper				Control damper type attributes.							
Control Damper Operation	String	Text		The inherent characteristic of the control damper operation.	Subcontractor	BIM Model				x	x
Torque Range	Integer	R-Value		Torque range: minimum operational torque to maximum allowable torque.	Subcontractor	BIM Model					x
Fire Damper				Fire damper type attributes.							
Actuation Type	String	Text		Enumeration that identifies the different types of dampers.	Subcontractor	BIM Model				x	x
Enclosure Rating	String	Text		Enumeration that identifies the closure rating for the damper.	Subcontractor	BIM Model				x	x
Fire Resistance Rating	String	Text		Measure of the fire resistance rating in hours (e.g., 1.5 hours, 2 hours, etc.).	Subcontractor	BIM Model				x	x
Fusible Link Temperature	String	Text		The temperature that the fusible link melts.	Subcontractor	BIM Model					x
Fire Smoke Damper				Combination Fire and Smoke damper type attributes.							
Actuation Type	String	Text		Enumeration that identifies the different types of dampers.	Subcontractor	BIM Model				x	x
Enclosure Rating	String	Text		Enumeration that identifies the closure rating for the damper.	Subcontractor	BIM Model				x	x
Control Type	String	Text		The type of control used to operate the damper (e.g., Open/Closed Indicator, Resettable Temperature Sensor, Temperature Override, etc.).	Subcontractor	BIM Model				x	x
Fire Resistance Rating	String	Text		Measure of the fire resistance rating in hours (e.g., 1.5 hours, 2 hours, etc.).	Subcontractor	BIM Model				x	x
Fusible Link Temperature	Integer	Degree C°		The temperature that the fusible link melts.	Subcontractor	BIM Model					x
Smoke Damper				Smoke damper type attributes.							
Control Type	String	Text		The type of control used to operate the damper (e.g., Open/Closed Indicator, Resettable Temperature Sensor, Temperature Override, etc.) .	Subcontractor	BIM Model				x	x
Dry Cooler				**An evaporative cooler is a device that cools air by saturating it with water vapor.**							
Cooler Type	String	Text		The property enumeration defines the types of evaporative cooler that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Air Pressure Drop Curve	Integer	mm of Water		Air pressure drop as function of air flow rate.	Subcontractor	BIM Model					x
Effectiveness Table	Integer	None		Total heat transfer effectiveness curve as a function of the primary air flow rate.	Subcontractor	BIM Model					x
Flow Arrangement	String	Text		Counter Flow: Air and water flow enter in different directions. Crossflow: Air and water flow are perpendicular. Parallel Flow: Air and water flow enter in same directions.	Subcontractor	BIM Model				x	x
Heat Exchange Area	Integer	mm²		Heat exchange area.	Subcontractor	BIM Model					x
Operation Temperature Range	Integer	Degree C°		Allowable operation ambient air temperature range.	Subcontractor	BIM Model				x	x
Air Requirement	Integer	mm³		Make-up water requirement.	Subcontractor	BIM Model					x
Effectiveness	Integer	None		Ratio of the change in dry bulb temperature of the (primary) air stream to the difference between the entering dry bulb temperature of the (primary) air and the wet-bulb temperature of the (secondary) air.	Subcontractor	BIM Model					x
Latent Heat Transfer Rate	Integer	R-Value		Latent heat transfer rate to primary air flow.	Subcontractor	BIM Model				x	x
Sensible Heat Transfer Rate	Integer	R-Value		Sensible heat transfer rate to primary air flow.	Subcontractor	BIM Model				x	x
Total Heat Transfer Rate	Integer	R-Value		Total heat transfer rate to primary air flow.	Subcontractor	BIM Model				x	x
Air Sump Temperature	Integer	Degree C°		Water sump temperature.	Subcontractor	BIM Model					x
Duct Silencer				**A duct silencer is a device that is typically installed inside a duct distribution system for the purpose of reducing the noise levels from air movement, fan noise, etc. in the adjacent space or downstream of the duct silencer device.**							
Silencer Type	String	Text		The property enumeration defines the types of silencer that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Airflow Rate Range	Integer	m/s		Possible range of airflow that can be delivered.	Subcontractor	BIM Model				x	x
Has Exterior Insulation	Logic		True or False	TRUE if the silencer has exterior insulation. FALSE if it does not.	Subcontractor	BIM Model				x	x
Hydraulic Diameter	Integer	Inches		Hydraulic diameter.	Subcontractor	BIM Model					x
Length	Integer	Inches		The finished length of the silencer.	Subcontractor	BIM Model					x

Temperature Range	Integer	Degree C°		Allowable minimum and maximum temperature.	Subcontractor	BIM Model					x
Weight	Integer	Lbs		The weight of the silencer.	Subcontractor	BIM Model					x
Working Pressure Range	Integer	Pa		Allowable minimum and maximum working pressure (relative to ambient pressure).	Subcontractor	BIM Model					x
Air Flow Rate	Integer	m³/s		Volumetric air flow rate.	Subcontractor	BIM Model				x	x
Air Pressure Drop Curve	Integer	mm of Water		Air pressure drop as a function of air flow rate.	Subcontractor	BIM Model					x
Engine				**An engine is a device that converts fuel into mechanical energy through combustion.**							
Engine Type	Bool	yes/no		The property enumeration defines the types of engine that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Energy Source	String	Text		The source of energy.	Subcontractor	BIM Model				x	x
Evaporative Cooler				**An evaporative cooler is a device that cools air by saturating it with water vapor.**							
Cooler Type	String	Text		The property enumeration defines the types of evaporative cooler that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Air Pressure Drop Curve	Integer	mm of Water		Air pressure drop as function of air flow rate.	Subcontractor	BIM Model					x
Effectiveness Table	Integer	None		Total heat transfer effectiveness curve as a function of the primary air flow rate.	Subcontractor	BIM Model					x
Flow Arrangement	String	Text		Counter Flow: Air and water flow enter in different directions. Crossflow: Air and water flow are perpendicular. Parallel Flow: Air and water flow enter in same directions.	Subcontractor	BIM Model				x	x
Heat Exchange Area	Integer	mm²		Heat exchange area.	Subcontractor	BIM Model					x
Operation Temperature Range	Integer	Degree C°		Allowable operation ambient air temperature range.	Subcontractor	BIM Model				x	x
Water Press Drop Curve	Integer	Pa		Water pressure drop as function of water flow rate.	Subcontractor	BIM Model					x
Water Requirement	Integer	mm³		Make-up water requirement.	Subcontractor	BIM Model					x
Effectiveness	Integer	None		Ratio of the change in dry bulb temperature of the (primary) air stream to the difference between the entering dry bulb temperature of the (primary) air and the wet-bulb temperature of the (secondary) air.	Subcontractor	BIM Model					x
Latent Heat Transfer Rate	Integer	R-Value		Latent heat transfer rate to primary air flow.	Subcontractor	BIM Model				x	x
Sensible Heat Transfer Rate	Integer	R-Value		Sensible heat transfer rate to primary air flow.	Subcontractor	BIM Model				x	x
Total Heat Transfer Rate	Integer	R-Value		Total heat transfer rate to primary air flow.	Subcontractor	BIM Model				x	x
Water Sump Temperature	Integer	Degree C°		Water sump temperature.	Subcontractor	BIM Model					x
Evaporator				**An evaporator is a device in which a liquid refrigerant is vaporized and absorbs heat from the surrounding fluid.**							
Evaporator Type	String	Text		The property enumeration defines the types of evaporator that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Evaporator Coolant	String	Text		The fluid used for the coolant in the evaporator.	Subcontractor	BIM Model				x	x
Evaporator Medium Type	String	Text		Cold Liquid: Evaporator is using liquid type of fluid to exchange heat with refrigerant. Cold Air: Evaporator is using air to exchange heat with refrigerant.	Subcontractor	BIM Model				x	x
External Surface Area	Integer	mm²		External surface area (both primary and secondary area).	Subcontractor	BIM Model					x
Internal Refrigerant Volume	Integer	R-Value		Internal volume of evaporator (refrigerant side).	Subcontractor	BIM Model					x
Internal Surface Area	Integer	mm²		Internal surface area.	Subcontractor	BIM Model					x
Internal Water Volume	Integer	m³		Internal volume of evaporator (water side).	Subcontractor	BIM Model					x
Nominal Heat Transfer Area	Integer	mm²		Nominal heat transfer surface area associated with nominal overall heat transfer coefficient.	Subcontractor	BIM Model				x	x
Nominal Heat Transfer Coefficient	Integer	R-Value		Nominal overall heat transfer coefficient associated with nominal heat transfer area.	Subcontractor	BIM Model				x	x
Refrigerant Class	String	Text		Refrigerant class used by the compressor.	Subcontractor	BIM Model				x	x
Refrigerant Type	String	Text		Refrigerant material.	Subcontractor	BIM Model				x	x
Compressor Evaporator Heat Gain	Integer	R-Value		Heat gain between the evaporator outlet and the compressor inlet.	Subcontractor	BIM Model					x
Compressor Evaporator Pressure Drop	Integer	Pa		Pressure drop between the evaporator outlet and the compressor inlet.	Subcontractor	BIM Model					x
Evaporating Temperature	Integer	Degree C°		Refrigerant evaporating temperature.	Subcontractor	BIM Model					x
Evaporator Mean Void Fraction	Integer	None		Mean void fraction in evaporator.	Subcontractor	BIM Model					x
Exterior Heat Transfer Coefficient	Integer	None		Exterior heat transfer coefficient associated with exterior surface area.	Subcontractor	BIM Model					x
Heat Rejection Rate	Integer	R-Value		Sum of the refrigeration effect and the heat equivalent of the power input to the compressor.	Subcontractor	BIM Model					x
Interior Heat Transfer Coefficient	Integer	None		Interior heat transfer coefficient associated with interior surface area.	Subcontractor	BIM Model					x
Logarithmic Mean Temperature Differ	Integer	Degree C°		Logarithmic mean temperature difference between refrigerant and water or air.	Subcontractor	BIM Model					x
Refrigerant Fouling Resistance	Integer	R-Value		Fouling resistance on the refrigerant side.	Subcontractor	BIM Model					x
U A curves	String	Text		UV = f (VExterior, VInterior), UV as a function of interior and exterior fluid flow velocity at the entrance.	Subcontractor	BIM Model					x
Water Fouling Resistance	Integer	R-Value	0,00025	Fouling resistance on water/air side.	Subcontractor	BIM Model					x

Property	Data Type	Unit	Values	Description	Responsible	Source					
Fan				**A fan is a device which imparts mechanical work on a gas. A typical usage of a fan is to induce airflow in a building services air distribution system**							
Fan Type	String	Text		The property enumeration defines the types of fan that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Application Of Fan	String	Text	Supply Air:, Return Air,	The functional application of the fan.	Subcontractor	BIM Model			x	x	x
Capacity Control Type	String	Text		Inlet Vane: Control by adjusting inlet vane. Variable Speed Drive: Control by variable speed drive. Blade Pitch Angle: Control by adjusting blade pitch angle. Two Speed: Control by switch between high and low speed. Discharge Damper: Control by modulating discharge damper.	Subcontractor	BIM Model				x	x
Coil Position	String	Text		Defines the relationship between a fan and a coil.	Subcontractor	BIM Model				x	x
Discharge Pressure Loss	Integer	mm of Water		Fan discharge pressure loss associated with the discharge arrangement.	Subcontractor	BIM Model					x
Discharge Type	String	Text		Defines the type of connection at the fan discharge. Duct: Discharge into ductwork. Screen: Discharge into screen outlet. Louver: Discharge into a louver. Damper: Discharge into a damper.	Subcontractor	BIM Model				x	x
Discharge Velocity	Integer	m/s		The speed at which air discharges from the fan through the fan housing discharge opening.	Subcontractor	BIM Model					x
Drive Power Loss	Integer	Horsepower		Fan drive power losses associated with the type of connection between the motor and the fan wheel.	Subcontractor	BIM Model					x
Efficiency Curve	Integer	Percent		Fan efficiency =f (flow rate).	Subcontractor	BIM Model				x	x
Fan Efficiency	Integer	Percent		Fan mechanical efficiency.	Subcontractor	BIM Model				x	x
Fan Mounting Type	String	Text		Defines the method of mounting the fan in the building.	Subcontractor	BIM Model				x	x
Fan Power Rate	Integer	Horsepower		Fan power consumption.	Subcontractor	BIM Model				x	x
Fan Rotation Speed	Integer	RPM		Fan rotation speed.	Subcontractor	BIM Model				x	x
Fraction Of Motor Heat To Air Stream	Integer	R-Value		Fraction of the motor heat released into the fluid flow.	Subcontractor	BIM Model					x
Impeller Diameter	Integer	mm		Diameter of fan wheel - used to scale performance of geometrically similar fans.	Subcontractor	BIM Model					x
Motor Drive Type	String	Text		Motor drive type: DIRECT DRIVE: Direct drive. BELT DRIVE: Belt drive. COUPLING: Coupling. OTHER: Other type of motor drive. UNKNOWN: Unknown motor drive type.	Subcontractor	BIM Model			x	x	x
Motor Position	String	Text		Defines the location of the motor relative to the air stream. In Airstream: Fan motor is in the air stream. Out Of Air Stream: Fan motor is out of the air stream.	Subcontractor	BIM Model					x
Nominal Air Flow Rate	Integer	m³/s		Nominal air flow rate.	Subcontractor	BIM Model				x	x
Nominal Power Rate	Integer	Horsepower		Nominal fan power rate.	Subcontractor	BIM Model				x	x
Nominal Rotation Speed	Integer	RPM		Nominal fan wheel speed.	Subcontractor	BIM Model				x	x
Nominal Static Pressure	Integer	mm of Water		The static pressure within the air stream	Subcontractor	BIM Model				x	x
Nominal Total Pressure	Integer	mm of Water		Nominal total pressure rise across the fan.	Subcontractor	BIM Model				x	x
Operation Temperature Range	Integer	Degree C°		Allowable operation ambient air temperature range.	Subcontractor	BIM Model				x	x
Operational Criteria	Integer	Hours		Time of operation at maximum operational ambient air temperature.	Subcontractor	BIM Model					x
Overall Efficiency	Integer	Percent		Total efficiency of motor and fan.	Subcontractor	BIM Model					x
Pressure Curve	Integer	mm		Pressure rise = f (flow rate).	Subcontractor	BIM Model					x
Shaft Power Rate	Integer	Horsepower		Fan shaft power.	Subcontractor	BIM Model					x
Wheel Tip Speed	Integer	m/s		Fan blade tip speed, typically defined as the linear speed of the tip of the fan blade furthest from the	Subcontractor	BIM Model					x
Centrifugal Fan				Centrifugal fan occurrence attributes attached to an instance of a fan.							
Arrangement	String	Text		Defines the fan and motor drive arrangement as defined by AMCA.	Subcontractor	BIM Model				x	x
Direction Of Rotation	String	Text	Clockwise, Counter Clockwis	The direction of the centrifugal fan wheel rotation when viewed from the drive side of the fan.	Subcontractor	BIM Model					x
Discharge Position	String	Text	Top Horizontal, Top Angular	Centrifugal fan discharge position.	Subcontractor	BIM Model				x	x
Filter				**A filter is an apparatus used to remove particulate or gaseous matter from fluids and gases.**							
Filter Type	String	Text		The property enumeration defines the types of filter that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Final Resistance	Integer	mm of Water		Filter fluid resistance when replacement is required	Subcontractor	BIM Model					x
Flow Rate Range	Integer	m³/s		Possible range of fluid flowrate that can be delivered.	Subcontractor	BIM Model				x	x

Initial Resistance	Integer	mm of Water		Initial new filter fluid resistance (i.e., pressure drop at the maximum air flowrate across the filter when the filter is new per ASHRAE Standard 52.1).	Subcontractor	BIM Model					x
Nominal Filter Face Velocity	Integer	m/s		Filter face velocity.	Subcontractor	BIM Model				x	x
Nominal Flowrate	Integer	m³/s		Nominal fluid flow rate through the filter.	Subcontractor	BIM Model				x	x
Nominal Media Surface Velocity	Integer	m/s		Average fluid velocity at the media surface.	Subcontractor	BIM Model				x	x
Nominal Particle Geometric Mean Dia	Integer	Microns		Particle geometric mean diameter associated with nominal efficiency.	Subcontractor	BIM Model					x
Nominal Particle Geometric Standard	Integer	Microns		Particle geometric standard deviation associated with nominal efficiency.	Subcontractor	BIM Model					x
Nominal Pressure Drop	Integer	mm of Water		Total pressure drop across the filter.	Subcontractor	BIM Model				x	x
Operation Temperature Range	Integer	Degree C°		Allowable operation ambient fluid temperature range.	Subcontractor	BIM Model					x
Weight	Integer	kg		Weight of filter.	Subcontractor	BIM Model					x
Counted Efficiency	Integer	Percent		Filter efficiency	Subcontractor	BIM Model					x
Particle Mass Holding	Integer	Grams		Mass of particle holding in the filter.	Subcontractor	BIM Model					x
Weighted Efficiency	Integer	Percent		Filter efficiency	Subcontractor	BIM Model					x
Air Filter				Air particle filter type attributes.							
Air Particle Filter Type	String	Text	Coarse Filter, Coarse Metal	A panel dry type extended surface filter is a dry-type air filter	Subcontractor	BIM Model				x	x
Counted Efficiency Curve	Integer	R-Value		Counted efficiency curve as a function of dust holding weight	Subcontractor	BIM Model					x
Dust Holding Capacity	Integer	Grams		Maximum filter dust holding capacity.	Subcontractor	BIM Model					x
Face Surface Area	Integer	mm²		Face area of filter frame.	Subcontractor	BIM Model				x	x
Frame Material	String	Text		Filter frame material.	Subcontractor	BIM Model				x	x
Media Extended Area	Integer	mm²		Total extended media area.	Subcontractor	BIM Model					x
Nominal Counted Efficiency	Integer	Percent		Nominal filter efficiency based the particle count concentration before and after the filter against particles with a certain size distribution.	Subcontractor	BIM Model				x	x
Nominal Weighted Efficiency	Integer	Percent		Nominal filter efficiency based the particle weight concentration before and after the filter against particles with a certain size distribution.	Subcontractor	BIM Model				x	x
Pressure Drop Curve	Integer	Pa		Under certain dust holding weight, DelPressure = f (fluid flowrate)	Subcontractor	BIM Model					x
Separation Type	String	Text		Air particulate filter media separation type.	Subcontractor	BIM Model				x	x
Weighted Efficiency Curve	Integer	Percent		Weighted efficiency curve as a function of dust holding weight, efficiency = f (dust holding weight).	Subcontractor	BIM Model					x
Compressed Air Filter				Compressed air filter type attributes.							
Automatic Condensate Discharge	String	Text		Whether or not the condensing water or oil is discharged automatically from the filter.	Subcontractor	BIM Model				x	x
Clogging Indicator	Bool	yes/no	True or False	Whether the filter has an indicator to display the degree of clogging of the filter.	Subcontractor	BIM Model				x	x
Compressed Air Filter Type	String	Text		ACTIVATED CARBON: absorbs oil vapor and odor; PARTICLE FILTER: used to absorb solid particles of medium size; COALESCENSE FILTER: used to absorb fine solid, oil, and water particles, also called micro filter	Subcontractor	BIM Model				x	x
Operation Pressure Max	Integer	Pa		Maximum pressure under normal operating conditions.	Subcontractor	BIM Model				x	x
Particle Absorption Curve	Integer	Percent		Ratio of particles that are removed by the filter	Subcontractor	BIM Model					x
Water Filter				Water filter type attributes.							
Water Filter Type	String	Text	Filtration; purficiation;	Further qualifies the type of water filter	Subcontractor	BIM Model				x	x
Flow Meter				**A flow meter is a device that is used to measure the flow rate in a system.**							
Meter Type	String	Text	Energy, Gas, Oil, Water, User Defined	The property enumeration defines the types of meter that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Purpose	String	Text	Master, Submaster,	Enumeration defining the purpose of the flow meter occurrence.	Subcontractor	BIM Model			x	x	x
Read Out Type	String	Text	Dial, Digital, Other, Not Known, Unset	Indication of the form that readout from the meter takes. In the case of a dial read out, this may comprise multiple dials that give a cumulative reading and/or a mechanical odometer.	Subcontractor	BIM Model				x	x
Remote Reading	Bool	yes/no	True or False	Indicates whether the meter has a connection for remote reading through connection of a communication device (set TRUE) or not (set FALSE).	Subcontractor	BIM Model				x	x
Energy Meter				Device that measures, indicates and sometimes records, the energy usage in a system.							
Maximum Current	Integer	Amps		The maximum allowed current that a device is certified to handle.	Subcontractor	BIM Model					x
Multiple Tariff	String	Text		Indicates whether meter has built-in support for multiple tariffs (variable energy cost rates).	Subcontractor	BIM Model					x
Nominal Current	Integer	Amps		The nominal current that is designed to be measured.	Subcontractor	BIM Model				x	x
Gas Meter				Device that measures, indicates and sometimes records, the volume of gas that passes through it without interrupting the flow.							
Connection Size	Integer	mm		Defines the size of inlet and outlet pipe connections to the meter.	Subcontractor	BIM Model				x	x
Gas Type	String	Text		Defines the types of gas that may be specified.	Subcontractor	BIM Model			x	x	x
Maximum Flow Rate	Integer	m³/s		Maximum rate of flow which the meter is expected to pass.	Subcontractor	BIM Model				x	x
Maximum Pressure Loss	Integer	Pa		Pressure loss expected across the meter under conditions of maximum flow.	Subcontractor	BIM Model				x	x

Oil Meter				Device that measures, indicates and sometimes records, the volume of oil that passes through it							
Connection Size	Integer	mm		Defines the size of inlet and outlet pipe connections to the meter.	Subcontractor	BIM Model				x	x
Maximum Flow Rate	Integer	m³/s		Maximum rate of flow which the meter is expected to pass.	Subcontractor	BIM Model				x	x
Water Meter				Device that measures, indicates and sometimes records, the volume of water that passes through it							
Backflow Preventer Type	String	Text	Atmospheric Vacuum breaker, Anti Siphon valve, Double Check Backflow Preventer, Pressure Vacuum breaker, Reduced Pressure Backflow Preventer, Other, Not known, Unset	Identifies the type of backflow preventer installed	Subcontractor	BIM Model				x	x
Connection Size	Integer	mm		Defines the size of inlet and outlet pipe connections to the meter.	Subcontractor	BIM Model				x	x
Maximum Flow Rate	Integer	m³/s		Maximum rate of flow which the meter is expected to pass.	Subcontractor	BIM Model				x	x
Maximum Pressure Loss	Integer	Pa		Pressure loss expected across the meter under conditions of maximum flow.	Subcontractor	BIM Model					x
Type	String	Text	Compound, Inferential, Piston, Other, Not Known, Unset	Defines the allowed values for selection of the flow meter operation type.	Subcontractor	BIM Model			x	x	x
Heat Exchanger				**A heat exchanger is a device used to provide heat transfer between non-mixing media such as plate and shell and tube heat exchangers.**							
Exchanger Type	String	Text		The property enumeration defines the types of heat exchanger that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Arrangement	String	Text	Counter flow, Crossflow,	Defines the basic flow arrangements for the heat exchanger:	Subcontractor	BIM Model				x	x
Plate Exchanger				Plate heat exchanger type							
Number Of Plates	Integer	None	1,2,3…	Number of plates used by the plate heat exchanger.	Subcontractor	BIM Model					x
Humidifier				**A humidifier is a device that adds moisture into the air.**							
Humidifier Type	String	Text		The property enumeration defines the types of humidifier that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Air Pressure Drop Curve	Integer	R-Value		Air pressure drop versus air-flow rate.	Subcontractor	BIM Model					x
Application	String	Text	Fixed; Portable	Humidifier application.	Subcontractor	BIM Model					x
Internal Control	String	Text		Internal modulation control.	Subcontractor	BIM Model				x	x
Nominal Air Flow Rate	Integer	m³/s		Nominal rate of air flow into which water vapor is added.	Subcontractor	BIM Model				x	x
Nominal Moisture Gain	Integer	m³/day		Nominal rate of water vapor added into the airstream.	Subcontractor	BIM Model				x	x
Saturation Efficiency Curve	Integer	Percent		Saturation efficiency as a function of the air flow rate.	Subcontractor	BIM Model					x
Water Requirement	Integer	m³/s		Make-up water requirement.	Subcontractor	BIM Model					x
Weight	Integer	kg		The weight of the humidifier.	Subcontractor	BIM Model				x	x
Atmospheric Pressure	Integer	Pa		Ambient atmospheric pressure.	Subcontractor	BIM Model				x	x
Saturation Efficiency	Integer	Percent		Saturation efficiency	Subcontractor	BIM Model				x	x
Pump				**A pump is a device which imparts mechanical work on fluids or slurries to move them through a channel or pipeline.**							
Pump Type	String	Text		The property enumeration defines the types of pump that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Base Type	String	Text	Frame.	Defines Generic types of pump bases.	Subcontractor	BIM Model				x	x
Connection Size	Integer	mm		The connection size of the to and from the pump.	Subcontractor	BIM Model					x
Drive Connection Type	String	Text	Direct drive.	The way the pump drive mechanism is connected to the pump.	Subcontractor	BIM Model				x	x
Flow Rate Range	Integer	m³/s		Allowable range of volume of fluid being pumped against the resistance specified.	Subcontractor	BIM Model				x	x
Flow Resistance Range	Integer	Pa		Allowable range of frictional resistance against which the fluid is being pumped.	Subcontractor	BIM Model				x	x
Flowrate	Integer	m³/s		The actual operational fluid flowrate.	Subcontractor	BIM Model					x
Impeller Diameter	Integer	mm		Diameter of pump impeller - used to scale performance of geometrically similar pumps.	Subcontractor	BIM Model					x
Mechanical Efficiency	Integer	Percent		The pumps operational mechanical efficiency.	Subcontractor	BIM Model					x
Net Positive Suction Head	Integer	mm		Minimum liquid pressure at the pump inlet to prevent cavitation.	Subcontractor	BIM Model					x
Nominal Rotation Speed	Integer	RPM		Pump rotational speed under nominal conditions.	Subcontractor	BIM Model					x
Overall Efficiency	Integer	Percent		The pump and motor overall operational efficiency.	Subcontractor	BIM Model					x
Power	Integer	Horsepower		The actual power consumption of the pump.	Subcontractor	BIM Model					x
Pressure Rise	Integer	Pa		The developed pressure.	Subcontractor	BIM Model				x	x
Rotation Speed	Integer	RPM		Pump rotational speed.	Subcontractor	BIM Model				x	x
Temperature Range	Integer	Degree C°		Allowable operational range of the fluid temperature.	Subcontractor	BIM Model				x	x

Space Heater				**Space heaters utilize a combination of radiation and/or natural convection using a heating source such as electricity, steam or hot water to heat a limited space or area.**							
Space Heater Type	String	Text		The property enumeration defines the types of space heater that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Air Resistance Curve	Integer	mm of Water		Air resistance curve (w/ fan only); Pressure = f (flow rate).	Subcontractor	BIM Model					x
Auxiliary Energy Source Consumption	Integer	Watts		Auxiliary energy source consumption.	Subcontractor	BIM Model					x
Effectiveness	Integer	None		Ratio of the real heat transfer rate to the maximum possible heat transfer rate.	Subcontractor	BIM Model					x
Energy Source	String	Text	Electric, Natural Gas, Propane, Hot Water, Steam, etc.	Enumeration defining the energy source or fuel combusted to generate heat if applicable	Subcontractor	BIM Model				x	x
Exponent	Integer	None		Characteristic exponent, slope of log(heat output) vs log (surface temperature minus environmental temperature).	Subcontractor	BIM Model				x	x
Fraction Convective Heat Transfer	Integer	None		Fraction of the total heat transfer rate as the convective heat transfer.	Subcontractor	BIM Model					x
Fraction Radiant Heat Transfer	Integer	None		Fraction of the total heat transfer rate as the radiant heat transfer.	Subcontractor	BIM Model					x
Heat Output Rate	Integer	R-Value		Overall heat transfer rate.	Subcontractor	BIM Model				x	x
Heat Transfer Dimension	String	Text		Indicates how heat is transmitted according to the shape of the space heater.	Subcontractor	BIM Model					x
Heat Transfer Medium	String	Text		Enumeration defining the heat transfer medium if applicable.	Subcontractor	BIM Model				x	x
Number Of Panels	Integer	None	1,2,3…	Number of panels.	Subcontractor	BIM Model					x
Number Of Sections	Integer	None	1,2,3…	Number of vertical sections, measured in the direction of flow.	Subcontractor	BIM Model					x
Output Capacity	Integer	Watts		Total nominal heat output as listed by the manufacturer.	Subcontractor	BIM Model					x
Output Capacity Curve	Integer	R-Value		Partial output capacity curve (as a function of water temperature); Q = f (Twater).	Subcontractor	BIM Model					x
Placement Type	String	Text		Indicates how the space heater is designed to be placed.	Subcontractor	BIM Model				x	x
Size	Integer	mm		Overall body mass of the heater.	Subcontractor	BIM Model					x
Space Air Temperature	Integer	Degree C°		Dry bulb temperature in the space.	Subcontractor	BIM Model				x	x
Space Mean Radiant Temperature	Integer	Degree C°		Mean radiant temperature in the space.	Subcontractor	BIM Model				x	x
Surface Temperature	Integer	Degree C°		Average surface temperature of the component.	Subcontractor	BIM Model					x
Temperature Classification	String	Text		Enumeration defining the temperature classification of the space heater surface temperature.	Subcontractor	BIM Model				x	x
Thermal Efficiency	Integer	Percent		Overall Thermal Efficiency is defined as gross energy output of the heat transfer device divided by the energy input.	Subcontractor	BIM Model					x
Thermal Mass Heat Capacity	Integer	R-Value		Product of component mass and specific heat.	Subcontractor	BIM Model				x	x
UV Curve	Integer	None		UV = f (VExterior, VInterior), UV as a function of interior and exterior fluid flow velocity at the entrance.	Subcontractor	BIM Model					x
Convector Characteristic				**Space heater type convector attributes.**							
Convector Type	String	Text	Forced Air; Natural	Indicates the type of convector	Subcontractor	BIM Model				x	x
Radiator Characteristic				**Space heater type radiator attributes.**							
Radiator Type	String	Text		Indicates the type of radiator.	Subcontractor	BIM Model				x	x
Tubing Length	Integer	mm		Water tube length inside the component.	Subcontractor	BIM Model					x
Water Content	Integer	m³		Weight of water content within the heater.	Subcontractor	BIM Model					x
Cooling Air Flow Rate	Integer	m³/s		Cooling air flow rate in the space.	Subcontractor	BIM Model				x	x
Exhaust Air Flow Rate	Integer	m³/s		Exhaust air flow rate in the space.	Subcontractor	BIM Model				x	x
Heating Air Flow Rate	Integer	m³/s		Heating air flow rate in the space.	Subcontractor	BIM Model				x	x
Space Relative Humidity	Integer	Percent		The relative humidity of the space.	Subcontractor	BIM Model				x	x
Space Temperature	Integer	Degree C°		Temperature of the space.	Subcontractor	BIM Model				x	x
Ventilation Air Flow Rate	Integer	m³/s		Ventilation air flow rate in the space.	Subcontractor	BIM Model				x	x
Tank				**A tank is a vessel or container in which a fluid or gas is stored for later use**							
Tank Type	String	Text		The property enumeration defines the types of tank that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Storage Type	String	Text	Fuel, Oil, Water, Rain Water, Waste Water, Potable Water, Other, Not Known	Defines the Generic material category intended to be stored.	Subcontractor	BIM Model			x	x	x
Nominal Capacity	Integer	m³		The total nominal or design volumetric capacity of the tank.	Subcontractor	BIM Model			x	x	x
Access Type	String	Text	Manhole, User Defined	Defines the types of access (or cover) to a tank that may be specified.	Subcontractor	BIM Model				x	x
Effective Capacity	Integer	m³		The total effective or actual volumetric capacity of the tank.	Subcontractor	BIM Model					x

End Shape Type	String	Text	Semi-Elliptical, ASME Flanged Dished, ASME High Crown, Conical Dished, Standard Flanged Dished, Flanged Only, Dished Only, User Defined	Defines the types of end shapes that can be used for preformed tanks. The convention for reading these enumerated values is that for a vertical cylinder, the first value is the base and the second is the top; for a horizontal cylinder, the order of reading should be left to right. For a spherical tank, the value UNSET should be used.	Subcontractor	BIM Model					x
First Curvature Radius	Integer	mm		First Curvature Radius should be defined as the base or left side radius of curvature value.	Subcontractor	BIM Model					x
Has Ladder	Bool	yes/no	True or False	Indication of whether the tank is provided with a ladder (set TRUE) for access to the top. If no ladder is provided then value is set FALSE. Note: No indication is given of the type of ladder (gooseneck etc.)	Subcontractor	BIM Model				x	x
Has Visual Indicator	Bool	yes/no	True or False	Indication of whether the tank is provided with a visual indicator (set TRUE) that shows the water level in the tank. If no visual indicator is provided then value is set FALSE.	Subcontractor	BIM Model				x	x
Nominal Depth	Integer	mm		The nominal depth of the tank. Note: Not required for a horizontal cylindrical tank.	Subcontractor	BIM Model					x
Nominal Length Or Diameter	Integer	mm		The nominal length or, in the case of a vertical cylindrical tank, the nominal diameter of the tank.	Subcontractor	BIM Model					x
Nominal Width Or Diameter	Integer	mm		The nominal width or, in the case of a horizontal cylindrical tank, the nominal diameter of the tank. Note: Not required for a vertical cylindrical tank.	Subcontractor	BIM Model					x
Number Of Sections	Integer	None	1,2,3…	Number of sections used in the construction of the tank. Default is 1. Note: All sections assumed to be the same size.	Subcontractor	BIM Model				x	x
Operating Weight	Integer	kg		Operating weight of the tank including all of its contents.	Subcontractor	BIM Model					x
Pattern Type	Text		Horizontal Cylinder,Vertical Cylinder, Rectangular, Other, Not Known	Defines the types of pattern (or shape of a tank that may be specified.	Subcontractor	BIM Model				x	x
Second Curvature Radius	Integer	Inches/Feet		Second Curvature Radius should be defined as the top or right side radius of curvature value.	Subcontractor	BIM Model					x
Storage Type	String	Text	Fuel, Oil, Water, Rain Water, Waste Water, Potable Water, Other, Not Known	Defines the Generic material category intended to be stored.	Subcontractor	BIM Model				x	x
Tank Composition	String	Text	Complex, Element, Partial, User Defined	Defines the level of element composition where. COMPLEX: A set of elementary units aggregated together to fulfill the overall required purpose. ELEMENT: A single elementary unit that may exist of itself or as an aggregation of partial units.. PARTIAL: A partial elementary unit.	Subcontractor	BIM Model				x	x
Expansion Tank				Specific Baseline Attributes of an expansion type tank.							
Charge Pressure	Integer	Pa		Nominal or design operating pressure of the tank.	Subcontractor	BIM Model				x	x
Pressure Regulator Setting	Integer	Pa		Pressure that is automatically maintained in the tank.	Subcontractor	BIM Model					x
Relief Valve Setting	Integer	Pa		Pressure at which the relief valve activates.	Subcontractor	BIM Model					x
Pressure Vessel				Specific Baseline Attributes of a pressure vessel.							
Charge Pressure	Integer	Pa		Nominal or design operating pressure of the tank.	Subcontractor	BIM Model				x	x
Pressure Regulator Setting	Integer	Pa		Pressure that is automatically maintained in the tank.	Subcontractor	BIM Model					x
Relief Valve Setting	Integer	Pa		Pressure at which the relief valve activates.	Subcontractor	BIM Model					x
Sectional Tank				Fixed vessel constructed from sectional parts with one or more compartments for storing a liquid.							
Number Of Sections	Integer	None	1,2,3…	Number of sections used in the construction of the tank	Subcontractor	BIM Model				x	x
Section Length	Integer	mm		The length of a section used in the construction of the tank.	Subcontractor	BIM Model				x	x
Section Width	Integer	mm		The width of a section used in the construction of the tank.	Subcontractor	BIM Model				x	x
Tube Heat Exchanger				**A device that transfer heat using shell and tube configuration**							
Exchanger Type	String	Text		The property enumeration defines the types of tube heat exchanger that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Fouling Factor	Integer	R-Value		Fouling factor of the tubes in the tube bundle.	Subcontractor	BIM Model				x	x
Has Turbulator	Bool	yes/no	True or False	TRUE if the tube has a turbulator, FALSE if it does not.	Subcontractor	BIM Model				x	x
Horizontal Spacing	Integer	None	1,2,3…	Horizontal spacing between tubes in the tube bundle.	Subcontractor	BIM Model				x	x
In Line Row Spacing	Integer	None	1,2,3…	In-line tube row spacing.	Subcontractor	BIM Model					x

Inside Diameter	Integer	mm		Actual inner diameter of the tube in the tube bundle.	Subcontractor	BIM Model					x
Length	Integer	mm		Length of the tubes in the tube bundle.	Subcontractor	BIM Model				x	x
Nominal Diameter	Integer	mm		Nominal diameter or width of the tubes in the tube bundle.	Subcontractor	BIM Model					x
Number Of Circuits	Integer	None	1,2,3…	Number of parallel fluid tube circuits.	Subcontractor	BIM Model					x
Number Of Rows	Integer	None	1,2,3…	Number of tube rows in the tube bundle assembly.	Subcontractor	BIM Model					x
Outside Diameter	Integer	mm		Actual outside diameter of the tube in the tube bundle.	Subcontractor	BIM Model					x
Staggered Row Spacing	Integer	None	1,2,3…	Staggered tube row spacing.	Subcontractor	BIM Model					x
Thermal Conductivity	Integer	R-Value		The thermal conductivity of the tube.	Subcontractor	BIM Model				x	x
Vertical Spacing	Integer	mm	1,2,3…	Vertical spacing between tubes in the tube bundle.	Subcontractor	BIM Model				x	x
Volume	Integer	m^3		Total volume of fluid in the tubes and their headers.	Subcontractor	BIM Model					x
Finned Bundle				Finned tube bundle type attributes.							
Diameter	Integer	mm		Actual diameter of a fin for circular fins only.	Subcontractor	BIM Model					x
Fin Corrugated Type	String	Text		Description of a fin corrugated type.	Subcontractor	BIM Model				x	x
Has Coating	Bool	yes/no	True or False	TRUE if the fin has a coating, FALSE if it does not.	Subcontractor	BIM Model				x	x
Height	Integer	mm		Length of the fin as measured perpendicular to the direction of airflow.	Subcontractor	BIM Model					x
Length	Integer	mm		Length of the fin as measured parallel to the direction of airflow.	Subcontractor	BIM Model					x
Spacing	Integer	mm		Distance between fins on a tube in the tube bundle.	Subcontractor	BIM Model					x
Thermal Conductivity	Integer	R-Value		The thermal conductivity of the fin.	Subcontractor	BIM Model				x	x
Thickness	Integer	mm		Thickness of the fin.	Subcontractor	BIM Model				x	x
Valve				**A valve is used in a building services piping distribution system to control or modulate the flow of the fluid.**							
Valve Type	String	Text		The property enumeration defines the types of valve that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Valve Pattern	String	Text	Single port, Angled_2 Port, Straight_2_Port, Straight_3_Port, Crossover_4_Port	The configuration of the ports of a valve according to either the linear route taken by a fluid flowing through the valve or by the number of ports.	Subcontractor	BIM Model			x	x	x
Body Material	String	Text		Material from which the body of the valve is constructed.	Subcontractor	BIM Model				x	x
Close Off Rating	Integer	Pa		Close off rating.	Subcontractor	BIM Model				x	x
Flow Coefficient	Integer	Kv or Cv		Flow coefficient (the quantity of fluid that passes through a fully open valve at unit pressure drop), typically expressed as the Kv or Cv value for the valve.	Subcontractor	BIM Model				x	x
Measured Flow Rate	Integer	m^3/s		The rate of flow of a fluid measured across the valve.	Subcontractor	BIM Model				x	x
Measured Pressure Drop	Integer	Pa		The actual pressure drop in the fluid measured across the valve.	Subcontractor	BIM Model					x
Percentage Open	Integer	Percent		The ratio between the amount that the valve is open to the full open position of the valve.	Subcontractor	BIM Model				x	x
Size	Integer	mm		The size of the connection to the valve (or to each connection for faucets, mixing valves, etc.).	Subcontractor	BIM Model				x	x
Test Pressure	Integer	Pa		The maximum pressure to which the valve has been subjected under test.	Subcontractor	BIM Model				x	x
Valve Mechanism	String	Text	Ball, Butterfly, Gate, Globe, Plug, Gland, Needle	The mechanism by which the valve function is achieved.	Subcontractor	BIM Model				x	x
Valve Operation	String	Text	Drop weight, Float, Hydraulic, Lever, Lock shield, Motorized, Pneumatic, Solenoid, Thermostatic, Wheel , User Defined	The method of valve operation.	Subcontractor	BIM Model				x	x
Working Pressure	Integer	Pa		The normally expected maximum working pressure of the valve.	Subcontractor	BIM Model				x	x
Air Vent				**Valve used to release air from a pipe or fitting.**							
Is Automatic	Bool	yes/no	True or False	Indication of whether the valve is automatically operated (TRUE) or manually operated (FALSE).	Subcontractor	BIM Model				x	x
Isolation Valve				**A valve that is used to isolate system components.**							
Is Normally Open	Bool	yes/no	True or False	If TRUE, the valve is normally open. If FALSE is normally closed.	Subcontractor	BIM Model				x	x
Isolating Purpose	String	Text		Defines the purpose for which the isolating valve is used	Subcontractor	BIM Model				x	x
Pressure Reducing Valve				**Valve that reduces the pressure of a fluid immediately downstream of its position in a pipeline to a**							
Downstream Pressure	Integer	Pa		The operating pressure of the fluid downstream of the pressure reducing valve.	Subcontractor	BIM Model				x	x
Upstream Pressure	Integer	Pa		The operating pressure of the fluid upstream of the pressure reducing valve.	Subcontractor	BIM Model				x	x
Pressure Relief Valve			Spring Loaded	**A valve that automatically discharges to a safe place fluid that has built up to excessive pressure in**							

Relief Pressure	Integer	Pa		The pressure at which the spring or weight in the valve is set to discharge fluid.	Subcontractor	BIM Model				x	x
Vibration Isolator				**A vibration isolator is a device used to minimize the effects of vibration transmissibility in a building**							
Height	Integer	mm		Height of the vibration isolator before the application of load.	Subcontractor	BIM Model				x	x
Isolator Compressibility	Integer	R-Value		The compressibility of the vibration isolator.	Subcontractor	BIM Model					x
Isolator Static Deflection	Integer	mm		Static deflection of the vibration isolator.	Subcontractor	BIM Model				x	x
Maximum Supported Weight	Integer	kg		The maximum weight that can be carried by the vibration isolator.	Subcontractor	BIM Model					x
Vibration Transmissibility	Integer	Percent		The vibration transmissibility percentage.	Subcontractor	BIM Model				x	x

D - Air Distribution

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		Subcontractor	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		Subcontractor	BIM Model			x	x	x
	Provider	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		Subcontractor	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		Subcontractor	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		Subcontractor	BIM Model			x	x	x
	Item-Specific Attributes											
	Duct											
	Atmospheric Pressure	Integer	Pa		Ambient atmospheric pressure.	Subcontractor	BIM Model				x	x
	Color	String	Text		The color of the duct segment. Note: This is typically used for any duct segments with a painted surface which is not otherwise specified as a covering.	Subcontractor	BIM Model					
	Condition Status	String	Text		Status of the element, predominately used in renovation or retrofitting projects. The status can be assigned to as "New" - element designed as new addition, "Existing" - element exists and remains, "Demolish" - element existed but is to be demolished, "Temporary" - element will exists only temporary (like a temporary support structure).	Subcontractor	BIM Model				x	x
	Fluid Flow Leakage	Integer	R-Value		Volumetric leakage flow rate.	Subcontractor	BIM Model				x	x
	Has Liner	Bool	yes/no		TRUE if the fitting has interior duct insulating lining, FALSE if it does not.	Subcontractor	BIM Model				x	x
	Interior Roughness Coefficient	Integer	None		The interior roughness of the duct fitting material.	Subcontractor	BIM Model					x
	Leakage Curve	Integer	R-Value		Leakage per unit length curve versus working pressure. If a scalar is expressed then it represents Leakage Class which is flowrate per unit area at a specified pressure rating (e.g., ASHRAE Fundamentals 2001 34.16.).	Subcontractor	BIM Model				x	x
	Longitudinal Seam	String	Text	Lock seam, button punch snap lock	The type of seam to be used along the longitudinal axis of the duct segment.	Subcontractor	BIM Model					
	Loss Coefficient	Integer	None		Dimensionless loss coefficient used for calculating fluid resistance representing the ratio of total pressure loss to velocity pressure at a referenced cross-section.	Subcontractor	BIM Model				x	x
	Nominal Diameter Or Width	Integer	mm		The nominal diameter or width of the duct segment.	Subcontractor	BIM Model				x	x
	Nominal Height	Integer	mm		The nominal height of the duct segment.	Subcontractor	BIM Model				x	x
	Pressure Range	Integer	R-Value		Allowable maximum and minimum working pressure (relative to ambient pressure).	Subcontractor	BIM Model				x	x
	Reinforcement	Text		angle, hat section, zee, or channel iron	The type of reinforcement, if any, used for the duct segment.	Subcontractor	BIM Model					
	Reinforcement Spacing	Integer	mm		The spacing between reinforcing elements.	Subcontractor	BIM Model					
	Shape	String	Text	Rectangular, Square, Round	Cross sectional shape. Note that this shape is uniform throughout the length of the segment. For non uniform shapes, a transition fitting should be used instead.	Subcontractor	BIM Model				x	x
	Temperature Range	Integer	Degree C°		Allowable maximum and minimum temperature.	Subcontractor	BIM Model				x	x
	Working Pressure	Integer	R-Value	SMACNA	Pressure classification as defined by the authority having jurisdiction (e.g., SMACNA, etc.).	Subcontractor	BIM Model				x	x

D40 - Fire Protection

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		Subcontractor	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		Subcontractor	BIM Model			x	x	x
	Provider	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		Subcontractor	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		Subcontractor	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		Subcontractor	BIM Model			x	x	x
	Item-Specific Attributes											
	Breeching Inlet				**Symmetrical pipe fitting that unites two or more inlets into a single pipe**							
	Breeching Inlet Type	String	Text		Defines the type of breeching inlet.	Subcontractor	BIM Model			x	x	x
	Coupling Type	String	Text		Defines the type coupling on the inlet of the breeching inlet.	Subcontractor	BIM Model				x	x
	Has Caps	Bool	yes/no	True or False	Does the inlet connection have protective caps.	Subcontractor	BIM Model				x	x
	Inlet Diameter	Integer	Inches		The inlet diameter of the breeching inlet.	Subcontractor	BIM Model					x
	Flow Meter				**A flow meter is a device that is used to measure the flow rate in a system.**							
	Meter Type	String	Text	Energy, Gas, Oil, Water, User Defined	Identifies the predefined types of meter from which the type required may be set.	Subcontractor	BIM Model			x	x	x
	Purpose	String	Text	Master, Submaster, Submeter, Other, Unknown	Enumeration defining the purpose of the flow meter occurrence.	Subcontractor	BIM Model			x	x	x
	Read Out Type	String	Text	Dial, Digital, Other, Not Known, Unset	Indication of the form that readout from the meter takes. In the case of a dial read out, this may comprise multiple dials that give a cumulative reading and/or a mechanical odometer.	Subcontractor	BIM Model				x	x
	Remote Reading	Bool	yes/no	True or False	Indicates whether the meter has a connection for remote reading through connection of a communication device (set TRUE) or not (set FALSE).	Subcontractor	BIM Model				x	x
	Energy Meter				Device that measures, indicates and sometimes records, the energy usage in a system.							
	Maximum Current	Integer	Amps		The maximum allowed current that a device is certified to handle.	Subcontractor	BIM Model					x
	Multiple Tariff	String	Text		Indicates whether meter has built-in support for multiple tariffs (variable energy cost rates).	Subcontractor	BIM Model					x
	Nominal Current	Integer	Amps		The nominal current that is designed to be measured.	Subcontractor	BIM Model				x	x
	Gas Meter				Device that measures, indicates and sometimes records, the volume of gas that passes through it without interrupting the flow.							
	Connection Size	Integer	mm		Defines the size of inlet and outlet pipe connections to the meter.	Subcontractor	BIM Model				x	x
	Gas Type	String	Text		Defines the types of gas that may be specified.	Subcontractor	BIM Model			x	x	x
	Maximum Flow Rate	Integer	m^3/s		Maximum rate of flow which the meter is expected to pass.	Subcontractor	BIM Model				x	x
	Maximum Pressure Loss	Integer	Pa		Pressure loss expected across the meter under conditions of maximum flow.	Subcontractor	BIM Model				x	x
	Oil Meter				Device that measures, indicates and sometimes records, the volume of oil that passes through it							
	Connection Size	Integer	mm		Defines the size of inlet and outlet pipe connections to the meter.	Subcontractor	BIM Model				x	x
	Maximum Flow Rate	Integer	m^3/s		Maximum rate of flow which the meter is expected to pass.	Subcontractor	BIM Model				x	x
	Water Meter				Device that measures, indicates and sometimes records, the volume of water that passes through it							

Backflow Preventer Type	String	Text	Atmospheric Vacuum breaker, Anti Siphon valve, Double Check Backflow Preventer, Pressure Vacuum breaker Reduced Pressure Backflow Preventer Other Not known Unset	Identifies the type of backflow preventer installed	Subcontractor	BIM Model				x	x
Connection Size	Integer	mm		Defines the size of inlet and outlet pipe connections to the meter.	Subcontractor	BIM Model				x	x
Maximum Flow Rate	Integer	m^3/s		Maximum rate of flow which the meter is expected to pass.	Subcontractor	BIM Model				x	x
Maximum Pressure Loss	Integer	Pa		Pressure loss expected across the meter under conditions of maximum flow.	Subcontractor	BIM Model					x
Type	String	Text	Compound, Inferential, Piston, Other, Not Known, Unset	Defines the allowed values for selection of the flow meter operation type.	Subcontractor	BIM Model			x	x	x
Hose Reel				**A supporting framework on which a hose may be wound (BS6100 155 8201).** **Note that the service provided by the hose (water/foam) is determined by the context of the system onto which the hose reel is connected.**							
Hose Reel Mounting Type	String	Text		Identifies the predefined types of hose reel mounting	Subcontractor	BIM Model			x	x	x
Hose Nozzle Type	String	Text		Identifies the predefined types of nozzle spray pattern	Subcontractor	BIM Model			x	x	x
Classification Authority	String	Text	NFPA, FEMA	The name of the authority that applies the classification of service to the hose reel	Subcontractor	BIM Model				x	x
Class Of Service	String	Text		A classification of usage of the hose reel that may be applied.	Subcontractor	BIM Model				x	x
Hose Diameter	Integer	mm		Notional diameter (bore) of the hose.	Subcontractor	BIM Model				x	x
Hose Length	Integer	Feet		Nominal length of the hose fitted to the hose reel when fully extended.	Subcontractor	BIM Model				x	x
Hose Reel Type	String	Text		Identifies the predefined types of hose arrangement	Subcontractor	BIM Model				x	x
Inlet Connection Size	Integer	mm		Size of the inlet connection to the hose reel.	Subcontractor	BIM Model				x	x
Hydrant				**Device, fitted to a pipe, through which a temporary supply of water may be provided (BS6100 330 6107)**							
Fire Hydrant Type	String	Text	DryBarrel, WetBarrel, User defined	Defines the range of hydrant types from which the required type can be selected where.	Subcontractor	BIM Model			x	x	x
Body Color	String	Text	Consult local fire regulations for statutory colors	Color of the body of the hydrant.	Subcontractor	BIM Model				x	x
Cap Color	String	Text	Consult local fire regulations for statutory colors	Color of the caps of the hydrant.	Subcontractor	BIM Model				x	x
Discharge Flow Rate	Integer	R-Value		The volumetric rate of fluid discharge.	Subcontractor	BIM Model				x	x
Flow Class	String	Text	AA, A, B, C	AlphaInteger indication of the flow class of a hydrant	Subcontractor	BIM Model				x	x
Hose Connection Size	Integer	mm		The size of connections to which a hose may be connected (other than that to be linked to a pumping unit).	Subcontractor	BIM Model				x	x
Number Of Hose Connections	Integer	None		The number of hose connections on the hydrant (excluding the pumper connection).	Subcontractor	BIM Model				x	x
Pressure Rating	Integer	Pa		Maximum pressure that the hydrant is manufactured to withstand.	Subcontractor	BIM Model					x
Pumper Connection Size	Integer	mm		The size of a connection to which a fire hose may be connected that is then linked to a pumping unit.	Subcontractor	BIM Model					
Water Is Potable	Bool	yes/no	True or False	Indication of whether the water flow from the hydrant is potable (set TRUE) or non potable (set FALSE).	Subcontractor	BIM Model				x	x
Pump				**A pump is a device which imparts mechanical work on fluids or slurries to move them through a channel or pipeline. A typical use of a pump is to circulate chilled water or heating hot water in a building services distribution system**							
Pump Type	String	Text		The property enumeration defines the types of pump that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Base Type	String	Text	Frame, Base, None, Other	Defines Generic types of pump bases.	Subcontractor	BIM Model			x	x	x
Connection Size	Integer	mm		The connection size of the to and from the pump.	Subcontractor	BIM Model					x
Drive Connection Type	String	Text	Direct drive, Belt drive, Coupling, Other	The way the pump drive mechanism is connected to the pump	Subcontractor	BIM Model				x	x
Flow Rate Range	Integer	R-Value		Allowable range of volume of fluid being pumped against the resistance specified.	Subcontractor	BIM Model				x	x

Flow Resistance Range	Integer	Kv or Cv		Allowable range of frictional resistance against which the fluid is being pumped.	Subcontractor	BIM Model				x	x
Flowrate	Integer	R-Value		The actual operational fluid flowrate.	Subcontractor	BIM Model					x
Impeller Diameter	Integer	mm		Diameter of pump impeller	Subcontractor	BIM Model					x
Mechanical Efficiency	Integer	Percentage		The pumps operational mechanical efficiency.	Subcontractor	BIM Model					x
Net Positive Suction Head	Integer	R-Value		Minimum liquid pressure at the pump inlet to prevent cavitation.	Subcontractor	BIM Model					x
Nominal Rotation Speed	Integer	RPM		Pump rotational speed under nominal conditions.	Subcontractor	BIM Model					x
Overall Efficiency	Integer	Percentage		The pump and motor overall operational efficiency.	Subcontractor	BIM Model					x
Power	Integer	Voltage		The actual power consumption of the pump.	Subcontractor	BIM Model					x
Pressure Rise	Integer	Pa		The developed pressure.	Subcontractor	BIM Model				x	x
Rotation Speed	Integer	RPM		Pump rotational speed.	Subcontractor	BIM Model				x	x
Temperature Range	Integer	Degrees C°		Allowable operational range of the fluid temperature.	Subcontractor	BIM Model				x	x
Sprinkler Head				**Device for sprinkling water from a pipe under pressure over an area (BS6100 100 3432)**							
Sprinkler Type	String	Text		Identifies the predefined types of sprinkler from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Activation	String	Text		Identifies the predefined methods of sprinkler activation	Subcontractor	BIM Model				x	x
Activation Temperature	Integer	Degrees C°		The temperature at which the object is designed to activate.	Subcontractor	BIM Model				x	x
Bulb Liquid Color	String	Text		The color of the liquid in the bulb for a bulb activated sprinkler	Subcontractor	BIM Model				x	x
Connection Size	Integer	mm		Size of the inlet connection to the sprinkler.	Subcontractor	BIM Model				x	x
Coverage Area	Integer	R-Value		The area that the sprinkler is designed to protect.	Subcontractor	BIM Model				x	x
Discharge Coefficient	Integer	Kv or Cv		The coefficient of flow at the sprinkler.	Subcontractor	BIM Model					x
Discharge Flow Rate	Integer	R-Value		The volumetric rate of fluid discharge.	Subcontractor	BIM Model				x	x
Has Deflector	Bool	yes/no	True or False	Indication of whether the sprinkler has a deflector (baffle) fitted to diffuse the discharge on activation (= TRUE) or not (= FALSE).	Subcontractor	BIM Model				x	x
Maximum Working Pressure	Integer	Pa		Maximum pressure that the object is manufactured to withstand.	Subcontractor	BIM Model					x
Residual Flowing Pressure	Integer	Pa		The residual flowing pressure in the pipeline at which the discharge flow rate is determined.	Subcontractor	BIM Model				x	x
Response	String	Text		Identifies the predefined methods of sprinkler response	Subcontractor	BIM Model				x	x
Tank				**A tank is a vessel or container in which a fluid or gas is stored for later use.**							
Tank Type	String	Text	Fuel, Oil, Water, Rain Water,	Identifies the predefined types of tank from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Nominal Capacity	Integer	m³/s		The total nominal or design volumetric capacity of the tank.	Subcontractor	BIM Model			x	x	x
Access Type	String	Text		Defines the types of access (or cover) to a tank	Subcontractor	BIM Model				x	x
Effective Capacity	Integer	m³/s		The total effective or actual volumetric capacity of the tank.	Subcontractor	BIM Model					x
End Shape Type	String	Text		Defines the types of end shapes that can be used for preformed tanks	Subcontractor	BIM Model					x
First Curvature Radius	Integer	mm		First Curvature Radius should be defined as the base or left side radius of curvature value.	Subcontractor	BIM Model					x
Has Ladder	Bool	yes/no	True or False	Indication of whether the tank is provided with a ladder(TRUE) or no ladder(FALSE)	Subcontractor	BIM Model				x	x
Has Visual Indicator	Bool	yes/no	True or False	Indication of whether the tank is provided with a visual indicator(TRUE) or no visual indicator(FALSE)	Subcontractor	BIM Model				x	x
Nominal Depth	Integer	mm		The nominal depth of the tank	Subcontractor	BIM Model					x
Nominal Length Or Diameter	Integer	mm		The nominal length or, in the case of a vertical cylindrical tank, the nominal diameter of the tank.	Subcontractor	BIM Model					x
Nominal Width Or Diameter	Integer	mm		The nominal width or, in the case of a horizontal cylindrical tank, the nominal diameter of the tank.	Subcontractor	BIM Model					x
Number Of Sections	Integer	None		Number of sections used in the construction of the tank	Subcontractor	BIM Model				x	x
Operating Weight	Integer	kg		Operating weight of the tank including all of its contents.	Subcontractor	BIM Model					x
Pattern Type	String	Text		Defines the types of pattern (or shape of a tank) that may be specified.	Subcontractor	BIM Model				x	x
Second Curvature Radius	Integer	Inches		Second Curvature Radius should be defined as the top or right side radius of curvature value.	Subcontractor	BIM Model					x
Storage Type	String	Text		Defines the Generic material category intended to be stored.	Subcontractor	BIM Model				x	x
Tank Composition	String	Text	Complex, Element, Partial	Defines the level of element composition	Subcontractor	BIM Model					x
Expansion Tank				Specific Baseline Attributes of an expansion type tank.							
Charge Pressure	Integer	Pa		Nominal or design operating pressure of the tank.	Subcontractor	BIM Model				x	x
Pressure Regulator Setting	Integer	Pa		Pressure that is automatically maintained in the tank.	Subcontractor	BIM Model					x
Relief Valve Setting	Integer	Pa		Pressure at which the relief valve activates.	Subcontractor	BIM Model					x
Pressure Vessel				Specific Baseline Attributes of a pressure vessel.							
Charge Pressure	Integer	Pa		Nominal or design operating pressure of the tank.	Subcontractor	BIM Model				x	x
Pressure Regulator Setting	Integer	Pa		Pressure that is automatically maintained in the tank.	Subcontractor	BIM Model					x
Relief Valve Setting	Integer	Pa		Pressure at which the relief valve activates.	Subcontractor	BIM Model					x
Sectional Tank				Fixed vessel constructed from sectional parts with one or more compartments for storing a liquid.							
Number Of Sections	Integer	None	1,2,3…	Number of sections used in the construction of the tank Note: All sections assumed to be the same size.	Subcontractor	BIM Model				x	x

Section Length	Integer	mm		The length of a section used in the construction of the tank.	Subcontractor	BIM Model				x	x
Section Width	Integer	mm		The width of a section used in the construction of the tank.	Subcontractor	BIM Model				x	x
Valve				**A valve is used in a building services piping distribution system to control or modulate the flow of the fluid.**							
Valve Type	String	Text		Identifies the predefined types of valve from which the type required may be set.	Subcontractor	BIM Model			x	x	x
Valve Operation	String	Text	Dropwight, Float, Hydraulic, lever, Locksheild, Motorized, Pneumatic, Solenoid, Spring, Thermostatic, Chainwheel	The method of valve operation	Subcontractor	BIM Model			x	x	x
Body Material	String	Text		Material from which the body of the valve is constructed.	Subcontractor	BIM Model				x	x
Close Off Rating	Integer	Pa		Close off rating.	Subcontractor	BIM Model				x	x
Flow Coefficient	Integer	Kv or Cv		Flow coefficient (the quantity of fluid that passes through a fully open valve at unit pressure drop),	Subcontractor	BIM Model				x	x
Measured Flow Rate	Integer	R-Value		The rate of flow of a fluid measured across the valve.	Subcontractor	BIM Model				x	x
Measured Pressure Drop	Integer	Kv or Cv		The actual pressure drop in the fluid measured across the valve.	Subcontractor	BIM Model					x
Percentage Open	Integer	None		The ratio between the amount that the valve is open to the full open position of the valve.	Subcontractor	BIM Model				x	x
Size	Integer	mm		The size of the connection to the valve (or to each connection for faucets, mixing valves, etc.).	Subcontractor	BIM Model				x	x
Test Pressure	Integer	Pa		The maximum pressure to which the valve has been subjected under test.	Subcontractor	BIM Model				x	x
Valve Mechanism	String	Text	Ball, Butterfly, Gate, Globe, Gland, Plug, Needle	The mechanism by which the valve function	Subcontractor	BIM Model				x	x
Valve Pattern	String	Text	2Way, 3 Way, 4 Way	The configuration of the ports of a valve	Subcontractor	BIM Model				x	x
Working Pressure	Integer	Pa		The normally expected maximum working pressure of the valve.	Subcontractor	BIM Model				x	x
Air Vent				**Valve used to release air from a pipe or fitting. Note that an air release valve is constrained to have a single port pattern**							
Is Automatic	Bool	yes/no	True or False	Indication of whether the valve is automatically operated (TRUE) or manually operated (FALSE).	Subcontractor	BIM Model				x	x
Faucet				**A small diameter valve, with a free outlet, from which water is drawn.**							
Faucet Function	Integer	Degrees C°		Defines the operating temperature of a faucet that may be specified.	Subcontractor	BIM Model				x	x
Faucet Operation	String	Text	CeramicDisc, LeverHandle,	Defines the range of ways in which a faucet can be operated	Subcontractor	BIM Model				x	x
Faucet Top Description	String	Text		Description of the operating mechanism/top of the faucet.	Subcontractor	BIM Model				x	x
Faucet Type	String	Text	Bib, Globe, Diverter,	Defines the range of faucet types	Subcontractor	BIM Model				x	x
Finish	String	Text		Description of the finish applied to the faucet.	Subcontractor	BIM Model				x	x
Flush Valve				**Valve that flushes a predetermined quantity of water to cleanse a WC, urinal or slop hopper. Note that a flushing valve is constrained to have a 2 port pattern.**							
Flushing Rate	Integer	GPF		The predetermined quantity of water to be flushed.	Subcontractor	BIM Model				x	x
Has Integral Shut Off Device	Bool	yes/no	True or False	Indication of whether the flushing valve has an integral shut off device fitted (set TRUE) or not (set	Subcontractor	BIM Model				x	x
Is High Pressure	Bool	yes/no	True or False	Indication of whether the flushing valve is suitable for use on a high pressure water main (set TRUE)	Subcontractor	BIM Model				x	x
Gas Tap Valve				**A small diameter valve, used to discharge gas from a system.**							
Has Hose Union	Bool	yes/no	True or False	Indicates whether the gas tap is fitted with a hose union connection (= TRUE) or not (= FALSE).	Subcontractor	BIM Model				x	x
Hose Bib				**A small diameter valve, used to drain water from a tank or water filled system.**							
Has Hose Union	Bool	yes/no	True or False	Indicates whether the drawoff cock is fitted with a hose union connection (= TRUE) or not (= FALSE).	Subcontractor	BIM Model				x	x
Isolation Valve				**Valve that is used to isolate system components.**							
Is Normally Open	Bool	yes/no	True or False	If TRUE, the valve is normally open. If FALSE is is normally closed.	Subcontractor	BIM Model				x	x
Isolating Purpose	String	Text		Defines the purpose for which the isolating valve	Subcontractor	BIM Model				x	x
Mixing Valve				**A valve where typically the temperature of the outlet is determined by mixing hot and cold water inlet flows.**	Subcontractor	BIM Model					
Mixer Control	String	Text		Defines the form of control of the mixing valve.	Subcontractor	BIM Model				x	x
Outlet Connection Size	Integer	mm		The size of the pipework connection from the mixing valve.	Subcontractor	BIM Model				x	x
Pressure Reducing Valve				**Valve that reduces the pressure of a fluid immediately downstream of its position in a pipeline to a preselected value or by a predetermined ratio. Note that a pressure reducing valve is constrained to have a 2 port pattern.**							
Downstream Pressure	Integer	Pa		The operating pressure of the fluid downstream of the pressure reducing valve.	Subcontractor	BIM Model				x	x

Upstream Pressure	Integer	Pa		The operating pressure of the fluid upstream of the pressure reducing valve.	Subcontractor	BIM Model				x	x
Pressure Relief Valve				**Spring or weight loaded valve that automatically discharges to a safe place fluid that has built up to excessive pressure in pipes or fittings. Note that a pressure relief valve is constrained to have a single port pattern.**							
Relief Pressure	Integer	Pa		The pressure at which the spring or weight in the valve is set to discharge fluid.	Subcontractor	BIM Model				x	x
Vibration Isolator				**A vibration isolator is a device used to minimize the effects of vibration transmissibility in a building**							
Height	Integer	mm		Height of the vibration isolator before tha application of load.	Subcontractor	BIM Model				x	x
Isolator Compressibility	Integer	mm		The compressibility of the vibration isolator.	Subcontractor	BIM Model					x
Isolator Static Deflection	Integer	mm		Static deflection of the vibration isolator.	Subcontractor	BIM Model				x	x
Maximum Supported Weight	Integer	kg		The maximum weight that can be carried by the vibration isolator.	Subcontractor	BIM Model					x
Vibration Transmissibility	Integer	Percentage		The vibration transmissibility percentage.	Subcontractor	BIM Model				x	x

D - Fluid Gas Distribution

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		Subcontractor	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		Subcontractor	BIM Model			x	x	x
	Provider	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		Subcontractor	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		Subcontractor	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		Subcontractor	BIM Model			x	x	x
	Item-Specific Attributes											
	Pipe Flange											
	Condition Status	String	Text	New, Existing, Demolish, Temporary, User Defined	Status of the element, predominately used in renovation or retrofitting projects	Subcontractor	BIM Model				x	x
	Bolthole Pitch	Integer	mm		Diameter of the circle along which the boltholes are placed.	Subcontractor	BIM Model					x
	Bolt Size	Integer	mm		Size of the bolts securing the flange.	Subcontractor	BIM Model					x
	Bore Size	Integer	mm		The nominal bore of the pipe flange.	Subcontractor	BIM Model					x
	Flange Diameter	Integer	mm		Overall diameter of the flange.	Subcontractor	BIM Model					x
	Flange Standard	String	Text		Designation of the standard describing the flange table.	Subcontractor	BIM Model					x
	Flange Table	String	Text		Designation of the standard table to which the flange conforms.	Subcontractor	BIM Model					x
	Flange Thickness	Integer	mm		Thickness of the material from which the pipe bend is constructed.	Subcontractor	BIM Model					x
	Number Of Bolt holes	Integer	None		Number of boltholes in the flange.	Subcontractor	BIM Model					x
	Pipe Fitting											
	Condition Status	String	Text	New, Existing, Demolish, Temporary, User Defined	Status of the element, predominately used in renovation or retrofitting projects	Subcontractor	BIM Model				x	x
	Color	String	Text		The color of the pipe segment	Subcontractor	BIM Model				x	x
	Flowrate Leakage	String	Text		Leakage flowrate versus pressure difference.	Subcontractor	BIM Model				x	x
	Interior Roughness Coefficient	Integer	None		The interior roughness coefficient of the pipe segment.	Subcontractor	BIM Model				x	x
	Loss Coefficient	Integer	None		Dimensionless loss coefficient used for calculating fluid resistance	Subcontractor	BIM Model				x	x
	Temperature Range	Integer	Degree C°		Allowable maximum and minimum temperature.	Subcontractor	BIM Model				x	x
	Bend Attributes				**Pipe fitting type attributes for bend shapes.**							
	Bend Angle	Integer	Degrees		The change of direction of flow.	Subcontractor	BIM Model					x
	Bend Radius	Integer	mm		The radius of bending if circular arc or zero if sharp bend.	Subcontractor	BIM Model					x
	Fitting Loss Factor	Integer	None		A factor that determines the pressure loss due to friction through the fitting.	Subcontractor	BIM Model					x
	Pressure Class	Text	Lbs		The test or rated pressure classification of the fitting.	Subcontractor	BIM Model					x
	Pressure Range	Integer	Pa		Allowable maximum and minimum working pressure	Subcontractor	BIM Model					x
	Tee/Cross Attributes				**Pipe fitting type attributes for junction shapes.**							
	Junction Left Angle	Integer	Degrees		The change of direction of flow for the left junction.	Subcontractor	BIM Model					x
	Junction Left Radius	Integer	Inches		The radius of bending for the left junction.	Subcontractor	BIM Model					x
	Junction Right Angle	Integer	Degrees		The change of direction of flow for the right junction where 0 indicates straight segment.	Subcontractor	BIM Model					x
	Junction Right Radius	Integer	Inches		The radius of bending for the right junction where 0 indicates sharp bend.	Subcontractor	BIM Model					x
	Junction Type	String	Text	Tee, Cross	The type of junction	Subcontractor	BIM Model					x
	Pipe											
	Condition Status	String	Text	New, Existing, Demolish, Temporary, User Defined	Status of the element, predominately used in renovation or retrofitting projects	Subcontractor	BIM Model				x	x
	Color	String	Text		The color of the pipe segment.	Subcontractor	BIM Model					x
	Fluid Flow Leakage	String	Text		Volumetric leakage flow rate.	Subcontractor	BIM Model				x	x
	Gradient	Integer	None		The gradient of the pipe segment.	Subcontractor	BIM Model					x
	Inner Diameter	Integer	mm		The actual inner diameter of the pipe.	Subcontractor	BIM Model					x
	Interior Roughness Coefficient	Integer	Kv or Cv		The interior roughness coefficient of the pipe segment.	Subcontractor	BIM Model					x
	Invert Elevation	Integer	mm		The invert elevation relative to the datum established for the project.	Subcontractor	BIM Model				x	x

				Leakage Curve	Integer	Kv or Cv		Leakage per unit length curve versus working pressure.	Subcontractor	BIM Model				x	x
				Nominal Diameter	Integer	mm		The nominal diameter of the pipe segment.	Subcontractor	BIM Model					x
				Outer Diameter	Integer	mm		The actual outer diameter of the pipe.	Subcontractor	BIM Model					x
				Pressure Range	Integer	Pa		Allowable maximum and minimum working pressure (relative to ambient pressure).	Subcontractor	BIM Model				x	x
				Temperature Range	Integer	Degrees C°		Allowable maximum and minimum temperature.	Subcontractor	BIM Model				x	x
				Working Pressure	Integer	Pa		Working pressure.	Subcontractor	BIM Model				x	x

D - Electrical								LOI				
Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		Subcontractor	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		Subcontractor	BIM Model			x	x	x
	Provider	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		Subcontractor	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		Subcontractor	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		Subcontractor	BIM Model			x	x	x
	Item-Specific Attributes											
	Battery				**A device for storing energy in chemical form so that it can be released as electrical energy.**							
	Battery Type	String	Text		The property enumeration defines the types of battery that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
	Connected Conductor Function	String	Text		Function of the conductors to which the load is connected.	Subcontractor	BIM Model				x	x
	Capacity	Integer	mAh		The capacity of the battery						x	x
	Earth Fault1 Pole Maximum State	Integer	Amps		Maximum 1 pole earth fault current provided at the point of supply i.e. the fault between 1 phase and	Subcontractor	BIM Model					x
	Earth Fault1 Pole Minimum State	Integer	Amps		Minimum 1 pole earth fault current provided at the point of supply i.e. the fault between 1 phase and	Subcontractor	BIM Model					x
	Earth Fault1 Pole Power Factor Maxim	Integer	Amps		Power factor of the maximum 1 pole earth fault current provided at the point of supply i.e. the fault b	Subcontractor	BIM Model					x
	Earth Fault1 Pole Power Factor Minim	Integer	Amps		Power factor of the minimum 1 pole earth fault current provided at the point of supply i.e. the fault be	Subcontractor	BIM Model					x
	Nominal Frequency	Integer	Hertz		The nominal frequency of the supply.	Subcontractor	BIM Model				x	x
	Nominal Supply Voltage	Integer	Volts		The nominal voltage of the supply.	Subcontractor	BIM Model				x	x
	Nominal Supply Voltage Offset	Integer	Volts		The maximum and minimum allowed voltage of the supply e.g. boundaries of 380V/440V may be appl	Subcontractor	BIM Model					x
	Short Circuit1 Pole Maximum State	Integer	Amps		Maximum 1 pole short circuit current provided at the point of supply i.e. the fault between 1 phase an	Subcontractor	BIM Model					x
	Short Circuit1 Pole Minimum State	Integer	Amps		Minimum 1 pole short circuit current provided at the point of supply i.e. the fault between 1 phase an	Subcontractor	BIM Model					x
	Short Circuit1 Pole Power Factor Maxi	Integer	PF		Power factor of the maximum 1 pole short circuit current provided at the point of supply i.e. the fault	Subcontractor	BIM Model					x
	Short Circuit1 Pole Power Factor Mini	Integer	PF		Power factor of the minimum 1 pole short circuit current provided at the point of supply i.e. the fault l	Subcontractor	BIM Model					x
	Short Circuit2 Pole Minimum State	Integer	Amps		Minimum 2 pole short circuit current provided at the point of supply.	Subcontractor	BIM Model					x
	Short Circuit2 Pole Power Factor Mini	Integer	PF		Power factor of the minimum 2 pole short circuit current provided at the point of supply.	Subcontractor	BIM Model					x
	Short Circuit3 Pole Maximum State	Integer	Amps		Maximum 3 pole short circuit current provided at the point of supply.	Subcontractor	BIM Model					x
	Short Circuit3 Pole Power Factor Maxi	Integer	PF		Power factor of the maximum 3 pole short circuit current provided at the point of supply.	Subcontractor	BIM Model					x
	Breaker				**A protective device tripping unit breaks an electrical circuit at a separate breaking unit when a stated electric current that passes through the unit is excee**							
	Breaker Type	String	Text		The property enumeration defines the types of breaker that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
	Atex Verified	Bool	yes/no	True or False	An indication whether the tripping_unit is verified to be applied in EX-environment or not.	Subcontractor	BIM Model				x	x
	Limiting Terminal Size	String	Text		The maximum terminal size capacity of the device.	Subcontractor	BIM Model				x	x
	Old Device	Bool	yes/no	True or False	Indication whether the protection_ unit is out-dated or not. If not out-dated, the device is still for sale.	Subcontractor	BIM Model				x	x
	Standard	String	Text		The designation of the standard applicable for the definition of the characteristics of the tripping_unit	Subcontractor	BIM Model				x	x
	Use In Discrimination	Bool	yes/no	True or False	An indication whether the time/current tripping information can be applied in a discrimination analysi	Subcontractor	BIM Model				x	x
	Curve				A coherent set of attributes representing a curve for let-through energy of a protective device.							
	Breaker Unit Curve	Integer	Amps		A curve that establishes the let through energy of a breaker unit when a particular prospective current	Subcontractor	BIM Model					x
	Nominal Current	Integer	Amps		A set of nominal currents in [A] for which the data of this instance is valid.	Subcontractor	BIM Model				x	x
	Voltage Level	Integer	Volts		The voltage levels of the protective device for which the data of the instance is valid.	Subcontractor	BIM Model				x	x
	Fuse Curve				A coherent set of attributes representing curves for melting- and breaking-energy of a fuse.							
	Breaker Unit Fuse Breaking Curve	Integer	Amps		The let through breaking energy of a breaker unit when a particular prospective breaking current is ap	Subcontractor	BIM Model					x
	Breaker Unit Fuse Melting Curve	Integer	Amps		A curve that establishes the energy required to melt the fuse of a breaker unit when a particular prosp	Subcontractor	BIM Model					x
	Voltage Level	Integer	Volts		The voltage levels of the fuse for which the data of the instance is valid. More than one value may be s	Subcontractor	BIM Model				x	x
	IPI Curve				A coherent set of attributes representing curves for let-through currents of a protective device.							
	Breaker Unit I P I Curve	Integer	Amps		The let through peak current of a breaker unit when a particular prospective current is applied.	Subcontractor	BIM Model					x
	Nominal Current	Integer	Amps		A set of nominal currents in [A] for which the data of this instance is valid. At least one value shall be p	Subcontractor	BIM Model				x	x
	Voltage Level	Integer	Volts		The voltage level of the protective device for which the data of the instance is valid. More than one va	Subcontractor	BIM Model				x	x
	Breaker Capacity				A coherent set of attributes representing the breaking capacities of an MCB.							

I C N60898	Integer	Amps		The nominal breaking capacity in [A] for an MCB tested in accordance with the IEC 60898 series.	Subcontractor	BIM Model					x
I C S60898	Integer	Amps		The service breaking capacity in [A] for an MCB tested in accordance with the IEC 60898 series.	Subcontractor	BIM Model					x
I C S60947	Integer	Amps		The service breaking capacity in [A] for an MCB tested in accordance with the IEC 60947 series.	Subcontractor	BIM Model					x
I C U60947	Integer	Amps		The ultimate breaking capacity in [A] for an MCB tested in accordance with the IEC 60947 series.	Subcontractor	BIM Model					x
Nominal Currents	Integer	Amps		A set of nominal currents in [A] for which the data of this instance is valid. At least one value shall be p	Subcontractor	BIM Model				x	x
Power Loss	Integer	Watts		The power loss in [W] per pole of the MCB when the nominal current is flowing through the MCB.	Subcontractor	BIM Model				x	x
Voltage Level	Integer	Volts		The voltage levels for which the data of the instance is valid. More than one value may be selected in t	Subcontractor	BIM Model				x	x
Motor Protection				A coherent set of attributes representing different capacities of a a motor protection device, defined in accordance with IEC 60947.							
I C M60947	Integer	Amps		The making capacity in [A] for a circuit breaker or motor protection device tested in accordance with t	Subcontractor	BIM Model					x
I C S60947	Integer	Amps		The service breaking capacity in [A] for a circuit breaker or motor protection device tested in accordan	Subcontractor	BIM Model					x
I C U60947	Integer	Amps		The ultimate breaking capacity in [A] for a circuit breaker or motor protection device tested in accorda	Subcontractor	BIM Model					x
I C W60947	Integer	Amps		The thermal withstand current in [A] for a circuit breaker or motor protection device tested in accorda	Subcontractor	BIM Model					x
Performance Classes	String	Text	B, C, N, S, H, L, V	A set of designations of performance classes for the breaker unit for which the data of this instance is	Subcontractor	BIM Model					x
Voltage Level	Integer	Volts		The voltage levels for which the data of the instance is valid. More than one value may be selected in t	Subcontractor	BIM Model				x	x
Characteristics				Properties that are applied to an occurrence of a protective device.							
Ground Fault Current Set Value	Integer	Amps		Ground fault current set value. The set value of the ground tripping current if adjustable.	Subcontractor	BIM Model					x
Ground Fault Function	Bool	yes/no	True or False	A flag indicating that the ground fault function of the device is used.	Subcontractor	BIM Model					x
Ground Faulti2t Function	Bool	yes/no	True or False	A flag indicating that the I2t ground fault function of the device is used.	Subcontractor	BIM Model					x
Ground Fault Tripping Time	Integer	Seconds		Ground fault tripping time. The set value of the ground fault tripping current if adjustable.	Subcontractor	BIM Model					x
Instantaneous Current Set Value	Integer	Amps		Instantaneous current set value. The set value of the instantaneous tripping current if adjustable.	Subcontractor	BIM Model					x
Instantaneous Tripping Time	Integer	Seconds		Instantaneous tripping time. The set value of the instantaneous tripping time if adjustable.	Subcontractor	BIM Model					x
Long Time Current Set Value	Integer	Amps		Long time current set value. The set value of the long time tripping current if adjustable.	Subcontractor	BIM Model					x
Long Time Delay	Integer	Seconds		Long time delay. The set value of the long time time-delay if adjustable.	Subcontractor	BIM Model					x
Long Time Function	Bool	yes/no	True or False	A flag indicating that the long time function (i.e. the thermal tripping) of the device is used.	Subcontractor	BIM Model					x
Pole Usage	Integer	None	1,3	Pole usage.	Subcontractor	BIM Model					x
Short Time Current Set Value	Integer	Amps		Short time current set value. The set value of the long time tripping current if adjustable.	Subcontractor	BIM Model					x
Short Time Function	Bool	yes/no	True or False	A flag indicating that the short time function of the device is used.	Subcontractor	BIM Model					x
Short Timei2t Function	Bool	yes/no	True or False	A flag indicating that the I2t short time function of the device is used.	Subcontractor	BIM Model					x
Short Time Tripping Time	Integer	Seconds		Short time tripping time. The set value of the short time tripping time if adjustable.	Subcontractor	BIM Model					x
Trip Curve				Tripping curves are applied to thermal, thermal magnetic or MCB_RCD tripping units (i.e. tripping units having type property sets for thermal, thermal magnet							
Tripping Curve	Integer	Amps		A curve that establishes the release time of a tripping unit when a particular prospective current is app	Subcontractor	BIM Model					x
Tripping Curve Type	String	Text		The type of tripping curve that is represented by the property set.	Subcontractor	BIM Model					x
G Curve				Tripping functions are applied to electronic tripping units (i.e. tripping units having type property sets for electronic tripping defined). They are not applied to t							
Current Tolerance1	Integer	Percentage		The tolerance for the current of time/current-curve in [%].	Subcontractor	BIM Model					x
Current Tolerance2	Integer	Percentage		The tolerance for the current of time/current-curve in [%] valid for times above CurrentTolereanceLim	Subcontractor	BIM Model					x
Current Tolerance Limit1	Integer	Seconds		The time limit in [s] limiting the application of CurrentTolerance1, if any. If the value is set to 0, the val	Subcontractor	BIM Model					x
External Adjusted	Bool	yes/no	True or False	An indication if the ground fault protection may be adjusted according to an external current coil or no	Subcontractor	BIM Model					x
Is Current Tolerance Positive Only	Bool	yes/no	True or False	Indication whether the value of CurrentTolerance1 is provided as a positive tolereance only or not. If	Subcontractor	BIM Model					x
Is Selectable	Bool	yes/no	True or False	Indication whether the S-function can be switched off or not.	Subcontractor	BIM Model					x
Is Time Tolerance Positive Only	Bool	yes/no	True or False	Indication whether the value of TimeTolerance1 is provided as a positive tolereance only or not. If no	Subcontractor	BIM Model					x
Nominal Current Adjusted	Bool	yes/no	True or False	An indication if the tripping currents of the short time protection is related to the nominal current mul	Subcontractor	BIM Model					x
Release Current	Integer	Amps		The release current in [x In] for the initial tripping of the S-function.	Subcontractor	BIM Model					x
Release Current I2t End	Integer	Amps		The release current in [x In] for the end point of the I2t tripping curve of the G-function, if any. The val	Subcontractor	BIM Model					x
Release Current I2t Start	Integer	Amps		The release current in [x In] for the start point of the I2t tripping curve of the G-function, if any.	Subcontractor	BIM Model					x
Release Time	Integer	Seconds		The release time in [s] for the initial tripping of the relevant part. This time indicates that for current Io	Subcontractor	BIM Model					x
Release Time I2t End	Integer	Seconds		The release time in [s] for the end point of the I2 tripping curve of the G-function, if any. The value of R	Subcontractor	BIM Model					x
Release Time I2t Start	Integer	Seconds		The release time in [s] for the start point of the I2t tripping curve of the G-function, if any.	Subcontractor	BIM Model					x
Time Tolerance1	Integer	Percentage		The tolerance for the time of time/current-curve in [%].	Subcontractor	BIM Model					x
Time Tolerance2	Integer	Percentage		The tolerance for the time of the time/current-curve in [%] valid for currents above TimeToleranceLim	Subcontractor	BIM Model					x
Time Tolerance Limit1	Integer	Amps		The current limit in [x In] limiting the application of TimeTolerance1, if any. If the value is set to 0, the	Subcontractor	BIM Model					x
I Curve				Tripping functions are applied to electronic tripping units (i.e. tripping units having type property sets for electronic tripping defined). They are not applied to t							
Current Tolerance1	Integer	Percentage		The tolerance for the current of time/current-curve in [%].	Subcontractor	BIM Model					x
Current Tolerance2	Integer	Percentage		The tolerance for the current of time/current-curve in [%] valid for times above CurrentTolereanceLim	Subcontractor	BIM Model					x
Current Tolerance Limit1	Integer	Seconds		The time limit in [s] limiting the application of CurrentTolerance1, if any. If the value is set to 0, the val	Subcontractor	BIM Model					x
Is Current Tolerance Positive Only	Bool	yes/no	True or False	Indication whether the value of CurrentTolerance1 is provided as a positive tolereance only or not. If	Subcontractor	BIM Model					x
Is Off When S Function On	Bool	yes/no	True or False	Indication whether the I-function is automatically switched off when the S-function is switched on.	Subcontractor	BIM Model					x
Is Selectable	Bool	yes/no	True or False	Indication whether the S-function can be switched off or not.	Subcontractor	BIM Model					x

Is Time Tolerance Positive Only	Bool	yes/no	True or False	Indication whether the value of TimeTolerance1 is provided as a positive tolereance only or not. If no	Subcontractor	BIM Model	x
Max Adjustment X_ I C S	Integer	Amps		Provides the maximum setting value for the available current adjustment in relation to theIcs breaking	Subcontractor	BIM Model	x
Nominal Current Adjusted	Bool	yes/no	True or False	An indication if the tripping currents of the short time protection is related to the nominal current mul	Subcontractor	BIM Model	x
Release Current	Integer	Amps		The release current in [x In] for the initial tripping of the S-function.	Subcontractor	BIM Model	x
Release Time	Integer	Seconds		The release time in [s] for the initial tripping of the relevant part.	Subcontractor	BIM Model	x
Time Tolerance1	Integer	Percentage		The tolerance for the time of time/current-curve in [%].	Subcontractor	BIM Model	x
Time Tolerance2	Integer	Percentage		The tolerance for the time of the time/current-curve in [%] valid for currents above TimeToleranceLim	Subcontractor	BIM Model	x
Time Tolerance Limit1	Integer	Amps		The current limit in [x In] limiting the application of TimeTolerance1, if any. If the value is set to 0, the	Subcontractor	BIM Model	x
L Curve				Tripping functions are applied to electronic tripping units (i.e. tripping units having type property sets for electronic tripping defined). They are not applied to t			
Is Selectable	Bool	yes/no	True or False	Indication whether the L-function can be switched off or not.	Subcontractor	BIM Model	x
Lower Current1	Integer	Amps		The current in [x In], indicating that for currents smaller than LowerCurrent1 the I2t part of the L-funct	Subcontractor	BIM Model	x
Lower Current2	Integer	Amps		The current in [x In], indicating the upper current limit of the lower time/current curve of the I2t part c	Subcontractor	BIM Model	x
Lower Time1	Integer	Seconds		The time in [s], indicating that tripping times of the lower time/current curve lower than LowerTime1 i	Subcontractor	BIM Model	x
Lower Time2	Integer	Seconds		The time in [s], indicating the tripping times of the upper time/current curve at the LowerCurrent2.	Subcontractor	BIM Model	x
Upper Current1	Integer	Amps		The current in [x In], indicating that for currents larger than UpperCurrent1 the I2t part of the L-functic	Subcontractor	BIM Model	x
Upper Current2	Integer	Amps		The current in [x In], indicating the upper current limit of the upper time/current curve of the I2t part c	Subcontractor	BIM Model	x
Upper Time1	Integer	Seconds		The time in [s], indicating that tripping times of the upper time/current curve lower than UpperTime1	Subcontractor	BIM Model	x
Upper Time2	Integer	Seconds		The time in [s], indicating the tripping times of the upper time/current curve at the UpperCurrent2.	Subcontractor	BIM Model	x
S Curve				Tripping functions are applied to electronic tripping units (i.e. tripping units having type property sets for electronic tripping defined). They are not applied to t			
Current Tolerance1	Integer	Percentage		The tolerance for the current of time/current-curve in [%].	Subcontractor	BIM Model	x
Current Tolerance2	Integer	Percentage		The tolerance for the current of time/current-curve in [%] valid for times above CurrentTolereanceLim	Subcontractor	BIM Model	x
Current Tolerance Limit1	Integer	Seconds		The time limit in [s] limiting the application of CurrentTolerance1, if any. If the value is set to 0, the val	Subcontractor	BIM Model	x
Is Current Tolerance Positive Only	Bool	yes/no	True or False	Indication whether the value of CurrentTolerance1 is provided as a positive tolereance only or not. If	Subcontractor	BIM Model	x
Is Off When Lfunction On	Bool	yes/no	True or False	Indication whether the S-function is automatically switched off when the I-function is switched on.	Subcontractor	BIM Model	x
Is Selectable	Bool	yes/no	True or False	Indication whether the S-function can be switched off or not.	Subcontractor	BIM Model	x
Is Time Tolerance Positive Only	Bool	yes/no	True or False	Indication whether the value of TimeTolerance1 is provided as a positive tolereance only or not. If no	Subcontractor	BIM Model	x
Nominal Current Adjusted	Bool	yes/no	True or False	An indication if the tripping currents of the short time protection is related to the nominal current mul	Subcontractor	BIM Model	x
Release Current	Integer	Amps		The release current in [x In] for the initial tripping of the S-function.	Subcontractor	BIM Model	x
Release Current I2t End	Integer	Amps		The release current in [x In] for the end point of the I2t tripping curve of the S-function, if any. The valu	Subcontractor	BIM Model	x
Release Current I2t Start	Integer	Amps		The release current in [x In] for the start point of the I2t tripping curve of the S-function, if any.	Subcontractor	BIM Model	x
Release Time	Integer	Seconds		The release time in [s] for the initial tripping of the relevant part. This time indicates that for current Ic	Subcontractor	BIM Model	x
Release Time I2t End	Integer	Seconds		The release time in [s] for the end point of the I2 tripping curve of the S-function, if any. The value of R	Subcontractor	BIM Model	x
Release Time I2t Start	Integer	Seconds		The release time in [s] for the start point of the I2t tripping curve of the S-function, if any	Subcontractor	BIM Model	x
Time Tolerance1	Integer	Percentage		The tolerance for the time of time/current-curve in [%].	Subcontractor	BIM Model	x
Time Tolerance2	Integer	Percentage		The tolerance for the time of the time/current-curve in [%] valid for currents above TimeToleranceLim	Subcontractor	BIM Model	x
Time Tolerance Limit1	Integer	Amps		The current limit in [x In] limiting the application of TimeTolerance1, if any. If the value is set to 0, the	Subcontractor	BIM Model	x
Current Adjustment Values				A set of current adjustment values that may be applied to an electronic or thermal tripping unit type.			
Adjustment Designation	String	Text		The desgnation on the device for the adjustment.	Subcontractor	BIM Model	x
Adjustment Range	Integer	Amps		Upper and lower current adjustment limits for an AdjustmentValueType = RANGE. Note that this prop	Subcontractor	BIM Model	x
Adjustment Range Step Value	Integer	Amps		Step value of current adjustment for an AdjustmentValueType = RANGE. Note that this property shoul	Subcontractor	BIM Model	x
Adjustment Values	Integer	Amps		A list of current adjustment values that may be applied to a tripping unit for an AdjustmentValueType	Subcontractor	BIM Model	x
Adjustment Value Type	String	Text		The type of adjustment value that is applied through the property set. This determines the properties	Subcontractor	BIM Model	x
Time Adjustment Values				A set of time adjustment values that may be applied to an electronic or thermal tripping unit type.			
Adjustment Designation	String	Text		The desgnation on the device for the adjustment.	Subcontractor	BIM Model	x
Adjustment Range	Integer	Seconds		Upper and lower time adjustment limits for an AdjustmentValueType = RANGE	Subcontractor	BIM Model	x
Adjustment Range Step Value	Integer	Seconds		Step value of time adjustment for an AdjustmentValueType = RANGE	Subcontractor	BIM Model	x
Adjustment Values	Integer	Seconds		A list of time adjustment values that may be applied to a tripping unit for an AdjustmentValueType = L	Subcontractor	BIM Model	x
Adjustment Value Type	String	Text		The type of adjustment value that is applied through the property set	Subcontractor	BIM Model	x
Current For Time Delay	Integer	Amps		The tripping current in [x In] at which the time delay is specified	Subcontractor	BIM Model	x
I2 T Applicability	Bool	yes/no	True or False	The applicability of the time adjustment related to the tripping function.	Subcontractor	BIM Model	x
Electro Magnetic Type				Information on tripping units that are electrically or magnetically tripped.			
Curve Designation	String	Text		The designation of the trippingcurve given by the manufacturer	Subcontractor	BIM Model	x
Defined Temperature	Integer	Degrees C		The ambient temperature at which the thermal current/time-curve associated with this protection dev	Subcontractor	BIM Model	x
Electro Magnetic Tripping Unit Ty	String	Text	l, short circuit, motor protectio	A list of the available types of electric magnetic tripping unit from which that required may be selecte	Subcontractor	BIM Model	x
I1	Integer	Amps		The (thermal) lower testing current limit in [x In], indicating that for currents lower than I1, the trippin	Subcontractor	BIM Model	x
I2	Integer	Amps		The (thermal) upper testing current limit in [x In], indicating that for currents larger than I2, the trippir	Subcontractor	BIM Model	x
I4	Integer	Amps		The lower electromagnetic testing current limit in [x In], indicating that for currents lower than I4, the	Subcontractor	BIM Model	x

I5	Integer	Amps		The upper electromagnetic testing current limit in [x In], indicating that for currents larger than I5, the	Subcontractor	BIM Model					x
T2	Integer	Seconds		The (thermal) testing time in [s] associated with the testing currents I1 and I2.	Subcontractor	BIM Model					x
T5	Integer	Seconds		The electromagnetic testing time in [s] associated with the testing currents I4 and I5, i.e. electromagn	Subcontractor	BIM Model					x
Temperature Factor	String	Text		The correction factor (typically measured as %/deg K) for adjusting the thermal current/time to an am	Subcontractor	BIM Model					x
Electronic Type				Information on tripping units that are electronically tripped.							
Electronic Tripping Unit Type	String	Text		A list of the available types of electronic tripping unit from which that required may be selected.	Subcontractor	BIM Model					x
N_ Protection	Bool	yes/no	True or False	An indication whether the electronic tripping unit has separate protection for the N conductor, or not.	Subcontractor	BIM Model					x
N_ Protection_100	Bool	yes/no	True or False	An indication whether the electronic tripping unit is tripping if the current in the N conductor is more t	Subcontractor	BIM Model					x
N_ Protection_50	Bool	yes/no	True or False	An indication whether the electronic tripping unit is tripping if the current in the N conductor is more t	Subcontractor	BIM Model					x
N_ Protection_ Select	Bool	yes/no	True or False	An indication whether the use of the N_Protection can be selected by the user or not.	Subcontractor	BIM Model					x
Nominal Currents	Integer	R-Value		A set of values providing information on available modules (chips) for setting the nominal current of th	Subcontractor	BIM Model					x
Residual Current				Information on tripping units that are activated by residual current.							
Tripping Unit Release Current	Integer	mA		The value of tripping or residual current for which the device has the possibility to be equipped. The va	Subcontractor	BIM Model					x
Thermal Type				Information on tripping units that are thermally tripped.							
Curve Designation	String	Text		The designation of the trippingcurve given by the manufacturer. For a MCB the designation should be	Subcontractor	BIM Model					x
Defined Temperature	Integer	Degrees C		The ambient temperature at which the thermal current/time-curve associated with this protection dev	Subcontractor	BIM Model					x
I1	Integer	Amps		The (thermal) lower testing current limit in [x In], indicating that for currents lower than I1, the trippin	Subcontractor	BIM Model					x
I2	Integer	Amps		The (thermal) upper testing current limit in [x In], indicating that for currents larger than I2, the trippir	Subcontractor	BIM Model					x
T2	Integer	Seconds		The (thermal) testing time in [s] associated with the testing currents I1 and I2.	Subcontractor	BIM Model					x
Temperature Factor	String	Text		The correction factor (typically measured as %/deg K) for adjusting the thermal current/time to an am	Subcontractor	BIM Model					x
Thermal Tripping Unit Type	String	Text		A list of the available types of thermal tripping unit from which that required may be selected.	Subcontractor	BIM Model					x
Circuit Breaker Type				A coherent set of attributes representing different capacities of a circuit breaker or of a motor protection device, defined in accordance with IEC 60947.							
I C M60947	Integer	Amps		The making capacity in [A] for a circuit breaker or motor protection device tested in accordance with t	Subcontractor	BIM Model					x
I C S60947	Integer	Amps		The service breaking capacity in [A] for a circuit breaker or motor protection device tested in accordan	Subcontractor	BIM Model					x
I C U60947	Integer	Amps		The ultimate breaking capacity in [A] for a circuit breaker or motor protection device tested in accorda	Subcontractor	BIM Model					x
I C W60947	Integer	Amps		The thermal withstand current in [A] for a circuit breaker or motor protection device tested in accorda	Subcontractor	BIM Model					x
Performance Classes	Text		B, C, N, S, H, L, V	A set of designations of performance classes for the breaker unit for which the data of this instance is	Subcontractor	BIM Model					x
Voltage Level	Integer	Volts		The voltage levels for which the data of the instance is valid. More than one value may be selected in t	Subcontractor	BIM Model					x
Ground Fault Type				An earth failure device acts to protect people and equipment from the effects of current leakage.							
Earth Failure Device Type	String	Text		A list of the available types of circuit breaker from which that required may be selected	Subcontractor	BIM Model					x
Sensitivity	Integer	Amps (RMS)		The rated rms value of the vector sum of the instantaneous currents flowing in the main circuits of the	Subcontractor	BIM Model					x
Fuse Disconnect Type				A coherent set of attributes representing the breakeing capacity of a fuse, defined in accordance with IEC 60269.							
Fuse Disconnector Type	String	Text	r, HRC, OverloadProtectionDev	A list of the available types of fuse disconnector from which that required may be selected	Subcontractor	BIM Model				x	x
I C60269	Integer	Amps		The breaking capacity in [A] for fuses in accordance with the IEC 60269 series.	Subcontractor	BIM Model					x
Power Loss	Integer	Watts		The power loss in [W] of the fuse when the nominal current is flowing through the fuse.	Subcontractor	BIM Model					x
Voltage Level	Integer	Volts		The voltage levels for which the data of the instance is valid. More than one value may be selected in t	Subcontractor	BIM Model				x	x
Current Circuit Breaker				A residual current circuit breaker opens, closes or isolates a circuit and has short circuit and overload protection.							
Sensitivity	Integer	Amps		Current leakage to an unwanted leading path during normal operation (IEC 151-14-49).	Subcontractor	BIM Model					x
Current Switch				A residual current switch opens, closes or isolates a circuit and has no short circuit or overload protection.							
Sensitivity	Integer	Amps		Current leakage to an unwanted leading path during normal operation (IEC 151-14-49).	Subcontractor	BIM Model					x
Variable Resistor				A high voltage surge protection device.							
Varistor Type	String	Text		A list of the available types of varistor from which that required may be selected.	Subcontractor	BIM Model					x
Distribution Board				**A distribution board is a flow controller in which instances of electrical devices are brought together at a single place for a particular purpose.**							
Main or Sub Main	Bool	yes/no	True or False	Identifies if the current instance is a main distribution point or topmost level in an electrical distributic	Subcontractor	BIM Model			x	x	x
Requires Qualifies Operator	Bool	yes/no	True or False	Identifies if the current instance requires a skilled person or instructed person to perform operations c	Subcontractor	BIM Model					x
Electrical Appliance				**Common properties for electric appliances**							
Power Status	Bool	yes/no	True or False	Indicates the power state of the device where True is on and False is off.	Subcontractor	BIM Model				x	x
Electric Motor				**Defines a particular type of machine for converting mechanical energy into electrical energy.**							
Motor Type	String	Text		The property enumeration defines the types of motor that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Electric Motor Efficiency	Integer	Ratio		The ratio of output capacity to intake capacity.	Subcontractor	BIM Model				x	x
Frame Size	String	Text	B, C, D	Designation of the frame size according to the named range of frame sizes	Subcontractor	BIM Model				x	x
Has Part Winding	Bool	yes/no	True or False	Indication of whether the motor is single speed, i.e. has a single winding	Subcontractor	BIM Model				x	x
Is Guarded	Bool	yes/no	True or False	Indication of whether the motor enclosure is guarded	Subcontractor	BIM Model				x	x
Locked Rotor Current	Integer	Amps		Input current when a motor armature is energized but not rotating.	Subcontractor	BIM Model				x	x
Maximum Power Output	Integer	KW		The maximum output power rating of the engine.	Subcontractor	BIM Model				x	x
Motor Enclosure Type	String	Text	ODP, TEFC, TENV	A list of the available types of motor enclosure from which that required may be selected.	Subcontractor	BIM Model				x	x

Start Current Factor	Integer	None		StartCurrentFactor is multiplied to NominalCurrent and to give the start current.	Subcontractor	BIM Model				x	x
Starting Time	Integer	Seconds		The time (in s) needed for the motor to reach its rated speed with its driven equipment attached, start	Subcontractor	BIM Model				x	x
Te Time	Integer	Seconds		The maximum time (in s) at which the motor could run with locked rotor when the motor is used in an	Subcontractor	BIM Model				x	x
Generator				**Defines a particular type of machine for converting mechanical energy into electrical energy.**							
Generator Type	String	Text		The property enumeration defines the types of generator that may be specified within the property se	Subcontractor	BIM Model			x	x	x
Electric Generator Efficiency	Integer	Ratio		The ratio of output capacity to intake capacity.	Subcontractor	BIM Model				x	x
Maximum Power Output	Integer	KW		The maximum output power rating of the engine.	Subcontractor	BIM Model				x	x
Start Current Factor	Integer	None		StartCurrentFactor is multiplied to NominalCurrent and we get the start current.	Subcontractor	BIM Model				x	x
Junction Box				**Contains cables, outlets, and/or switches for electrical power.**							
Junction Box Type	String	Text		The property enumeration defines the types of junction box that may be specified within the property	Subcontractor	BIM Model			x	x	x
Clear Depth	Integer	Inches		Clear unobstructed depth available for cable inclusion within the junction box.	Subcontractor	BIM Model				x	x
I P_ Code	String	Text		IEC 60529 (1989) Classification of degrees of protection provided by enclosures (IP Code).	Subcontractor	BIM Model					x
Is External	Bool	yes/no	True or False	Indication of whether the junction box type is allowed for exposure to outdoor elements	Subcontractor	BIM Model					x
Mounting Type	String	Text	Surface, Flush	Method of mounting to be adopted for the type of junction box.	Subcontractor	BIM Model				x	x
Number Of Gangs	Integer	None	1,2,3,4	Number of slots available for switches/outlets (most commonly 1, 2, 3, or 4).	Subcontractor	BIM Model				x	x
Placing Type	String	Text		Location at which the type of junction box can be located.	Subcontractor	BIM Model				x	x
Shape Type	String	Text	Square, Round	Shape of the junction box.	Subcontractor	BIM Model				x	x
Lamp				**A lamp is an artificial light source such as a light bulb or tube.**							
Lamp Box Type	String	Text		The property enumeration defines the types of lamp that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Color Appearance	String	Text		In both the DIN and CIE standards, artificial light sources are classified in terms of their color appearan	Subcontractor	BIM Model				x	x
Color Rendering Index	Integer	R-Value	1-100	The CRI indicates how well a light source renders eight standard colors compared to perfect reference	Subcontractor	BIM Model				x	x
Color Temperature	Integer	Kelvin	3000-4100	The color temperatures of the commonest artificial light sources range from less than 3000K (warm w	Subcontractor	BIM Model				x	x
Contributed Luminous Flux	Integer	Lumens		Luminous flux is a photometric measure of radiant flux, i.e. the volume of light emitted from a light so	Subcontractor	BIM Model				x	x
Lamp Ballast Type	String	Text	EC-A, EC-B	The type of ballast used to stabilise gas discharge by limiting the current during operation and to deliv	Subcontractor	BIM Model				x	x
Lamp Compensation Type	String	Text		Identifies the form of compensation used for power factor correction and radio suppression.	Subcontractor	BIM Model				x	x
Lamp Maintenance Factor	Integer	None		Non recoverable losses of luminous flux of a lamp due to lamp depreciation; i.e. the decreasing of ligh	Subcontractor	BIM Model				x	x
Light Emitter Nominal Power	Integer	Watts		Light emitter nominal power.	Subcontractor	BIM Model				x	x
Spectrum	Integer	nm	380-780nm	The spectrum of radiation describes its composition with regard to wavelength.	Subcontractor	BIM Model				x	x
Light Fixture				**A light fixture that is considered to have a length or surface area from which it emits light in a direction**							
Light Fixture Mounting Type	String	Text	urface, Recessed, Wall, Pendar	A list of the available types of mounting for light fixtures from which that required may be selected.	Subcontractor	BIM Model			x	x	x
Light Fixture Placing Type	String	Text		A list of the available types of placing specification for light fixtures from which that required may be s	Subcontractor	BIM Model			x	x	x
Maintenance Factor	Integer	None		The arithmetical allowance made for depreciation of lamps and reflective equipment from their initial	Subcontractor	BIM Model				x	x
Maximum Plenum Sensible Load	Integer	Watts		Maximum or Peak sensible thermal load contributed to return air plenum by the light fixture.	Subcontractor	BIM Model				x	x
Maximum Space Sensible Load	Integer	Watts		Maximum or Peak sensible thermal load contributed to the conditioned space by the light fixture.	Subcontractor	BIM Model				x	x
Number Of Sources	Integer	None		Number of sources .	Subcontractor	BIM Model				x	x
Sensible Load To Radiant	Integer	Percentage		Percent of sensible thermal load to radiant heat.	Subcontractor	BIM Model				x	x
Total Wattage	Integer	Watts		Wattage on whole lightfitting device with all sources intact.	Subcontractor	BIM Model				x	x
Outlet				**An outlet is a device installed at a point to receive one or more inserted plugs for electrical power or communications.**							
Outlet Type	String	Text		The property enumeration defines the types of outlet that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Is Pluggable Outlet	Bool	yes/no	True or False	Indication of whether the outlet accepts a loose plug connection	Subcontractor	BIM Model				x	x
Number Of Sockets	Integer	None		The number of sockets that may be connected. In case of inconsistency, sockets defined on ports take	Subcontractor	BIM Model				x	x
Security Light				**A light fixture having specific purpose of directing occupants in an emergency, such as an illuminated exit sign or emergency flood light.**							
Security Light Type	String	Text		The property enumeration defines the types of security light that may be specified within the property	Subcontractor	BIM Model			x	x	x
Addressablility	String	Text		The type of addressability.	Subcontractor	BIM Model				x	x
Backup Supply System	String	Text		The type of backup supply system.	Subcontractor	BIM Model				x	x
Fixture Height	Integer	mm		The height of the fixture, such as the text height of an exit sign.	Subcontractor	BIM Model			x	x	x
Pictogram Escape Direction	String	Text		The direction of escape pictogram.	Subcontractor	BIM Model				x	x
Security Lighting Type	String	Text		The type of security lighting.	Subcontractor	BIM Model				x	x
Self Test Function	String	Text		The type of self test function.	Subcontractor	BIM Model				x	x
Switch				**A switch is used in a cable distribution system (electrical circuit) to control or modulate the flow of electricity**							
Switch Type	String	Text		The property enumeration defines the types of switch that may be specified within the property set.	Subcontractor	BIM Model			x	x	x
Has Lock	Bool	yes/no	True or False	Indication of whether a switching device has a key operated lock	Subcontractor	BIM Model				x	x
Is Illuminated	Bool	yes/no	True or False	An indication of whether there is an illuminated indicator to show that the switch is on	Subcontractor	BIM Model				x	x
Legend	String	Text		A text inscribed or applied to the switch as a legend to indicate purpose or function.	Subcontractor	BIM Model				x	x
Number Of Gangs	Integer	None	1,2,3,4	Number of gangs/buttons on this switch.	Subcontractor	BIM Model				x	x
Set Point	Bool	yes/no	0,1	Indicates the setpoint and label. For toggle switches, there are two positions, 0 for off and 1 for on.	Subcontractor	BIM Model				x	x
Switch Function	String	Text		Indicates types of switches which differs in functionality.	Subcontractor	BIM Model				x	x

Contact				An electrical device used to control the flow of power in a circuit on or off.	Subcontractor	BIM Model					
Contactor Type	String	Text	agneticLatching, MechanicalLat	A list of the available types of contactor from which that required may be selected	Subcontractor	BIM Model					x
Dimmer				A dimmer switch is a switch that adjusts electrical power through a variable position level action.	Subcontractor	BIM Model					
Dimmer Type	String	Text		A list of the available types of dimmer switch from which that required may be selected.	Subcontractor	BIM Model				x	x
Emergency Stop				An emergency stop device acts to remove as quickly as possible any danger that may have arisen unex	Subcontractor	BIM Model					
Switch Operation	Bool	yes/no	True or False	Indicates operation of emergency stop switch.	Subcontractor	BIM Model					x
Keypad				A keypad is a switch supporting multiple functions.	Subcontractor	BIM Model					
Keypad Type	String	Text		A list of the available types of keypad switch from which that required may be selected.	Subcontractor	BIM Model					x
Momentary				A momentary switch is a switch that does not hold state.	Subcontractor	BIM Model					
Momentary Type	String	Text		A list of the available types of momentary switch from which that required may be selected.	Subcontractor	BIM Model					x
Set Point	Bool	yes/no	0,1	Indicates the switch position over time	Subcontractor	BIM Model					x
Selector				A selector switch is a switch that adjusts electrical power through a multi-position action.	Subcontractor	BIM Model					
Selector Type	String	Text		A list of the available types of selector switch from which that required may be selected.	Subcontractor	BIM Model					x
Switch Activation	String	Text		A list of the available activations for selector switches from which that required may be selected.	Subcontractor	BIM Model					x
Switch Usage	String	Text		A list of the available usages for selector switches from which that required may be selected.	Subcontractor	BIM Model					x
Starter				A starter is a switch which in the closed position controls the application of power to an electrical devi	Subcontractor	BIM Model					
Starter Type	String	Text	al, DirectOnLine, Frequency, nS	A list of the available types of starter from which that required may be selected	Subcontractor	BIM Model					x
Disconnect				A switch disconnector is a switch which in the open position satisfies the isolating requirements specif	Subcontractor	BIM Model					
Load Disconnection Type	String	Text		A list of the available types of load disconnection from which that required may be selected.	Subcontractor	BIM Model					x
Switch Disconnector Type	String	Text	ledSupport, DoubleBreak, Earth	A list of the available types of switch disconnector from which that required may be selected	Subcontractor	BIM Model					x
Toggle				A toggle switch is a switch that enables or isolates electrical power through a two position on/off actic	Subcontractor	BIM Model					
Switch Activation	String	Text		A list of the available activations for toggle switches from which that required may be selected.	Subcontractor	BIM Model					x
Switch Usage	String	Text		A list of the available usages for toggle switches from which that required may be selected.	Subcontractor	BIM Model					x
Toggle Switch Type	String	Text		A list of the available types of toggle switch from which that required may be selected.	Subcontractor	BIM Model					x
Transformer				**A transformer is an inductive stationary device that transfers electrical energy from one circuit to another.**							
Transformer Type	String	Text		The property enumeration defines the types of transformer that may be specified within the property	Subcontractor	BIM Model			x	x	x
Imaginary Impedance Ratio	Integer	None		The ratio between the imaginary part of the zero sequence impedance and the imaginary part of the p	Subcontractor	BIM Model				x	x
Is Neutral Primary Terminal Available	Bool	yes/no	True or False	An indication of whether the neutral point of the primary winding is available as a terminal	Subcontractor	BIM Model				x	x
Is Neutral Secondary Terminal Availab	Bool	yes/no	True or False	An indication of whether the neutral point of the secondary winding is available as a terminal	Subcontractor	BIM Model				x	x
Maximum Apparent Power	Integer	VA		Maximum apparent power/capacity in VA	Subcontractor	BIM Model				x	x
Primary Apparent Power	Integer	VA		The power in VA that has been transformed and that runs into the transformer on the primary side.	Subcontractor	BIM Model				x	x
Primary Current	Integer	Amps		The current that is going to be transformed and that runs into the transformer on the primary side.	Subcontractor	BIM Model				x	x
Primary Frequency	Integer	Hertz		The frequency that is going to be transformed and that runs into the transformer on the primary side.	Subcontractor	BIM Model				x	x
Primary Voltage	Integer	Volts		The voltage that is going to be transformed and that runs into the transformer on the primary side.	Subcontractor	BIM Model				x	x
Real Impedance Ratio	Integer	None		The ratio between the real part of the zero sequence impedance and the real part of the positive impe	Subcontractor	BIM Model				x	x
Secondary Apparent Power	Integer	VA		The power in VA (volt ampere) that has been transformed and is running out of the transformer on the	Subcontractor	BIM Model				x	x
Secondary Current	Integer	Amps		The current that has been transformed and is running out of the transformer on the secondary side.	Subcontractor	BIM Model				x	x
Secondary Current Type	String	Text		A list of the secondary current types that can result from transformer output.	Subcontractor	BIM Model				x	x
Secondary Frequency	Integer	Hertz		The frequency that has been transformed and is running out of the transformer on the secondary side	Subcontractor	BIM Model				x	x
Secondary Voltage	Integer	Volts		The voltage that has been transformed and is running out of the transformer on the secondary side.	Subcontractor	BIM Model				x	x
Short Circuit Voltage	Integer	Percentage		A complex number that specifies the real and imaginary parts of the short-circuit voltage at rated curr	Subcontractor	BIM Model				x	x
Transformer Vector Group	String	Text	D, Y, Z	List of the possible vector groups for the transformer from which that required may be set. D: means tl	Subcontractor	BIM Model				x	x

D - Electrical Distribution

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		Subcontractor	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		Subcontractor	BIM Model			x	x	x
	Provider	String	Text	Kone		Subcontractor	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		Subcontractor	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		Subcontractor	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		Subcontractor	BIM Model			x	x	x
	Item-Specific Attributes											
	Cable Management											
	Cable Ladder				An open carrier segment on which cables are carried on a ladder structure.							
	Ladder Configuration	String	Text		Description of the configuration of the ladder structure used.	Subcontractor	BIM Model				x	x
	Nominal Height	Integer	mm		The nominal height of the segment.	Subcontractor	BIM Model				x	x
	Nominal Width	Integer	mm		The nominal width of the segment.	Subcontractor	BIM Model				x	x
	Cable Tray				**An (typically) open carrier segment onto which cables are laid.**							
	Has Cover	Bool	yes/no	True or False	Indication of whether the cable tray has a cover (=TRUE) or not (= FALSE). By default, this value should be set to FALSE..	Subcontractor	BIM Model				x	x
	Nominal Height	Integer	mm		The nominal height of the segment.	Subcontractor	BIM Model				x	x
	Nominal Width	Integer	mm		The nominal width of the segment.	Subcontractor	BIM Model				x	x
	Cable Trunk				**An enclosed carrier segment with one or more compartments into which cables are placed.**							
	Nominal Height	Integer	mm		The nominal height of the segment.	Subcontractor	BIM Model				x	x
	Nominal Width	Integer	mm		The nominal width of the segment.	Subcontractor	BIM Model				x	x
	Number Of Compartments	Integer	None		The number of separate internal compartments within the trunking.	Subcontractor	BIM Model				x	x
	Conduit				**An enclosed tubular carrier segment through which cables are pulled.**							
	Conduit Shape Type	String	Text		The shape of the conduit segment.	Subcontractor	BIM Model				x	x
	Is Rigid	Bool	yes/no	True or False	Indication of whether the conduit is rigid	Subcontractor	BIM Model				x	x
	Nominal Height	Integer	mm		The nominal height of the segment.	Subcontractor	BIM Model				x	x
	Nominal Width	Integer	mm		The nominal width of the segment.	Subcontractor	BIM Model				x	x
	Electrical Cable											
	Carrier Stack Number	Integer	None		Number of carrier segments (tray, ladder etc.) that are vertically stacked (vertical is measured as the z-axis of the local coordinate system of the carrier segment).	Subcontractor	BIM Model				x	x
	Current Carrying Capacity	Integer	Amps		Maximum value of electric current which can be carried continuously by a conductor, a device or an apparatu	Subcontractor	BIM Model				x	x
	Design Ambient Temperature	Integer	Degrees C		The highest and lowest local ambient temperature likely to be encountered.	Subcontractor	BIM Model				x	x
	Distance Between Parallel Circuits	Integer	mm		Distance measured between parallel circuits.	Subcontractor	BIM Model					
	Installation Method	String	Text		Method of installation of cable/conductor.	Subcontractor	BIM Model				x	x
	Installation Method Flag Enum	String	Text		Special installation conditions relating to particular types of installation based on IEC60364-5-52:2001 reference installation methods C and D.	Subcontractor	BIM Model				x	x
	Is Horizontal Cable	Bool	yes/no	True or False	Indication of whether the cable occurrences are mounted horizontally	Subcontractor	BIM Model				x	x
	Is Mounted Flat Cable	Bool	yes/no	True or False	Indication of whether the cable occurrences are mounted flat	Subcontractor	BIM Model				x	x
	Maximum Cable Length	Integer	mm		Maximum cable length based on voltagedrop.	Subcontractor	BIM Model				x	x
	Mounting Method	String	Text		The method of mounting cable segment on a cable carrier from which the method required can be selected.	Subcontractor	BIM Model				x	x
	Number Of Parallel Circuits	Integer	None		Number of parallel circuits.	Subcontractor	BIM Model				x	x
	Power Loss	Integer	Watts		Total loss of power across this cable.	Subcontractor	BIM Model				x	x
	Soil Conductivity	Integer	R-Value		Thermal conductivity of soil. Genericly, within standards such as IEC 60364-5-52, table 52A-16	Subcontractor	BIM Model				x	x
	User Correction Factor	Integer	Percentage		An arbitrary correction factor that may be applied by the user.	Subcontractor	BIM Model				x	x

Bus Bar				Properties specific to busbar cable segments.							
Busbar Routing	Bool	yes/no	True or False	Indication of whether the busbar occurrences are routed horizontally	Subcontractor	BIM Model					x
Electrical Cable				Electrical cable with a specific purpose to lead electric current within a circuit or any other electric construction.							
Function Reliable	Bool	yes/no	True or False	Cable/bus maintain given properties/functions over a given (tested) time and conditions. According to IEC standard.	Subcontractor	BIM Model				x	x
Halogen Proof	Bool	yes/no	True or False	Produces small amount of smoke and irritating Deaerator/Gas.	Subcontractor	BIM Model					x
Has Protective Earth	Bool	yes/no	True or False	One core has protective earth marked insulation, Yellow/Green.	Subcontractor	BIM Model				x	x
Maximum Operating Temperatur	Integer	Degrees C		The maximum temperature at which a cable or bus is certified to operate.	Subcontractor	BIM Model					x
Maximum Short Circuit Temperat	Integer	Degrees C		The maximum short circuit temperature at which a cable or bus is certified to operate.	Subcontractor	BIM Model					x
Number Of Cores	Integer	None		The number of cores in Cable/Bus.	Subcontractor	BIM Model				x	x
Overall Diameter	Integer	Inches		The overall diameter of a Cable/Bus.	Subcontractor	BIM Model				x	x
Rated Temperature	Integer	Degrees C		The range of allowed temerature that a device is certified to handle. The upper bound of this value is the maximum.	Subcontractor	BIM Model					x
Rated Voltage	Integer	Volts		The range of allowed voltage that a device is certified to handle. The upper bound of this value is the maximum.	Subcontractor	BIM Model					x
Screen Diameter	Integer	Inches		The diameter of the screen around a cable or bus segment (if present).	Subcontractor	BIM Model					x
Self Extinguishing60332_1	Bool	yes/no	True or False	Self Extinguishing cable/core according to IEC 60332.1.	Subcontractor	BIM Model					x
Self Extinguishing60332_3	Bool	yes/no	True or False	Self Extinguishing cable/core according to IEC 60332.3.	Subcontractor	BIM Model					x
Special Construction	String	Text		Special construction capabilities like self-supporting, flat devidable cable or bus flat non devidable cable or bus supporting elements inside	Subcontractor	BIM Model					x
Standard	String	Text		The designation of the standard applicable for the definition of the Cable/Bus used.	Subcontractor	BIM Model				x	x
Weight	Integer	Lbs		Weight of cable kg/km.	Subcontractor	BIM Model					x
Electrical Conductor				An electrical conductor is a single linear element with the specific purpose to lead electric current.							
Construction	String	Text	Solid, Stranded	Purpose of informing on how the conductor is constucted (interwined or solid). I.e. Solid (IEV 461-01-06), stranded (IEV 461-01-07), solid-/finestranded(IEV 461-01-11) (not flexible/flexible).	Subcontractor	BIM Model				x	x
Cross Sectional Area	Integer	R-Value		Cross section area of the phase(s) lead(s).	Subcontractor	BIM Model				x	x
Function	String	Text		Type of function for which the conductor is intended.	Subcontractor	BIM Model					x
Material	String	Text		Type of material from which the conductor is constructed.	Subcontractor	BIM Model					x
Shape	String	Text		Indication of the shape of the conductor.	Subcontractor	BIM Model					x
Insulated Conductor				An assembly comprising a conductor with its own insulation (and screens if any)							
Core Identifier	String	Text		The core identification used Identifiers may be used such as by color (Black, Brown, Grey) or by number (1, 2, 3) or by IEC phase reference (L1, L2, L3) etc.	Subcontractor	BIM Model				x	x
Function Reliable	Bool	yes/no	True or False	Core maintain given properties/functions over a given (tested) time and conditions. According to (IEC) standard.	Subcontractor	BIM Model				x	x
Halogen Proof	Bool	yes/no	True or False	Produces small amount of smoke and irritating deaerator/gas.	Subcontractor	BIM Model					x
Overall Diameter	Integer	mm		The overall diameter of a core (maximum space used).	Subcontractor	BIM Model					x
Rated Temperature	Integer	Degrees C		The range of allowed temerature that a device is certified to handle. The upper bound of this value is the maximum.	Subcontractor	BIM Model					x
Rated Voltage	Integer	Volts		The range of allowed voltage that a device is certified to handle. The upper bound of this value is the maximum.	Subcontractor	BIM Model				x	x
Screen Diameter	Integer	mm		The diameter of the screen around a core segment (if present).	Subcontractor	BIM Model					x
Self Extinguishing60332_1	Bool	yes/no	True or False	Self Extinguishing cable/core according to IEC 60332.1.	Subcontractor	BIM Model					x
Self Extinguishing60332_3	Bool	yes/no	True or False	Self Extinguishing cable/core according to IEC 60332.3.	Subcontractor	BIM Model					x
Sheath Colors	String	Text		Colour of the core (derived from IEC 60757).	Subcontractor	BIM Model					x
Standard	String	Text		The designation of the standard applicable for the definition of the core used.	Subcontractor	BIM Model				x	x
Weight	Integer	Lbs		Weight of core kg/km.	Subcontractor	BIM Model					x
Power State	Bool	yes/no	0,1	Indicates the power state of the device where True is on and False is off.	Subcontractor	BIM Model					x
Electrical Properties											
Conductor Function	String	Text		Function of a line conductor to which a device is intended to be connected where L1, L2 and L3 represent the phase lines according to IEC 60446 notation	Subcontractor	BIM Model				x	x
Has Protective Earth	Bool	yes/no	True or False	Indicates whether the electrical device has a protective earth connection	Subcontractor	BIM Model				x	x
Insulation Standard Class	String	Text		Insulation standard classes provides basic protection information against electric shock. Defines levels of insulation required in terms of constructional requirements	Subcontractor	BIM Model				x	x
I P_ Code	String	Text		IEC 60529 Classification of degrees of protection provided by enclosures (IP Code).	Subcontractor	BIM Model					x
Nominal Frequency Range	Integer	Hertz		The upper and lower limits of frequency for which the operation of the device is certified.	Subcontractor	BIM Model				x	x

				Number Of Poles	Integer	None		The number of live lines that is intended to be handled by the device.	Subcontractor	BIM Model				x	x
				Power Factor	Integer	Ratio		The ratio between the rated electrical power and the product of the rated current and rated voltage	Subcontractor	BIM Model					x
				Rated Current	Integer	Amps		The current that a device is designed to handle.	Subcontractor	BIM Model				x	x
				Rated Voltage	Integer	Volts		The voltage that a device is designed to handle.	Subcontractor	BIM Model				x	x

F - Metal Construction								LOI				
Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	1	2	3	4	5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Construction Width	Integer	m			GC	BIM Model	x	x	x	x	x
	Construction Length	Integer	m			GC	BIM Model	x	x	x	x	x
	Eave Height	Integer	m			GC	BIM Model	x	x	x	x	x
	Roof Type	String	Text	options: [monoslope, gable, other]		GC	BIM Model	x	x	x	x	x
	Roof Slope	Integer	R-Value			GC	BIM Model	x	x	x	x	x
	Fireproofed	String	Text	RF…		GC	BIM Model			x	x	x
	Weight	Integer	kg			GC	BIM Model				x	x
	Primary Framing and Bracing					GC	BIM Model					
	Structural steel materials	String	Text		ASTM Specification, Grade	GC	BIM Model			x	x	x
	Frame base fixed	Bool	yes/no	options: [yes, no]		GC	BIM Model			x	x	x
	Support Reactions	String	Text		Table of values	GC	BIM Model				x	x
	Member finish	String	Text	options: [none, primer, galvanized, other]		GC	BIM Model					x
	Fastener materials	String	Text		ASTM Specification, Grade	GC	BIM Model					x
	Fasterner finish	String	Text	options: [black, zinc electroplated, hot-dipped galvanized, other]		GC	BIM Model					x
	Secondary Framing					GC	BIM Model					
	Structural steel materials	String	Text		ASTM Specification, Grade	GC	BIM Model			x	x	x
	Finish	String	Text	options: [none, primer, galvanized, other]		GC	BIM Model			x	x	x
	Fastener materials	String	Text		ASTM Specification, Grade	GC	BIM Model					x
	Fasterner finish	String	Text	options: [black, zinc electroplated, hot-dipped galvanized, other]		GC	BIM Model					x
	Cladding and Exterior Trim					GC	BIM Model					
	Roof Panel System	String	Text	options: [through-fastened, standing seam roof]		GC	BIM Model		x	x	x	x
	Wall Panel System	String	Text	options: [concealed fastener, through-fastened]		GC	BIM Model		x	x	x	x
	Roof Panel Materials	String	Text		ASTM Specification, Grade, thickness, finish, and color	GC	BIM Model			x	x	x
	Wall Panel Materials	String	Text		ASTM Specification, Grade, thickness, finish, and color	GC	BIM Model			x	x	x
	Installation details	String	Text		Panel laps, crimping, etc. Fastener spacing and edge distance, etc.	GC	BIM Model				x	x
	Fastener materials	String	Text		ASTM Specification, Grade	GC	BIM Model					x
	Fasterner finish	String	Text	options: [black, zinc electroplated, hot-dipped galvanized, other]		GC	BIM Model					x
	Caulk/mastic installation details	String	Text		field-installed weather-tightness materials and installation instructions	GC	BIM Model					x

F - Concrete Construction

Category	Attribute	Data Type	Units	Option Examples	Commentary	Responsable	Stockage	LOI 1	LOI 2	LOI 3	LOI 4	LOI 5
Generic	Codification	Classification	Sequence	21-04-01-01-01 Elevators	Omniclass Classification	ARCH	BIM Model	x	x	x	x	x
	ID	Classification	Sequence	123456789	Unique Number	GC	BIM Model	x	x	x	x	x
	Designation of the equipment	String	Text	Main elevator		Exploitant	BIM Model	x	x	x	x	x
	Name of Building / Zone	String	Text	Building A/Zone 1		ARCH	BIM Model	x	x	x	x	x
	Floor and Room name	Classification	Sequence	R+1 A018		ARCH	BIM Model	x	x	x	x	x
	Material	String	Text	Steel		GC	BIM Model		x	x	x	x
	Manufacturer's name	String	Text	Kone		GC	BIM Model			x	x	x
	Manufacturer's reference	Classification	Sequence	Mono Space 500		GC	BIM Model			x	x	x
	Provider	String	Text	Kone		GC	BIM Model			x	x	x
	Duration of guarantee	Integer	Year	10		GC	BIM Model/GMAO			x	x	x
	Start date warranty	Datetime	dd-mm-yy	01-01-18		GC	BIM Model/GMAO			x	x	x
	Periodicity of control	Integer	Month	12		GC	BIM Model/GMAO			x	x	x
	Last date check	Datetime	dd-mm-yy	01-01-19		Exploitant	BIM Model/GMAO			x	x	x
	Reference technical documents	Classification	Sequence	123456789		GC	BIM Model			x	x	x
Additional	Construction Width	Integer	m			GC	BIM Model	x	x	x	x	x
	Construction Length	Integer	m			GC	BIM Model	x	x	x	x	x
	Eave Height	Integer	m			GC	BIM Model	x	x	x	x	x
	Roof Type	String	Text	options: [monoslope, gable, other]		GC	BIM Model	x	x	x	x	x
	Roof Slope	Integer	R-Value			GC	BIM Model	x	x	x	x	x
	Fireproofed	String	Text	RF…		GC	BIM Model			x	x	x
	Concrete Compression Strength	Integer	Pa	Example: 3000 Pa		GC	BIM Model			x	x	x
	Reinforcing Steel Flexture	Integer	Pa	Example: 60,000 Pa		GC	BIM Model			x	x	x
	Reinforcing Steel Shear	Integer	Pa	Example: 60,000 Pa		GC	BIM Model			x	x	x
	Coating	String	Text	options: [galvanized, painted for exterior exposure, etc]		GC	BIM Model			x	x	x
	Archtectural Exposed Structural Steel	Bool	yes/no	options: [yes, no]		GC	BIM Model			x	x	x
	Weight	Integer	kg			GC	BIM Model				x	x
	Primary Framing and Bracing					GC	BIM Model					
	Frame base fixed	Bool	yes/no	options: [yes, no]		GC	BIM Model			x	x	x
	Support Reactions	String	Text		Table of values	GC	BIM Model				x	x
	Member finish	String	Text	options: [none, primer, galvanized, other]		GC	BIM Model					x
	Fastener materials	String	Text		ASTM Specification, Grade	GC	BIM Model					x
	Fasterner finish	String	Text	options: [black, zinc electroplated, hot-dipped galvanized, other]		GC	BIM Model					x
	Secondary Framing					GC	BIM Model					
	Finish	String	Text	options: [none, primer, galvanized, other]		GC	BIM Model			x	x	x
	Fastener materials	String	Text		ASTM Specification, Grade	GC	BIM Model					x
	Fasterner finish	String	Text	options: [black, zinc electroplated, hot-dipped galvanized, other]		GC	BIM Model					x
	Cladding and Exterior Trim					GC	BIM Model					
	Roof Panel System	String	Text	options: [through-fastened, standing seam roof]		GC	BIM Model		x	x	x	x
	Wall Panel System	String	Text	options: [concealed fastener, through-fastened]		GC	BIM Model		x	x	x	x
	Roof Panel Materials	String	Text		ASTM Specification, Grade, thickness, finish, and color	GC	BIM Model			x	x	x
	Wall Panel Materials	String	Text		ASTM Specification, Grade, thickness, finish, and color	GC	BIM Model			x	x	x
	Installation details	String	Text		Panel laps, crimping, etc. Fastener spacing and edge distance, etc.	GC	BIM Model				x	x

		Fastener materials	String	Text		ASTM Specification, Grade	GC	BIM Model				x
		Fasterner finish	String	Text	options: [black, zinc electroplated, hot-dipped galvanized, other]		GC	BIM Model				x
		Caulk/mastic installation details	String	Text		field-installed weather-tightness materials and installation instructions	GC	BIM Model				x

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