

Evaluation de la Qualité des Données BIM pour la Phase d'Exploitation

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Introduction

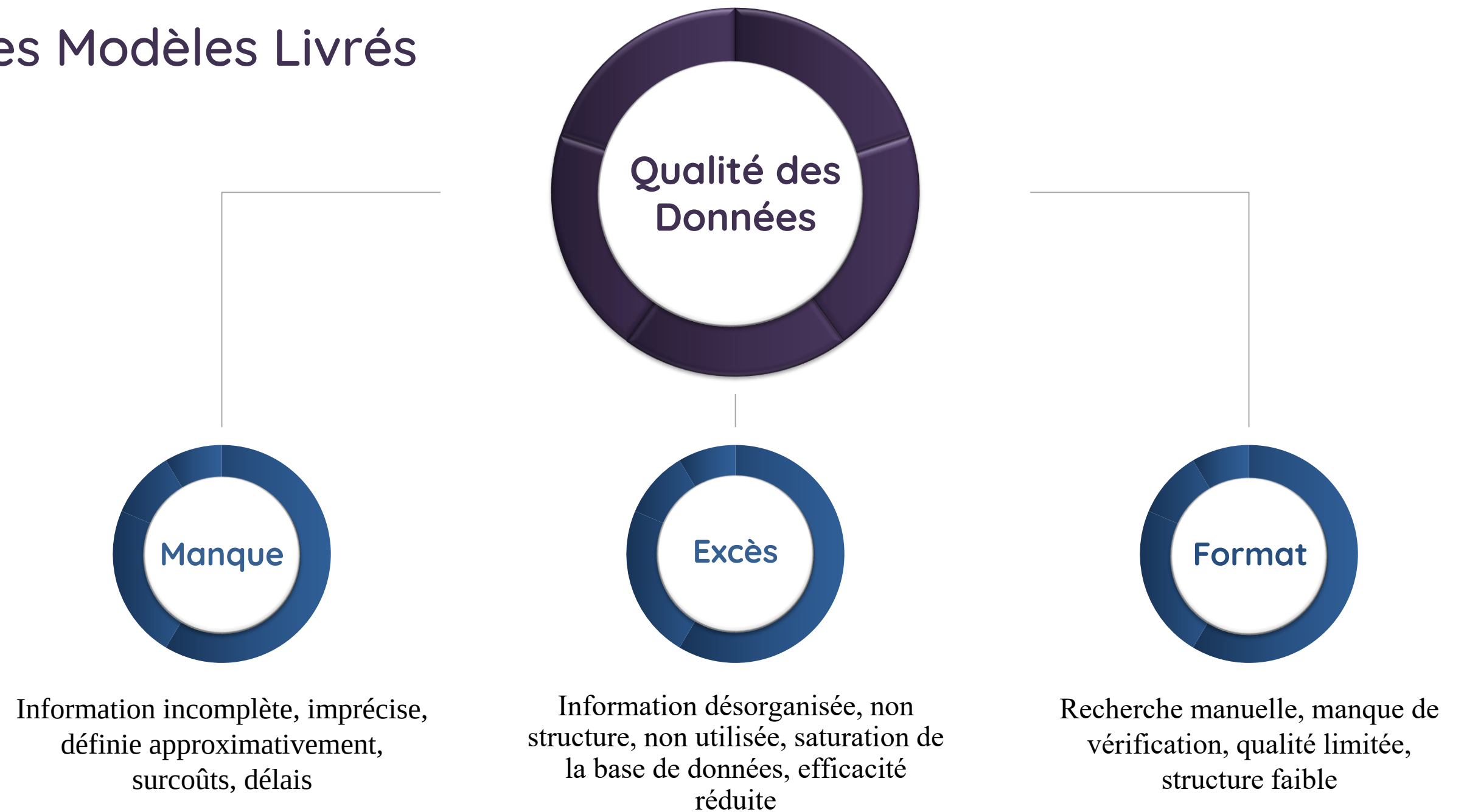
BIM pour les Opérations

- Base de données de l'information des actifs
- Visualisation 3D du bâtiment
- Locations des actifs et relations entre eux
- Historique de la maintenance
- Intégration avec d'autres technologies



Problème Initial

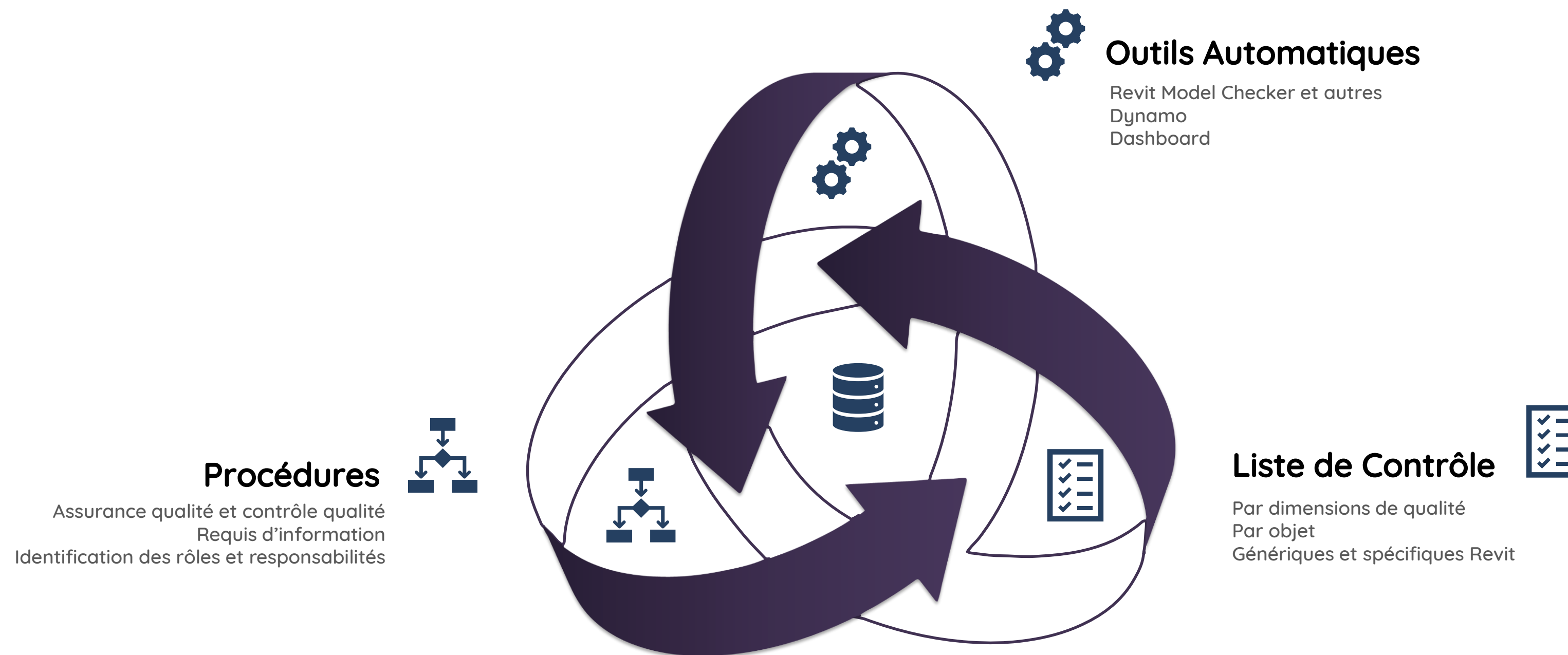
Faible Qualité des Modèles Livrés



Solution Proposée

Cadre pour la Qualité des Modèles FM BIM

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Product	Persp.	Item Definition
Elements	Objects	Floors should be properly defined and should not exist as ceilings.
		Ceilings should not be cut by a space.
	Attributes	All elements properties must reflect as-built conditions.
	Location	Elements should have a relation to the space where they are located.
Spatial Elements	Objects	Spaces should be in a properly enclosed/bounded region.
		Space volume should go from current level up to the slab.
	Attributes	All space properties must reflect as-built conditions.
System	Relations	No disconnection should exist in the systems.
Facility	Integrity	The model should be geolocated.

Product	Persp.	Item Definition
Elements	Objects	Element names should conform to a standard. (IR)
	Attributes	Elements should be classified following a standard classification scheme. (IR)
		Consistent units should be used for the properties of elements. (IR)
Spatial Elements	Objects	All spaces should be hosted to the level in which they contribute to the building square footage.
		Floors and levels naming should be consistent and conform to a standard. (IR)
		Spaces names should be consistent and conform to a standard. (IR)
	Attributes	Spaces should be classified following a standard classification scheme. (IR)
		The area calculation method should comply with a guideline. (IR)
System	Relations	System names should be consistent and conform to a standard. (IR)
Facility	Integrity	Model file names should conform to a standard. (IR)
Drawings	Objects	Model view and sheets names should be consistent and conform to a standard. (IR)
Annotations	Objects	All annotations should be consistent and conform to a standard. (IR)

Product	Persp.	Item Definition
Elements	Objects	There should not be duplicate elements.
	Attributes	There should not be duplicate properties.
	Location	Elements should have a relationship with the space they are accessed from.
Spatial Elements	Objects	There should not be multiple spaces in the same enclosed region.
	Attributes	Unique name and numbering should be used for spaces.
System	Relations	Unique name and numbering should be used for systems definition.
Facility	Integrity	The architecture, structural and MEP models should match and align.
		Links should be pinned in place. (*)
		Links should use overlay method. (*)
		Models files are organized in a standard and consistent directory structure. (IR)

Product	Persp.	Item Definition
Elements	Objects	All required elements must be included in the model. (IR)
		All assets must have the correct LOD. (IR)
	Attributes	All required element properties must be available in the model. (IR)
Spatial Elements	Objects	There should not be infant spaces (e.g. on roofs, external stairs, parking, shafts).
		Zones are defined in addition to spaces for grouping by function purpose.
	Attributes	Spaces should have finishes in addition to materials.
		Every Space should be assigned to at least one Zone.
System	Relations	Systems must be defined and have all their individual components assigned to them.
Facility	Integrity	Delivered models should be complete including: plans, schedules, diagrams, and data from all disciplines. (IR)

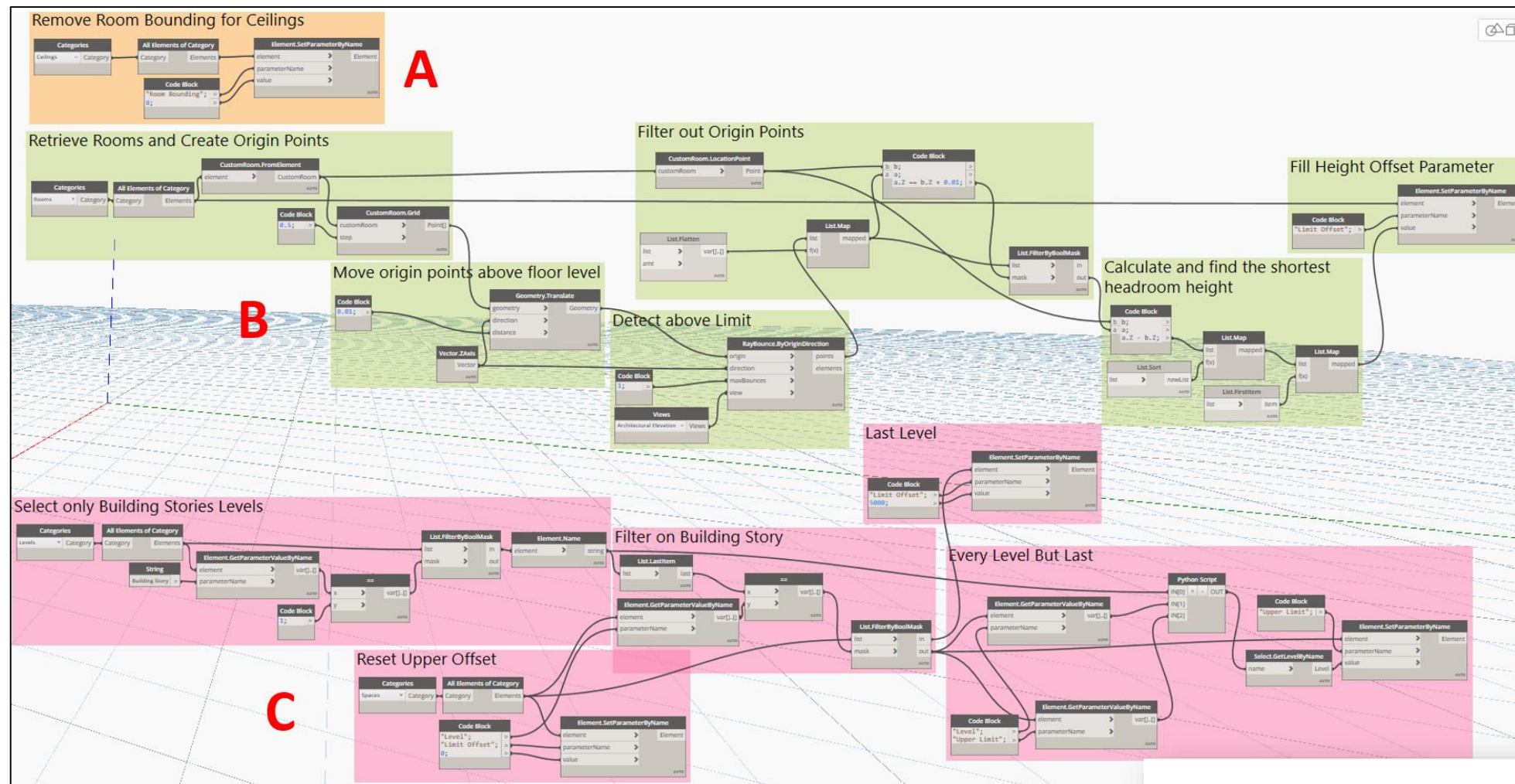
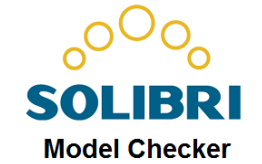
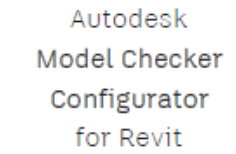
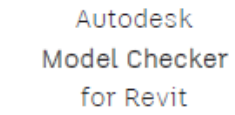
Product	Persp.	Item Definition
Elements	Objects	All unnecessary generic models should be removed. Generic models should be generally avoided. (*)
		All unnecessary in place families should be removed. In place families should be generally avoided. (*)
		All unused objects should be purged and removed. (*)
		All unnecessary mass elements should be removed. Mass elements should be generally avoided. (*)
		All detailed components should be removed. (*)
		All groups used to model the building must be ungrouped. (*)
		There should not be duplicate identification values for elements (e.g. mark, tag).
Spatial Elements	Objects	Non-building story levels and floors should be removed.
		All unnecessary area space schemes should be removed, specifically related to structure, installation, assembly, or construction. (*)
		All unnecessary color schemes should be removed, specifically related to structure, installation, assembly, or construction. (*)
		There should not be multiple levels at the same elevation.
	Attributes	Identification values for spaces (e.g. name, number) should be unique.
Facility	Integrity	Scope Boxes should be removed from the model. (*)
		Design Options should be removed from the model. (*)
		Worksets should be discarded. (*)
		Keep only the default browser organization ("all") for views, sheets and schedules. (*)
		All non-transmittal linked-in files (CAD/Revit/SketchUp) should be removed from the model.
		The models must be purged multiple times before it is shared. (*)
		Warning count should be reduced to zero. (*)
Annotations	Objects	All unnecessary annotation should be deleted, specifically related to structure, installation, assembly, or construction.
		Revisions information should be purged from the model.
		All non-required line styles should be removed, specifically related to structure, installation, assembly, or construction.
Drawings	Objects	All non-required legends should be removed, specifically related to structure, installation, assembly, or construction.
		All unnecessary schedules should be removed, specifically related to structure, installation, assembly, or construction. (IR)
		All unnecessary sheets should be removed. (IR)
		All unnecessary view templates should be removed, specifically related to structure, installation, assembly, or construction.
		All views not on any sheet should be removed (e.g. plan, section, elevation, detail, test, work in progress and drafting views).
		All unnecessary images should be removed.

Product	Persp.	Item Definition
Elements	Objects	There should not be any hidden objects, filter, or annotative element in any view.
		Each object should be modeled in the proper phase. (*)
		Elements should be placed only in their associated models.
	Attributes	Values of property set should only include URLs when there is no alternative.
		Elements properties name and values must be comprehensible.
Spatial Elements	Objects	Spaces should be visible and tagged in all plan views. (*)
	Attributes	Spaces properties name and values must be comprehensible.
System	Relations	System views of the included components and their relations must exist in the model.
Facility	Integrity	FM-BIM model files should be delivered standalone, preferably integrated. If the size does not allow, various discipline models should be properly linked.
		Details about the compatible version of the viewing and editing applications and IFC standard should be provided per model.
		Reference nesting should be avoided. (*)
		Whenever possible, all links must have relative file paths.

Démonstration

Listes de Contrôle

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Add Filter...

	Operator	Criteria	Property	Condition	Value		
☰		Category ▾	OST_MEPSpaces ▾	Include ▾	☑ Code: True		✗
☰	And ▾	Type or Instan ▾	Is Element Type ▾	= ▾	☑ Code: False		✗
☰	And ▾	Parameter ▾	IC_ROOM_NAME ▾	Does N ▾	☑ Code: ROOM_NAME		✗
☰	Or ▾	Category ▾	OST_MEPSpaces ▾	Include ▾	☑ Code: True		✗
☰	And ▾	Parameter ▾	ROOM_NUMBER ▾	Does N ▾	☑ Code: ROOM_NUMBER		✗

Preview (Category OST_MEPSpacesIncluded True AND Type or Instance Is Element Type= False AND Parameter SPACE_ASSOC_ROOM_NAME Does Not Match Parameter ROOM_NAME) OR (Category OST_MEPSpacesIncluded True AND Parameter SPACE_ASSOC_ROOM_NUMBER Does Not Match Parameter ROOM_NUMBER)

Démonstration

Analyse des Modèles

Item Definition	Time		# of identified issues	
	Man.	Aut.	Man.	Aut.
The model should be geolocated	03:30	00:15	0	0
The models must match and align	03:05	00:10	2	2
Links should be pinned in place (*)	14:38	00:30	5	44
Ceiling must not be room-bounded (*)	04:45	00:06	6	234
Spaces must be placed	03:31	00:03	25	28
Spaces must be in enclosed regions and must not overlap	02:00	00:03	0	2
Elements should be placed in their associated models	23:27	00:28	11731	16520
Elements should have a relation with the space they are located in	18:00	00:14	17960	18136
There should not be any hidden objects, filter, or annotative element in any view	39:13	01:12	434	860
Generic Models must be avoided (*)	06:06	00:22	1700	1705
Mass must be avoided (*)	04:37	00:19	6	12
Detail components must be avoided (*)	04:19	00:16	21962	22017
Groups must be dissociated (*)	20:15	00:16	67	2985
Views that are not on any sheet must be purged	05:12	00:16	210	209

Démonstration

Analyse des Modèles

A	B	E	F	G	H	I
COBie	NAME	TYPENAME	SPACE	DESCRIPTION	SERIALNUMBER	INSTALLATIONDAT
☒	AC PKFY-P12NHMU 1TON_AC PKFY-P12NHMU_AC-114	AC PKFY-P12NHMU 1TON_AC PKFY-P12NHMU				
☒	AC PKFY-P12NHMU 1TON_AC PKFY-P12NHMU_AC-113	AC PKFY-P12NHMU 1TON_AC PKFY-P12NHMU				
☒	AC PKFY-P12NHMU 1TON_AC PKFY-P12NHMU_AC-112	AC PKFY-P12NHMU 1TON_AC PKFY-P12NHMU				
☒	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU_AC-101	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU				
☒	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU_AC-104	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU				
☒	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU_AC-115	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU				
☒	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU_AC-111	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU				
☒	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU_AC-108	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU				
☒	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU_AC-102	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU				
☒	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU_AC-107	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU				
☒	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU_AC-109	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU				
☒	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU_AC-116	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU				
☒	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU_AC-115	AC PKFY-P24NKMU 2TON_AC PKFY-P24NKMU				
☒	Condensing Unit PUMY - P60NKMU1_Condensing Unit PUMY - P60NKMU1_CU-101	Condensing Unit PUMY - P60NKMU1_Condensing Unit PUMY - P60NKMU1				
☒	Condensing Unit PUMY - P60NKMU1_Condensing Unit PUMY - P60NKMU1_CU-102	Condensing Unit PUMY - P60NKMU1_Condensing Unit PUMY - P60NKMU1				
☒	Condensing Unit PUMY - P60NKMU1_Condensing Unit PUMY - P60NKMU1_CU-103	Condensing Unit PUMY - P60NKMU1_Condensing Unit PUMY - P60NKMU1				
☒	Condensing Unit PUMY - P60NKMU1_Condensing Unit PUMY - P60NKMU1_CU-104	Condensing Unit PUMY - P60NKMU1_Condensing Unit PUMY - P60NKMU1				

Non consistent,
incomprehensible
, and duplicate
names

Missing Space,
Description,
Serial Number,
and Installation
Values

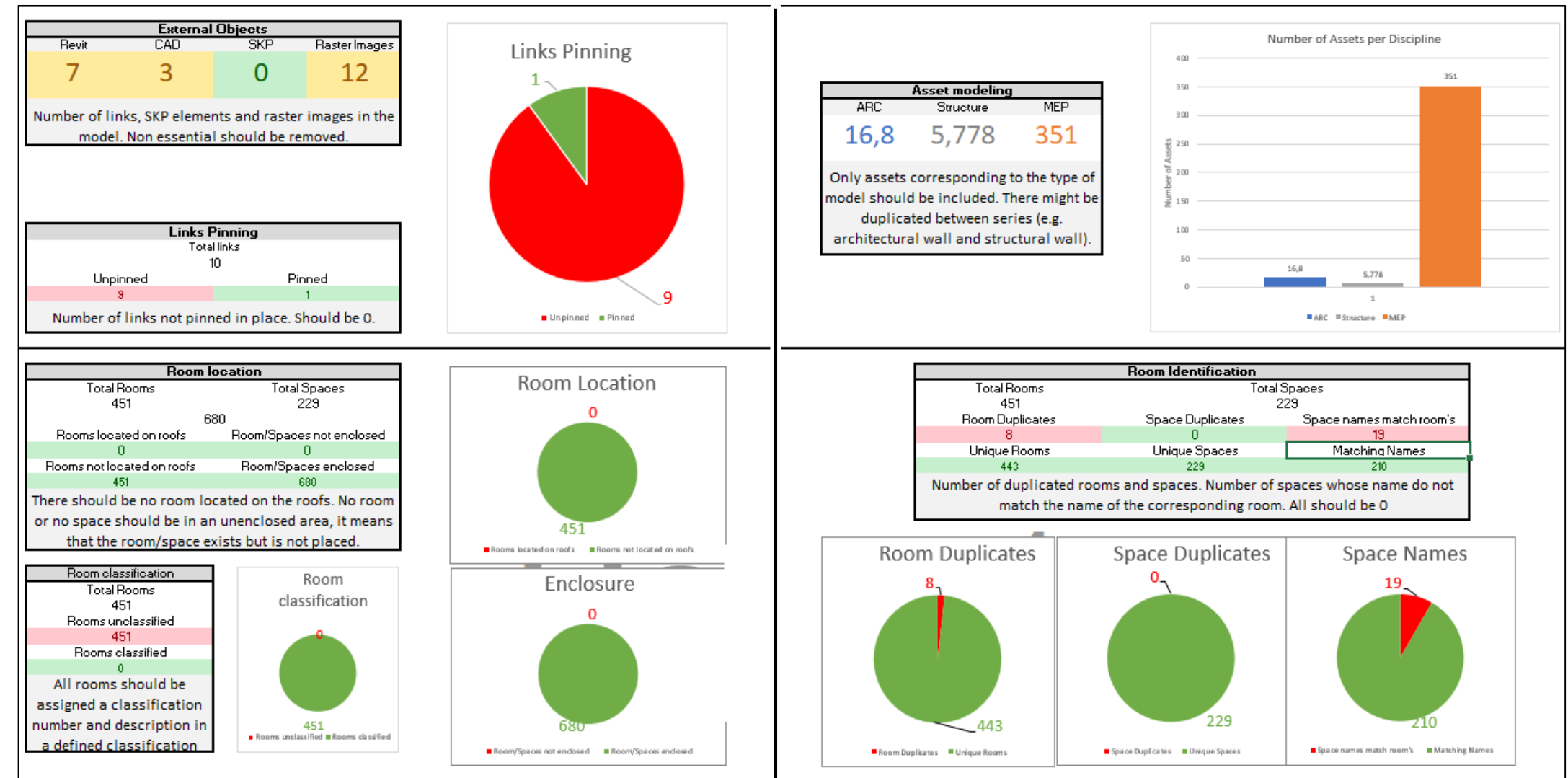
A	B	E	F	G	H	I	J	K
COBie	NAME	CATEGORY	DESCRIPTION	ASSETTYPE	MANUFACTURER	MODELNUMBER	WARRANTYGUARA	WARRANTYDURATI
☒	Windows - Window Wall - Mechanical Louver_3D_Frame Depth 102mm	n/a						
☒	Windows - Window Wall - Awning_3D_Operable Insert	n/a						
☒	Windows - Scupper_3D_Overflow	n/a						
☒	Windows - Mechanical Louvre_3D_1500x1000_Frame Depth 102mm	n/a						
☒	WH3740BAR_WH3740BAR	n/a	Whitehall ADA Compli		Acorn Engineering	WH3740BAR		
☒	Washroom_Bam Door_Bam - Typical Bedroom Washroom	n/a						
☒	SLIDING DOOR - WALL MOUNT - 300 mm	n/a						
☒	SLIDING DOOR - WALL MOUNT - 300 mm	n/a						
☒	Radiant Panel_Radiant Panel 2825AFF	n/a						
☒	Radiant Panel_Radiant Panel	n/a						
☒	PotLight - Cing Based - 3D_Type 1	n/a						
☒	Plumbing - Urinal - Wall Mount - 3D_Base	n/a						
☒	Plumbing - Toilet - Wall Mount - Commercial_3D_Base	n/a						
☒	Plumbing - Drain_3D_Floor Drain 2	n/a						
☒	Plumbing - Drain_3D_Floor Drain	n/a						
☒	Plumbing - Drain_2D_Shower Drain - 100mm DIA.	n/a						
☒	Medicine Wheel Door - 300 mm	n/a						
☒	Mechanical - Gas Meter - 300 mm	n/a						
☒	M_Roof Drain_380 mm Strainer - 200 mm Drain	n/a						
☒	M_Roof Drain_380 mm Strainer - 75 mm Drain	n/a						
☒	Locker-Spectrum-Two_Tier_2 Tier Locker - 15.375"	E2020200	2 Tier Locker		Spectrum	2 Tier Locker 15.375"		
☒	Light Fixture - Sconce_200x100 mm	n/a						
☒	Light Fixture - Pots_300 mm	n/a						
☒	Library Gate_1_Bam 1120mm x 2450mm - Level 3 Only	n/a						
☒	Ladder-Precision_Ladders-Fixed_Ladder_w_Parapet_Platform_and_Roof-Side_Return_Fixed	n/a	Fixed Ladder		Precision Ladders, LL	FL-06		
☒	Ladder-Access-OKeeffes-Removable_Standard	n/a	Aluminum Ladder		O'Keefe's, Inc.	Removable		
☒	Fitness - Weight Rack_2D_Fitness - Weight Rack_2D	n/a						
☒	Fitness - Upright Bike_2D_Fitness - Upright Bike_2D	n/a						
☒	Fitness - Treadmill_2D_Fitness - Treadmill_2D	n/a						
☒	Fire Suppression - Valve Cabinet (Recessed)_3D_865x865x300	n/a						
☒	FF-Isolation-FF-Isolation-400x400	n/a						

Non consistent
names
Misplaced
objects

Missing Classification,
Description,
Manufacturer and
Warranty Values

Démonstration

Tableau de bord



Merci pour votre attention !

Merci à nos partenaires :

