



To access the demo, an account *must* be requested at: <u>https://demo.bimkeeper.com</u> The demo can be accessed at: <u>https://demo.bimkeeper.com/demos/ifc-ids-checker</u>

This demo-instance is only intended for use with this particular demo. The focus of the demo is on this subject only. This means the navigation shows only what the user might need. Some features might not work for this reason. The first demo (basics) can be checked for a broader perspective of all the features BIMBMS offers. For more detailed information, the BIMBMS manual can be referenced, or IRP can be contacted at: contact@bimkeeper.com.





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### 1 Introduction

A new checking tool is built that can make analyses of IFC-files. It can check whether a model matches "information specifications", but also present more general information. It can also be used to calculate some estimates, like volume, percentage of wall-openings/walls (often used for energy calculations).

The checking tool is very flexible. Own rule sets can be built for example. Please note that checks often depend on how the IFC is modeled (language, naming conventions, structure, used technical specifications).

There are two types of checks: general checks and technical specification checks.

Example of general checks: At least 10 toilets, 10 bathrooms, 10 kitchens can be expected if there are 10 apartments in a building. In some countries there are rules for the minimum size of a toilet room: for example, 1.6  $\text{m}^2$ , or a living room 4.5  $\text{m}^2$ . This is not likely to be found in the technical specs. When using the checking module this information can be extracted to easily interpret whether it is correct.

Technical specifications normally contain information on specific details desired to be modelled. Many clients demand IFCs to be modelled in accordance with specifications they use throughout the portfolio. Meaning every IFC needs to match a (large) number of criteria. For example, all doors should have measurements, a material definition, fire safety properties, etc. The IFC-based viewer of BIMBMS is already showing all this information, but this way it can't be easily found out if any information is missing. This module offers a solution for that problem

At this moment, the results of checks are not saved online, although this will change in the future.



### 2 Manual

PLEASE NOTE: The IFC Models need to be re-converted with the latest version of the BIMkeeper converter to work with the BIMkeeper Model Checker.

### 2.1. Running a check

To open the "BIMkeeper Model Checker", the model that needs to be checked should be opened. Once the model is loaded, the "Model Checking" button must be pressed and followed by the "Open checking configuration" button located in the viewer's toolbar.

Once the "BIMkeeper Model Checker" is open a ruleset must be loaded.



Figure 1: Pressing the icon button of Modelling checking will give the option to open the checking configuration.





#### The "Load ruleset..." button must be pressed to load or import a ruleset.

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Wilgenvliet Arnhem W	/F: Checking rules for model "Block	B.ifc"		×
CHOOSE A MODEL:	The selected model Block B.ifc has n	checking configuration loaded. Load or create a rule set		
Block B.ifc	A sector extension			
Load ruleset	Import checking rules			
EDIT RULESET:				
+ Add rule				
+ Add rule category				
Tree of building elem				Export to database +

Figure 2: Load or import a ruleset

In the "Load or import a rule set" dialog, the dropdown box can be used to select the rule set that needs to be loaded. Then the "Load rule set" button needs to be pressed. Alternatively, a custom ruleset can be imported by pressing on the "Import from local file..." button.



Figure 3: Pick a ruleset from a dropdown menu



Figure 4: Different kinds of rulesets





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and the street of the street o	·			
Wilgenvliet Arnhem WF	: Checking rules for model "Block B.	ifc"		×
CHOOSE A MODEL:	To show the results for the current rulese	t first Bun the checks.		
Block B.ifc				
Run checks	Run the current checking configuration			
Show results		-		
Load ruleset				
EDIT RULESET:				
Save ruleset				
+ Add rule				
+ Add rule category				
<ul> <li>Overzichten</li> </ul>				

### Next, the "Run checks" button needs to be pressed in the navigation bar to run the checks.

*Figure 5: Running a check on the current configuration* 

	0	bpd-beheer.bimkeeper.com	Ċ	0 🗈 📖
٢		Wilgenvliet Arnhem Block B full		+
Wilgenvliet Arnhem WF	: Checking rules for model "Block E	B.ifc"		X
CHOOSE A MODEL: Block B.ifc	The checks are currently running. This n	nay take up to a few minutes, and the results will appea	ar once finished.	
Run checks	in the meantine, you can close this dia	og and containe using the viewer.		
Load ruleset	Task 7,189 of 52,743			
EDIT RULESET:				
Save ruleset				
+ Add rule				
+ Add rule category				
+ ILS				

Figure 6: A check is being run





### 2.2. View checking results

The checking results can be viewed by ensuring the "BIMkeeper Model Checker" is opened and running selected checks.

When the "Show Result" button is pressed, the results can be viewed.



Figure 7: Show results

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		10 T			
Wilger	Wilgenvliet Arnhem WF: Checki	ng results for mo	odel "Block B.ifc"		××
CHOOSE	CHOOSE A MODEL:				
Block	Block B.ifc				
R	Show rules				
SI	Generate HTML report				
	+ ILS				
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Sa	ILS - 13.1* - Vloeren op gronds				
- Cu	ILS - 13.2* - Vloeren op gronds				
	ILS - 16.** - Funderingsconstru				
+ Add	ILS - 17.** - Paalfunderingen; n				
	ILS - 21.1* - Buitenwanden; nie				
+ ILS	ILS - 21.2* - Buitenwanden; co				
	ILS - 22.1* - Binnenwanden; nie				
	ILS - 22.2* - Binnenwanden; cc				
	ILS - 23.1* - Vloeren; niet const				
	ILS - 23.2* - Vloeren; construct				
	ILS - 24.1* - Trappen en helling				
	ILS - 24.2* - Trappen en helling				
	ILS - 27.1* - Daken; niet constr				
	II S 27.2* Dakon: constructiv				

Figure 8: Results of checks

The results can	be viewed b	v pressing on	a rule and	selecting a	result category.
The results can	DC VICWCU D	y pressing on	a ruic unu	Jereeting u	result category.

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Block	Block B.ifc	ILS - 00 - Ruimtes			
	Show rules	This rule checks that the model con			
s	Generate HTML report				
	- ILS	HoSpace «Any»			
Lo	ILS - 00 - Ruimtes	» licZone <any></any>			
EDIT BU	ILS - 11.** - Bodernvoorziening				
	ILS - 13.1* - Viceren op gronds				
	ILS - 13.2" - Viberen op gronds				
	ILS - 16.** - Funderingsconstru				
+ Ad	ILS - 17.** - Paalfunderingen; n				
	ILS - 21.1* - Buiterwanden; nie				
> ILS	ILS - 21.2* - Buiterwanden; co				
	ILS - 22.1* - Binnenwanden; nk				
	ILS - 22.2* - Binnenwanden; cc				
	ILS - 23.1" - Vloeren; niet const				
	ILS - 23.2* - Viceran; construct				
	ILS - 24.1" - Trappen en helling				
	ILS - 24.2* - Trappen en heling				
	ILS - 27.1* - Daken; niet constr				
	H.C. 07.01 Delvery construction				

Figure 9: A rule and category is selected





*Figure 10: The results of a ruleset category* 





### 3 Scenario's

### 3.1. Bathrooms with a toilet and a sink

An example of a model check that can be performed is one where the application checks whether each bathroom has a toilet and a sink. After opening the model checker, a rule category should be added first by pressing on "+ Add rule category". Also, make sure that the correct model has been selected under "Choose a model" before proceeding.



Figure 11: Pressing on "+ Add rule category" allows for a new category to be added

					(		
		Wilgenvliet Arnhem WF: Che	cking rules for model "Bloc	Add a new category	×	×	
>>		CHOOSE A MODEL:	The colorted model Plack			A	
		Block A.ifc 🗸 🗸 🗸	The selected model block	Category name Overviews			Ø
	0	Load ruleset	Load a ruleset		Court Court		
		EDIT RULESET:			Cancel	9* Show	
		+ Add rule					
		+ Add rule category					
2		× 11	New York				
men						Open 0 Completed & needs approva	N D
g ele						Closed 0	
ildin							
if bu							
ree c						Export to database	
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### For this example, the category will be named "Overviews". After

Figure 12: Naming a category and adding it





Now that the new category has been added, it can be selected by pressing on the category name, which is "Overviews" in this case. The new category can be found at the bottom left of the model checker screen.



Figure 13: Selecting the newly created category

Now, a rule template needs to be selected. For this example, we can use the "Components Per Building" template. For this example, this template is chosen because the goal of this check is to find out whether every bathroom has a toilet and a sink. A bathroom can be considered a "space", and the toilet and sink can be considered "components".

		and the second state of th	El Manager El Comm	A Provide O Trades			<u> </u>	account.
		Wilgenvliet Arnhem WF: Check	ting rules for model "Block A.ifc	Create a rule	×		×	
>>		CHOOSE A MODEL:						
	A	Block A.ifc 🗸 🗸		Select a rule template to use as basis:				Ľ
		Load ruleset		Components Per Space	~			. *
		EDIT RULESET:		Cancel Ok				
		+ Add rule			_			O= Show in 3D
		+ Add rule category						
s		+ Add rule subcategory						i
emen		* Overviews						ds approval 0
lg el							CIUJCU U	
ildir								
of bu							No element selection	
ree o								e *
							Download model scr	eenshot
	-				0	🛉 🔅 Solar study		

*Figure 14: Selecting a rule template* 





After choosing the newly added "Components Per Space" rule template, it needs to be selected by pressing on it. In this case, it can be found under the "Overviews" category. After pressing on "Components Per Space", the empty template is shown.

	📚 Wilg	Wilgenvliet Arnhem WF: Check	ing rules for model "Block A.ifc"	en A Decentral O Trades	deal .			X	y account	
>>	5 0	CHOOSE A MODEL:								
		Block A.ifc 🗸 🗸	<b>Components Per Space</b>			Change name	Change description	Delete rule	D	
		Run checks	This rule checks that a space contains	the specified components.					. *	
Show results  Load ruleset Control parameters Control over the checking behaviour of the checking rule.										
									• Show in 3D	
		EDIT RULESET:	IT RULESET: Required components							
nts		Save ruleset	# Space	Target filter	Minimum Count	м	aximum Count			
l eleme		+ Add rule	The table contains no records. To add a new row, click the button below.							
Iding		+ Add rule category	Add a new row Clear the tal	ble					is model	
of bui		+ Add rule subcategory								
Tree o		• Overviews	Reporting parameter	'S					<b>}</b>	
	~	Components Per Space	Reporting parameters have control	over the reporting behaviour of th	he checking rule.				enshot	
			Reporting properties					_		
			# Component filter	Property	Grouping by	0	perator			
			The table contains no records. To	add a new row, click the button be	elow.					
			Add a new row Clear the tal	ble						
			Report found entities						F	

Figure 15: Overview of the empty "Components Per Space" rule template





If desired, the name and description of this rule can be changed by respectively pressing on "Change name" and "Change description".



Figure 16: Changing the name and description of the rule





The next step is to specify the components that the model checker needs to look for, and how many of these components a space should have. This can be done in the "Control parameters" section. First, a new row needs to be added for every component that the model checker has to look for. Since the goal of this particular check is to check bathrooms for two separate components (toilets and sinks), two rows need to be added. This is done by pressing the "Add a new row" button twice.

	💓 Wila	a a sure 🕅 administration	B Martin B Com	and a street and	6 Francist	O Tubin	1			y account		
		Wilgenvliet Arnhem WF: Checkin	ing rules for model "Block A.	ifc"						×		
>>	50	CHOOSE A MODEL:						farming on barries and				
		Block A.ifc 🗸 🗸	Bathrooms with to	ilet and	sink			Change name Change dese	Cription Delete rule	2		
		Run checks	This rule checks whether each bathroom has a toilet and sink									
		Show results										
		Load ruleset	Load ruleset Control parameters Control paramete									
		EDIT RULESET:	Required components	introl over th	le checking behavi	our or the che	cking rule.					
ints		Save ruleset	# Space		Target filter		Minimum Count	Maximum Count		1		
g eleme		+ Add rule	1 🖬 <any></any>		┙ <any></any>		0	0	↑ ¥ Î	ds approval 0		
uilding		+ Add rule category	2 🖬 <any></any>	/	┙ <any></any>		0	0	↑ ↓ ■	is model		
ofb		+ Add rule subcategory	Add a new row Clear	the table								
Tree		~ Overviews								····		
		Bathrooms with toilet and :								enshot		
			Reporting paran	neters								
			Reporting parameters have	control over	the reporting beh	aviour of the	checking rule.					
		Reporting properties										
			# Component filter		Property		Grouping by	Operator				
			The table contains no reco	ords. To add a	a new row, click the	e button below	N.					
			Add a new row Clear	the table								
						T						

Figure 17: Adding rows in the "Required components" table

Now, both of these rows should be edited so that the model checker knows what to do. First of all, the spaces that need to be checked are bathrooms. In order to specify this, the left side of the table should be edited ("Space" column) by pressing on the edit button ("pencil" icon). In this particular IFC model, bathroom spaces are simply called "Toilet" which are part of the "LongName" attribute in this case, so the model checker needs to look at spaces that contain this name. This can be done for both rows in the table.

	Wilg	Wilgenvliet Arnhem WF: Checkir	ng rules for model "	Component and pr	operties	×			×	account
>>		Run checks	This rule checks who			_			•	
		Show results		Filters instances of IfcSp	ace whose LongName attribute contains: To	let				Ľ
		Load ruleset	Control pa	IFC Component	IfcSpace	~				
		EDIT RULESET:	Required compc	Туре	Attribute	~				o= Show in 3D
		Save ruleset	# Space	Attribute	LongName	~	Maximum Count			Ľ
s		+ Add rule	1 🖵 Long	Operator	Contains	~	1	↑ <b>↓</b>		
ment		+ Add rule category	2 🖵 Nam	Target value	Toilet		1	↑ ↓ ■		s approval 0
g ele		+ Add rule subcategory	Add a new roy							
uildin		* Overviews		Close						
of bi		Bathrooms with toilet and :								
Tree			Reporting	Reporting parameters						
			Reporting parame	ters have control over th	ers have control over the reporting behaviour of the checking rule.					
			Reporting prope	rties				_		
			# Compone	ent filter	Property	Grouping by	Operator			
			The table contain	ns no records. To add a n	ew row, click the button below.					
			Add a new row	Clear the table						
			Report found	d entities					Ų	B

*Figure 18: Specifying the spaces that needs to be included during the check* 



### Now, the table looks like this:

	😂 Wilg	Wilgenvliet Arnhem WF: Checkir	ng rules for model "Block A.ifc"					×
>>	50	CHOOSE A MODEL:	Bathrooms with toilet and	l sink		Change name Change descr	ription Delete rule	î
		Run checks	This rule checks whether each bathroom h	has a toilet and sink				2
		Show results						
		Load ruleset	Control parameters	he checking behaviour of the che	ckina rule.			O= Show in 3D
		EDIT RULESET:	Required components	the encoding benariour of the enc	congrater			
ts		Save ruleset	# Space	Target filter	Minimum Count	Maximum Count		
elemen		+ Add rule	1 ⊔ LongName ∋ Toilet 🖍	🗆 <any> 🖊</any>	0	0	↑ ¥ <b>î</b>	ds approval 0
ding		+ Add rule category	2 ⊔ LongName ∋ Toilet 🖍	u <any></any>	0	0	↑ ↓ <b>I</b>	s model
of buil		+ Add rule subcategory	Add a new row Clear the table					
Tree		<ul> <li>Overviews</li> </ul>						****
		Bathrooms with toilet and :						enshot
			Reporting parameters					
			Reporting parameters have control over	er the reporting behaviour of the o	hecking rule.			
			Reporting properties					
			# Component filter	Property	Grouping by	Operator		
			The table contains no records. To add	a new row, click the button below	<i>i.</i>			
			Add a new row Clear the table	) · · ·				<u> </u>

Figure 19: Overview of the "Required components" table after editing the values in the "Space" column





The next step would be to specify the components to check for (toilet and sink). This is done by pressing the edit button in the "Target filter" column. In this particular model, the toilets and sinks are respectively called "Toilet" and "Hoekfontein" (Dutch for "corner sink"), and belong to the "FlowTerminal" class.

	😂 Wilg	Wilgenvliet Arnhem WF: Checking	g rules for model "	Component and prop	erties	×			× <sup>y account</sup>
>>		Run checks	This rule checks whe	Filters instances of IfcFlow]	erminal whose Name attribute contains: Toilet				^
		Show results	Control no						
		Load ruleset	Control paramete	IFC Component	IfcFlowTerminal	~			
		EDIT RULESET:	Required compo	Туре	Attribute	¥.		_	O= Show in 3D
		Save ruleset	# Space	Attribute	Name	~	Maximum Count		2
51		+ Add rule	1 🖵 Long	Operator	Contains	~	0	↑ <b>↓ Ê</b>	
ement		+ Add rule category	2 🖵 Long	Target value	Toilet		0	↑ <b>↓</b>	ds approval 0
ing el		+ Add rule subcategory	Add a new roy						is model
f build		Overviews     Bathrooms with toilet and :		Close					
Tree o			Reporting	parameters					5
			Reporting parame	ters have control over the r	reporting behaviour of the checking rule.				enshot
			Reporting proper	ties of filter	Property Group	oina by	Operator	_	
			The table contain	s no records. To add a new	row, click the button below.	,	operator		
			Add a new row	Clear the table					
			C Report found	l entities					
	1					_			- 6
	S Wilg	Wilgenvliet Arnhem WF: Checking	g rules for model '	Component and prop	erties	×	_		× <sup>y</sup> account
»	S wild	Wilgenvliet Arnhem WF: Checkin Run checks	g rules for model <sup>†</sup> This rule checks wh	Component and prop	erties	×		_	× vaccount
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»	Wilg	Wilgenvliet Arnhem WF: Checking Run checks Show results Load ruleset EDIT RULSET:	g rules for model ' This rule checks who Control paramete Required compr	Component and prop Fibers instances of IfcFlowT IFC Component Type	erties erminal whose Name attribute contains: Hoekfor IfCFlowTerminal Attribute	X ntein V			x account
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ee of building elements		Wilgenvliet Arnhem WF: Checkin Run checks Show results Load ruleset EDIT RULSET: Save ruleset + Add rule + Add rule category + Add rule subcategory - Overviews Bathrooms with toilet and b	g rules for model 1 This rule checks who Control parameter Required compset Space 1 Long 2 Long Add a new row	Component and prop Fibers instances of IfCFlowT IFC Component Type Attribute Operator Target value Close	erties erminal whose Name attribute contains: Hoekford If CFlow Terminal Attribute Name Contains Hoekfontein	X ttein V V	Maximum Count		x / account x / account C C S S S S S S S S S S S S S
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Tree of building elements		Wilgenvliet Arnhem WF: Checking Run checks Show results Load ruleset EDIT RULESET: Save ruleset + Add rule + Add rule subcategory + Add rule subcategory • Overviews Bathrooms with toilet and :	g rules for model 1 This rule checks wh Control paramets Required comps Space 1 Long 2 Long Add a new ro Reporting paramet Reporting paramet Reporting paramet	Component and prop Filers instances of HCFlowT IFC Component Type Attribute Operator Target value Close Parameters ters have control over the or ties	erties erminal whose Name attribute contains: Hoekfor IfcFlowTerminal Attribute Name Contains Hoekfontein eporting behaviour of the checking rule.		Maximum Count 0 0		X Paccourt X Paccourt Construction Construct
Tree of building elements		Wilgenvliet Arnhem WF: Checking Run checks Show results Load ruleset EDIT RULESET: Save ruleset + Add rule + Add rule aubcategory + Add rule subcategory - Overviews Bathrooms with toilet and :	g rules for model 1 This rule checks wh Control paramets Control paramets Required compe Space 1 Long 2 Long 2 Long Add a new row Reporting paramet Reporting paramet Reporting paramet	Component and prop Filers instances of ifcFowT IFC Component Type Attribute Operator Target value Close parameters ters have control over the re- ties on paragrees to actid a series	erties erminal whose Name attribute contains: Hoekfor ffcFlowTerminal Attribute Name Contains Hoekfontein Propersty Group come click the bettep balance	ten	Maximum Count 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Account     A
Tree of building elements		Wilgenvliet Arnhem WF: Checkin Run checks Show results Load ruleset EDIT RULESET: Save ruleset + Add rule + Add rule subcategory + Add rule subcategory • Overviews Bathrooms with toilet and i	g rules for model 1 This rule checks wis Control parameter Control parameter Space 1 Long 2 Long Add a new row Reporting parameter Reporting parameter Reporting parameter Componet The table contain Add a new row	Component and prop Filers instances of ifcFowT IFC Component Type Attribute Operator Target value Close parameters entities at filter s to records. To add a news Clear the table	erties erminal whose Name attribute contains. Hoekfor IfcFlowTerminal Attribute Name Contains Hoekfontein eporting behaviour of the checking rule. Property Group row, click the button below.	ttein v v v v v v v v v v v v v	Maximum Count 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		X Vaccount X Vaccount C Show in 3D C Show
Tree of building elements		Wilgenvliet Arnhem WF: Checkin Run checks Show results Load ruleset EDIT RULSST: Save ruleset + Add rule + Add rule category + Add rule subcategory • Overviews Bathrooms with toilet and :	g rules for model " This rule checks wh Control parameter Required compose Space 1 1 1 1000 2 1 Long Add a new row Reporting parameter Reporting	Component and prop Fibers instances of IdFlowT IFC Component Type Attribute Operator Target value Close parameters ters have control over the or tis no records. To add a new Clear the table	erties eminal whose Name attribute contains: Hoekford If CFlow Terminal Attribute Name Contains Hoekfontein  Property Group row, dick the button below.	xtein v v v	Maximum Count 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		x * account * * * * * * * * * * * * * * * * * * *
Tree of building elements		Wilgenvliet Arnhem WF: Checkin Run checks Show results Load ruleset EDIT RULESET: Save ruleset + Add rule + Add rule category + Add rule subcategory • Overviews Bathrooms with toilet and :	g rules for model 1 This rule checks who Control parameter Required compose Space 1 Long 2 Long Add a new row Reporting parameter Reporting parameter Reporting parameter Reporting parameter Compose The table contain Add a new row	Component and prop Filers Instances of IGFlowT IFC Component Type Attribute Operator Target value Close parameters ters have control over the re- ties nt filter s no records. To add a new Clear the table Lentities	erties erminal whose Name attribute contains: Hoekford If CFlow Terminal Attribute Name Contains Hoekfontein  Property Group row, click the button below.	xten v	Maximum Count 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		x raccurd c c c c c c c c c c c c c

Figure 20: Specifying the components that the model checker needs to look for





Block A.ifc ~	Bathrooms with toilet	and sink			Change name Chan	ge description	Delete rule	
Run checks	This rule checks whether each bath	room has a toilet and sink						
Show results								
Load ruleset	Control parameters			- 1-				0-
EDIT RULESET:	Control parameters have control Required components	over the checking behaviour of	the checking	rule.				
Save ruleset	# Space	Target filter		Minimum Count	Maximum Count	£		ds at
+ Add rule	1 ⊔ LongName ∋ Toilet	L Name ∋ Toilet		0	0	<b>^</b>	¥ 🗎	
+ Add rule category	2 ⊔ LongName ∋ Toilet	Name 🤊 Hoekfo	ntein	0	0	1	+	s mo
+ Add rule subcategory	Add a new row Clear the	table						
<ul> <li>Overviews</li> <li>Bathrooms with toilet and :</li> </ul>		_						ens
	Reporting parameter	ers						
	Reporting parameters have contr	rol over the reporting behaviour	of the checki	ng rule.				
	Reporting properties							
	# Component filter	Property		Grouping by	Operato	1		

#### Now that the target filters have been added, the table looks like this:



The last thing that needs to be done within the "Control parameters" section is specifying the minimum and maximum count for each respective component. In this case, the minimum count will be set to 1, since the goal is to find out whether each bathroom has at least 1 toilet and sink.

	S Wilg	Wilgenvliet Arnhem WF: Checki	ing rules for model "Block A.ifc"	A Description O Testame				x account
>>	50	CHOOSE A MODEL:						A
		Block A.ifc 🗸 🗸	Bathrooms with toilet and s	sink		Change name Change de	scription Delete rule	
		Run checks	This rule checks whether each bathroom ha	s a toilet and sink				. *
		Show results						
		Load ruleset	Control parameters	checking behaviour of the checking	a rule.			o= Show in 3D
		EDIT RULESET:	Required components	creeking benefice	g fore.			
nts		Save ruleset	# Space	Target filter	Minimum Count	Maximum Count		
g eleme		+ Add rule	1 🖵 LongName 🤊 Toilet 🖍	Դել Name ∋ Toilet	1	0	↑ ¥ 🚺	ds approval 0
uilding		+ Add rule category	2 🖵 LongName 🤋 Toilet 🖍	<b>L</b> Name ∋ Hoekfontein	1	0	↑ ↓ <b>I</b>	is model
e of bi		+ Add rule subcategory	Add a new row Clear the table					
Tree		<ul> <li>Overviews</li> </ul>						- And
		Bathrooms with toilet and :						enshot
			Reporting parameters					
			Reporting parameters have control over t	the reporting behaviour of the chec	king rule.			
			Reporting properties					
			# Component filter	Property	Grouping by	Operator		
			The table contains no records. To add a	new row, click the button below.				
	-		Add a new row Clear the table					J P

Figure 22: Overview of the "Required components" table after setting the minimum count to 1





Now, the "Reporting parameters" need to be added to specify how the results are reported. In this case, the results should show for both components (toilet and sink) how many there are per space. Therefore, two rows need to be added by pressing on the "Add a new row" button twice, but this time under the "Reporting properties" table.

	S Wila	a a sure III advertised		0 minuted 0 minuted			A	v account
		Wilgenvliet Arnhem WF: Checking	g rules for model "Block A.ifc"				×	
>>		Load ruleset	Control parameters					
			Control parameters have control over th	e checking behaviour of the che	cking rule.			2
	1	EDIT RULESET:	Required components					. *
		Save ruleset	# Space	Target filter	Minimum Count	Maximum Count		
		+ Add rule	1 ⊔ LongName ∋ Toilet 🖍	<b>1</b> Name ∋ Toilet	1	0	↑ ¥ 🚺	O- Show in 3D
		+ Add rule category	2 ⊔ LongName ∋ Toilet 🖍	L Name ∋ Hoekfontein	1	0	↑ ↓ 1	Ľ
2		+ Add rule subcategory	Add a new row Clear the table		1	1		····
men		* Overviews	Had a new row clear the table					ds approval 0
g ele	~	Bathrooms with toilet and :						
ildin			<b>Reporting parameters</b>					s model
of bu	•		Reporting parameters have control over	the reporting behaviour of the c	hecking rule.			
Iree			Reporting properties					b
			# Component filter	Property	Grouping by	Operator		enshot
			1 🖬 <any> 🖍</any>	<empty></empty>	<any></any>	COUNT ~	↑ <b>↓</b>	
			2 🖬 <any> 🖊</any>	<empty></empty>	<any></any>	COUNT ~	↑ ↓ ■	
			Add a new row Clear the table					
			Report found entities					
				τ				

Figure 23: Overview of the "Reporting properties" table after adding two rows





Both the toilets and sinks need to be included in the results. Therefore, both are added by editing the values in the "Component filter" column.

	S Wilg	Wilgenvliet Arnhem WF: Checking	g rules for model "	Component and pro	perties			×					×	account
»		Load ruleset	Control paramete	Filters instances of IfcFlov	vTerminal whose Name at	ttribute co	ontains: Toilet						Î	Z
		EDIT RULESET: Save ruleset	Required compo	IFC Component	IfcFlowTerminal			~	Maximum Count					•
		+ Add rule	1 🖵 Long	Туре	Attribute			×	0		↑ ↓			•• Show in 3D
		+ Add rule category	2 Long	Attribute	Name			×	0		↑ ↓			Ľ
nts		+ Add rule subcategory	Add a new row	Operator	Contains			~					1	
l eleme		<ul> <li>Overviews</li> <li>Bathrooms with toilet and :</li> </ul>	_	Target value	Toilet			- 1					d	s approval 0
ouilding			Reporting	Close									8	
ree of			Reporting parame	ties	richormid neimmoni r		ecting rule.						2	
÷			# Compone	nt filter I	Property		Grouping by		Operator	_			24	enshot
			1 L Name	∋ Toilet	<empty></empty>		<any></any>		COUNT	~	↑ ↓			
			2 🖬 <anys< td=""><td></td><td><empty></empty></td><td></td><td><any></any></td><td>1</td><td>COUNT</td><td>~</td><td>* *</td><td></td><td></td><td></td></anys<>		<empty></empty>		<any></any>	1	COUNT	~	* *			
			Add a new row	Clear the table										
	7		Report found	l entities									Ų	6
		Wilgenvliet Arnhem WF: Checking	g rules for model "	Component and pro	martias			×		-	_		×	account
>>	S Wilg	Wilgenvliet Arnhem WF: Checking	g rules for model " Control pa	Component and pro	operties			×					×	account
»	S wild	Wilgenvliet Arnhem WF: Checkin Load ruleset	g rules for model " Control pa Control paramete	Component and pro	operties wTerminal whose Name a	ttribute c	ontains: Hoekfontein	×					×	account
>>	Wilg	Wilgenvliet Arnhem WF: Checkin Load ruleset EDIT RULESET: Save ruleset	g rules for model " Control paramete Reguired compo # Space	Component and pro	operties witerminal whose Name a lfcFlowTerminal	ttribute c	ontains: Hoekfontein	×	Maximum Count				×	raccount 2
*		Wilgenvliet Arnhem WF: Checkin Load ruleset EDT RULESET: Save ruleset + Add rule	g rules for model * Control pa Control paramete Required compo # Space 1 u Long	Component and pro Filters instances of itcFior IFC Component Type	opperties wTerminal whose Name a IfcFlowTerminal Attribute	ttribute c	ontains: Hoekfontein	×	Maximum Count		↑ ¥		×	eaccount 2 - - Show in 3D
*	Wile	Wilgenvliet Arnhem WF: Checkin Load ruleset EDIT RULESET: Save ruleset + Add rule + Add rule category	g rules for model * Control paramete Control paramete Required compe 7 Space 1 Long 2 Long	Component and pro Fibers instances of ifcFlor IFC Component Type Attribute	Verminal whose Name a IfcFlowTerminal Attribute Name	ttribute c	ontains: Hoekfontein	×	Maximum Count		+         -           +         -	D	×	account 2 9- Show in 3D
ents		Wilgenvliet Arnhem WF: Checkin Load ruleset EDIT RULESET: Save ruleset + Add rule + Add rule category + Add rule subcategory • Overviews	g rules for model " Control paramete Control paramete Required compo Space 1 Long 2 Long Add a new row	Component and pro	witerminal whose Name a If cFlowTerminal Attribute Name Contains	stribute c	ontains: Hoekfontein	× × × × ×	Maximum Count 0 0				×	account 2   Show in 3D 2  3 approval
g elements		Wilgenvliet Arnhem WF: Checking Load ruleset EDT RUESET: Save ruleset + Add rule + Add rule category + Add rule subcategory - Overviews Bathrooms with toilet and :	g rules for model " Control parameter Control parameter Required compe # Space 1	Component and pro Filters instances of ifcFior IFC Component Type Attribute Operator Target value	opperties aflerminal whose Name a lifeFlowTerminal Attribute Name Contains Hoekfontein	ttribute c	ontains: Hoekfontein	××××	Maximum Count 0 0		↑ ↓ ↑ ↓	0	×	e- Show in 3D sapproval 0
building elements		Wilgenvliet Arnhem WF: Checkin Load ruleset EDIT RULESET: Save ruleset + Add rule + Add rule + Add rule subcategory + Add rule subcategory - Overviews Bathrooms with toilet and :	g rules for model * Control parameter Control parameter Required comps * Space 1   Long 2   Long Add a new row Reporting Reporting parameter	Component and pro Fiters instances of riction IFC Component Type Attribute Operator Target value Close	opperties If CF low Terminal Attribute Name Contains Hoekfontein	ttribute c	ontains: Hoekfontein	×××××	Maximum Count		↑ ↓ ↑ ↓		X	eaccount 2 • • • • • • • • • • • • • • • • • • •
Tree of building elements		Wilgenvliet Arnhem WF: Checking Load ruleset EDIT RULESET: Save ruleset + Add rule + Add rule category + Add rule subcategory • Overviews Bathrooms with toilet and :	g rules for model * Control paramete Required compo * Space 1 Long 2 Long Add a new row Reporting parame Reporting parame	Component and proc Fiters instances of ifcFior IFC Component Type Attribute Operator Target value Close	Wermal whose Name a If CFI ow Terminal Attribute Name Contains Hoekfontein	on the ca	ontains: Hoekfontein	×	Maximum Count 0 0 0		↑ ↓		×	e- Show in 3D Show in 3D 
Tree of building elements		Wilgenvliet Arnhem WF: Checking Load ruleset EDIT RULESET: Save ruleset + Add rule + Add rule + Add rule category + Add rule subcategory • Overviews Bathrooms with toilet and :	g rules for model * Control paramete Control paramete Required compe * Space 1	Component and proc Fibers instances of ficFior IFC Component Type Attribute Operator Target value Close	operties Iferninal whose Name a IfcFlowTerminal Attribute Name Contains Hoekfontein Property	ttribute c	ontains: Hoekfontein	×	Maximum Count    Operator				X	account C Show in 3D C Show in 3D C as approval 0 as model as model as model
Tree of building elements		Wilgenvliet Arnhem WF: Checking Load ruleset EDT RULESET: Save ruleset + Add rule autocategory + Add rule subcategory • Overviews Bathrooms with toilet and :	g rules for model * Control parameter Required comps * Space 1  Long 2  Long Add a new row Reporting parameter Reporting parameter * Compose * C	Component and pro	operties If CFIOWTerminal Attribute Name Contains Hoekfontein Property <empty></empty>	ttribute c	ontains: Hoelfontein	×	Maximum Count 0 0 0 0 0				×	account C Show in 3D C sapproval 0 madel madel madel
Tree of building elements		Wilgenvliet Arnhem WF: Checkin Load ruleset EDT RULESET: Save ruleset + Add rule + Add rule category + Add rule subcategory • Overviews Bathrooms with toilet and :	g rules for model * Control paramete Required compe * Space 1  Long 2  Long Add a new ros Reporting parame Reporting parame Reporting parame 2 Compose 1 Long Add a new ros	Component and proc Fibers instances of ifcFlor IFC Component Type Attribute Operator Target value Close tties tties tties Toilet > Toilet	Property emptys emptys		ontains: Hoeldontein Grouping by «Any» «Any»	× • • • •	Maximum Count				X	eaccount 2 - Show in 3D 2 
Tree of building elements		Wilgenvliet Arnhem WF: Checkin Load ruleset EDT RULESET: Save ruleset + Add rule + Add rule category + Add rule subcategory • Overviews Bathrooms with toilet and :	g rules for model * Control paramete Required compe * Space 1 * Long 2 * Long Add a new row Reporting parame Reporting parame * Compose 1 * Compose 1 * Nome 2 * Nome Add a new row	Component and proc Fiters instances of ficFlow IFC Component Type Attribute Operator Target value Close tries ent filter > Toilet	operties Iferninal whose Name a IferFlowTerminal Attribute Name Contains Hoekfontein Property <empty> <empty></empty></empty>		ontains: Hoekfontein Crouping by «Any» <any»< th=""><th>× • • • • •</th><th>Maximum Count   Maximum Count</th><th></th><th></th><th></th><th>×</th><th>eaccount C = Show in 3D C =</th></any»<>	× • • • • •	Maximum Count   Maximum Count				×	eaccount C = Show in 3D C =

Figure 24: Specifying the components that need to be reported in the results





The values in the "Property" column can be left empty, because specific properties of a toilet or sink component are not relevant for this check. Next, the "Grouping by" values need to be edited so that the results are shown per space (bathroom). In order to do this, "Relationship" needs to be selected, followed by "Space".

	Wilg	Wilgenvliet Arnhem WF: Checking	g rules for model Grouping		×		× vaccount
of building elements		Load ruleset EDIT RULESET: Save ruleset + Add rule + Add rule category + Add rule subcategory • Overviews Bathrooms with toilet and i	Control parameters have control over	Any Attribute Property set Material Classification Relationship Space Building Floor Zone Space the reporting behaviour of the checking r	Maxi 0 Je.	num Count	C  
Tree			Reporting properties  Component filter  Component filter  Name 3 Toilet  Add a new row Clear the table  Report found entities	Property         Grou           cempty>            cempty>            cempty>	ping by Operat	tor VT v + 2 1	enshot

Figure 25: Editing the "Grouping by" values

Lastly, the "Operator" values can be left on "COUNT" for this example, so that the results show the amount of toilets and sinks per bathroom.

	🔵 Wilg	Wilgenvliet Arnhem WF: Checking	g rules for model "Block A.ifc"					× <sup>v account</sup>
>>	5 0	Show results						-
		Load ruleset	Control parameters	checking behaviour of the chec	king rule.			2
		EDIT RULESET:	Required components		o room			
		Save ruleset	# Space	Target filter	Minimum Count	Maximum Count		O- Show in 3D
		+ Add rule	1 ⊔ LongName ∋ Toilet 🖍	<b>1</b> Name ∋ Toilet	1	0	↑ ↓ ■	Ľ
		+ Add rule category	2 ⊔ LongName ∋ Toilet 🖍	<b>1</b> Name ∋ Hoekfontein	1	0	↑ ↓ <b>I</b>	:
ments		+ Add rule subcategory	Add a new row Clear the table					ds approval 0
g eler	1	· Overviews	Add then for clear the able					
ildin		Bathrooms with toilet and :						is model
of bu			Reporting parameters					
Iree			Reporting parameters have control over the	he reporting behaviour of the cl	necking rule.			2
			Reporting properties					enshot
			# Component filter	Property	Grouping by	Operator		
			1 🍾 Name 🤊 Toilet	<empty></empty>	SPACE 🖍	COUNT ~	↑ <b>↓</b> ■	
			2 L Name 🤋 Hoekfontein 🖍	<empty></empty>	SPACE	COUNT ~	↑ ↓ ■	
			Add a new row Clear the table					
			Report found entities					

Figure 26: Overview of the "Reporting properties" table after setting the "Grouping by" value to "SPACE" and leaving the "Operator" value on "COUNT"





If everything is filled in correctly, the blue "Run checks" button can be pressed at the top left of the model checker screen. After which the results are shown.

Wilgenvliet Arnhem WF: Cl	hecking results for model "Block A.ifc"			×
CHOOSE A MODEL: Block A.ifc ~	Bathrooms with toilet and sin	k		
Show rules	This rule checks whether each bathroom has a t	coilet and sink		
Generate HTML report				
<ul> <li>Overviews</li> </ul>	▼ IfcSpace LongName ∋ Toilet	Found: IfcFlowTermin	nal Name ∋ Toilet <i>(33)</i>	
Bathrooms with toilet	<ul> <li>✓ IfcFlowTerminal Name ∋ Toilet</li> <li>Found (33)</li> </ul>	A list of all IfcFlowTerminal Name ∋ To	ilet components found inside the space.	
	✓ IfcFlowTerminal Name   → Hoekfo	SPACE	COUNT	
	Found (33)	08: Toilet	1	
		14: Toilet	1	
		20: Toilet	1	
		26: Toilet	1	
		32: Toilet	1	
		76: Toilet	1	
		78: Toilet	1	

*Figure 27: Results of the configurated check* 



### 3.2. Spaces per zone

An overview of the spaces per apartment within a complex can be created. Such an overview can be achieved by using the "Components per Building" checking constraint.

With the "BIMkeeper Model Checker" opened the "Add rule category" button must be pressed.

	Ū	📾 bpd-beheer.bimkeeper.com	C	O 🗇 888
۲		Wilgenvliet Arnhem Block B full		+
- 1100- A-11-0-110P B			A	
Wilgenvliet Arnhem WF:	Checking rules for model "Block B	ifc"		×
HOOSE A MODEL:	The selected model Block B.ifc has no c	hecking configuration loaded. Load or create a rule set		
Block B.ifc	Trade street			
Load ruleset	Load a ruleset			
EDIT RULESET:				
+ Add rule				
+ Add rule category	Add a rule main category to the cur configuration	ent checking		
elen			No elemen	nt selection
Tree of building				Export to database *

Figure 28: Pressing "Add rule category" allows for a new category to be created

••• < > • •	0	🗎 bpd-beheer.bimkeeper.com 🍣 Wilgenvliet Arnhem Block B full	٢	• <u></u>
Wilgenvliet Arnhem WF: 24005£ A MODEL: Block B.ifc Load ruleset EDIT RULESET: + Add rule + Add rule	Checking rules for model "B The selected model Block B.ifc h Load a ruleset	Add a new category Category name Overviews Car	Toel Add	, ,
Tree of building also				

#### In this example the category is named "Overviews".

Figure 29: Naming a category and adding it





The "Overviews" category needs to be selected and the "Add rule" button needs to be pressed.



Figure 30: Add a rule to a category

Components per Building under Component instances needs to be selected. Afterwards the rule needs to be selected.



Figure 31: A rule template needs to be selected from the dropdown

*Figure 32: Different rule templates are available* 







Figure 33: Components Per Building template is selected



*Figure 34: The rule is added to the "Overviews" category* 

Wilgenvliet Arnhem WF: Checking rules CHOOSE A MODEL Block B.ifc Com	for model "Block B.ifc"	Wigervliet Arnhem Block B Control of Control of Cont	i full	A	+
Wilgenvliet Arnhem WF: Checking rules CHOOSE A MODEL: Block B.ifc Com	for model "Block B.ifc"	0	0.700		×
Wilgenvliet Arnhem WF: Checking rules CHOOSE A MODEL: Block B.ifc Com	for model "Block B.ifc"				×
Block B.ifc Com	nononto Dor Ruild				~
This rule	ponents Per Build	ing		Change name Change description	Delete rule
Run checks	e checks that a building cont	ains the specified components.			
Show results					
Load ruleset Cont	ntrol parameters	over the checking behaviour of the ch	ecking rule.		
EDIT RULESET: Requ	ired components				
Save ruleset	Building filter	Target filter	Minimum Count	Maximum Count	
The	table contains no records. 1	To add a new row, click the button be	łow.		
+ Add rule Ad	d a new row Clear the t	table			
+ Add rule category					
+ Add rule subcategory	porting paramete	rs			
Overviews     Repo	rting parameters have contro	of over the reporting behaviour of the	checking rule.		
Components Per Building Repo	rting properties				
			Grouping by	Operator	
	table contains as months 7				

Figure 35: The rule is selected





The rule is renamed to "Space per unit overview" for clarification, by pressing the "Change name" button.

••• < > •• •	D	B bpd-beheer.bimkeeper.c	om C	• •
۲		SWilgenvliet Arnhem Block 8	3 full	+
Wilgenvliet Arnhem WF: Check	ing rules for model "Block	Change the rule name	×	×
Block B.ifc	Components Per E	Name Space per unit overview	Change	name Change description Delete rule
Run checks	This rule checks that a buildin		Cancel OK	
Load ruleset	Control parameters Control parameters have con	ers	necking rule.	
	Required components			
Save ruleset				
	The table contains no reco	rds. To add a new row, click the button be	alow.	
+ Add rule	Add a new row Clear			
+ Add rule category				
+ Add rule subcategory	Departing never	atowa		
- Overviews	Reporting param	eters		
Components Per Building	Reporting parameters have o	control over the reporting behaviour of the	checking rule.	
	Reporting properties			Operator
				operator
	The table contains no reco		now.	

*Figure 36: The rule is renamed to "Space per unit overview"* 

••• < > •••	0	🗎 bpd-beheer.bimkeeper.com	Ċ	0	<u> </u>
•		Wilgenvliet Arnhem Block B fu	1		
- 100 - A-100 - FR A-	12		Technical	A	
Wilgenvliet Arnhem WF: Cheo	cking rules for model "Block B.i	ifc"			
HOOSE A MODEL: Block B.ifc	Space per unit overv	iew	Cha	ange name Change description	Delete rule
Run checks	Show an overview of spaces grou	uped per zone within the building.			
Show results					
Load ruleset	Control parameters have control	"S rol over the checking behaviour of the ch	king rule.		
DIT RULESET:	Required components				
Save ruleset	# Building filter	Target filter	Minimum Count	Maximum Count	
	The table contains no record	s. To add a new row, click the button below	N.		
+ Add rule	Add a new row Clear th	he table			
+ Add rule category					
+ Add rule subcategory	Reporting parame	ters			
Overviews	Reporting parameters have co	ntrol over the reporting behaviour of the ch	ecking rule.		
Space per unit overview	Reporting properties				
	# Component filter	Property	Grouping by	Operator	

Figure 37: The rule is now added to the "Overviews" category and the details can be viewed by selecting it





The description can be changed to "Show an overview of spaces grouped per zone within the building" for clarification, by pressing the "Change description" button.

••• < > ••	0	🗎 bpd-beheer.bimkeeper.com	Ċ		0	
0		Wilgenvliet Arnhem Block B fu	1			
- 1101- Andrew 1107 - 111		Committee C Thereit C	Testaleat	A 10 mm		<b>A</b>
Wilgenvliet Arnhem WF: Chec	king rules for model "Block B.ifc'	1				>
HOOSE A MODEL:						Constant of the local division of the
Block B.ifc	Space per unit overvie	W		Change name Cha	nge description	Delete rule
Run checks	This rule checks that a building cont	ains the specified components.		Click to change	e the description of	of the rule
Show results						
Load ruleset	Control parameters	over the checking behaviour of the chec	king rule.			
EDIT RULESET:	Required components					
Save ruleset	# Building filter	Target filter	Minimum Count	Maxim	um Count	
	The table contains no records.	To add a new row, click the button below	N.			
+ Add rule	Add a new row Clear the	table				
+ Add rule category						
+ Add rule subcategory	<b>D</b>					
Overviews	Reporting paramete	rs				
	Reporting parameters have control	ol over the reporting behaviour of the ch	ecking rule.			
Space per unit overview	Reporting properties					
	# Component filter	Property	Grouping by	Operat	or	
	The table contains no records.	To add a new row, click the button below	N.			

Figure 38: The "Change description" button is pressed to change the description of the rule

••• <>	D	🗎 bpd-beheer.bimkeeper.com	C	• •
0		Wilgenvliet Arnhem Block B full		+
Wilgenvliet Arnhem WF: Chec	king rules for model "Blow	Change the rule description	×	×
HOOSE A MODEL: Block B.ifc	Space per unit o	Description overview of spaces grouped per zone v	within the building. Change na	ame Change description Delete rule
Run checks	This rule checks that a bui	c		
Load ruleset		eters	ing rule	
	Required components		ing rule.	
Save ruleset	# Building filter	Target filter		Maximum Count
+ Add rule	Add a new row Cl			
+ Add rule category				
+ Add rule subcategory	Reporting para	meters		
Overviews	Reporting parameters have	ve control over the reporting behaviour of the che	cking rule.	
Space per unit overview	Reporting properties			
				Operator
	The table contains no re	ecords. To add a new row, click the button below.		

Figure 39: The description is changed





••• <> ••	0	i bpd-beheer.bimkeeper.com	Ċ	O 🖞 😳
٢		Wilgenvliet Arnhem Block B full		+
- 1101a Analysis 1107 10 Auto	Barrow B	Communication & Firmulat	Testedad	
Wilgenvliet Arnhem WF: Check	king rules for model "Block B.ife	5 <sup>m</sup>		×
HOOSE A MODEL:				
Block B.ifc	Space per unit overvie	ew .	Chang	ge name Change description Delete rule
Run checks	Show an overview of spaces group	ed per zone within the building.		
Show results				
Load ruleset	Control parameters	over the checking behaviour of the checki	ng rule.	
EDIT RULESET:	Required components			
Save ruleset	# Building filter	Target filter	Minimum Count	Maximum Count
	The table contains no records.	To add a new row, click the button below.		
+ Add rule	Add a new row Clear the	table		
+ Add rule category				
+ Add rule subcategory				
0	Reporting parameter	ers		
• Overviews	Reporting parameters have cont	rol over the reporting behaviour of the che	cking rule.	
Space per unit overview	Reporting properties			
	# Component filter	Property	Grouping by	Operator
	The table contains no records.	To add a new row, click the button below.		

Figure 40: The description can be viewed under the rule page



Ş

In the "Control parameters" section the "Required components" table can be found. By pressing the "Add a new row" button underneath the table, a new row with component filters can be added.

••• < > •••	O	🗎 bpd-beheer.bimkeeper.com	n C	0 1
٢		Wilgenvliet Arnhem Block B f	ull	+
- 1000 - A-1000 - 1000 - 100 - 100	and a second	A manage	O Trabalant	
Wilgenvliet Arnhem WF: Che	cking rules for model "Block B.ifc	u		×
HOOSE A MODEL:				
Block B.ifc	Space per unit overvie	W	Chang	e name Change description Delete rule
Run checks	Show an overview of spaces group	ed per zone within the building.		
Show results				
Load ruleset	Control parameters	over the checking behaviour of the che	cking rule.	
EDIT RULESET:	Required components			
Save ruleset	# Building filter	Target filter	Minimum Count	Maximum Count
	The table contains no records.	To add a new row, click the button belo	w.	
+ Add rule	Add a new row Clear the	table		
+ Add rule category	Add a new row to the table above	e.		
+ Add rule subcategory				
· Overviews	Reporting parameter	ers		
Crease man unit ausmaiaus	Reporting parameters have contr	ol over the reporting behaviour of the c	hecking rule.	
Space per unit overview	Reporting properties			
	# Component filter	Property	Grouping by	Operator
	The table contains no records.	To add a new row, click the button belo	w.	

*Figure 41: Pressing the "Add a new row" button adds component filters* 

In the new row, there are four columns: Building Filter, Target Filter, Minimum Count and Maximum Count. For this example, the Building Filter, Minimum Count and Maximum Count columns are not used.

••• <> ••	0	🗎 bpd-beheer.bimkeep	er.com	Ċ	C	
0		😂 Wilgenvliet Arnhem Blo	ick B full			+
- Mile Andrew Mile III Adv	and a second sec	- Commission - C. Francis	O Trabalant			0
Wilgenvliet Arnhem WF: Check	king rules for model "Block B.it	fc"				×
CHOOSE A MODEL:						_
Block B.ifc	Space per unit overvi	ew		Change name	Change description	Delete rule
Run checks	Show an overview of spaces grou	ped per zone within the building.				
Show results						
Load ruleset	Control parameter	S	e checking rule.			
EDIT RULESET:	Required components					
Save ruleset	# Building filter	Target filter	Minimum Count	Ma	aximum Count	
+ Add rule	1 <b>A</b> <any></any>	✓ u <any></any>		0	0	
+ Add rule category	Add a new row Clear th	e table				
+ Add rule subcategory						
- Overviews	Reporting parameter	ters				
Space per unit overview	Reporting parameters have con	ntrol over the reporting behaviour of	the checking rule.			
	Reporting properties					
	# Component filter	Property	Grouping by		Operator	

Figure 42: Component filters are added as a row





### The pencil icon in the "Target Filter" column of the new row is pressed to change the filter options.

••• <> •	0	🗎 bpd-beheer.bimkeeper.	com (	Ċ.	0 ሰ 📖
٢		😂 Wilgenvliet Arnhem Block	B full		+
- uni - Australian - 171 - 14			0	A all annulation of	a a
Wilgenvliet Arnhem WF: Chec	king rules for model "Block B.ife	c"			×
CHOOSE A MODEL:	Space per unit evenui	0.14		Change name Change descrir	Delete rule
Block B.ifc	Space per unit overvit	ew		Change descrip	Deleterate
Run checks	Show an overview of spaces group	ped per zone within the building.			
Show results					
Load ruleset	Control parameters	S of over the checking behaviour of the r	checking rule.		
EDIT RULESET:	Required components				
Save ruleset	# Building filter	Target filter Filters and	instance of IfcSpace nt	Maximum Count	
+ Add rule	1 <b>1</b> <any></any>	✓ u <any></any>	/ 0	٥	
+ Add rule category	Add a new row Clear the	e table			
+ Add rule subcategory					
- Overviews	Reporting paramet	ers			
Space per unit overview	Reporting parameters have com	trol over the reporting behaviour of th	e checking rule.		
	Reporting properties				
	# Component filter	Property	Grouping by	Operator	
	No. of Concession, Name of				

Figure 43: Opening filter options by pressing the pencil icon

••• <>	0		🗎 bpd-beheer.bimkeeper.com	Ċ	0 1	000
۲			Wilgenvliet Arnhem Block B ful	1		+
Wilgenvliet Arnhem WF: Checkin	ng rules for mode	Component and	properties	×	<u> </u>	×
CHOOSE A MODEL:	Control pa	-				
Block B.ifc	Control paramete	Filters any instance	of IfcSpace			
Run checks	Required compo	IFC Component	IfcSpace	<b>v</b> ]		
Show results	# Building	Туре	0 Any			
Load ruleset	1 Add a new ro	96	Attribute Property set		0	
EDIT RULESET:			Classification			
Save ruleset The filter a component	accepts instances of that meet the relation	the selected IFC hship requirements.	Relationship			
+ Add rule	Reporting parame	ters have control over	the reporting behaviour of the ch	ecking rule.		
+ Add rule category	Reporting proper	ties				
+ Add rule subcategory						
- Overviews	The table contai	ns no records. To add	a new row, click the button below	v.		
Space per unit overview	Add a new row	Clear the table				
	C Report found	d entities				

### The "IFC Component" needs to be "IfcSpace", and "Type" should be set to "Any".

Figure 44: Options need to be set to "ifcSpace" and "Any"



#### With this new rule a check can, be performed.

••• < > •••	0	🗎 bpd-beheer.bimke	eper.com (		• • •
0		Wilgenvliet Arnhem	Block B full		+
			ist O Trabaicat	A All completion	
Wilgenvliet Arnhem WF: Chee	cking rules for model "Block B.i	fc"			×
Block B.ifc	Space per unit overvi	iew		Change name Change descrip	tion Delete rule
Run checks	Run the current checking configu	ration			
Show results					
Load ruleset	Control parameters	S	the checking rule.		
EDIT RULESET:	Required components				
Save ruleset	# Building filter	Target filter	Minimum Count	Maximum Count	
+ Add rule	1 🕈 <any></any>	Any>		0	
+ Add rule category	Add a new row Clear th	ne table			
+ Add rule subcategory					
✓ Overviews	Reporting parameter	ters			
Space per unit overview	Reporting parameters have cor	ntrol over the reporting behaviour	of the checking rule.		
	Reporting properties				
	# Component filter	Property	Grouping by	Operator	

Figure 45: The check is performed with the new configuration

This check results in a list displaying all the spaces in the model, but they are ungrouped. The "Group results by" function can be used to group by zone.

		0	ili bpd-beheer.bimkeeper.com	Ċ		0 ů	122		
	Wilsondiet Arabem WE: Chee	king moudle for model "Block I	Wilgerwliet Arrivem Block B full I ifen			~	+		Ruilding
CHOOSE	CHOOSE A MODEL:		, , , , , , , , , , , , , , , , , , ,			^			Dullully
Block E	Block B.ifc	Space per unit over	new			-	rule		
	Show rules	Show an overview of spaces gro	uped per zone within the building.						
	Generate HTML report								Floor
	<ul> <li>Overviews</li> </ul>	+ IfcBuilding <any></any>	Found: IfcSpace	<any> (365)</any>					11001
	Space per unit overview	IfcSpace <any></any>	A list of all IfcSpace <any> cor</any>	mponents found inside the building					
EDIT RUL			Group results by IFC Type 1						7
				Involved entities (365)		To View in 3D			Zone
			Name	Guid	Туре				
+ /			⊷ HcSpace (365)			Wiew in 3D			-
+ Ad			34-1: Buitenruimte	2jqlelh996wv2VkcVwP Xct	L HcSpace	View in 3D			Space
- Overv			34-2: Buitennuimte	2jqlelh996wv2VkcVwP Xcp	L HcSpace	Mew in 3D			opuoo
. opi			34: Berging	2jqlelh996wv2VkcVwP Xcg	L IfcSpace	View in 3D			
			34: Buitenberging	2jqlelh998wv2VkcVwP Xf7	L HcSpace	View in 3D		5	IFC Type
			34: Hal	2jqlelh996wv2VkcVwP Xce	L IfcSpace	View in 3D		4	
				Distances (States) - D		( ) ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (			

Figure 46: The "Group results by" functionality is used

Figure 47: "Zone" is picked as a category to group





This shows results per zone. This is not the preferred outcome; therefore a few reporting parameters must be changed within the rules by pressing the "Show rules" button.

		D A	bpd-beheer.bimkeeper.com	Ċ		(		) 888	
0		\$ I	Wilgenvliet Arnhem Block B full					+	
Wilgen	Wilgenvliet Arnhem WF: Check	ing results for model "Block B.ifc"				-	×	×	
HOOSE	CHOOSE A MODEL:								
Block B	Block B.ifc	Space per unit overview						te rule	
	Show rules	Show an overview of spaces grouped p	show an overview of spaces grouped per zone within the building.						
	Generate HTML report		D 24 A-7645746 (0)			View in 3D			
	- Overviews	<ul> <li>IfcBuilding <any></any></li> </ul>				at view in SD			
	Space per unit overview	IfcSpace <any></any>	34-1: Buitenruimte	2jqlelh996wv2VkcVwP Xct	L IfcSpace	So View in 3D			
EDIT RUL			34: Berging	2jqlelh996wv2VkcVwP Xcg	L IfcSpace	3D View in 3D			
			34: Hal	2jqlelh996wv2VkcVwP Xce	∟ IfcSpace	30 View in 3D			
			34: MK	2jqlelh996wv2VkcVwP Xcf	L IfcSpace	View in 3D			
+ /			34: Slaapkamer 01	2jqlelh996wv2VkcVwP XfO	L IfcSpace	SD View in 3D			
+ Ad			34: Slaapkamer 02	2jqlelh996wv2VkcVwP XfR	L IfcSpace	SD View in 3D			
Spa			34: Woonkamer / keuken	2jqlelh996wv2VkcVwP Xcq	L IfcSpace	SD View in 3D			
			103: Badkamer	2jqlelh996wv2VkcVwP c8W	lfcSpace ں	ST View in 3D			
			104: Toilet	2jqlelh996wv2VkcVwP c8V	IfcSpace L	3D View in 3D			
			⊕ 35_B:7615717 (9)			30 View in 3D			

Figure 48: The overview shows the spaces grouped by zone

To change the reporting rules, use the "Reporting properties" under the "Reporting parameters".

••• < > ••	0	🗎 bpd-beheer.bimk	eeper.com	C	• • •
۲		Wilgenvliet Arnhem	Block B full		+
- 100 Australia - 100 Autori	and the second s		O Trabalant	A 48-	
Wilgenvliet Arnhem WF: Checkin	ng rules for model "Block B	.ifc"			×
CHOOSE A MODEL:	Control paramete	rs			
Block B.ifc	Control parameters have con	trol over the checking behaviour o	f the checking rule.		
Run checks	Required components				
Show results	# Building filter	Target filter	Minimum Cou	int Maximun	n Count
Load ruleset	1 🛧 <any></any>	✓ u <any></any>		0	0
EDIT RULESET: Save ruleset	Add a new row Clear	eters			
+ Add rule	Reporting parameters have c	ontrol over the reporting behaviour	r of the checking rule.		
+ Add rule category	Reporting properties				
+ Add rule subcategory	# Component filter	Property	Grouping by	y Open	ator
- Overviews	The table contains no recor	ds. To add a new row, click the bu	tton below.		
Space per unit overview	Add a new row Clear	the table			
	Report found entities				

*Figure 49: Checking rules can be changed. In this case the "Reporting parameters"* 





The "Add a new row" button needs to be pressed under the reporting properties table. In the "new row", there are four columns: Component Filter, Property, Grouping By and Operator.

••• <>	0		📾 bpd-beheer.biml	keeper.com	Ċ			0 ሰ 📖
٢			Wilgenvliet Arnheit	m Block B full				+
🗢 Miller Annalasee Miller 🗖 Astro			A pai	0.7	- de al a al l		A All an end a second	0.0
Wilgenvliet Arnhem WF: Check	ing rules for model "Block	B.ifc"						×
HOOSE A MODEL:	Control paramet	ers						
Block B.ifc	Control parameters have co	ntrol over the	checking behaviour of	of the checking	g rule.			
Run checks	Required components							
Show results	# Building filter		Target filter		Minimum Count		Maximum Count	
Load ruleset	1 🛧 <any></any>	/	⊔ <any></any>	/	0	٥	0	0
Save ruleset + Add rule + Add rule category	Reporting parameters have	eters	he reporting behaviou	ir of the check	ing rule.			
+ Add rule subcategory	# <u>Component filter</u>		Property		Grouping by		Operator	
Overviews	1 ⊔ <any></any>		<empty></empty>		<any></any>		COUNT	~ <b>[</b>
Space per unit overview	Add a new row Clea	r the table						

Figure 50: Four "Reporting parameters" are available to be configured inside the checking rules

Here the number of spaces per zone is shown.

The "Component filter" needs to be configured to accept any "IfcSpace".

The "Property" column doesn't need configuration for the count.

••• < > •••	O		🗎 bpd-beheer.bimkeeper.com		C		0 1	000
٢			Wilgenvliet Arnhem Block B fu					+
Wilgenvliet Arnhem WF: Checkin HOOSE A MODEL: Block B.ifc	g rules for mode Control paramete Beguired compr	Component and	properties f lfcSpace	:	×		0	×
Run checks	# Building	IFC Component	IfcSpace	~				
Show results	1 🔒 <an< th=""><th>Туре</th><th><ul> <li>Any</li> </ul></th><th></th><th>3</th><th></th><th></th><th></th></an<>	Туре	<ul> <li>Any</li> </ul>		3			
Load ruleset	Add a new ro		<ul> <li>Attribute</li> <li>Property set</li> </ul>					
EDIT RULESET:			Material     Classification					
Save ruleset	Reporting		Relationship					
+ Add rule	Reporting param							
+ Add rule category	Reporting proper	ties ont filter						
+ Add rule subcategory	Anv		cemptro	Anvo		COUNT		
- Overviews								
Space per unit overview	Add a new row	Clear the table						
	C Report found	l entities						

Figure 51: Component filter is configured to any "ifcSpace"





On the "Grouping" column the type needs to be set to "Relationship" and "Relationship" needs to be set to "Zone" afterwards.

••• < > •••	0		🗎 bpd-beheer.bir	nkeeper.com		Ċ		0		00
0			Wilgenvliet Arnh	em Block B full						+
Wilgenvliet Arnhem WF: Checkin	ng rules for mode	Grouping			>	<	da - Alterative term	<u> </u>		×
HOOSE A MODEL: Block B.ifc	Control paramete	Туре	Any Attribute							
Run checks Show results	# Building		<ul> <li>Property set</li> <li>Material</li> <li>Classification</li> </ul>						n	
Load ruleset	Add a new ro	Relationship	Relationship							
EDIT RULESET:			Zone		~					
Save ruleset	Reporting p	arameters								
+ Add rule	Reporting parameter	ers have control over	r the reporting behavio	ur of the checki	ng rule.					
+ Add rule category	Heporting propert	es nt filter								
+ Add rule subcategory					TO US					
Overviews	Add a new row	Clear the table	<empty></empty>	<u> </u>	ZUNE					
	Report found	entities								

Figure 52: Grouping filter is configured to "Relationship" and it is filtered to "Zone"

Finally, the "Operator	" column nee	ds to be set to "COUNT".	
	0	🗎 bpd-beheer.bimkeeper.com	Ċ
10	Illy, the "Operator" column needs to be set to "COUNT".		

	0	🗎 bpd-beheer.bimkeeper.co	n	Ċ		0	<u> </u>
٥		Wilgenvliet Arnhem Block B	full				
- 100 Autom 107 17 Adv		Communication 6 Provided	O Traduction		A All an unal autor	0 0	
Wilgenvliet Arnhem WF: Checki	ng rules for model "Block B.ifc						2
CHOOSE A MODEL:	Control parameters have control	over the checking behaviour of the ch	oking rulo				
Block B.ifc	Control parameters have control	over the checking behaviour of the ch	cking rule.				
Run checks	# Building filter	Target filter	Minimum Cou	nt	Maximum Count		
Show results	1 🛧 <any></any>	د جAny> ،	• 0	0	0	0	
Load ruleset	Add a new row Clear the	table					
Save ruleset + Add rule	Reporting parameters Reporting parameters have contr	ers	checking rule.				
+ Add rule category	# Component filter	Property	Grouping by		Operator		
+ Add rule subcategory	1.1. Ann	d cometer (	ZONE		COLINIT		-
· Overviews	i u «Any»	<empty></empty>	ZONE		COUNT	·	
Space per unit overview	Add a new row Clear the	table					
	Report found entities						

*Figure 53: Operator filter is configured to "COUNT"* 





When the checks are run again, an overview is shown in the report with several spaces per zone.

		0	i bpd-beheer.bimkeeper.com	Ċ	0 ሰ 🗯
۲			Wilgenvliet Arnhem Block B full		+
Wilgen	Wilgenvliet Arnhem WF: Check	ing results for model "Block B	Lifc"		× ×
CHOOSE A	CHOOSE A MODEL:				
Block B	Block B.ifc	Space per unit overv	iew		te rule
	Show rules	Show an overview of spaces grou	ped per zone within the building.		
	Generate HTML report				
	- Overviews	<ul> <li>IfcBuilding <any></any></li> </ul>	Found: IfcSpace < An	y> (365)	
	Space per unit overview	IfcSpace <any></any>	A list of all IfcSpace <any> componer</any>	nts found inside the building.	
EDIT RUI				IfcSpace <any></any>	
EDIT NOL			ZONE	COUNT	
			34_A:7615716	9	
			35_B:7615717	9	
			36_C:7615718	9	
+ A			37_A1:7615719	9	
+ Ad			38_B1:7615720	9	
			39_C1:7615721	9	
<ul> <li>Overvi</li> </ul>			40_D1:7615722	9	
Spa			41_E:7615723	9	
			42_F1:7615724	8	
			43_A2:7615725	11	
			44_B2:7615726	9	
			45_C2:7615727	9	
			46_D2:7615728	9	

Figure 54: Overview of several spaces per zone

The "space numbers" and "space names" are added to the overview.

To add the "space numbers", a new row to the reporting parameter needs to be added. The new row needs to be configured as follows:

••• <>	O		🗎 bpd-beheer.bimkee	per.com		Ċ		0	â 800
٢			Wilgenvliet Arnhem B	llock B full					4
Wilgenvliet Arnhem WF: Checkin	g rules for mode Required compo	Component and p	roperties			×			>
Block B.ifc	# Building	Filters any instance of	lfcSpace						
Run checks	1 🏦 <an< th=""><th>IFC Component</th><th>IfcSpace</th><th></th><th></th><th>~</th><th></th><th></th><th></th></an<>	IFC Component	IfcSpace			~			
Show results	Add a new ro	Туре	O Any						
Load ruleset			<ul> <li>Attribute</li> <li>Property set</li> </ul>						
EDIT RULESET:	Reporting		Material						
Save ruleset	Reporting param		Classification     Relationship						
+ Add rule	# Comport		r ropeny		circulating of	_			
+ Add rule category	1 └── <any></any>		<empty></empty>		ZONE		COUNT	~	
+ Add rule subcategory	2 😐 <any></any>		<empty></empty>		<any></any>		COUNT	×	
Overviews     Space per unit overview	Add a new row	Clear the table							

The "Component filter" column needs to be configured to accept any space.

Figure 55: "Component filter" is set to accept any space





The "Property column" needs to be configured as Type: "Attribute" and "Name" needs to be picked as "Attribute".

••• < > •••	0		🗎 bpd-beheer.bimke	eper.com	Ċ	5		0	
٢			😂 Wilgenvliet Arnhem	Block B full				0	+
Wilgenvliet Arnhem WF: Checkin	g rules for mode	Component and	properties		×				×
HOOSE A MODEL: Block B.lfc Run checks Show results	Building       #     Building       1	Type	Attribute     Property     Material     Classification			3			
Load ruleset			Name		~				
EDIT RULESET: Save ruleset	Reporting paramet	parameters ers have control over ties	the reporting behaviour	of the check	ing rule,				
+ Add rule									
+ Add rule category	1 😐 <any:< th=""><th>· .</th><th><empty></empty></th><th></th><th>ZONE</th><th></th><th>COUNT</th><th>~</th><th></th></any:<>	· .	<empty></empty>		ZONE		COUNT	~	
+ Add rule subcategory	2 🛏 <any:< th=""><th></th><th>Name</th><th></th><th><any></any></th><th></th><th>COUNT</th><th>~</th><th></th></any:<>		Name		<any></any>		COUNT	~	
Space per unit overview	Add a new row	Clear the table entities							

Figure 56: "Property" column is configured as Type: "Attribute" with "Name" indication

The "Grouping by" column needs to be configured as Type: "Relationship" and "Zone" needs to be picked as "Relationship".

••• < > •••	0		🗎 bpd-beheer.biml	keeper.com		C		0	000
🖉 ×			😂 Wilgenvliet Arnhei	m Block B full					+
Wilgenvliet Arnhem WF: Checki	ng rules for mode	Grouping	Wilgenvliet Arnhem Bloc bpd-beheer.bimkeeper.co	<b>k B full</b>	;	×			×
HOOSE A MODEL: Block B.ifc	Required compo # Building	Туре	Any Attribute						
Run checks Show results	1 Add a new ro		<ul> <li>Property set</li> <li>Material</li> </ul>			0			
Load ruleset		Relationshin	<ul> <li>Classification</li> <li>Relationship</li> </ul>						
EDIT RULESET:	Reporting	Relationarip	Zone		~				
Save ruleset	Reporting param	ties							
+ Add rule									
+ Add rule category	t ن <any< th=""><th>× 🖉</th><th><empty></empty></th><th>/</th><th>ZONE</th><th>/</th><th>COUNT</th><th>~</th><th></th></any<>	× 🖉	<empty></empty>	/	ZONE	/	COUNT	~	
+ Add rule subcategory	2 <b>⊔</b> <any< th=""><th>&gt; 📝</th><th>Name</th><th></th><th>ZONE</th><th></th><th>COUNT</th><th>~</th><th></th></any<>	> 📝	Name		ZONE		COUNT	~	
Overviews     Space per unit overview	Add a new row	Clear the table	2		1				

Figure 57: "Grouping by" column is configured as Type: "Relationship" with "Zone" indication





-					
••• < > •••	0	🗎 bpd-beheer.bi	nkeeper.com	0	0 🗅 🗄
•		😂 Wilgenvliet Arnh	em Block B full		
🗢 1101 - Andrew 1107 - 🕅 Anto	na n	o na de la construcción de la const		A 11	
Wilgenvliet Arnhem WF: Check	king rules for model "Block B.ifc"				
HOOSE A MODEL:	Required components				
Block B.ifc	# Building filter	Target filter	Minimum Cou	nt Maximum Cour	nt
Run checks	1 🗙 <any></any>	✓		0	
Show results	Add a new row Clear the ta	able	·	,	
Load ruleset					
EDIT RULESET:	Reporting parameter	S			
Save ruleset	Reporting parameters have control	over the reporting behavior	our of the checking rule.		
+ Add rule	# Component filter	Property	Grouping by	Operator	
+ Add rule category	1 └─ <any></any>	empty>	ZONE	COUNT	~ <b>[]</b>
+ Add rule subcategory	2 ⊔ <any></any>	Name	ZONE	LIST	~
Overviews Space per unit overview	Add a new row Clear the ta	able			
	Report found entities				

#### The "Operator" column needs to be configured as "List".

*Figure 58: "Operator" column is configured as "List"* 

Next, the "space name" need to be added to the report. The "add a new row" button needs to be pressed below the table, and configured as follows:

••• < > •• •	O		iii bpd-beheer.bimke	eper.com		Ċ		0	<u> </u>
٥			🛢 Wilgenvliet Arnhem	Block B full					
Wilgenvliet Arnhem WF: Check	king rules for mode	Component and p	properties			x			;
CHOOSE A MODEL: Block B.ifc	1 🟦 <an< td=""><td>Filters any instance of</td><td>IfcSpace</td><td></td><td></td><td></td><td></td><td></td><td></td></an<>	Filters any instance of	IfcSpace						
Run checks	Add a new ro	IFC Component	IfcSpace		v	1			
Show results		Туре	O Any						
Load ruleset	Reporting Reporting param		<ul><li>Attribute</li><li>Property set</li></ul>						
EDIT RULESET:	Reporting prope		Material						
Save ruleset	# Compor		Relationship						
+ Add rule	1 ⊔ <an< td=""><td></td><td></td><td></td><td></td><td></td><td>COUNT</td><td>~</td><td></td></an<>						COUNT	~	
+ Add rule category	2 🖵 <any:< td=""><td>- 1</td><td>Name</td><td></td><td>ZONE</td><td>1</td><td>LIST</td><td>~</td><td></td></any:<>	- 1	Name		ZONE	1	LIST	~	
+ Add rule subcategory									
- Overviews	3 🖬 <any:< td=""><td><u> </u></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></any:<>	<u> </u>							
Space per unit overview	Add a new row	Clear the table							
	C Report found	l entities							

The "Component filter" column needs to be configured to accept any "IfcSpace".

*Figure 59: The new row is configured with spaces Type: "Any"* 





The "Property" column needs to be configured as Type: "Attribute" and "LongName" should be picked as Attribute.

••• <> ••	0		bpd-beheer.bimke	eper.com	Ċ	)		0	
٢			Wilgenvliet Arnhem	Block B full					+
Wilgenvliet Arnhem WF: Checkin	g rules for mode	Component and	properties		×				×
HOOSE A MODEL: Block B.ifc	1 👚 <an< th=""><th>Туре</th><th>Attribute     Property</th><th></th><th></th><th>0</th><th></th><th></th><th></th></an<>	Туре	Attribute     Property			0			
Run checks	Add a new ro		Material     Classification						
Show results		Attribute							
Load ruleset	Reporting		LongName		~				
EDIT'RULESET:	Reporting param.	rties							
Save ruleset									
+ Add rule	1 😐 <an< th=""><th>P 7</th><th><empty></empty></th><th></th><th>ZONE</th><th></th><th>COUNT</th><th>*</th><th></th></an<>	P 7	<empty></empty>		ZONE		COUNT	*	
+ Add rule category	2 🗆 <an< th=""><th>~ /</th><th>Name</th><th></th><th>ZONE</th><th></th><th>LIST</th><th>Ŷ</th><th></th></an<>	~ /	Name		ZONE		LIST	Ŷ	
+ Add rule subcategory	з ш <an< th=""><th>&gt; /</th><th>LongName</th><th></th><th><any></any></th><th></th><th>COUNT</th><th>~</th><th></th></an<>	> /	LongName		<any></any>		COUNT	~	
Overviews Space per unit overview	Add a new roo	v Clear the table							

Figure 60: "Property" column is configured as Type: "Attribute" with "LongName" indication

The "Grouping by" column needs to be configured as Type: "Relationship" and "Zone" needs to be picked as Relationship.

••• <> •••	0		🗎 bpd-beheer.bimkeepe	r.com	Ċ		0	
٥			Wilgenvliet Arnhem Bloc	k B full				+
Wilgenvliet Arnhem WF: Checkin	g rules for mode	Grouping			×			×
HOOSE A MODEL: Block B.ifc	1. 🏦 <an< th=""><th>Туре</th><th>Any Attribute</th><th></th><th></th><th></th><th></th><th></th></an<>	Туре	Any Attribute					
Run checks	Add a new ro		<ul> <li>Property set</li> <li>Material</li> </ul>					
Load ruleset	Reporting	Belationshin	Classification Relationship					
EDIT RULESET:	Reporting param	Relationship	Zone		~			
Save ruleset	# <u>Compon</u>	ent filter	Property		Grouping by			
+ Add rule	1 └─ <any< th=""><th>&gt;</th><th><empty></empty></th><th></th><th>ZONE</th><th>COUNT</th><th>~</th><th></th></any<>	>	<empty></empty>		ZONE	COUNT	~	
+ Add rule category	2 └─ <any< th=""><th>&gt;</th><th>Name</th><th>1</th><th>ZONE</th><th>LIST</th><th>~</th><th></th></any<>	>	Name	1	ZONE	LIST	~	
+ Add rule subcategory	3 🖵 <am< th=""><th></th><th>LongName</th><th></th><th>ZONE</th><th>LIST</th><th>~ 1</th><th></th></am<>		LongName		ZONE	LIST	~ 1	
Overviews     Space per unit overview	Add a new rov	Clear the table			LOIL			

Figure 61: "Grouping by" column configured as Type: "Relationship" with "Zone" indication





••• < > •••	0	🗎 bpd-beheer.bim	eeper.com	Ċ	0 ሰ 📖
		Wilgenvliet Arnheit	n Block B full		
- 14/10 Australian 11/17 178 August	and the second s	Commission & ran	O Traductori	A	
Wilgenvliet Arnhem WF: Checki	ng rules for model "Block B.ife	<b>)</b> "			>
HOOSE A MODEL:	1 A 1997				
Block B.ifc	1 TT <any></any>				
Run checks	Add a new row Clear the	table			
Show results					
Load ruleset	Reporting parameter	ers			
	Reporting parameters have cont	rol over the reporting behaviou	r of the checking rule.		
EDIT RULESET:	Reporting properties				
Save ruleset	# Component filter	Property	Grouping by	Operator	
+ Add rule	1 ⊔ <any></any>	empty>	ZONE	COUNT	~ <b>[]</b>
+ Add rule category	2 ⊔ <any></any>	Name	ZONE	<ul> <li>LIST</li> </ul>	~
+ Add rule subcategory	3 ⊔ <any></any>	✔ LongName	ZONE	LIST	~
• Overviews					
Space per unit overview	Add a new row Clear the	table			
	Report found entities				

### The "Operator" column needs to be configured as "List".

*Figure 62: "Operator" column configured as "List"* 

### The checks need to be run again.

		0	🗎 bpd-beheer.bimkeeper.com		C		0	Ô	000
•			Wilgenvliet Arnhem Block B full						4
		provide the second second					s - 0		
Wilgen	Wilgenvliet Arnhem WF: Check	ing results for model "Block B.if	c"					×	×
HOOSE A	CHOOSE A MODEL:								
Block B	Block B.ifc	Space per unit overvie	w						e rule
	Show rules	Show an overview of spaces groupe	d per zone within the building.						
	Generate HTML report								
	- Overviews	✓ IfcBuilding <any></any>	Found: IfcSpac	e <any></any>	(365)				
	Space per unit overview	IfcSpace <any></any>	A list of all IfcSpace <any></any>	components for	und inside the build	ling.			
			-		IfcSpace <any></any>				
			ZONE	COUNT	LIST of Name	LIST of LongName			
+ A + Ad			34_A:7615716	9	34-1 34 34 34 34 34 34 103 104	Buitenruimte Berging Hal MK Slaapkamer 01 Slaapkamer 02 Woonkamer / keuken Badkamer Toilet			
Overvie Spa			35_B:7615717	9	34-2 35 35 35 35 35 35 35 35 101 102	Buitenruimte Berging Hal MK Siaapkamer 01 Siaapkamer 02 Woornkamer / keuken Toilet Badkamer			
			36_C:7615718	9	36 36 36	Berging Buitenruimte Hal MK			

Figure 63: The checks are run again





Now there is an overview of spaces per zone. The reporting properties can be configured to show any property of the space. The floor area per space, and a sum of the total space floor area per zone can be shown as well. According to the Employer's Information Requirements (EIR) of the model used in this manual, the area of a space is in the "Area" property of the "Dimensions" property set within an "IfcSpace".

•	• < > • •	0	🗎 bpd-beheer.bimkeeper.com	Ċ	0 ሰ 📖
۲			Wilgenvliet Arnhem Block B full		+
ا چ	Wilg Arnhem WF II. Administration	Hanagement	E Communication \$ Financial Q Technica	al 🔨 All compl	exes 🥐 😫 My account
Tree of building elements $\ll$	☆ ~ C ● ・ Ø ・ 荘 ・ D 9 ● ・ ※ 次 ▲ ■ → separate floors			Area Computation Height + Materials + Materials + Materials + Constraints - Dimensions Area Computation Height Perimeter Unbounded Height + Electrical - Light + Electrical - Light + Electrical - Load + Hothing - Load + Hothing - Load + Hothing - Load + Beat Meldense + Materials	BPD Woningfonds Verwer € 1.40.00 /fiew contract /fiew con
				+ Peat ProductPa	auiramente oset [2]
			and the later and the second second second	T Past_Flouterne	danemento baer (el

*Figure 64: The "Dimensions" property set of the IfcSpace* 

0	1			··· /··						
	O		🗎 bpd-beheer.bimk	eeper.com		Ċ		0	۵	000
٢			Wilgenvliet Arnhem	Block B full						+
		100	A second second					. <u>a</u> a		
Wilgenvliet Arnhem WF: Check	ing rules for mode	Component and	properties			×				×
CHOOSE A MODEL:						-				
Block B.ifc	1 <b>त</b> <an< td=""><td>Filters any instance o</td><td>f IfcSpace</td><td></td><td></td><td></td><td></td><td></td><td>Ľ</td><td></td></an<>	Filters any instance o	f IfcSpace						Ľ	
Run chocks	Add a new ro	IFC Component								
Aut checks			IfcSpace		~					
Show results		Туре	O Any							
tood educat	Reporting		Attribute							
Load fuleset	Reporting param		Property set							
EDIT RULESET:			Material							
Courselanat	Reporting prope		<ul> <li>Classification</li> </ul>							
Save ruleset	# <u>Compor</u>		<ul> <li>Relationship</li> </ul>							
+ Add rule	1 ⊔ <ar< td=""><td></td><td></td><td></td><td></td><td>_</td><td>COUNT</td><td>~</td><td></td><td></td></ar<>					_	COUNT	~		
+ Add rule category	2 🖵 <anj< td=""><td>•</td><td>Name</td><td></td><td>ZONE</td><td></td><td>LIST</td><td>~</td><td></td><td></td></anj<>	•	Name		ZONE		LIST	~		
+ Add rule subcategory										
Overviews	3 🖵 <anj< td=""><td>° 🗹</td><td>LongName</td><td></td><td>ZONE</td><td></td><td></td><td>~</td><td></td><td></td></anj<>	° 🗹	LongName		ZONE			~		
Space per unit overview	4 ⊔ <anj< td=""><td>&gt; <b>/</b></td><td><empty></empty></td><td></td><td><any></any></td><td></td><td>COUNT</td><td>~</td><td></td><td></td></anj<>	> <b>/</b>	<empty></empty>		<any></any>		COUNT	~		
	Add a new row	Clear the table								

To list the area per space, click the "add a new row" button, and configure it as follows: Configure the "Component filter" column to accept any space.

Figure 65: "Component filter" column is configured to accept any space





The "Property" column needs to be configured as Type: "Property" with Property set name: "Dimensions" and Property name: "Area".

••• < > ••	0		🗎 bpd-beheer.bimke	eper.com		C		0	<b>A </b>
٢			Wilgenvliet Arnhem	Block B full					+
Wilgenvliet Arnhem WF: Checki	ing rules for mode	Component and p	roperties			×			×
HOOSE A MODEL:	Add a new ro	Туре	<ul><li>Attribute</li><li>Property</li></ul>						
Run checks	Reporting		Material     Classification						
Load ruleset	Reporting param	Property set name	Dimensions						
EDIT RULESET:	# Compor	Property name Property type	Area						
Save ruleset	1 🖵 <an< th=""><th></th><th>String</th><th></th><th></th><th></th><th>COUNT</th><th>~</th><th></th></an<>		String				COUNT	~	
+ Add rule	2	₽ <b>/</b>	Name	1	ZONE		LIST	×	
+ Add rule category	з 🗆 <Ап	y> 🚺	LongName		ZONE		LIST	~	
+ Add rule subcategory	4 ⊔ <an< th=""><th>y&gt; 🚺</th><th>Dimensions::A</th><th></th><th><any></any></th><th>(</th><th>COUNT</th><th>~</th><th></th></an<>	y> 🚺	Dimensions::A		<any></any>	(	COUNT	~	
Overviews     Space per unit overview	Add a new rot	W Clear the table							
							Pset AirSideSystemin     Pset ProductRequirer		

Figure 66: "Property" column is configured with Type: "Property" with a set name "Dimensions" and property name: "Area"

# The "Grouping by" column needs to be configured as Type: "Relationship" and "Zone" needs to be picked as Relationship.



Figure 67: "Grouping by" column configured as Type: "Relationship" with "Zone" indication





		D		bpd-beheer himke	eper.com		Ċ		0	<b>A</b>
				Wilcondist 4	Direct D full				•	
				S Wilgenvliet Arnhem	BIOCK B TUII					
Wilgenvliet Arnhem WF: Chec	king rules	for model "Block B	.ifc"	enderstan Artises	-let 0-3	Productional		A 11		
HOOSE A MODEL:				Ú.						
Block B.ifc	Add	a new row Clear	the table							
Run checks										
Show results	Rep	orting parame	eters							
	Repor	ting parameters have c	ontrol over	the reporting behaviour	of the check	king rule.				
Load ruleset	Repor	rting properties								
		Component filter		Property		Grouping by		Operator		
EDIT RULESET:										
Save ruleset	1	⊔ <any></any>	1	<empty></empty>	1	ZONE	/	COUNT	~	
+ Add rule	2	⊔ <any></any>	/	Name	/	ZONE	/	LIST	~	
+ Add rule category	3	ш <any></any>		LongName	/	ZONE		LIST	~	
+ Add rule subcategory						7015				-
Overviews	4	□ <any></any>	1	Dimensions:: P		ZONE		LIST	~	
Canada por unit overview	Add	a new row Clear	the table							
Space per unit overview										
		Report found entities								
								Pset AirSideSysteml	nformation	
								+ Pset ProductRequire	ments	

#### The "Operator" column needs to be configured as "List".

Figure 68: "Operator" column configured as "List"

To show the sum of space areas per zone, the "add a new row" button needs to be pressed and the new row needs to be configured as follows:

The "Component filter" column needs to be configured to accept any IfcSpace.

••• <> ••	O		iii bpd-beheer.bimke	eper.com		Ċ		0	₫	800
Ø			Wilgenvliet Arnhem I	Block B full						+
Wilgenvliet Arnhem WF: Check	ting rules for mode	Component and	properties			×		<u> </u>		×
HOOSE A MODEL: Block B.ifc		Filters any instance of	lfcSpace							
Run checks	Reporting Reporting param	IFC Component	IfcSpace							
Show results	Reporting prope	Туре	<ul> <li>Any</li> <li>Attribute</li> </ul>							
Load ruleset	1		Property set				COUNT	~		
Save ruleset	2		Classification				LIST	~		
+ Add rule	3 ⊔ <an< th=""><th></th><th></th><th>_</th><th></th><th></th><th>LIST</th><th>~</th><th></th><th></th></an<>			_			LIST	~		
+ Add rule category	4 ⊑ <any< th=""><th>&gt;</th><th>Dimensions::A</th><th></th><th>ZONE</th><th></th><th>LIST</th><th>~</th><th></th><th></th></any<>	>	Dimensions::A		ZONE		LIST	~		
+ Add rule subcategory	5 🖬 <any< th=""><th>&gt;</th><th><empty></empty></th><th></th><th><any></any></th><th></th><th>COUNT</th><th>~</th><th></th><th></th></any<>	>	<empty></empty>		<any></any>		COUNT	~		
Space per unit overview	Add a new row	Clear the table								
	Report found	d entities								
							+ Prot AliSideSys			

Figure 69: "Component filter" is configured to accept any ifcSpace





The "Property" column needs to be configured as Type: "Property" with Property set name: "Dimensions" and Property name: "Area".

••• <> ••		O		🗎 bpd-beheer.bimke	eper.com		C			0	A 800
٢				😂 Wilgenvliet Arnhem	Block B full						+
Wilgenvliet Arnhem WF: Check	ing rules f	or mode	Component and p	properties			×		- 11 p		×
HOOSE A MODEL: Block B.ifc	Repo	orting	Туре	<ul> <li>Attribute</li> <li>Property</li> <li>Material</li> </ul>							
Show results	Reporti Report	ng param ing prope Compor	Property set name	Classification							
Load ruleset		니 <an< th=""><th>Property name</th><th>Area</th><th></th><th></th><th></th><th>/ C</th><th>DUNT</th><th>×</th><th></th></an<>	Property name	Area				/ C	DUNT	×	
EDIT RULESET: Save ruleset		∟ <an< td=""><td>Property type</td><td>String</td><td></td><td>~</td><td></td><td></td><td>ST</td><td>~</td><td></td></an<>	Property type	String		~			ST	~	
+ Add rule		∟ <any></any>		LongName		ZONE		<ul> <li>I</li> <li>I</li> </ul>	ST	×	
+ Add rule category		└ <any></any>		Dimensions::A		ZONE		<ul> <li>U</li> </ul>	ST	~	
+ Add rule subcategory		└ <any></any>		Dimensions::A		<any></any>			JUNT	~	
Overviews     Space per unit overview	Add	a new row eport found	Clear the table								

Figure 70: "Property" column is configured with Type: "Property" with a set name "Dimensions" and property name: "Area"

# The "Grouping by" column needs to be configured as Type: "Relationship" and "Zone" needs to be picked as Relationship

••• <> ••		O		⊜ bpd-beheer.b	imkeeper.com		Ċ			0	A 800
٥				😂 Wilgenvliet Arn	hem Block B full						
Wilgenvliet Arnhem WF: Check	king rules	for mode	Grouping				×				
HOOSE A MODEL: Block B.ifc	Rei	oorting	Туре	Any Attribute							
Run checks Show results	Repo	rting param		Property set     Material     Classification							
Load ruleset		Compor	Relationship	<ul> <li>Relationship</li> </ul>				2	perator		
EDIT RULESET:		L cAn,		Zone					LIST		
+ Add rule		니 <any< th=""><th>&gt; /</th><th>LongName</th><th></th><th>ZONE</th><th></th><th></th><th>LIST</th><th>~</th><th></th></any<>	> /	LongName		ZONE			LIST	~	
+ Add rule category		니 <any< th=""><th>&gt; <b>/</b></th><th>Dimensions::A</th><th></th><th>ZONE</th><th></th><th></th><th>LIST</th><th>~ ]</th><th></th></any<>	> <b>/</b>	Dimensions::A		ZONE			LIST	~ ]	
+ Add rule subcategory Overviews		니 <any< th=""><th>&gt; /</th><th>Dimensions::A</th><th></th><th>ZONE</th><th></th><th></th><th>COUNT</th><th>× ]</th><th></th></any<>	> /	Dimensions::A		ZONE			COUNT	× ]	
Space per unit overview	Ad	d a new row	Clear the tab	le							
		Report found	l entities								

Figure 71: "Grouping by" column configured as Type: "Relationship" with "Zone" indication





#### ••• <> •• Ø C 0 🗄 📟 🗎 hnd-beheer bi SWilgenvliet Arnhem Block B full Wilgenvliet Arnhem WF: Checking rules for model "Block B.ifc" × HOOSE A MODEL: Block B.ifc **Reporting parameters** Run checks Reporting parameters have control over the reporting behaviour of the checking rule. Show results Reporting properties Load ruleset... ш <Any> 1 <empty> 1 ZONE 1 COUNT $\sim$ DIT RULESET: ⊔ <Any> 1 Name 1 ZONE 1 LIST ~ Save ruleset... 1 ⊔ <Any> LongName 1 ZONE 1 LIST ~ + Add rule + Add rule category ⊔ <Any> 1 Dimensions::A 1 ZONE 1 LIST ~ + Add rule subcategory 1 1 ⊔ <Any> Dimensions::A ZONE 1 SUM ~ Overviews Add a new row Clear the table Space per unit overview Report found entities

### The "Operator" column needs to be configured as "Sum".



#### The checks are run again to get an overview with the area dimensions.

••• < > ••	0	🗎 bpd-beheer.bimkeep	er.com		C		0 🗄	8
2		Wilgenvliet Arnhem Ble	ock B full	-				
Vilgenvliet Arnhem WF:	Checking results for model "Block B.	.ifc"					×	
DOSE A CHOOSE A MODEL:								
ock B Block B.ifc	Space per unit overvi	iew					te	rul
Show rules	Show an overview of spaces group	ped per zone within the b	uilding.					
Generate HTML repor	t							
- Overviews		Found: Ifc	Space <	<any></any>	(365)			
Space per unit overvie	ew	A list of all IfcSpac	e <any> com</any>	ponents fo	und inside the building.			
TRULE					IfcSpace <any></any>			
		ZONE	COUNT	LIST of Name	LIST of LongName	LIST of Dimensions::Area	SUM of Dimensions::An	
+ A + Adi Overvis		34_A:7615716	9	34-1 34 34 34 34 34 34 34 103 104	Buitenruimte Berging Hal Slaapkamer 01 Slaapkamer 02 Woonkamer / k Badkamer Toilet	9.31 m <sup>2</sup> 2.9 m <sup>2</sup> 9.53 m <sup>2</sup> 0.77 m <sup>2</sup> 14.76 m <sup>2</sup> 9.86 m <sup>2</sup> 40.75 m <sup>2</sup> 6.42 m <sup>2</sup> 1.21 m <sup>2</sup>	95.52 m²	
Spa		35_B:7615717	9	34-2 35 35 35 35 35 35 35 35 101 102	Buitenruimte Berging Hal MK Slaapkamer 01 Slaapkamer 02 Woonkamer / k Toilet Badkamer	9.57 m <sup>2</sup> 4.19 m <sup>2</sup> 7.58 m <sup>2</sup> 0.77 m <sup>2</sup> 14.94 m <sup>2</sup> 9.96 m <sup>2</sup> 37.2 m <sup>2</sup> 1.22 m <sup>2</sup> 6.38 m <sup>2</sup>	91.81 m²	
		36 C:7615718	9	36	Berging	3.72 m <sup>2</sup>	78.83 m <sup>2</sup>	

Figure 73: The checks are run again





### 3.3. External Walls Are Marked As External

If the NL/SfB classification is used within the model and all walls classified with "21" will be checked, the property should be set to: "*Pset\_WallCommon.IsExternal = true*".

The model that needs to be checked must be opened and afterwards the "checking configuration" needs to be opened.

•••	0	🗎 bpd-beheer.bimkeeper.com	Ċ	•
		😂 Wilgenvliet Arnhem Block B full		+
Wilgenvliet Arnhem WF:	Checking rules for model "Block	B.ifc"		×
CHOOSE A MODEL:	The selected model Block B.ifc has n	o checking configuration loaded. Load or create a rule se	et	
Block B.ifc	Load a ruleset			
Load ruleset				
EDIT RULESET:				
+ Add rule				
+ Add rule category				
eler	Little in a material of the little	DATE HER HER DE DERBERENS	No elemen	selection
Tree of building			•	Export to database ~

Figure 74: The "checking configuration" of the model is opened

The "Add a rule category" button needs to be pressed to add a new category. For this scenario the category is named: "*External Wall Requirements*".



Figure 75: The category "External Wall Requirements" is added to the checking





The "External Wall Requirements" category needs to be pressed, and the "Add rule" button needs to be pressed afterwards.



Figure 76: The "External Wall Requirements" category is selected, and a new rule is added

••• < > 🗉	0	🗎 bpd-beheer.bimkeeper.com	Ċ	0 ሰ 📟
		Wilgenvliet Arnhem Block B full		+
Wilgenvliet Arnhem WF: Che	ecking rules for model	Create a rule	×	×
CHOOSE A MODEL: Block B.ifc	The selected model B	Select a rule template to use as basis:		
Load ruleset	Load a fuleset	Required Property Sets	~	
EDIT RULESET:		Cancel		
+ Add rule				
+ Add rule category				
+ Add rule subcategory				
- External Wall Requirements				
Tree of but				

### The "Required Property Sets" rule needs to be selected.

Figure 77: The "Required Property Sets" rule is selected





### A new "Property sets" rule is added to the "Control parameters".

••• <>	0	🗎 bpd-beheer.bimkeeper.com	C)	0 🗈 😁
		Wilgenvliet Arnhem Block B full		+
		Constantian & Discontint O T	a shala at	
Wilgenvliet Arnhem WF: Chec	king rules for model "Block B.ifc"			×
CHOOSE A MODEL:	De muine d'Onements Cete		Oheren	
Block B.ifc	Required Property Sets		Change	Change description Delete rule
Run checks	This rule checks that the model contai	ins required property sets and properties.		
Show results				
Load ruleset	Control parameters	er the checking behaviour of the checking	g rule.	
EDIT RULESET:	Property sets			
Save ruleset	# <u>Component</u>		Required property	
+ Add rule	1 ⊔ <any></any>	·	<empty> Contains</empty>	
+ Add rule category	Add a new row Clear the ta	ble		
+ Add rule subcategory				
External Wall Requirements	Reporting parameters	S		
Required Property Sets	Reporting parameters have control	over the reporting behaviour of the check	ing rule.	
	Reporting properties			
	# Component filter	Property	Grouping by	Operator

Figure 78: "Property sets" rule is added to "Control parameters"

The "Component" column needs to be configured as IFC Component "IfcWall", type "Classification", operator "Starts With" and target value "21". This looks for IfcWall elements with the classification that starts with 21.

••• < > 🗉	O		🗎 bpd-beheer.bimkeeper.com	Ċ		0	<b>1</b> 888
			Wilgenvliet Arnhem Block B full				+
Wilgenvliet Arnhem WF: Chec	cking rules for mode	Component and	properties	×			×
Block B.ifc	Required Pre	Filters instances of If	cWall whose element classification sta	rts with: 21.	Change name Cl	hange description	Delete rule
Run checks	This rule checks the	IFC Component	IfcWall	~			
Show results	Control pa	Туре	Any				
Load ruleset	Control paramete		Property set				
EDIT RULESET:	Property sets		<ul> <li>Classification</li> </ul>				
Save ruleset	# <u>Compor</u>		Relationship				
+ Add rule	1 🗰 <cl< th=""><th>Operator</th><th>Starts With</th><th>~</th><th></th><th>1</th><th></th></cl<>	Operator	Starts With	~		1	
+ Add rule category	Add a new ro	Target value	21.				
+ Add rule subcategory							
- External Wall Requirements	Reporting	parameters					
Required Property Sets	Reporting parame	ters have control over	the reporting behaviour of the ch	ecking rule.			
	Reporting proper	rties					

Figure 79: "Component" column is configured





The "property" column needs to be configured as type "Property", property set name as "Pset\_WallCommon", property name as "IsExternal", property type "Boolean", operator as "Equals" and set the target value to "True".

••• < > ••	O		🗎 bpd-beheer.bimkeeper.c	om	C	0	
			Wilgenvliet Arnhem Block I	3 full			+
Wilgenvliet Arnhem WF: Check	king rules for mode	Component and p	properties	:	×		×
Block B.ifc	Required Pr	Filters instances of Ifc	Wall whose Pset_WallCommon::I	sExternal property equals: true	Change name	Change description	Delete rule
Run checks Show results Load ruleset	This rule checks th Control pa Control paramet	Type Property set name	Attribute Property Material Classification				
EDIT RULESET: Save ruleset + Add rule	Property sets      Compo      Some     Compo      Add a new rc	Property name Property type Operator	Pset_WallCommon IsExternal Boolean EQUALS ‡	~	ine		
Add rule category     Add rule subcategory     External Wall Requirements     Required Property Sets	Reporting Reporting parame	Target value	I True False the reporting behaviour of the	checking rule.			
	# Compon						

Figure 80: "Property" column is configured

When the checks are run, it reports there are 1521 walls found with the classification 21. In this model, all those walls have the Pset\_WallCommon.IsExternal = true property.

		0	🗎 bpd-beheer.bimkeeper.com	Ċ		C	1	<u>b</u>
			Wilgenvliet Arnhem Block B full					
						0	-	
		King results for model "Block B.It	C"				X	
lock B B	lock B.ifc	Required Property Set	s					te
	Show rules	This rule checks that the model cont	ains required property sets and proper	rties.				
	Generate HTML report							
× 1	External Wall Requirements	✓ IfcWall <classification> St</classification>	Correct: IfcWall Ps	et_WallCon	nmon::IsExte	rnal = true		
	Required Property Sets	✓ IfcWall Pset_WallComm	(1521)					
		Correct (1,521)	The IfcWall Pset_WallCommon::Is passed!	sExternal = true requi	rement on IfcWall <cla< td=""><td>ssification&gt; StartsWith 2</td><td>i.</td><td></td></cla<>	ssification> StartsWith 2	i.	
			Group results by: IFC Type \$	wolved entities (1 E	21)		2	ŗ,
				wolved entities (1,5	21)	ab View in 3	2	
+ A			Name	Guid	Туре			
+ Ade			🗱 IfcWall (79)			To View in 3D		I
Extern			Basic Wall:21.12_baksteen Type-glad-wv_100:612457	2jqlelh996wv2 VkcVw7NIS	🚮 IfcWall	D View in 3D		I
Req			Basic Wall:21.12_baksteen Type-glad-wv_100:678587	2jqlelh996wv2 VkcVw7daE	IfcWall	BD View in 3D		
			Basic Wall:21.12_baksteen Type-glad-wv_100:678589	2jqlelh996wv2 VkcVw7da8	IfcWall	View in 3D		
			Basic Wall:21.12_baksteen Type-glad-wv_100:693009	2jqlelh996wv2 VkcVw7h2a	IfcWall	View in 3D		
			Basic Wall:21.12_baksteen	2jqlelh996wv2	F KoWall	Wiew in 3D		

Figure 81: Checks on the walls are performed. The number of walls with classification 21 are shown





### 4 Checking rules

### 4.1. Components per Building

The "Components per building" checking rule checks for the presence of the selected target components within the building.

••• <>	0	🗎 bpd-beheer.bimkeeper.co	m Č		(	
•		Wilgenvliet Arnhem Block B	full			+
Wilgenvliet Arnhem WF: Chec	king rules for model "Block B.ifc"	Operation to a final design of the second se	O . To all all all	A	All	×
HOOSE A MODEL:						
Block B.ifc	Components Per Build	ing		Change name	Change description	Delete rule
Run checks	This rule checks that a building conta	ains the specified components.				
Show results						
Load ruleset	Control parameters Control parameters have control o	over the checking behaviour of the ch	ecking rule.			
EDIT RULESET:	Required components					
Save ruleset	# Building filter	Target filter	Minimum Count		Maximum Count	
+ Add rule	Add a new row Clear the t	table				
+ Add rule category						
+ Add rule subcategory	Poporting paramete	**				
Manual Example Components Per Building	Reporting parameters have control	ol over the reporting behaviour of the	checking rule.			
	# Component filter	Property	Grouping by		Operator	
	The table contains no records. T	o add a new row, click the button be	ow			

Figure 82: "Components per Building" overview

### 4.1.1. Control parameters

### Required components

The "Components per Building" check has a "Required components" control parameter. This is used to search for target filters within the building filter, which include an optional minimum and maximum count.

	0	🗎 bpd-beheer.bimkeeper.c	om Č	0
0		Wilgenvliet Arnhem Block E	8 full	-
San Analysis III A fair			O Technical	
Wilgenvliet Arnhem WF: Check	ing rules for model "Block B.ifc"			>
HOOSE A MODEL:	O		0	
Block B.ifc	Components Per Buildin	ng	Change	Change description Delete rule
Run checks	This rule checks that a building contai	ins the specified components.		
Show results				
Load ruleset	Control parameters Control parameters have control ov	rer the checking behaviour of the ch	necking rule.	
DIT RULESET:	Required components			
Save ruleset	# Building filter	Target filter	Minimum Count	Maximum Count
	The table contains no records. To	add a new row, click the button be	elow.	
+ Add rule	Add a new row Clear the ta	able		
+ Add rule category				
+ Add rule subcategory	Reporting parameter	s		
Manual Example	Peporting parameters have control	-	checking rule	
Components Per Building	Peperting parameters have control	over the reporting behaviour of the	checking rule.	
	# Component filter	Property	Grouping by	Operator

Figure 83: "Required components" table under "Control parameters"



### **Building filter**

i bpd-beheer.bimkeeper.com • • < > • • O 0 ሰ 🇯 SWilgenvliet Arnhem Block B full Wilgenvliet Arnhem WF: Checking rules for model "Block B.ifc" IOOSE A MODEL: **Components Per Building** Change name Change description Delete rule Block B.ifc This rule checks that a building contains the specified components. Run checks Show results **Control parameters** Load ruleset... Control parameters have control over the checking behaviour of the checking rule. DIT RULESET: Required components Building filter Save ruleset... A filter for the building. The che instances within the con vill only search for button below. + Add rule + Add rule category + Add rule subcategory **Reporting parameters** Manual Example Reporting parameters have control over the reporting behaviour of the checking rule. **Components Per Building Reporting properties** Grouping by Ope the contains no records. To add a new row, click the button b

Figure 84: Description when hovering over the "Building filter" field name

#### Target filter

This filter is used for searching instances based on the specified target. Any IFC component or attribute can be used for filtering.

••• < > •••	D	🗎 bpd-beheer.bimkeeper.com	ı C	0	
0		Wilgenvliet Arnhem Block B fe	11		+
- 100 - Andrew 100 - 50 - 4		A rissouth	O Transferration	A All	a
Wilgenvliet Arnhem WF: Chec	king rules for model "Block B.ifc"				×
HOOSE A MODEL:					
Block B.ifc	Components Per Buildir	ng	Cha	nge name Change description	Delete rule
Run checks	This rule checks that a building contain	ns the specified components.			
Show results					
Load ruleset	Control parameters Control parameters have control over	er the checking behaviour of the che	cking rule.		
DIT RULESET:	Required components				_
Save ruleset	# Building filter	Target filter	Minimum Count	Maximum Count	
+ Add rule	Add a new row	specified configuration.			
+ Add rule category					
+ Add rule subcategory	Benorting parameters	e			
Manual Example	Reporting parameters have control	over the reporting behaviour of the c	necking rule.		
Components Per Building	Reporting properties				
	# <u>Component filter</u>	Property	Grouping by	Operator	
	The table contains no records. To	add a new row, click the button belo	w.		

Figure 85: Description when hovering over the "Target filter" field name



### Minimum count

The "Minimum count" value is optional and ignored when set to zero. If there are fewer components found, the check will report it as an issue.

• • • < > • •	0	🗎 bpd-beheer.bimkeepe	r.com C		• • •
۲		Wilgenvliet Arnhem Blo	k B full		+
	and a feature and the second sec	Communication & Planado	O Testalari	A All constructs	0
Wilgenvliet Arnhem WF: Che	cking rules for model "Block B.ifc	;"			×
HOOSE A MODEL:					
Block B.ifc	Components Per Build	ling	Chang	e name Change description	Delete rule
Run checks	This rule checks that a building con	tains the specified components.			
Show results					
Load ruleset	Control parameters	over the checking behaviour of the	checking rule.		
DIT RULESET:	Required components				
Save ruleset	# Building filter	Target filter	Minimum Count	Maximum Count	
+ Add rule	The table contains no records. Add a new row Clear the	To add a new row, click t table	nimum occurrence count. This value is sheck displays a warning if fewer insta found.	s optional. nces are	
+ Add rule category					
+ Add rule subcategory	Demosting newspace				
Manual Example Components Per Building	Reporting parameters have control Reporting properties	PTS	he checking rule.		
	# Component filter	Property	Grouping by	Operator	
	The table contains no records	To add a new row, click the button	below		

Figure 86: Description when hovering over the "Minimum count" field name

#### Maximum count

The "Maximum count" value is optional and ignored when set to zero. If there are more components found, the check will report it as an issue.

	0	🗎 bpd-beheer.bimkeeper.d	com C	• <u> </u>
<b>O</b>		🍔 Wilgenvliet Arnhem Block	B full	+
- 1100 August 1000 - 100	Bernard Brannerson Bra	en e		
Wilgenvliet Arnhem WF: Check	ing rules for model "Block B.ifc"			×
HOOSE A MODEL:				
Block B.ifc	Components Per Buildir	ng	Chang	ge name Change description Delete rule
Run checks	This rule checks that a building contai	ns the specified components.		
Show results				
Load ruleset	Control parameters Control parameters have control ov	er the checking behaviour of the c	hecking rule.	
EDIT RULESET:	Required components			
Save ruleset	# Building filter	Target filter	Minimum Count	Maximum Count
+ Add rule	The table contains no records. To Add a new row Clear the ta	add a new row, click the button b	elow. The maxin The che	num occurrence count. This value is optional. ck displays a warning if more instances are found.
+ Add rule category				
+ Add rule subcategory	Boporting parameter			
Manual Example Components Per Building	Reporting parameters have control Reporting properties	> over the reporting behaviour of the	e checking rule.	
	# <u>Component filter</u>	Property	Grouping by	Operator

Figure 87:Description when hovering over the "Maximum count" field name



### 4.1.2. Reporting parameters

#### Reporting properties

The "Components per Building" check has a "Reporting properties" parameter. This is used to add extra properties to the report.

	0	🗎 bpd-beheer.bimkeeper.com	n C	0 1	000
0		Wilgenvliet Arnhem Block B f	ull		+
🗢 umo anno um 🕅 anno	Barren D	Commission 6 Presenter	O Testaria		
Wilgenvliet Arnhem WF: Checking	ng rules for model "Block B.ifc"				×
HOOSE A MODEL:					
Block B.ifc	Control parameters				
Bun checks	Control parameters have control or	ver the checking behaviour of the che	cking rule.		
Hull Cliecks	Required components				
Show results	# Building filter	Target filter	Minimum Count	Maximum Count	
Load ruleset	The table contains no records. To	o add a new row, click the button belo	w.		
	Add a new row Clear the ta	able			
EDIT RULESET:					
Save ruleset					
	Reporting parameter	'S			
+ Add rule	Reporting parameters have control	l over the reporting behaviour of the c	hecking rule.		
+ Add rule category	Reporting properties				
+ Add rule subcategory	# Component filter	Property	Grouping by	Operator	
Manual Example	The table contains no records. To	o add a new row, click the button belo	w.		
Components Per Building	Add a new row Clear the ta	able			
	Report found entities				

Figure 88: "Reporting properties" table under "Reporting parameters"

#### Report found entities

The "Report found entities" parameter is used to indicate whether to report entities that are found. Turning this property off will not list any components that are found, but will only show when the components are not found in the model, or when the minimum and/or maximum count of the "Required components" control parameter is exceeded.

	0	🗎 bpd-beheer.bimkeeper.com	Ċ	0	<u> </u>
•		Wilgenvliet Arnhem Block B full			
Australia March and March					1997 - C.
Wilgenvliet Arnhem WF: Chec	king rules for model "Block B.ifc				
IOOSE A MODEL:	(				
lock B.ifc	Control parameters				
Bun checks	Control parameters have control	over the checking behaviour of the checkin	g rule.		
Hun cheeks	Required components				
Show results	# Building filter	Target filter	Minimum Count	Maximum Count	
Load ruleset	The table contains no records.	To add a new row, click the button below.			
	Add a new row Clear the	table			
IT RULESET:					
Save ruleset					
	Reporting paramete	ers			
+ Add rule	Reporting parameters have contr	ol over the reporting behaviour of the check	king rule.		
+ Add rule category	Reporting properties				
+ Add rule subcategory	# Component filter	Property	Grouping by	<u>Operator</u>	
Manual Example	The table contains no records.	To add a new row, click the button below.			
Components Per Building	Report found entities too	table			
Components rer building	hepoir iound entited too				
	Report found entities				

*Figure 89: Description when hovering over the "Report found entities" button* 



### 4.2. Components per Floor

The "Components per Floor" checking rule checks for the presence of the selected target components within a specific floor of the building.

	O	🗎 bpd-beheer.bimkeeper.c	om Č		0 🖞 🗯
٢		Wilgenvliet Arnhem Block	B full		+
NAME AND ADDRESS OF	15 ci	Commission A riserial	O Traductant	A All	0
Wilgenvliet Arnhem WF: Chec	king rules for model "Block B	B.ifc"			×
HOOSE A MODEL:	Componente Der Ek			Change name Change descriptio	Delete rule
Block B.ifc	Components Per Fit	501		Change hame Change descriptio	Delete rule
Run checks	This rule checks that a floor con	ntains the specified components.			
Show results					
Load ruleset	Control parameter	rs	hecking rule.		
DIT RULESET:	Required components				
Save ruleset	# <u>Floor</u>	Target filter	Minimum Count	Maximum Count	
	The table contains no recor	rds. To add a new row, click the button be	elow.		
+ Add rule	Add a new row Clear	the table			
+ Add rule category					
+ Add rule subcategory	Reporting parame	eters			
Manual Example	Basading parameters have a	entrel ever the repeting behaviour of the	sheeling ale		
Components Per Building	Reporting parameters have c	control over the reporting behaviour of the	checking rule.		
Components Per Floor	# Component filter	Property	Grouping by	Operator	
	The table contains no reco	rda. To add a new row, click the button b	alow		

*Figure 90: "Components per Floor" overview* 

### 4.2.1. Control parameters

#### Floor filter

This filter is used for searching instances within the specified floor.

	0	🗎 bpd-beheer.bimkeeper.co	om Ĉ		0	
•		Wilgenvliet Arnhem Block E	s full			-
in in the second second		Commission 6 Descript	O Technical	ж. Ж.	All	0
Wilgenvliet Arnhem WF: Check	king rules for model "Block B.ifc					>
HOOSE A MODEL: Block B.ifc	Components Per Floor	r		Change name	Change description	Delete rule
Run checks	This rule checks that a floor contain	s the specified components.				
Show results						
Load ruleset	Control parameters	over the checking behaviour of the ch	necking rule.			
EDIT RULESET:	Required components			-		
Save ruleset	# <u>Floor</u>	Target filter	Minimum Count		Maximum Count	
+ Add rule + Add rule category	A filter for the floor. The check wi instances that are mate	ill only search for target button be hing the floor.	low.			
+ Add rule subcategory	Reporting parameter	ers				
Manual Example	Reporting parameters have contr	ol over the reporting behaviour of the	checking rule.			
Components Per Building	Reporting properties					
Components Per Floor	# Component filter	Property	Grouping by		Operator	

Figure 91: Description when hovering over the "Floor filter" field name

#### Target filter

The "Target filter" is used in a similar way to how it is described in chapter 4.1.1.

#### Minimum count and maximum count

The "Minimum count" and "Maximum count" values are used in a similar way to how they are described in chapter 4.1.1.





### 4.3. Components per Zone

The "Components per Zone" checking rule checks for the presence of the selected target components within a zone.

	0	i bpd-beheer.bimkeeper.co	m Č		C	
•		S Wilgenvliet Arnhem Block B	full			+
- 1000 - Annotana 1000 - 100 Ann		■ a	O Trabalant			o
Wilgenvliet Arnhem WF: Chec	king rules for model "Block B.i	ifc"				×
HOOSE A MODEL:						
Block B.ifc	Components Per Zor	ne		Change name	Change description	Delete rule
Run checks	This rule checks that a zone cont	ains the specified components.				
Show results						
Load ruleset	Control parameters	"S	ecking rule.			
DIT RULESET:	Required components					
Save ruleset	# Zone filter	Target filter	Minimum Count	<u>N</u>	laximum Count	
	The table contains no record	ls. To add a new row, click the button bel	low.			
+ Add rule	Add a new row Clear th	he table				
+ Add rule category						
+ Add rule subcategory	Reporting parame	ters				
Manual Example	Benorting parameters have co	ntrol over the reporting behaviour of the	checking rule			
Components Per Building	Reporting parameters have co	nationation are reporting benaviour of the	onconing rule.			
Components Per Floor	# Component filter	Property	Grouping by		Deretor	
Components Per Zone	The table contains no record	Is. To add a new row, click the button bel	ow.	2		

Figure 92: "Components per Zone" overview

### 4.3.1. Control parameters

### Required components

### Zone filter

This filter is used for searching instances within the specified zone.

	0	🗎 bpd-beheer.bimkeeper	.com Ĉ		0 ሰ 🗯
•		Wilgenvliet Arnhem Block	k B full		
Martin Annalyzan Mart	and a second	Torrent & provide	O Transmissed		
Wilgenvliet Arnhem WF: Che	cking rules for model "Block B.i	fc"			
HOOSE A MODEL:					
lock B.ifc	Components Per Zor	1e		Change name Change descri	iption Delete rule
Run checks	This rule checks that a zone cont	ains the specified components.			
Show results					
Load ruleset	Control parameters Control parameters have control	S ol over the checking behaviour of the	checking rule.		
DIT RULESET:	Required components	-1			
Save ruleset	# Zone filter	Target filter	Minimum Count	Maximum Count	
+ Add rule	A filter for the zone. The che target instances within zone	eck will only search for button less that match the filter.	below.		
+ Add rule category					
+ Add rule subcategory	Reporting parame	tors			
Manual Example	Perorting parameters have co	ntrol over the reporting behaviour of th	to checking rule		
Components Per Building	Reporting parameters have con	the reporting behaviour of the	te checking rule.		
Components Per Floor	Reporting properties	Desceta	Crossing but	Oncomton	
Components Per Zone	# Component filter	Property	Grouping by	Operator	
Componente Per Space	I he table contains no record	s. To add a new row, click the button i	below.		

Figure 93: Description when hovering over the "Zone filter" field name





## Target filter

The "Target filter" is used in a similar way to how it is described in chapter 4.1.1.

### Minimum count and maximum count

The "Minimum count" and "Maximum count" values are used in a similar way to how they are described in chapter 4.1.1.



### 4.4. Components per Space

The "Components per Space" checking rule checks for the presence of the selected target components within a space.

	0	i bpd-beheer.bimkeeper.com	n Č	(	
		Wilgenvliet Arnhem Block B f	ull		+
- unio Assistantine mark			O Technical		0.0
Wilgenvliet Arnhem WF: Che	cking rules for model "Block	B.ifc"			×
HOOSE A MODEL:	Components Per S	pace		Change name Change description	Delete rule
Run checks	This rule checks that a space	contains the specified components.			
Show results					
Load ruleset	Control parameters have co	<b>ers</b> ntrol over the checking behaviour of the che	cking rule.		
DIT RULESET:	Required components				
Save ruleset	# Space filter	Target filter	Minimum Count	Maximum Count	
	The table contains no rece	ords. To add a new row, click the button belo	ow.		
+ Add rule	Add a new row Clea	r the table			
+ Add rule category					
+ Add rule subcategory	Demosting a second				
Manual Example			hasking als		
Components Per Building	Reporting parameters have	control over the reporting behaviour of the c	necking rule.		
Components Per Floor	# Component filter	Property	Grouping by	Operator	
Components Per Zone	The table contains no rec	ords. To add a new row, click the button bein	a substraining by	operator	
Components Per Space	The table contains no reco	sida. To add a new tow, click the button beit	/11.		

Figure 94: "Components per Space" overview

### 4.4.1. Control parameters

Required components

#### Space filter

### This filter is used for searching instances within the specified space.

	0	🗎 bpd-beheer	.bimkeeper.com	Ċ		C	
0		Wilgenvliet A	rnhem Block B full				+
🗢 1800 - Annihans 1807 - 178 Aut		on an instantion		a da al			0.10
Wilgenvliet Arnhem WF: Chec	king rules for model "Block B.ifc"						×
HOOSE A MODEL:							
Block B.ifc	Components Per Space				Change name	Change description	Delete rule
Run checks	This rule checks that a space contains	the specified compon	ents.				
Show results							
Load ruleset	Control parameters Control parameters have control over	er the checking behavior	our of the checking n	ule.			
DIT RULESET:	Required components						
Save ruleset	# Space filter	Target filter		Minimum Count		Maximum Count	
	A filter for the space. The check w	vill only search for	e button below.				
+ Add rule	Addramew Tow Clear the tat						
+ Add rule category							
+ Add rule subcategory	Reporting parameters						
Manual Example	Beporting parameters have control of	ver the reporting beha	aviour of the checking	nule			
Components Per Building		the are reporting bond		, and			
Components Per Floor	Reporting properties	Descenter		Operations has		0	
Components Per Zone	* Component niter	Property		Grouping by		Operator	
Components Per Space	I he table contains no records. To	add a new row, click th	ne button below.				

Figure 95: Description when hovering over the "Space filter" field name





### Target filter

The "Target filter" is used in a similar way to how it is described in chapter 4.1.1.

### Minimum count and maximum count

The "Minimum count" and "Maximum count" values are used in a similar way to how they are described in chapter 4.1.1.



### 4.5. Required Property Sets

The "Required Property Sets" check is used to check whether the selected component has the required property.

	0	🗎 bpd-beheer.bimkeeper.com	Ċ		• • ***
0		😂 Wilgenvliet Arnhem Block B ful	1		+
- 1101- Annham 1107 - 178 A.C.		Commission & Financial C	Tankalant		0.11
Wilgenvliet Arnhem WF: Chec	king rules for model "Block B.ifc"	1			>
HOOSE A MODEL:					
Block B.ifc	Required Property Sets	6	Char	nge name Change description	Delete rule
Run checks	This rule checks that the model cont	tains required property sets and properti	ies.		
Show results					
Load ruleset	Control parameters	over the checking behaviour of the chec	king rule.		
EDIT RULESET:	Property sets				
Save ruleset	# Component		Required property		
	The table contains no records. 1	To add a new row, click the button below	ν.		
+ Add rule	Add a new row Clear the	table			
+ Add rule category					
+ Add rule subcategory					
Manual Example	Reporting paramete	rs			
Oceanorate Der Dulleller	Reporting parameters have control	ol over the reporting behaviour of the ch	ecking rule.		
Components Per Building	Reporting properties				
Components Per Floor	# Component filter	Property	Grouping by	Operator	
Components Per Zone	The table contains no records. T	To add a new row, click the button below	ν.		
Components Per Space					
Required Property Sets					

Figure 96: "Required Property Sets" overview

### 4.5.1. Control parameters

#### Property sets

The "Property sets" control parameters searches for the required properties within the selected components. For example, this can be used to check whether every IfcSpace has a name and number. Another example would be to see if every external wall has the property "Pset\_WallCommon.IsExternal" set to a value of "true".

	0		Ċ	C	
0		SWilgenvliet Arnhem Block B full			4
- 100- A-10- 107 - 11	E transier E	Committee A dimension O	Textestant	A AT	<b>0</b>
Wilgenvliet Arnhem WF: Cheo	cking rules for model "Block B.if	c"			×
HOOSE A MODEL:	Required Property Se	its	Cha	nge name Change description	Delete rule
Block B.ifc				onalige second	
Run checks	This rule checks that the model co	intains required property sets and propertie	·S.		
Show results					
	Control parameters	5			
Load ruleset	Control parameters have control	ol over the checking behaviour of the checki	ing rule.		
EDIT RULESET:	Property sets				
Save ruleset	# <u>Component</u>		Required property		
	The table contains no records	. To add a new row, click the button below.			
+ Add rule	Add a new row Clear th	e table			
+ Add rule category					
+ Add rule subcategory	Poporting paramet	toro			
Manual Example	Reporting paramet	ers			
Components Per Building	Reporting parameters have con	trol over the reporting behaviour of the cher	cking rule.		
Components Per Elser	Reporting properties				
Components Per Ploor	# Component filter	Property	Grouping by	Operator	
Components Per Zone	The table contains no records	3. To add a new row, click the button below.			
Components Per Space					
Required Property Sets					

*Figure 97: "Property sets" table under "Control parameters"* 



#### Component

	0	🗎 bpd-beheer.bimkeeper.com	Ċ		0 🖞 🚟
0		Wilgenvliet Arnhem Block B full			+
🗢 1471 Australia 1477 📰 Artic		Community à community à		A All constants	a a
Wilgenvliet Arnhem WF: Check	ting rules for model "Block B.ifc	," 			×
HOOSE A MODEL:					
Block B.ifc	Control parameters				
Run checks	Control parameters have control	over the checking behaviour of the checking	ng rule.		
Show results	Property sets # Component		Required property		
Load ruleset	The type of the IFC component	To add a new row, click the button below.			
DIT RULESET:	Add a new row Clear the	table			
Save ruleset	Reporting parameter	are			_
+ Add rule	Reporting parameters have contri	rol over the reporting behaviour of the che	cking rule.		
+ Add rule category	Reporting properties				
+ Add rule subcategory	# Component filter	Property	Grouping by	Operator	
Manual Example	The table contains no records.	To add a new row, click the button below.			
Components Per Building	Add a new row Clear the	table			
Components Per Floor	Report passed constraints				
Components Per Zone					
Components Per Space					
Required Property Sets					

Figure 98: Description when hovering over the "Component" field name

	0		🗎 bpd-beheer.bimkeeper.com	n Č	0 1:	00
Ø			Wilgenvliet Arnhem Block B fr	ull		+
Wilgenvliet Arnhem WF: Checkin HOOSE A MODEL:	ng rules for mode	Component and	properties	×		×
Block B.ifc	Control pa	Filters any instance of	of IfcSpace			
Run checks	Control paramete	IFC Component	IfcSpace	~		
Show results	# Compor	Туре	Any     Attribute			
DIT RULESET:	Add a new ro		Property set Material			
Save ruleset			Relationship			
+ Add rule	Reporting	ourumotoro				
+ Add rule category	Reporting parame	ters have control over	r the reporting behaviour of the c	hecking rule.		
+ Add rule subcategory	Reporting proper	ties ent filter				
Manual Example		ns no records. To add	a new row, click the button belo			
Components Per Building Components Per Floor	Add a new row					
Components Per Zone	C Report passe	ed constraints				
Components Per Space						
Required Property Sets						

Figure 99: Menu for selecting the IFC-component type. Here, the filter type is set to "Any"







Figure 100: Menu for selecting the IFC-component type. Here, the filter type is set to "Attribute"

	D		🗎 bpd-beheer.bimkeeper.com	Ċ	0 🗄 📟
0			Wilgenvliet Arnhem Block B full		+
Wilgenvliet Arnhem WF: Check	king rules for mode	Component and p	roperties	×	×
HOOSE A MODEL:					
Block B.ifc	Control pa	Filters instances of IfcS	Space whose <empty> property contains: <no< td=""><td>o target value&gt;</td><td></td></no<></empty>	o target value>	
Run checks	Control paramete	IFC Component	IfcSpace	~	
Show results	# <u>Compor</u>	Туре	Any		
Load ruleset	1 🖵 <en< td=""><td></td><td><ul> <li>Attribute</li> <li>Property set</li> </ul></td><td></td><td></td></en<>		<ul> <li>Attribute</li> <li>Property set</li> </ul>		
EDIT RULESET:	Add a new ro		Material     Classification		
Save ruleset			<ul> <li>Relationship</li> </ul>		
+ Add rule	Reporting	Property set name			
+ Add rule category	Reporting param	Property set			
+ Add rule subcategory	Reporting prope	Property type	String	~	Operator
Manual Example	The table conta	Operator	Contains	~	
Components Per Building	Add a new ro		Contains		
Components Per Floor		larget value			
Components Per Zone	Report pas				
Components Per Space					
Required Property Sets					

Figure 101: Menu for selecting the IFC-component type. Here, the filter type is set to "Property set"





	D		🗎 bpd-beheer.bimkeeper.com	C	0 🗄 🚥
۲			Wilgenvliet Arnhem Block B full		+
Wilgenvliet Arnhem WF: Checki	ng rules for mode	Component and	properties	×	×
Block B.ifc	Control pa	Filters instances of If	cSpace whose material name contains: <no targ<="" td=""><td>get value&gt;</td><td></td></no>	get value>	
Run checks	Control paramete	IFC Component	IfcSpace	~	
Show results	# <u>Compor</u> 1 - <ma< td=""><td>Туре</td><td>Any Attribute Property set</td><td></td><td></td></ma<>	Туре	Any Attribute Property set		
EDIT RULESET: Save ruleset	Add a new ro		Material     Classification     Relationship		
+ Add rule	Reporting	Operator	Contains	~	
+ Add rule category	Reporting param	Target value			
+ Add rule subcategory	# Compone	nt liiter	Property I S	arouping by	Operator
<ul> <li>Manual Example</li> </ul>	The table contain		a new row, click the button below.		
Components Per Building Components Per Floor Components Per Zone	Add a new row	Clear the table			
Components Per Space Required Property Sets					

Figure 102: Menu for selecting the IFC-component type. Here, the filter type is set to "Material"



Figure 103: Menu for selecting the IFC-component type. Here, the filter type is set to "Classification"



### Required property

	0		🗎 bpd-beheer.bimkeeper.com	Ċ		0 🗄 📟
•			Wilgenvliet Arnhem Block B full			+
- man Andreastan and Andreastan	and the second second second	-				
Wilgenvliet Arnhem WF: Check	king rules for mode	Component an	nd properties	×		×
HOOSE A MODEL:						
Block B.ifc	Control pa	Filters instances of	of IfcSpace whose LongName attribute con	ntains: <no target="" value=""></no>		
Run checks	Control paramete	Туре	<ul> <li>Attribute</li> </ul>			
Show results	Property sets		Property			
Unow results	# <u>Compor</u>		Material			
Load ruleset	1 🖵 <cla< td=""><td></td><td>Classification</td><td></td><td>ns</td><td></td></cla<>		Classification		ns	
		Attribute	LongNomo			
DIT RULESET:	Add a new ro		Longivarite	· ·		
Save ruleset		Operator	CONTAINS \$			
		Target value				
+ Add rule	Reporting					
+ Add rule category	Reporting parame	ters have control or	ver the reporting behaviour of the cheo	cking rule.		
+ Add rule subcategory	Reporting proper	ties				
+ Add Tule Subcategory						
Manual Example	The table contai	ns no records. To a	dd a new row, click the button below.			
Components Per Building	Add a new row	Clear the tab				
Components Per Floor						
Components Per Zone	C Report pass	ed constraints				
Components Per Space						
Required Property Sets						

Figure 104: Menu for selecting the required property. Here, the filter type is set to "Attribute"

	0		🗎 bpd-beheer.bimkeeper.com	Ċ	0 ሰ 🚥
٢			Wilgenvliet Arnhem Block B full		+
Wilgenvliet Arnhem WF: Check	king rules for mode	Component and p	roperties	×	×
HOOSE A MODEL: Block B.ifc	Control pa	Filters instances of Ifcs	Space whose <empty> property contains: <no tar<="" td=""><td>get value&gt;</td><td></td></no></empty>	get value>	
Run checks Show results	Control paramete	Туре	Attribute Property		
Load ruleset	# <u>Compor</u> 1 └─ <ck< td=""><td>Property set name</td><td>Material Classification</td><td></td><td></td></ck<>	Property set name	Material Classification		
EDIT RULESET: Save ruleset	Add a new ro	Property name			
+ Add rule	Reporting Reporting param	Operator	String CONTAINS +	~	
+ Add rule subcategory	Reporting prope	Target value			Operator
Components Per Building Components Per Floor Components Per Zone	Add a new row	ns no records. To add a	new row, click the button below.		
Required Property Sets					

Figure 105: Menu for selecting the required property. Here, the filter type is set to "Property"





	0		🗎 bpd-beheer.bimkeeper.com	Ċ	0 ሰ 🚥
0			Wilgenvliet Arnhem Block B full		+
- Internet and the second second	TRANSFER D				
Wilgenvliet Arnhem WF: Check	king rules for mode	Component ar	nd properties	×	×
CHOOSE A MODEL:		-			
Block B.ifc	Control pa	Filters instances of	of IfcSpace whose material name contains:	<no target="" value=""></no>	
Run checks	Control paramete	Туре	Attribute		
Show results	Property sets		Property		
	# Compor		Material		
Load ruleset	1 🖵 <cla< td=""><td></td><td>Classification</td><td>15</td><td></td></cla<>		Classification	15	
		Operator	CONTAINS \$		
EDIT RULESET:	Add a new ro	Target value			
Save ruleset					
+ Add rule	Reporting	parameters	i -		
	Beporting parame	ters have control o	ver the reporting behaviour of the cher	cking rule	
+ Add rule category					
+ Add rule subcategory	Reporting proper	ties			Onempter
<ul> <li>Manual Example</li> </ul>		ne ne recorde. Te c	end a new raw aliability button below		Operator
Components Per Building	The table contai	ns no records. To a	Ido a new row, click the button below.		
Components Per Floor	Add a new row	Clear the tab			
Componente Per Zono	Report pass	ed constraints			
Components Per Zone					
Components Per Space					
Required Property Sets					

Figure 106: Menu for selecting the required property. Here, the filter type is set to "Material"

### 4.5.2. Reporting parameters

### Report passed constraints

Indicates whether to report IFC elements that meet the requirements.

	0		Ċ		0	<u> </u>
		Wilgenvliet Arnhem Block B full				+
- un		0 Tanana 0 Tanana	abalaat	A 10	0 0	
Wilgenvliet Arnhem WF: Check	ting rules for model "Block B.ifc"					×
CHOOSE A MODEL:	Control parameters					
Block B.ifc	Control parameters have control ov	ver the checking behaviour of the checking	rule.			
Run checks	Property sets		1			
Show results	# Component		Required property			
Load ruleset	1 u <classification starts<="" td=""><td>sWith</td><td><classification< td=""><td></td><td></td><td></td></classification<></td></classification>	sWith	<classification< td=""><td></td><td></td><td></td></classification<>			
Loud Holdotin	Add a new row Clear the ta	able				
EDIT RULESET:						
Save ruleset						
	Reporting parameter	'S				
+ Add rule	Reporting parameters have control	over the reporting behaviour of the checki	ng rule.			
+ Add rule category	Reporting properties					
+ Add rule subcategory	# Component filter	Property	Grouping by	Operator		
<ul> <li>Manual Example</li> </ul>	The table contains no records. To	add a new row, click the button below.				
Components Per Building	Reports entities that passed the given the given by the g	ven constraint				
Components Per Floor	Report passed constraints					
Components Per Zone						
Components Per Space						
Required Property Sets						

Figure 107: Description when hovering over the "Report passed constraints" button





### 4.6. Space Area

The "Space Area" check, checks whether the specified spaces are within the space area bounds.

	0	🗎 bpd-behee	r.bimkeeper.com	C		0 🖞 🚟
٢		Wilgenvliet	Arnhem Block B full			+
- 1870 - Annham 1877 - 197			Character O Testador		All	0
Wilgenvliet Arnhem WF: Chec	cking rules for model "Block	B.ifc"				×
HOOSE A MODEL:				<b>C</b>	10	
Block B.ifc	Space Area			Change name	e Change description	Delete rule
Run checks	This rule checks that area of s	pecified spaces is inside set li	mits.			
Show results						
Load ruleset	Control parameters have co	ers	iour of the checking rule.			
EDIT RULESET:	Area Limits					
Save ruleset	# Space Type	Space Name	Space Number	Min Area	Max Area	
	The table contains no reco	ords. To add a new row, click t	the button below.			
+ Add rule	Add a new row Clea	r the table				
+ Add rule category						
+ Add rule subcategory	D					
Manual Example	Reporting param	eters				
Components Per Building	Reporting parameters have	control over the reporting beh	aviour of the checking rule.			
Components Per Bailding	Reporting properties					
Components Per Floor	# Component filter	Property	Grou	ping by	Operator	
Components Per Zone	The table contains no reco	ords. To add a new row, click t	the button below.			
Components Per Space						
Required Property Sets						
<b>A</b>						

Figure 108: "Space Area" overview

### 4.6.1. Control parameters

#### Area Limits

	0	⊜ bpd-behee	.bimkeeper.com	Ċ		0 ሰ 📖
٢		S Wilgenvliet /	rnhem Block B full			+
Wilgenvliet Arnhem WF:	Checking rules for model "Blo	ock B.ifc"	The available On Teasurate at		A All consistences (A	×
CHOOSE A MODEL:						
Block B.ifc	Space Area			Change	name Change descripti	on Delete rule
Run checks	This rule checks that area of spec	ified spaces is inside set limits.				
Show results						
Load ruleset	Control parameter	S	e checking rule.			
EDIT RULESET:	Area Limits					
Save ruleset	# Space Type	Space Name	Space Number	Min Area	Max Area	
+ Add rule	1		*	0 0	m² 0 0	m²
+ Add rule category	Add a new row Clear th	e table				
+ Add rule subcategory						
<ul> <li>Manual Example</li> </ul>	Reporting parameter	ters				
Components Per Bui	Reporting parameters have cor	ntrol over the reporting behaviour o	the checking rule.			
Components Per Flor	Reporting properties					
Components Per Zor	# Component filter	Property	Groupin	ig by	Operator	
Components Per Spa						
Required Property Se						
0						

Figure 109: "Area Limits" table under "Control parameters"



#### Space Type



Figure 110: Description when hovering over the "Space Type" field name

#### Space Name

	0	🗎 bpd-beheer.bimkeeper.co	m	C		0 ሰ 📖
0		Wilgenvliet Arnhem Block B	full			
- 1877au - Anna Ianuar 1877			O Technical			0
Wilgenvliet Arnhem WF:	Checking rules for model "Block	B.ifc"				
HOOSE A MODEL:				( e)		
Block B.ifc	Space Area			Change name	Change description	Delete rule
Run checks	This rule checks that area of specified	spaces is inside set limits.				
Show results						
Load ruleset	Control parameters Control parameters have control ov	er the checking behaviour of the checking r	ule.			
DIT RULESET:	Area Limits					
Save ruleset	# Space Type	Space Name Space Nur	mber Min Are	ea	Max Area	
+ Add rule	1 Space name. Ast	erisk (*) can be used as a wild char character.	0	0 m²	0 <sup>©</sup> m <sup>2</sup>	2
+ Add rule category	Add a new row Clear the ta	ble				
+ Add rule subcategory						
Manual Example	Reporting parameter:	s				
Components Per Bui	Reporting parameters have control	over the reporting behaviour of the checking	g rule.			
Components Per Flor	Reporting properties					
Components Per Zor	# Component filter	Property	Grouping by	q	operator	
Components Per Spa						
Required Property Se						

*Figure 111: Description when hovering over the "Space Name" field name* 



#### Space Number



*Figure 112: Description when hovering over the "Space Number" field name* 

#### Min Area



*Figure 113: Description when hovering over the "Min Area" field name* 



#### Max Area



*Figure 114: Description when hovering over the "Max Area" field name* 



### 4.6.2. Reporting Parameters

#### Report found entities

This setting indicates whether to report spaces found in the "Area Limits" table. This setting is switched on by default.

	0	🗎 bpd-	beheer.bimkeeper.com	٥)		0 ሰ 📖
		🌲 Wilge	nvliet Arnhem Block B full			
- Miller Annham Mill	- Andrewski - It Administra		6 Financial O Train	a	A All annual surv	
Wilgenvliet Arnhem WF: C	Checking rules for model "Blo	ck B.ifc"				
HOOSE A MODEL:	Control parameters have control	I over the checking behaviou	Ir of the checking rule.			
Block B.ifc	Area Limits					
Bun checks	# Space Type	Space Name	Space Number	Min Area	Max Area	
Show results	1	•	*	0 3	m² 0	🗘 m²
Load ruleset	Add a new row Clear the	e table				
EDIT RULESET:	Benorting paramet	ors				
Save ruleset	Reporting paramet					
	Reporting parameters have cont	trol over the reporting behav	iour of the checking rule.			
+ Add rule	Reporting properties					
+ Add rule category	# Component filter	Property	Gro	ouping by	Operator	
+ Add rule subcategory	The table contains no records.	. To add a new row, click the	button below.			
Manual Examples	Add a new row Clear the	e table				
Space Area	Report found entities					
	Report inadequate					
	Report found entities too					

Figure 115: Description when hovering over the "Report found entities" button

#### Report inadequate

This setting indicates whether to report spaces that are not found in the "Area Limits" table. This setting switched off by default.

This is an advanced setting when one "Space Area" check is used for all spaces in the IFC. By enabling "Report inadequate", the check shows which spaces are not configured.

	0	🗎 bpd-l	peheer.bimkeeper.com	٢)	0	<u> </u>
		🍔 Wilger	nvliet Arnhem Block B full			
A maile and 1800			6 Electric O Technic	-í	A All completion O	
Wilgenvliet Arnhem WF:	Checking rules for model "Bloc	k B.ifc"				
HOOSE A MODEL:	Control parameters have control	over the checking behaviou	r of the checking rule.			
Block B.ifc	Area Limits					
Run checks	# Space Type	Space Name	Space Number	Min Area	Max Area	
Show results	1		*	0 0	m² 0 0 m²	
Load ruleset	Add a new row Clear the	table				
EDIT RULESET:	Benorting paramete	re				
Save ruleset	Reporting parameters have contr	ol over the reporting behavi	our of the checking rule.			
+ Add rule	Reporting properties		J.			
+ Add rule category	# Component filter	Property	Grou	ping by	Operator	
+ Add rule subcategory	The table contains no records.	To add a new row, click the	button below.			
Manual Examples	Add a new row Clear the	table				
Space Area	Report found spaces but not four	nd in the table				
	Report inadequate					

Figure 116: Description when hovering over the "Report inadequate" button





### 4.7. Floor Height Check

The "Floor Height Check" is used to check whether the floors in the building meet the height requirements.

	0	🔒 bpd-beheer.bimkeeper.com	C _	0	
		Wilgenvliet Arnhem Block B full			+
Wilgenvliet Arnhem WF: C	Checking rules for model "Block B.ife	C"	A.		×
HOOSE A MODEL:					
Block B.ifc	Floor Height Check		Change name	Change description	Delete rule
Run checks	This rule checks the height of Floors				
Show results					
Load ruleset	Control parameters Control parameters have control over	the checking behaviour of the checking rule.			
EDIT RULESET:	Check Consistency of Building	Floor Heights			
Save ruleset	Minimum Floor Height				
+ Add rule	2500			6	mm
. Add mile estenant	Maximum Floor Height				
+ Add rule category	4000			6	mm
+ Add rule subcategory					
Manual Examples	Ignore Lowest Floor				
Space Area	Ignore Topmost Floor				
Floor Height Check					
	Reporting parameters				

Figure 117: "Floor Height Check" overview

### 4.7.1. Control Parameters

### *Check Consistency of building floor heights*

When this setting is enabled, it checks whether all floors in the building are the same height.

	0	🗎 bpd-beheer.bimkeeper.com	0	C		000
		Wilgenvliet Arnhem Block B full				
- 1171- Australia 1107 - 17		Constanting A Florestel O Technical		All annual annual 🔗	0.11	
Wilgenvliet Arnhem WF: 0	Checking rules for model "Block B.ife	5"				
HOOSE A MODEL:	Floor Height Check		Change name	Change description	Dele	te rule
Block B.ifc	Theor Height Check					
Run checks	This rule checks the height of Floors					
Show results						
Load ruleset	Control parameters Control parameters have control over	the checking behaviour of the checking rule.				
EDIT RULESET:	Check Consistency of Building	Floor Heights				
Save ruleset	Minimum Floor Height					
+ Add rule	If this is checked, floor heights of checked for equalit	f the floors are y.			<u>с</u> і	mm
+ Add rule category	Maximum Floor Height					
Tridu fulo outogory	4000				0	mm
+ Add rule subcategory	C Instant Floor					
Manual Examples	Ignore Lowest Floor					
Space Area	Ignore Topmost Floor					
Floor Height Check						
	Beneuting menometers					

Figure 118: Description when hovering over the "Check Consistency of Building Floor Heights" button



### Minimum floor height

The minimum height of the floor, in millimeters.

	0	🗎 bpd-beheer.bimkeeper.com	¢	C	
		Wilgenvliet Arnhem Block B full			
			~	All	0
Wilgenvliet Arnhem WF:	Checking rules for model "Block B.	ifc"			>
HOOSE A MODEL:				<b>C a</b>	
Block B.ifc	Floor Height Check		Change name	Change description	Delete rule
Run checks	This rule checks the height of Floors				
Show results					
Load ruleset	Control parameters				
	Control parameters have control or	ver the checking behaviour of the checking rule.			
EDIT RULESET:	Check Consistency of Buildin	g Floor Heights			
Save ruleset	Minimum Floor Height				
+ Add rule	2500				0 mm
	Maximum Floor Height				
+ Add rule category	Door indexision of the set had been				0 mm
+ Add rule subcategory	Requirea minimum floor neight				
Manual Examples	Ignore Lowest Floor				
Space Area	Ignore Topmost Floor				
Floor Height Check					
	Bonorting poromotor				

Figure 119: Description when hovering over the "Minimum Floor Height" field

### Maximum floor height

The maximum height of the floor, in millimeters.

	0	🗎 bpd-beheer.bimkeeper.com	¢	C	
		Wilgenvliet Arnhem Block B full			
Wilgenvliet Arnhem WF:	Checking rules for model "Block B.i	fc"			0
HOOSE A MODEL:					
Block B.ifc	Floor Height Check		Change nam	Change description	Delete rule
Run checks	This rule checks the height of Floors				
Show results					
Load ruleset	Control parameters Control parameters have control ov	er the checking behaviour of the checking rule.			
EDIT RULESET:	Check Consistency of Building	g Floor Heights			
Save ruleset	Minimum Floor Height				
+ Add rule	2500				0 mm
+ Add rule category	Maximum Floor Height				
+ Add rule subcategory	4000				0 mm
Manual Examples	Ignore Lowest Floor				
Space Area	Maximum allowed floor height				
Floor Height Check					

Figure 120: Description when hovering over the "Maximum Floor Height" field





#### Ignore Lowest Floor

In most models the lowest floor in the building consists of a foundation that has a different height and thus does not meet the set requirements. If this situation applies to the model, this setting can be enabled to ignore the lowest floor.

	0	🚔 bpd-beheer.bimkeeper.com	C	(	
		Wilgenvliet Arnhem Block B full			-
Wilgenvliet Arnhem WF: (	Checking rules for model "Block B.it			A All	<u>.</u>
HOOSE A MODEL:					
Block B.ifc	Floor Height Check		Change na	me Change description	Delete rule
Run checks	This rule checks the height of Floors				
Show results					
Load ruleset	Control parameters Control parameters have control over	er the checking behaviour of the checking rule.			
EDIT RULESET:	Check Consistency of Building	g Floor Heights			
Save ruleset	Minimum Floor Height				
+ Add rule	2500				© mm
+ Add rule category	Maximum Floor Height				© mm
+ Add rule subcategory					
Manual Examples	Ignore Lowest Floor				
Space Area	Ignore Topmost Floor				
Floor Height Check	If this is checked, the lowest floor (t is not taken into acc	ypically Foundation) ount.			
	Bonorting poromotor				

*Figure 121: Description when hovering over the "Ignore Lowest Floor" button* 

#### Ignore topmost floor

When this setting is enabled, the topmost floor is ignored. Roofs are usually a separate building floor, and often have heights that don't meet the set requirements.

	0	B bpd-beheer.bimkeeper.com	Ċ	(	D ሰ 🏻
		Wilgenvliet Arnhem Block B full			-
				A All completion A	0
Wilgenvilet Arnnem WF: 0	Shecking rules for model "Block B.I	IC."			,
Block B.ifc	Floor Height Check		Change na	Change description	Delete rule
Run checks	This rule checks the height of Floors				
Show results					
Load ruleset	Control parameters Control parameters have control ov	er the checking behaviour of the checking rule.			
EDIT RULESET:	Check Consistency of Building	g Floor Heights			
Save ruleset	Minimum Floor Height				
+ Add rule	2500				0 mm
+ Add rule category	Maximum Floor Height				
	4000				0 mm
+ Add rule subcategory	If this is checked, the topmost floo	or (typically Roof) is			
Manual Examples	not taken into acco	unt.			
Space Area	Ignore Topmost Floor				
Floor Height Check					
	Bonorting perometer	•			

Figure 122: Description when hovering over the "Ignore Topmost Floor" button





End of manual

For other inquiries, please contact IRP at contact@irp.nl