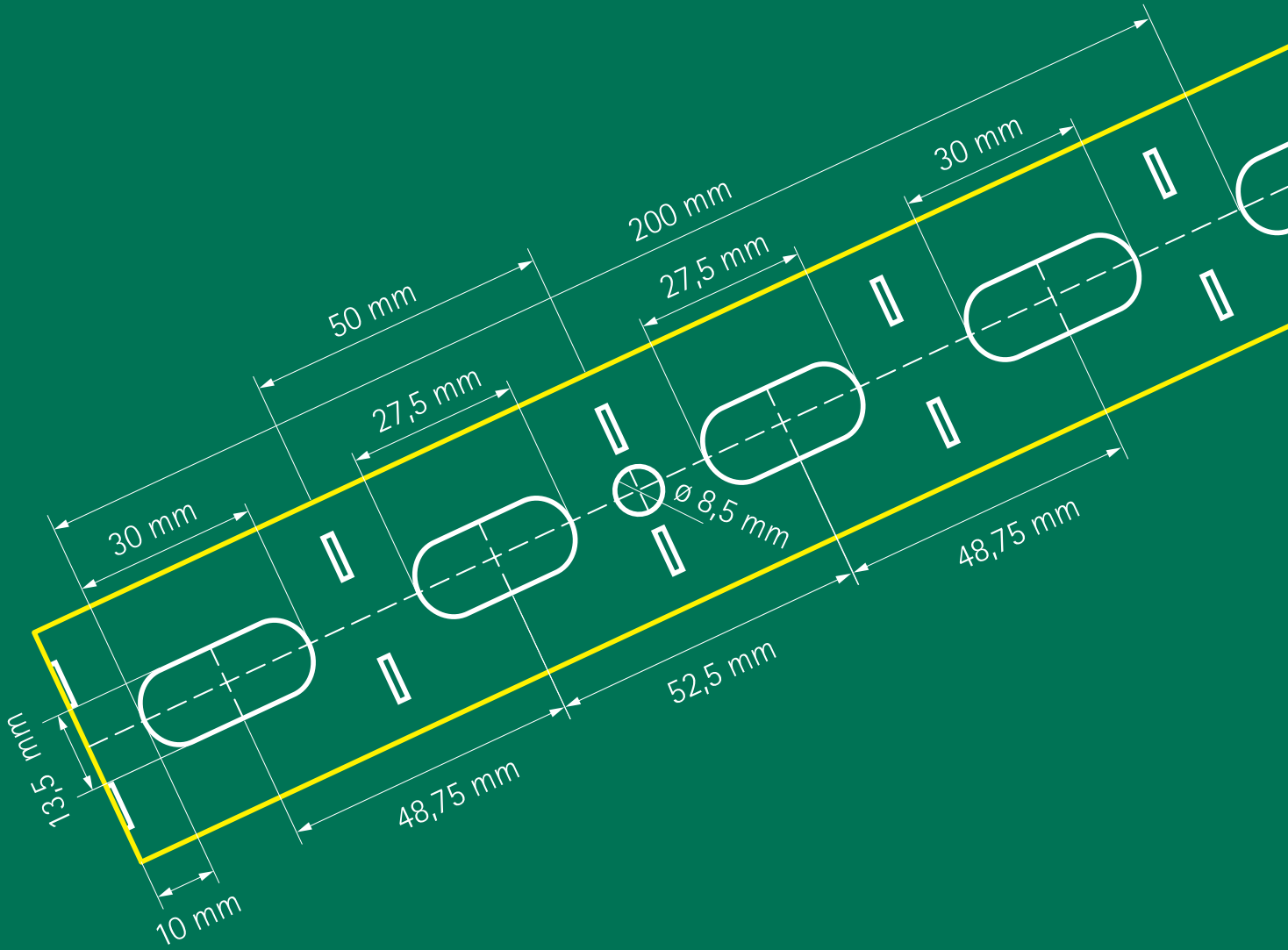
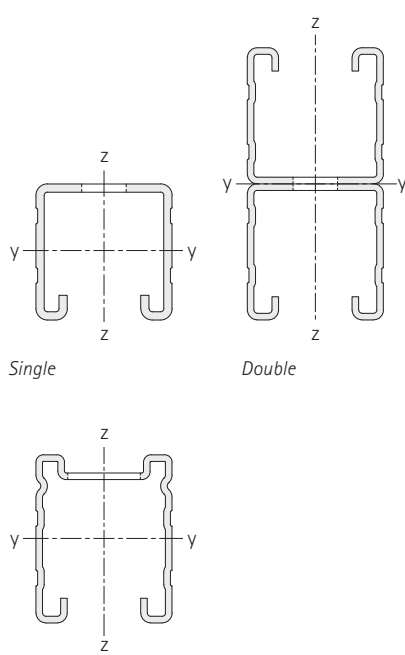




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System Walraven RapidStrut®

Table of channel section properties



51 | M - Walraven RapidStrut® DS 5

Type	Weight (kg/m)	Yield strength f_{max} (N/mm ²)	Moment of inertia (cm ⁴)		Section modulus (cm ³)	
			I_y	I_z	W_y	W_z
21 L	1.127	188.3 *	0.924	3.849	0.792	1.864
21 M	1.448	188.3 *	1.116	4.801	0.950	2.325
21 H	1.741	188.3 *	1.261	5.587	1.065	2.706
41 L	1.604	183.8 *	4.756	6.275	2.186	3.038
41 M	2.076	188.3 *	5.920	7.906	2.701	3.829
41 H	2.526	188.3 *	6.893	9.299	3.120	4.503
51 M	2.380	188.3 *	9.873	9.719	3.640	4.706
62 H	3.341	188.3 *	19.494	13.199	5.984	6.392
82 H	4.123	187.0 *	40.247	16.968	9.437	8.217
21 M-D	2.896	188.3 *	5.636	9.603	2.646	4.650
41 M-D	4.152	188.3 *	31.979	15.812	7.743	7.657
62 H-D	6.682	188.3 *	112.252	26.399	18.105	12.784

See channel load tables with calculated load values.

At the specified load values, the permissible steel stress f_{max} and a maximum deformation ratio of $L/200$ are not exceeded. Moment of inertia and moment of resistance were calculated with averaged hole pattern and tooththing.

* The maximum permissible steel stress f_{max} was determined due to the increased yield point as a result of cold Forming according to DIN EN 1993-1-3:2010-12, Section 3.2.2.

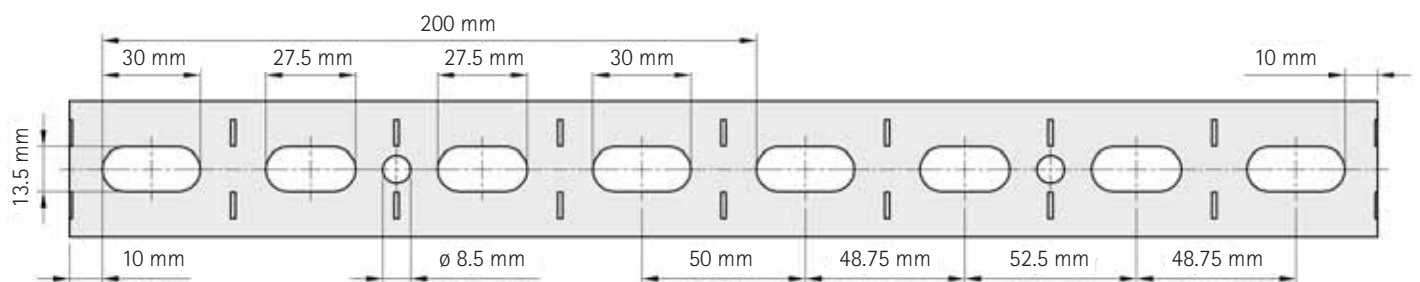
On the impact side a safety factor γ_{d10} of 1.4 was taken and on the material side a safety factor γ_M of 1.1.

The overall safety factor γ_{ges} is therefore 1.54.

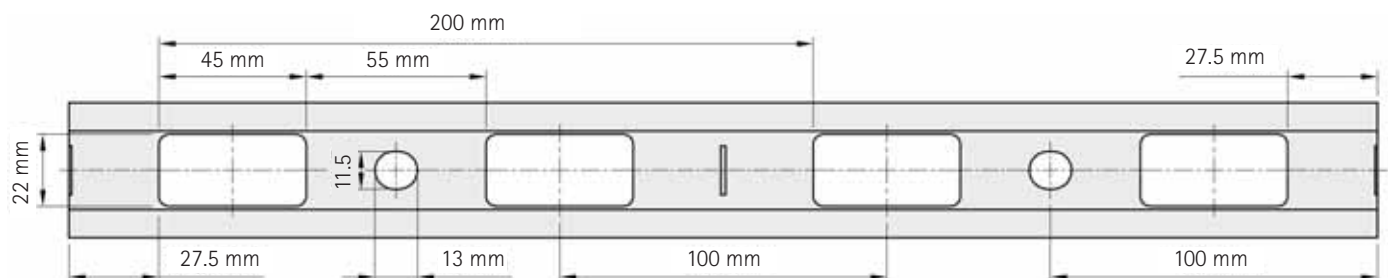
Perforation pattern of channels

Distance between channel end and first hole is always equal.

Walraven RapidStrut® – L (1.5 mm) / M (2.0 mm) / H (2.5 mm)



Walraven RapidStrut® DS 5 – M (2.0 mm)



Calculation method

The published safe working loads are calculated with perforated (slotted) channel.

Loads are calculated taking into consideration a maximum deflection (f) of L/200 (according to RAL-GZ 655/B) (see picture 1).

1 N (Newton) = 0.102 kg

1 kg = 9.8 N (Newton)

Fixing of channel to walls or ceilings

The strength of the anchoring of the channel has not been taken into consideration. The installer must verify that the bolts and wall plugs used are suitable for the maximum permitted loading of the channel.

Reading the channel loading tables

The stated values are only valid for the fixing channel. The maximum safe load of all other construction parts have to be verified. The stated maximum safe load is calculated for a static load at free bending support (see picture 2).

Where the segment is marked with a hyphen, the stated length cannot be safely loaded.

Special conditions

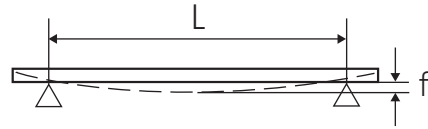
In case of doubt or for special conditions not stated in the loading tables, please do not hesitate to contact our technical department for their advice.

Hanging of channels from the ceiling

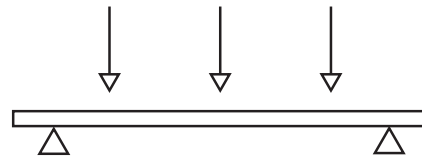
When hanging channels from the ceiling we recommend the use of U-formed washers on the open side of the channel (see picture 3).

Methods of loading

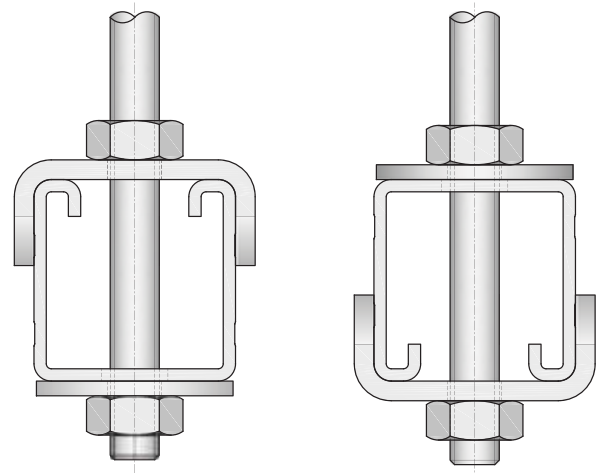
Where loads are suspended beneath channels (e.g. hanging pipes), the load must not exceed the relevant safe load of the Walraven Slide Nut. To increase rigidity of the installation we recommend the use of a U-formed washer (see picture 4).



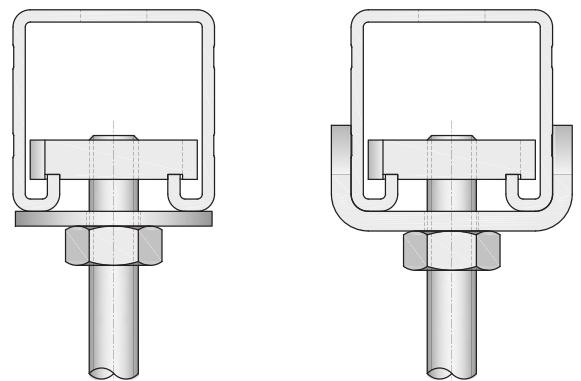
Picture 1: Calculation of loads, f = maximal deflection, L = length



Picture 2: Static load at free bending support

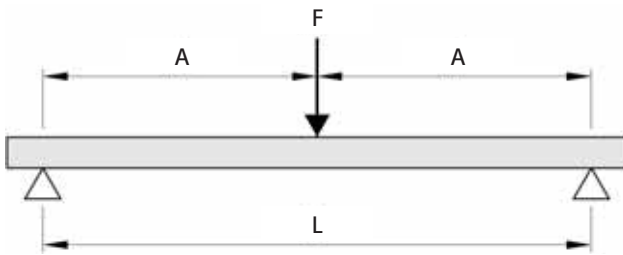


Picture 3: Use of Walraven Strut Washer – U-shaped on the open side of the channel



Picture 4: Increase rigidity for loads beneath the channel by using U-shaped washers (right picture) instead of standard flat washers (left picture)

Walraven RapidStrut® Fixing channel: suspension on 1 point



L = length, A = equal distances, F = load point

L (mm)	Single									Double		
	21 L	21 M	21 H	41 L	41 M	41 H	51 M	62 H	82 H	21 M-D	41 M-D	62 H-D
200	2,981	3,576	4,009	8,032	10,170	11,748	13,706	22,533	35,292	3,820	7,000	11,515
400	1,489	1,786	2,002	4,013	5,082	5,870	6,849	11,262	17,640	3,815	6,992	11,502
600	990	1,188	1,331	2,673	3,384	3,909	4,562	7,502	11,753	3,313	6,983	11,489
800	721	871	984	2,002	2,535	2,927	3,417	5,621	8,808	2,479	6,975	11,476
1,000	458	553	624	1,598	2,024	2,337	2,730	4,491	7,039	1,978	5,811	11,462
1,200	315	379	428	1,329	1,683	1,943	2,270	3,736	5,858	1,643	4,835	11,325
1,400	227	274	309	1,136	1,438	1,661	1,942	3,196	5,014	1,403	4,137	9,695
1,600	170	205	231	920	1,145	1,332	1,694	2,790	4,379	1,081	3,612	8,471
1,800	131	157	176	722	898	1,044	1,502	2,474	3,885	844	3,203	7,517
2,000	102	122	137	579	720	837	1,214	2,220	3,489	674	2,875	6,753
2,200	80	96	107	473	588	683	995	1,984	3,164	547	2,605	6,126
2,400	64	76	84	392	487	565	828	1,656	2,892	450	2,380	5,603
2,600	50	60	66	329	408	473	698	1,400	2,662	374	2,189	5,159
2,800	40	46	51	278	344	399	593	1,195	2,464	312	1,983	4,778
3,000	30	35	38	236	293	339	509	1,030	2,178	262	1,713	4,447
3,200	23	26	27	202	250	289	439	893	1,900	220	1,491	4,156
3,400	16	18	18	173	214	247	380	780	1,668	185	1,306	3,899
3,600	11	11	10	149	184	212	331	684	1,474	155	1,150	3,670
3,800	-	-	-	128	158	181	289	602	1,308	129	1,018	3,464
4,000	-	-	-	110	135	155	252	532	1,166	106	904	3,278
4,200	-	-	-	94	115	131	220	470	1,043	86	805	3,035
4,400	-	-	-	80	98	111	192	417	936	68	719	2,741
4,600	-	-	-	68	82	92	168	370	842	52	643	2,485
4,800	-	-	-	56	68	76	145	328	759	38	576	2,258
5,000	-	-	-	46	55	61	126	290	684	24	516	2,058
5,200	-	-	-	37	44	47	108	256	618	12	462	1,879
5,400	-	-	-	29	33	35	91	226	559	-	413	1,718
5,600	-	-	-	21	23	24	76	198	505	-	369	1,574
5,800	-	-	-	14	14	13	63	173	456	-	329	1,444
6,000	-	-	-	-	-	-	50	150	411	-	293	1,325

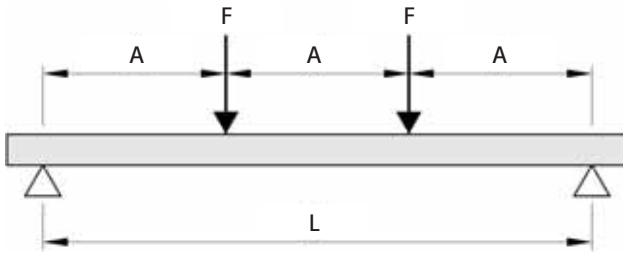
Max. allowed load in N.

The stated values are only valid for the fixing channel.

The maximum safe load of all other construction parts have to be verified.

For large spans and high channel flanks (≥ 62 mm), depending on the load, appropriate measures against occurring torsional forces may have to be taken.

Walraven RapidStrut® Fixing channel: 2 equal loads



L = length, A = equal distances, F = load point

L (mm)	Single									Double		
	21 L	21 M	21 H	41 L	41 M	41 H	51 M	62 H	82 H	21 M-D	41 M-D	62 H-D
200	2,236	2,682	3,007	6,024	7,628	8,811	10,280	16,900	26,469	1,907	3,496	5,751
400	1,117	1,339	1,501	3,010	3,812	4,403	5,137	8,447	13,230	1,902	3,488	5,738
600	743	891	999	2,005	2,539	2,932	3,422	5,627	8,816	1,896	3,479	5,725
800	423	511	577	1,502	1,901	2,196	2,564	4,216	6,607	1,860	3,471	5,712
1,000	269	324	366	1,199	1,519	1,754	2,048	3,369	5,281	1,485	3,463	5,698
1,200	184	223	251	970	1,207	1,405	1,704	2,804	4,395	1,145	3,455	5,685
1,400	133	161	181	709	883	1,027	1,457	2,399	3,762	836	3,105	5,672
1,600	100	120	135	540	672	781	1,127	2,095	3,287	634	2,711	5,659
1,800	77	92	103	423	527	612	886	1,758	2,917	495	2,405	5,642
2,000	60	72	80	340	422	491	713	1,417	2,620	395	2,159	5,070
2,200	47	56	63	277	345	401	584	1,165	2,376	321	1,921	4,601
2,400	37	44	49	230	286	332	486	972	2,031	264	1,606	4,209
2,600	29	35	38	193	239	278	409	821	1,722	219	1,360	3,877
2,800	23	27	30	163	202	234	348	701	1,477	183	1,164	3,591
3,000	18	21	22	139	172	199	298	604	1,278	153	1,005	3,343
3,200	13	15	16	118	147	170	257	524	1,115	129	875	3,126
3,400	-	10	10	102	126	145	223	457	979	108	767	2,790
3,600	-	-	-	87	108	124	194	401	865	91	675	2,475
3,800	-	-	-	75	92	106	169	353	768	75	597	2,208
4,000	-	-	-	64	79	91	148	312	684	62	530	1,979
4,200	-	-	-	55	67	77	129	276	612	50	472	1,781
4,400	-	-	-	47	57	65	113	244	549	40	422	1,609
4,600	-	-	-	39	48	54	98	217	494	30	377	1,458
4,800	-	-	-	33	40	44	85	192	445	22	338	1,325
5,000	-	-	-	27	32	36	73	170	402	14	302	1,208
5,200	-	-	-	22	25	28	63	150	363	-	271	1,103
5,400	-	-	-	17	19	20	53	132	328	-	242	1,008
5,600	-	-	-	12	14	14	45	116	296	-	217	924
5,800	-	-	-	-	-	-	37	101	267	-	193	847
6,000	-	-	-	-	-	-	29	88	241	-	172	778

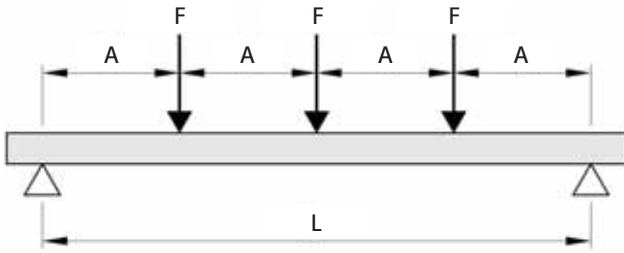
Max. allowed load in N. per suspension point (F).

The stated values are only valid for the fixing channel.

The maximum safe load of all other construction parts have to be verified.

For large spans and high channel flanks (> 62 mm), depending on the load, appropriate measures against occurring torsional forces may have to be taken.

Walraven RapidStrut® Fixing channel: 3 equal loads



L = length, A = equal distances, F = load point

L (mm)	Single									Double		
	21 L	21 M	21 H	41 L	41 M	41 H	51 M	62 H	82 H	21 M-D	41 M-D	62 H-D
200	1,490	1,788	2,004	4,016	5,085	5,874	6,853	11,266	17,646	1,270	2,328	3,830
400	744	893	1,001	2,006	2,541	2,935	3,424	5,631	8,820	1,264	2,320	3,816
600	495	594	665	1,336	1,692	1,954	2,281	3,751	5,876	1,258	2,311	3,803
800	303	367	414	1,001	1,267	1,463	1,708	2,810	4,404	1,239	2,303	3,790
1,000	193	233	263	799	1,012	1,168	1,365	2,245	3,519	989	2,295	3,777
1,200	132	159	180	664	841	971	1,135	1,868	2,929	821	2,287	3,764
1,400	95	115	130	509	633	737	971	1,598	2,507	599	2,068	3,751
1,600	71	86	97	387	482	560	808	1,395	2,189	455	1,806	3,738
1,800	55	66	74	304	378	439	635	1,237	1,942	355	1,601	3,725
2,000	43	51	57	244	303	352	511	1,016	1,744	284	1,437	3,376
2,200	34	40	45	199	247	287	419	835	1,582	230	1,302	3,063
2,400	27	32	35	165	205	238	348	697	1,446	189	1,152	2,801
2,600	21	25	27	138	171	199	293	589	1,235	157	975	2,579
2,800	16	19	21	117	145	168	250	503	1,059	131	835	2,389
3,000	13	15	16	99	123	142	214	433	917	110	721	2,223
3,200	-	11	11	85	105	121	184	376	800	92	628	2,078
3,400	-	-	-	73	90	104	160	328	702	78	550	1,949
3,600	-	-	-	62	77	89	139	288	620	65	484	1,775
3,800	-	-	-	54	66	76	121	253	551	54	428	1,584
4,000	-	-	-	46	57	65	106	224	491	44	380	1,419
4,200	-	-	-	39	48	55	92	198	439	36	339	1,277
4,400	-	-	-	33	41	46	81	175	394	28	302	1,154
4,600	-	-	-	28	34	39	70	155	354	22	270	1,046
4,800	-	-	-	23	28	32	61	138	319	16	242	951
5,000	-	-	-	19	23	25	53	122	288	10	217	866
5,200	-	-	-	15	18	20	45	108	260	-	194	791
5,400	-	-	-	12	14	14	38	95	235	-	174	723
5,600	-	-	-	-	10	10	32	83	212	-	155	662
5,800	-	-	-	-	-	-	26	72	192	-	138	608
6,000	-	-	-	-	-	-	21	63	173	-	123	558

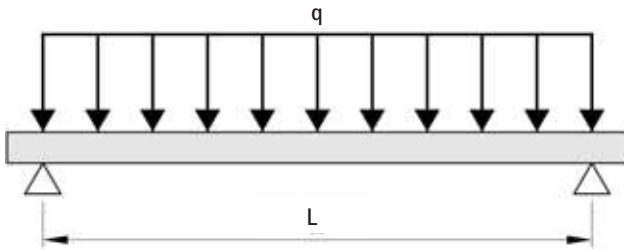
Max. allowed load in N. per suspension point (F).

The stated values are only valid for the fixing channel.

The maximum safe load of all other construction parts have to be verified.

For large spans and high channel flanks (> 62 mm), depending on the load, appropriate measures against occurring torsional forces may have to be taken.

Walraven RapidStrut® Fixing channel: uniformly distributed load



L (mm)	Single									Double		
	21 L	21 M	21 H	41 L	41 M	41 H	51 M	62 H	82 H	21 M-D	41 M-D	62 H-D
200	5,963	7,153	8,018	16,065	20,341	23,496	27,413	45,067	70,585	3,820	7,000	11,515
400	2,978	3,572	4,004	8,027	10,164	11,740	13,699	22,524	35,280	3,815	6,992	11,502
600	1,981	2,376	2,663	5,346	6,769	7,818	9,125	15,005	23,506	3,809	6,983	11,489
800	1,155	1,394	1,575	4,004	5,070	5,855	6,835	11,242	17,616	3,803	6,975	11,476
1,000	733	885	999	3,197	4,048	4,675	5,460	8,982	14,078	3,798	6,967	11,462
1,200	504	607	685	2,644	3,290	3,830	4,541	7,473	11,717	3,121	6,959	11,449
1,400	364	439	494	1,934	2,407	2,801	3,884	6,393	10,028	2,278	6,950	11,436
1,600	273	328	369	1,472	1,832	2,131	3,072	5,581	8,759	1,729	6,942	11,423
1,800	209	252	283	1,155	1,436	1,670	2,415	4,792	7,770	1,351	6,406	11,410
2,000	164	196	220	927	1,152	1,340	1,943	3,864	6,978	1,079	5,750	11,397
2,200	129	154	172	757	941	1,093	1,593	3,175	6,328	876	5,211	11,384
2,400	102	122	135	628	779	905	1,326	2,650	5,537	720	4,378	11,207
2,600	81	96	106	526	653	757	1,117	2,240	4,695	598	3,707	10,319
2,800	64	75	81	445	551	639	950	1,913	4,026	500	3,173	9,557
3,000	49	57	61	378	469	543	814	1,648	3,484	419	2,741	8,895
3,200	37	42	44	324	401	463	702	1,430	3,040	352	2,386	8,313
3,400	26	29	29	278	343	396	609	1,248	2,670	296	2,090	7,607
3,600	17	18	16	239	295	339	530	1,094	2,358	248	1,841	6,748
3,800	-	-	-	205	253	290	462	964	2,093	206	1,629	6,019
4,000	-	-	-	176	216	248	404	851	1,866	170	1,447	5,395
4,200	-	-	-	151	185	211	353	753	1,670	138	1,288	4,856
4,400	-	-	-	128	156	178	308	667	1,498	109	1,150	4,387
4,600	-	-	-	108	131	148	268	592	1,347	84	1,029	3,976
4,800	-	-	-	90	109	122	233	524	1,214	60	921	3,614
5,000	-	-	-	74	89	98	201	464	1,095	39	825	3,293
5,200	-	-	-	60	70	76	173	410	989	20	739	3,006
5,400	-	-	-	46	53	56	146	362	894	-	662	2,750
5,600	-	-	-	34	38	38	123	317	808	-	591	2,519
5,800	-	-	-	22	23	21	101	277	730	-	527	2,310
6,000	-	-	-	12	10	-	81	240	658	-	469	2,121

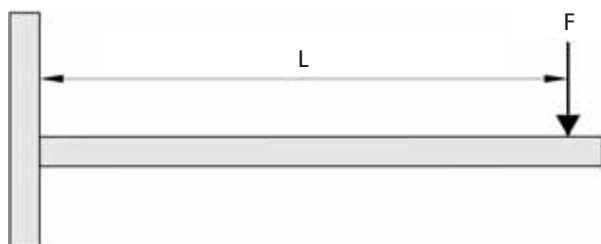
Max. allowed load in N.

The stated values are only valid for the fixing channel.

The maximum safe load of all other construction parts have to be verified.

For large spans and high channel flanks (> = 62 mm), depending on the load, appropriate measures against occurring torsional forces may have to be taken.

Walraven RapidStrut® Cantilever arms: suspension on 1 point



L = length, F = load point

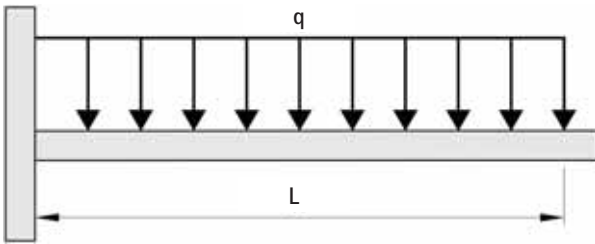
L (mm)	Single				Double
	21 M vertical	21 H	41 M	41 H	41 M-D
100	815	1,068	3,329	3,329	7,665
150	542	711	2,218	2,218	5,108
200	406	532	1,663	1,662	3,829
250	324	425	1,329	1,329	3,061
300	269	353	1,107	1,106	2,549
350	230	302	947	947	2,183
400	201	263	828	827	1,908
450	178	233	735	734	1,694
500	159	208	660	659	1,523
550	144	171	599	598	1,382
600	131	143	548	547	1,265
650			505	504	1,166
700			468	467	1,080
750			436	434	1,006
800				406	941
850				381	884
900				349	833
950				311	787
1,000				280	746
1,050				252	
1,100				229	
1,150				208	
1,200				189	

Max. allowed load in N.

The maximum safe load of all other construction parts have to be verified.

The specified overview of the maximum permissible loads reflects the available standard product range.

Walraven RapidStrut® Cantilever arms: uniformly distributed load



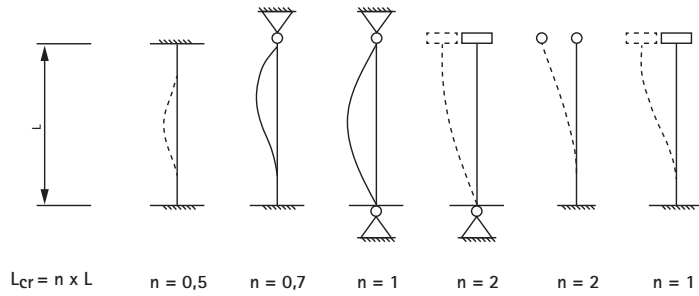
L (mm)	Single				Double
	21 M vertical	21 H	41 M	41 H	41 M-D
100	1,630	2,137	6,658	6,658	15,331
150	1,085	1,423	4,437	4,436	10,217
200	813	1,065	3,326	3,325	7,659
250	649	851	2,659	2,658	6,123
300	539	707	2,214	2,212	5,099
350	461	605	1,895	1,894	4,367
400	402	527	1,657	1,655	3,817
450	356	467	1,471	1,469	3,389
500	319	419	1,321	1,319	3,046
550	288	379	1,199	1,197	2,765
600	263	346	1,097	1,095	2,531
650			1,011	1,008	2,332
700			937	934	2,161
750			872	869	2,013
800				812	1,883
850				762	1,769
900				717	1,666
950				677	1,575
1,000				641	1,492
1,050				608	
1,100				578	
1,150				550	
1,200				506	

Max. allowed load in N.

The maximum safe load of all other construction parts have to be verified.

The specified overview of the maximum permissible loads reflects the available standard product range.

Walraven RapidStrut® Fixing channel: buckling load



	Translation Free	Translation Fixed
Rotation Free		
Rotation Fixed		

L _{cr} (mm)	Single									Double		
	21 L (kN)	21 M (kN)	21 H (kN)	41 L (kN)	41 M (kN)	41 H (kN)	51 M (kN)	62 H (kN)	82 H (kN)	21 M-D (kN)	41 M-D (kN)	62 H-D (kN)
200	26.23	33.13	39.14	38.43	50.27	60.12	60.60	79.61	97.76	70.07	100.54	159.22
400	21.73	27.23	31.90	36.27	47.24	56.36	58.36	76.86	94.69	60.37	94.73	150.88
600	16.62	20.58	23.79	33.12	43.00	51.20	54.08	71.35	88.09	50.87	84.60	135.20
800	12.03	14.75	16.87	29.70	38.37	45.56	49.52	65.49	81.10	41.97	74.85	120.12
1,000	8.73	10.64	12.11	26.01	33.40	39.53	44.59	59.17	73.57	34.14	65.49	105.60
1,200	6.51	7.91	8.98	22.30	28.46	33.56	39.43	52.52	65.61	27.70	56.76	91.97
1,400	5.01	6.08	6.88	18.87	23.95	28.15	34.34	45.91	57.65	22.62	48.93	79.63
1,600	3.96	4.80	5.42	15.91	20.10	23.58	29.63	39.76	50.14	18.68	42.12	68.82
1,800	3.20	3.88	4.38	13.45	16.94	19.85	25.50	34.31	43.42	15.61	36.35	59.57
2,000	2.64	3.20	3.61	11.45	14.39	16.84	21.99	29.65	37.63	13.20	31.51	51.77
2,200	2.22	2.68	3.02	9.82	12.33	14.41	19.05	25.73	32.72	11.29	27.47	45.22
2,400	1.88	2.28	2.57	8.50	10.66	12.45	16.61	22.45	28.60	9.76	24.10	39.74
2,600	1.62	1.96	2.21	7.42	9.29	10.85	14.57	19.71	25.14	8.51	21.28	35.13
2,800	1.41	1.70	1.92	6.52	8.16	9.52	12.87	17.42	22.24	7.48	18.90	31.23
3,000	1.24	1.50	1.69	5.77	7.22	8.43	11.43	15.49	19.78	6.63	16.89	27.93
3,500	0.92	1.11	1.26	4.38	5.47	6.38	8.72	11.82	15.13	5.04	13.03	21.59
4,000	0.71	0.86	0.97	3.43	4.28	4.99	6.86	9.30	11.91	3.95	10.34	17.15
4,500	0.57	0.69	0.77	2.75	3.44	4.01	5.53	7.50	9.61	3.19	8.40	13.94
5,000	0.46	0.56	0.63	2.26	2.82	3.29	4.55	6.17	7.91	2.62	6.95	11.55
5,500	0.39	0.47	0.52	1.89	2.36	2.75	3.81	5.17	6.63	2.19	5.85	9.72
6,000	0.33	0.39	0.44	1.60	2.00	2.33	3.23	4.39	5.63	1.86	4.99	8.29
6,500	0.28	0.34	0.38	1.38	1.71	2.00	2.78	3.77	4.84	1.60	4.30	7.16
7,000	0.24	0.29	0.33	1.19	1.49	1.73	2.41	3.28	4.21	1.39	3.75	6.24
7,500	0.21	0.25	0.29	1.05	1.30	1.52	2.11	2.87	3.69	1.22	3.30	5.49
8,000	0.19	0.22	0.25	0.92	1.15	1.34	1.87	2.54	3.26	1.08	2.92	4.86
Recommended buckling length [mm]	1,250	1,250	1,250	2,500	2,500	2,500	3,000	3,000	3,000	2,000	3,000	3,000

L_{cr} = Buckling Length

Buckling force calculation according to EC3.

Buckling safe loads valid only for pure compression load.

Safety factor considered 1,54 according to RAL (represents 1,1 from material and 1,4 for combination of actions).

Buckling safe loads have been calculated according the minimum inertia direction (worse case scenario).

Load values for "L_{cr}" above recommended; not recommended without previous consultation.

Example

- Profile type: 41|H
- Profile length: 1,4 m
- Both end supports with rotation free and translation fixed

- n = 1
- L_{cr} = 1400 x 1 = 1400 mm
- Buckling load = 28,15 kN

Find out how we can support you

Would you like to find out more about any of the solutions described in this Technical Data Sheet?
Or would you like to discuss how we could help you find the best possible solution for your project?
Get in touch today!

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