Walraven Rail Selector
User manual

500 N

600 N = 3000 N/m

Content

1 Introduction

Walraven Rail Selector (WRS) is an online web application with the main objective to verify that a Walraven fixing rail is valid for its purpose. Based on few inputs, the user can obtain a structural report justifying a specific configuration (fixing rail geometry with specific vertical loads applied).

1.1 Calculations

Safety factor:

On the impact side a safety factor $\gamma_{G/Q}$ of $1{,}40$ was taken and on the material side a safety factor γ_M of $1{,}10$. The overall safety factor γ is therefore $1{,}54$.

Fixing rail own weight:

The dead weight of the fixing rail is always taken into account.

Validation:

The tool validates whether stress or deflections are not exceeded

Additionally, when selecting "Simple cantilever" or "Fixing rail + base plate" in the "Construction type" field from the "Rail" dashboard, an additional check is performed to validate maximum moment in the end plate.

Base plates considered in the calculations:
- RapidStrut® – Walraven RapidStrut® Base Plate G2 (BUP1000) - Walraven International
  - 665885400 – 485 Nm
- RapidRail® – Walraven RapidRail® Wall Plate - Walraven International
  - 6613200 – 140 Nm
  - 6613235 – 310 Nm
- Maxx – Walraven Maxx Base Plate - Walraven International
  - BP80 – 2446 Nm
  - BP100 – 3492 Nm
  - BP120 – 3928 Nm

Default maximum deflection and maximum stress values:

Default values defined in the tool	
Beams	L/200
Cantilever arms	L/150

Stress values defined in the tool	
Walraven RapidStrut® and Walraven Rapidrail®	160,0 MPa
Maxx	152,6 MPa

In both cases, default values can be adjusted by the user to more conservative values (more restrictive). This adjustment can be done in the "Results" dashboard.

1.2 Conditions / Considerations

All calculations are valid for only ambient temperatures for rails stressed about the Y-axis.
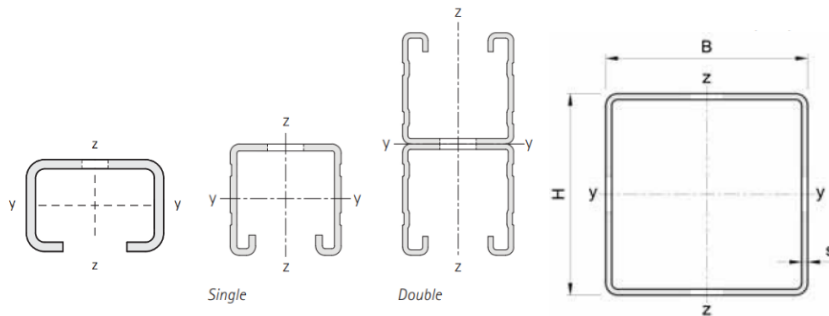
Other construction parts such as anchors or threaded rods must be verified separately by the user.

Further information such as cross-sections properties or recommendations for the ideal suspension method can be found in the technical data sheets.

Datasheet Walraven RapidRail® Fixing Rails
Datasheet Walraven RapidStrut® Channels
Datasheet Walraven Maxx Heavy Profiles

The tool is performing the calculations using the minimum inertia. By doing this, calculations are valid regardless rail orientation (open-up; open down). Worst case scenario is calculated to be on the safe side.

1.3 Disclaimer

The design results are based essentially on the conditions defined by the user of the software and on the data entered by them. Therefore, the end-user bears the sole responsibility for the absence of errors and the completeness of the data. Furthermore, the end-user is solely responsible for having the results of the calculation checked and cleared by an expert prior to using them for the specific application.

2 Getting Started

2.1 System Requirements

Before using the web application, ensure that your system meets the following requirements:
- A modern web browser (we recommend Edge).
- An active internet connection.
- It is recommended to use a PC/laptop or tablet.

2.2 Accessing the Application

To access the application, go to:
- www.walraven.com - Services – Walraven Rail Selector,
- or directly to the tool via this link: *https://walraven.com/walraven-rail-selector/*

The tool is freely available, no login details are needed.
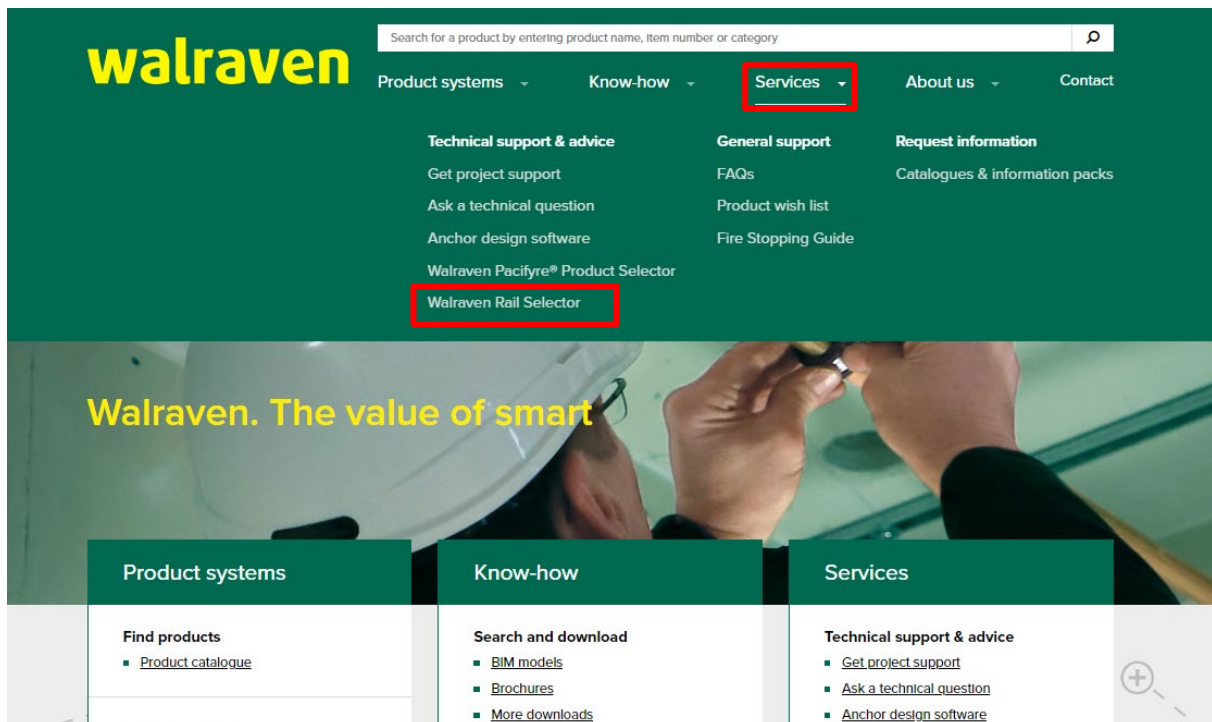
3 User Interface

3.1 General overview

The interface is divided in three main areas: graph; dashboard buttons; dashboard control panel

Legend:

1 – Graph → schematical visualisation of the configured solution showing supports, loads and results.

2 – Dashboard buttons → clickable buttons to navigate from one dashboard to another.

3 – Dashboard control panel → specific region used to interact with the tool; this is the place to provide input and read results. Each different dashboard has a different control panel.

The tool is divided into six dashboards, a more detailed description of which can be found on the following pages.

| Rail | Geometry | Point load | Continuous load | Results | Report |

The enter button to each dashboard can be either highlighted or shaded, as you can see below:

| Geometry | Geometry |

A highlighted button means that the dashboard is accessible, while a greyed-out button means that the dashboard is not accessible.

If the dashboard is not accessible, it may be because some information needs to be added. In this case the tool will warn you with yellow text, see example below:

Please assign a rail family before continuing to the next steps.

Another reason could be that you have entered some of the data incorrectly. In this case, the tool will warn you with red text. see example below:

There cannot be two supports in the same location. Please assign different locations before proceeding to the next steps

System of dashboards:

| ① | ② | ③ | ④ | ⑤ | ⑥ |
| Rail | Geometry | Point load | Continuous load | Results | Report |

Legend:

1 – Rail dashboard → To define Walraven fixing rail to be used.

2 – Geometry dashboard → To define fixing rail length and supports type and location.

3 – Point load dashboard → To define point loads, position and magnitude.

4 – Continuous load dashboard → To define continuous loads, position and magnitude.

5 – Results dashboard → To visualise results.

6 – Report dashboard → To generate and download report.

3.2 Rail dashboard

Rail	Geometry	Point load	Continuous load	Results	Report

Construction type   **i**   [Select ▼]   **①**

Please assign a construction type before continuing to the next steps.

Rail family   [Select ▼]   **②**

Please assign a rail family before continuing to the next steps.

Rail type   [Select ▼]   **③**

Please assign a rail type before continuing to the next steps.

Legend:

1 – Dropdown to choose between construction types (Beam, Simple Cantilever or Fixing rail + baseplate)

2 – Dropdown to choose rail family

3 – Dropdown to choose rail type

On Rail dashboard, you will select the construction type (1), rail family (2) and rail type (3)After properly selecting all three dropdowns, the "Geometry" button will become highlighted, see example below:

Rail	Geometry	Point load	Continuous load	Results	Report

Construction type   **i**   [Beam ▼]

Rail family   [Walraven RapidStr… ▼]

Rail type   [41|H ▼]

3.2.1 Rail Dashboard – Construction type

There are three options to select from: Beam, Simple cantilever, Fixing rail + base plate. Selections made in this field will affect following options when moving forward.

Construction type

There are 3 construction types available in the Walraven Rail Selector (WRS)

Beam

Definition

Fixing rail with custom length that can be fixed to the wall, ceiling or other fixing elements with additional parts.

With this construction type, the Walraven Rail Selector only validates the fixing rail.

Fixing rails available

To be used with RapidRail, RapidStrut and Maxx fixing rails.

Analysis considerations

Used when one or multiple supports are to be considered.

Bending Moment in the rigid supports must be manually checked by the user to ensure that other products (connectors) are suitable for its purpose.

Simple Cantilever

Definition

Fixing rail with specific length that has a steel end plate welded in one of its endings.

Each specific length and rail type is a different article code.

Fixing rails available

To be used with RapidRail and RapidStrut fixing rails.

Analysis considerations

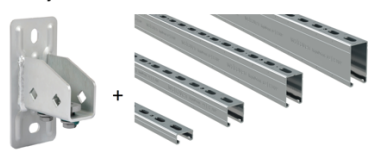Used when a single rigid support is to be considered.

Bending Moment in the end plate is automatically checked by the tool.

Fixing rail + base plate

Definition

Fixing rail with custom length that is fixed to the wall, ceiling or other fixing elements by means of baseplate.

Fixing rail and baseplate considered in the analysis.

Fixing rails available

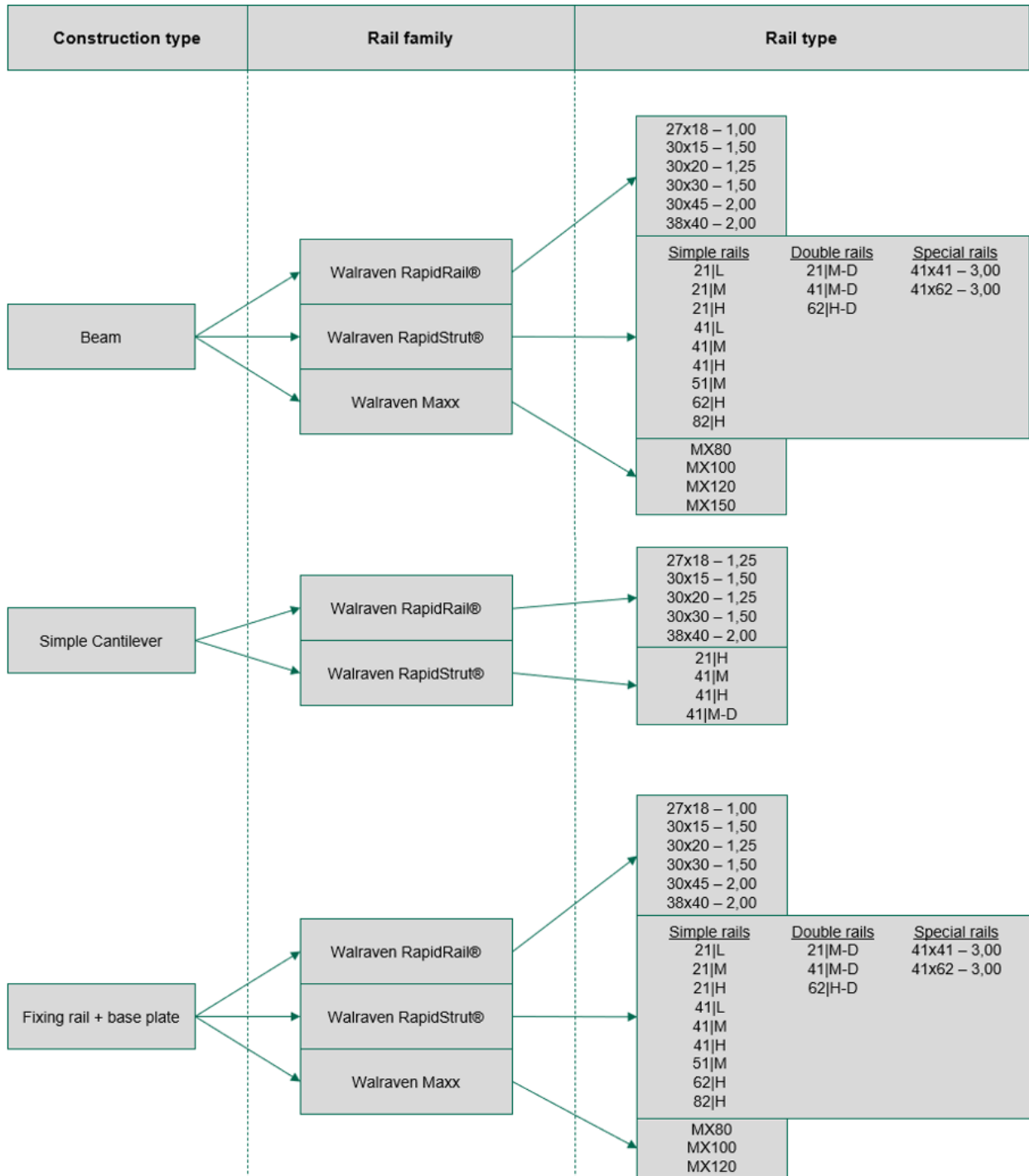To be used with RapidRail, RapidStrut or Maxx fixing rails.

Analysis considerations

Used when a single rigid support is to be considered.

Bending Moment in the base plate is automatically checked by the tool.

3.2.2 Rail dashboard – Selection logic

The following image shows the logic behind the WRS when selecting the different options in Rail Dashboard.

3.3 Geometry dashboard

In this dashboard, you will be able to define the solution geometry; fixing rail length and supports set up.

Legend:

1 – Field to define rail length

2 – Field to define support location

3 – Dropdown to choose between rigid and pinned support

4 – Button to delete existing support

5 – Button to add support

It is important to note that this dashboard is affected by choices made in the previous one – "Rail" dashboard:

Construction type	Rail length	Support
Beam	To be freely defined within the range: $100 < Rail\ length < 20.000$ Length units: mm	Single support → the tool will automatically adjust the support type as "Rigid" Multiple supports → user can decide whether they are "Rigid" or "Pinned"
Simple cantilever	To be selected from the dropdown. Options are related to Walraven product range. The dropdown options depend on previous choices made on "Rail" dashboard – "Rail family" and "Rail type"	Always one support considered at the rail left edge. Not possible to adjust position. Not possible to add or remove supports.
Fixing rail + base plate	To be freely defined within the range: $100 < Rail\ length < 20.000$ Length units: mm	Always one support considered at the rail left edge. Not possible to adjust position. Not possible to add or remove supports.

3.4 Point load dashboard

In this dashboard you will be able to define punctual loads. This dashboard does not depend on previous choices made.

Legend:

1 – Field to define point load position

2 – Field to define point load value

3 – Button to delete point load

4 – Button to add point load

Only vertical loads can be defined with the WRS.

There is no minimal amount of point loads required. A configuration can be analysed without having any point load included.

Point load positioning restrictions:

If a load is placed at a range $\pm 2,5\ mm$ from the support or node location, the tool is not able to evaluate the results. Exact support or node location not included:
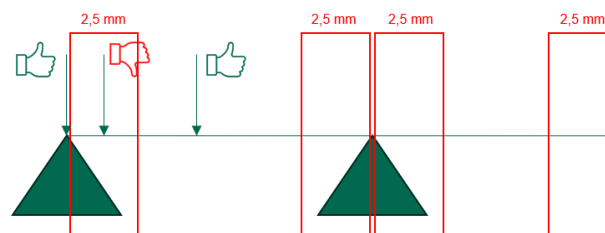
$$-2,5 < x < +2,5$$

If the load is placed just in the support or node, the tool will provide correct results.
If the load is placed between $-2,5 < x < +2,5$, the tool is no table to evaluate the results.

Point load FAQ's

- **Can two point loads be located at the same point?**

  Yes; be aware there is no indication that both loads are at the same location; so it is difficult to visually identify.

3.5 Continuous load dashboard

In this dashboard you will be able to define continuous loads. This dashboard does not depend on previous choices made.

Legend:

1 – Field for continuous load starting position

2 – Field for continuous load value

3 – Field for continuous load length

4 – Button to delete continuous load

5 – Button to add continuous load

Only vertical (gravitational) loads can be defined with the WRS.

There is no minimal amount of continuous loads required. A configuration can be analysed without having any continuous load included.

Continuous load positioning restrictions:

If a continuous load edge is placed at a range $\pm 2,5\ mm$ from the support or node location, the tool is not able to evaluate the results. Exact support or node location not included:
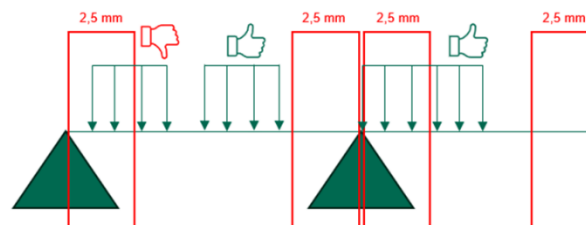
$$-2,5 < x < +2,5$$

If the continuous load edge is placed just in the support or node, the tool will provide correct results. If the continuous load edge is placed between $-2,5 < x < +2,5$, the tool is no table to evaluate the results.

Continuous load FAQ's

- **Can two continuous loads be located at the same point?**
  Yes; be aware there is no indication that both loads are at the same location; so it is difficult to visually identify.

3.6 Results dashboard

In this dashboard, the structural calculations result will be displayed. You will be able to adjust deflection limits for beams and cantilevers. Only more restrictive deflection limits can be applied.


Legend:

1 – Rail type → Type of fixing rail that has been selected on "Rail" dashboard, and which properties have been used to perform the structural calculations.

2 – Deflection limit beam → Maximum beam deflection that will be considered valid for the calculation.

3 – Deflection limit cantilever → Maximum cantilever deflection that will be considered valid for the calculation.

4 – Run analysis → Although the structural analysis is performed automatically when entering to this dashboard, you can run the analysis manually. This is mandatory when adjusting deflection limits.

5 – Reactions information → Information about reaction forces and reaction moments in the supports.

6 – Deflection information → Information about span deflection. Calculated deflection / maximum allowable deflection

7 – Stress information → information about fixing rail stress. Calculated stress / maximum allowable stress

8 – Moment in the End Plate information → Information about resultant moment in the End Plate. This section will only appear if "Simple cantilever" or "Fixing rail + base plate" have been selected in the "Construction type" filed from the "Rail" dashboard.

"Report" dashboard button will only be available (green highlighted) if the structural results are showing a valid configuration. That means, no report can be generated if the structural results are showing a failing configuration.

3.7 Report dashboard

In this dashboard you will be able to obtain a structural report. The structural report will show all inputs used for the configuration, fixing rail properties and results; reactions, stress and deflections. The structural report can be downloaded only if the results from the analysis show a valid configuration.

Rail	Geometry	Point load	Continuous load	Results	Report
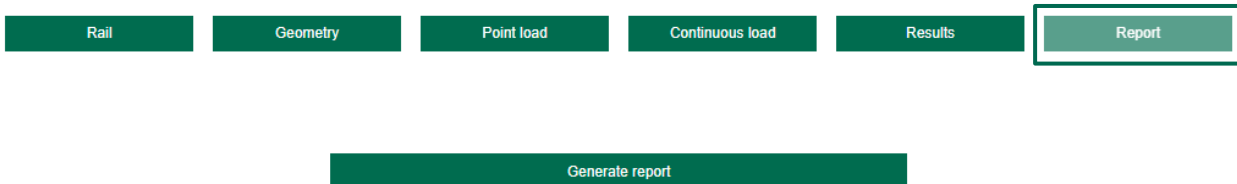
Generate report

When pressing the button "Generate report", a pop up will appear. To download the report, please fill in all the details. Fields marked in red are mandatory:

Project information

Project name	Please fill in a value
Solution name	Please fill in a value
Notes	Please fill in a value

User information

Name	Please fill in a value
E-mail	Please fill in a value
Phone number	0
Job title	Please fill in a value
Company	Please fill in a value
City	Please fill in a value
Country	Select

Your privacy matters to us

☐ I agree to receive information regarding my configuration

By filling out this form, you agree with Walraven to process your personal data to follow up on your request. You can withdraw your consent anytime by clicking 'Unsubscribe' in our emails or contacting us directly. We will treat your personal data with the utmost care. For more information, please consult our privacy policy.

Privacy policy
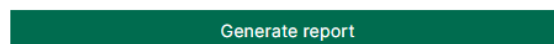
Generate report

After filling in all the required fields, please tick the box to agree to agree to data processing and confirm generating the report by clicking on "Generate report" again.

To download the report, press the "Download report" button:

Download report
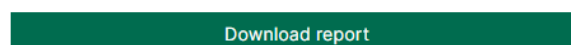
3.8 Symbols, Icons and Abbreviations

Lowercase

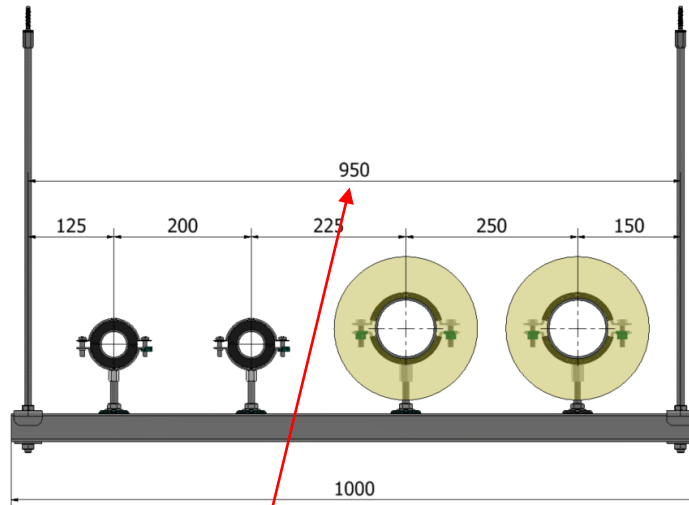|	
a (mm)	Continuous load starting position (left edge); expressed in millimetres
b (mm)	Continuous load length; expressed in millimetres
c (mm)	Point load position; expressed in millimetres
mm	Length unit; millimetres
q (N)	Continuous load; expressed in Newtons

Capital letters

F (N)	Point load; expressed in Newtons
L	Fixing rail length; expressed in millimetres
MPa	Stress unit; Megapascal
N	Force unit; Newtons
Nm	Moment unit; Newtons meter
W (mm)	Support position; expressed in millimetres

Symbols

	Globe icon, to select language
	Reaction force
	Reaction moment
	Point load
	Continuous load
	Pinned support – locked displacements; free rotations
	Rigid support – locked displacements; lock rotations
	Add (support, point load or continuous load)
	Remove (support, point load or continuous load)

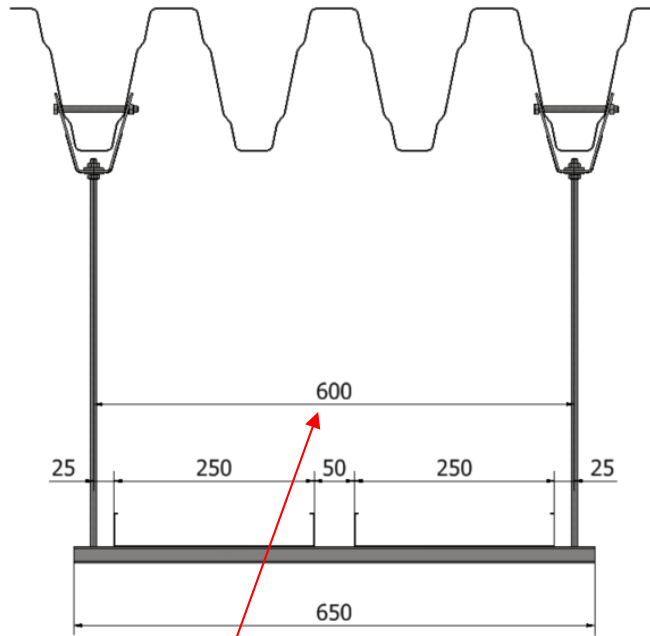# 4 Examples

4.1 Simple hanger for pipes

Geometry:

Loads:

4.2 Simple hanger for cable trays

Geometry:

Rail length [600] mm

Supports

W (mm)		Type	
0	mm	Pinned ⇕	−
600	mm	Pinned ⇕	−
+			

Loads:

Continuous load

a (mm)		q (N)		b (mm)		
25	mm	500	N	250	mm	−
325	mm	500	N	250	mm	−
+						

4.3 Simple cantilever for pipes

Geometry:

Rail length [750mm ⬍]

Supports

W (mm)	Type
0 mm	Rigid ⬍

Loads:

Point load

c (mm)	F (N)	
450 mm	250 N	−
650 mm	250 N	−
+		

4.4 Fixing rail + base plate for the unit

Geometry:

Rail length   800   mm

Supports

W (mm)		Type
0	mm	Rigid

Loads:

Point load

c (mm)		F (N)		
375	mm	400	N	—
775	mm	400	N	—
		+		

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5 Troubleshooting and Support

In case of doubts or support required, please get in contact with your local Walraven contact.