

LOADING CAPACITY - CLASS 1



DENSE CROWD (PEDESTRIAN FLOW) - UNI 11002-1

Italian Ministerial Decree dated 14 January 2008 - 3.1.4 Category E

Dynamic load 600 daN/m²

Made of S235JR steel - Sigma yield = 23.5 daN/mm² / 1,05 = Comparison sigma = 22.38 daN/mm²

Max. deflection 5 mm

Max. deflection 1/200 of clear opening

BEARING BAR		BEARING BAR CENTRES DISTANCE mm							
		11	15	22	25	30	34	44	66
		mm	mm	mm	mm	mm	mm	mm	mm
20 x 2	clear opening	1129	1045	933	894	842	807	741	633
	rise	5.00	5.00	4.65	4.46	4.21	4.02	3.70	2.96
25 x 2	clear opening	1335	1235	1123	1087	1039	1007	926	792
	rise	5.00	5.00	5.00	5.00	5.00	5.00	4.62	3.71
30 x 2	clear opening	1531	1417	1287	1247	1191	1154	1082	950
	rise	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.44
40 x 2	clear opening	1900	1758	1597	1547	1478	1432	1343	1214
	rise	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
25 x 3	clear opening	1478	1367	1242	1203	1150	1114	1045	926
	rise	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.62
30 x 3	clear opening	1694	1568	1425	1380	1318	1278	1198	1082
	rise	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
40 x 3	clear opening	2102	1945	1768	1712	1636	1585	1486	1343
	rise	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
50 x 3	clear opening	2485	2300	2090	2024	1934	1874	1757	1588
	rise	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
60 x 3	clear opening	2850	2637	2396	2321	2217	2149	2015	1821
	rise	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
70 x 3	clear opening	3199	2960	2690	2605	2489	2412	2262	2044
	rise	5.00	5.00	5.00	4.99	5.00	5.00	5.00	5.00
80 x 3	clear opening	3536	3272	2973	2880	2751	2667	2500	2259
	rise	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
30 x 4	clear opening	1821	1685	1531	1483	1417	1373	1287	1163
	rise	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
40 x 4	clear opening	2259	2090	1900	1840	1758	1704	1597	1443
	rise	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
50 x 4	clear opening	2671	2471	2246	2175	2078	2014	1888	1706
	rise	5.00	4.99	5.00	5.00	5.00	5.00	5.00	5.00
60 x 4	clear opening	3062	2834	2575	2494	2383	2309	2165	1956
	rise	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
70 x 4	clear opening	3437	3181	2890	2800	2675	2592	2430	2196
	rise	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

The table shows the maximum clear opening for which the LOAD CLASS is guaranteed.

LOADING CAPACITY - CLASS 2



CARS - UNI 11002-1

Italian Ministerial Decree dated 14 January 2008 - 3.1.4 Category F

Dynamic load 1000 daN on 200x200 mm imprint, total floor mass up to 3000 kg

Made of S235JR steel - Sigma yield = 23.5 daN/mm² / 1,05 = Comparison sigma = 22.38 daN/mm²

Max. deflection 5 mm

Max. deflection 1/200 of clear opening

BEARING BAR		BEARING BAR CENTRES DISTANCE mm							
		11	15	22	25	30	34	44	66
mm		mm	mm	mm	mm	mm	mm	mm	mm
20 x 2	clear opening	272	231	197	187	168	156	143	129
	rise	0.54	0.39	0.28	0.26	0.21	0.18	0.15	0.12
25 x 2	clear opening	369	305	252	238	210	195	179	162
	rise	0.77	0.54	0.37	0.33	0.26	0.22	0.19	0.15
30 x 2	clear opening	488	395	320	298	259	237	216	194
	rise	1.09	0.73	0.49	0.43	0.33	0.27	0.23	0.18
40 x 2	clear opening	790	625	491	453	383	345	306	268
	rise	2.05	1.31	0.83	0.71	0.52	0.42	0.34	0.26
25 x 3	clear opening	504	407	329	307	265	243	221	198
	rise	1.39	0.93	0.62	0.54	0.41	0.35	0.29	0.23
30 x 3	clear opening	682	543	430	398	339	306	274	242
	rise	2.06	1.34	0.86	0.74	0.55	0.45	0.36	0.29
40 x 3	clear opening	1136	887	687	629	524	467	410	353
	rise	4.13	2.56	1.57	1.33	0.94	0.75	0.59	0.44
50 x 3	clear opening	1510	1330	1017	928	763	674	584	495
	rise	5.00	4.48	2.66	2.24	1.53	1.21	0.92	0.67
60 x 3	clear opening	1811	1653	1421	1292	1056	927	798	669
	rise	5.00	5.00	4.24	3.53	2.39	1.86	1.39	0.99
70 x 3	clear opening	2111	1928	1748	1690	1401	1225	1050	874
	rise	5.00	5.00	5.00	5.00	3.54	2.73	2.02	1.42
80 x 3	clear opening	2412	2202	1997	1930	1794	1570	1341	1112
	rise	5.00	5.00	5.00	5.00	5.00	3.86	2.84	1.98
30 x 4	clear opening	877	690	540	497	418	375	332	289
	rise	3.34	2.11	1.32	1.13	0.81	0.66	0.52	0.40
40 x 4	clear opening	1331	1150	883	806	666	590	513	437
	rise	5.00	4.22	2.54	2.13	1.48	1.18	0.90	0.66
50 x 4	clear opening	1661	1517	1323	1204	985	865	746	627
	rise	5.00	5.00	4.43	3.69	2.51	1.95	1.47	1.06
60 x 4	clear opening	1992	1819	1650	1595	1374	1202	1031	859
	rise	5.00	5.00	5.00	5.00	3.97	3.07	2.28	1.61
70 x 4	clear opening	2323	2121	1924	1859	1728	1601	1367	1133
	rise	5.00	5.00	5.00	5.00	5.00	4.59	3.37	2.35

The table shows the maximum clear opening for which the LOAD CLASS is guaranteed.

LOADING CAPACITY - CLASS 3



LORRIES - UNI 11002-1

Dynamic load 3000 daN on 400x200 mm imprint, total floor mass up to 6000 kg

Made of S235JR steel - Sigma yield = 23.5 daN/mm² / 1,05 = Comparison sigma = 22.38 daN/mm²

Max. deflection 5 mm

Max. deflection 1/200 of clear opening

BEARING BAR		BEARING BAR CENTRES DISTANCE mm							
		11	15	22	25	30	34	44	66
mm		mm	mm	mm	mm	mm	mm	mm	mm
20 x 2	clear opening	205	176	150	142	129	120	110	93
	rise	0.31	0.23	0.17	0.15	0.12	0.11	0.09	0.06
25 x 2	clear opening	264	222	187	177	162	150	138	117
	rise	0.41	0.29	0.21	0.18	0.15	0.13	0.11	0.08
30 x 2	clear opening	321	276	227	213	194	180	165	140
	rise	0.51	0.37	0.25	0.22	0.18	0.16	0.13	0.10
40 x 2	clear opening	430	374	323	302	268	245	222	187
	rise	0.68	0.52	0.39	0.33	0.26	0.22	0.18	0.13
25 x 3	clear opening	328	283	232	218	198	184	169	143
	rise	0.63	0.47	0.32	0.28	0.23	0.20	0.17	0.12
30 x 3	clear opening	394	343	290	270	242	222	202	172
	rise	0.77	0.58	0.41	0.35	0.29	0.24	0.20	0.15
40 x 3	clear opening	545	462	395	375	336	313	283	232
	rise	1.08	0.79	0.58	0.52	0.42	0.36	0.29	0.20
50 x 3	clear opening	739	610	505	476	421	391	359	306
	rise	1.55	1.07	0.75	0.67	0.52	0.45	0.38	0.27
60 x 3	clear opening	977	790	640	597	518	475	432	389
	rise	2.19	1.46	0.98	0.86	0.65	0.55	0.46	0.37
70 x 3	clear opening	1257	1004	799	741	633	575	516	458
	rise	3.03	1.98	1.28	1.11	0.82	0.69	0.56	0.44
80 x 3	clear opening	1581	1250	983	906	766	690	613	537
	rise	4.11	2.62	1.66	1.42	1.04	0.85	0.68	0.53
30 x 4	clear opening	459	396	342	325	289	263	237	199
	rise	1.04	0.77	0.57	0.52	0.40	0.34	0.28	0.20
40 x 4	clear opening	660	550	461	435	388	361	332	276
	rise	1.56	1.10	0.78	0.70	0.56	0.48	0.41	0.28
50 x 4	clear opening	919	747	607	568	495	455	415	374
	rise	2.34	1.58	1.06	0.94	0.72	0.61	0.51	0.39
60 x 4	clear opening	1236	987	787	729	624	567	510	453
	rise	3.42	2.23	1.45	1.26	0.93	0.78	0.63	0.50
70 x 4	clear opening	1610	1272	999	921	778	700	622	544
	freccia	4.86	3.10	1.96	1.68	1.22	1.00	0.80	0.62

The table shows the maximum clear opening for which the LOAD CLASS is guaranteed.

LOADING CAPACITY - CLASS 4



TRACTOR-TRAILER - UNI 11002-1

Road Traffic Code - Article 62. Limit mass - Point 5. Whatever the type of vehicle, the mass resting on the more loaded axle must not exceed 12 tonnes

Dynamic load 9000 daN on 600x250 mm imprint, total floor mass up to 45,000 kg

Made of S235JR steel - Sigma yield = 23.5 daN/mm² / 1,05 = Comparison sigma = 22.38 daN/mm²

Max. deflection 5 mm

Max. deflection 1/200 of clear opening

BEARING BAR		BEARING BAR CENTRES DISTANCE mm							
		11	15	22	25	30	34	44	66
		mm	mm	mm	mm	mm	mm	mm	mm
20 x 2	clear opening	159	138	115	109	100	93	82	70
	rise	0.19	0.14	0.10	0.09	0.07	0.06	0.05	0.04
25 x 2	clear opening	199	173	144	136	125	116	103	88
	rise	0.23	0.18	0.12	0.11	0.09	0.08	0.06	0.05
30 x 2	clear opening	239	208	173	164	150	139	124	106
	rise	0.28	0.21	0.15	0.13	0.11	0.09	0.08	0.06
40 x 2	clear opening	329	278	231	218	201	186	165	141
	rise	0.40	0.28	0.20	0.17	0.15	0.13	0.10	0.07
25 x 3	clear opening	244	212	177	167	154	142	126	108
	rise	0.35	0.27	0.19	0.16	0.14	0.12	0.09	0.07
30 x 3	clear opening	297	254	212	201	184	171	152	129
	rise	0.43	0.32	0.22	0.20	0.17	0.14	0.11	0.08
40 x 3	clear opening	404	352	285	268	246	228	202	173
	rise	0.60	0.46	0.30	0.26	0.22	0.19	0.15	0.11
50 x 3	clear opening	505	440	376	349	314	288	253	216
	rise	0.75	0.57	0.41	0.35	0.29	0.24	0.19	0.14
60 x 3	clear opening	606	528	452	433	395	360	310	259
	rise	0.90	0.69	0.50	0.46	0.38	0.31	0.24	0.16
70 x 3	clear opening	717	616	528	505	460	434	376	308
	rise	1.08	0.80	0.59	0.54	0.45	0.40	0.29	0.20
80 x 3	clear opening	845	713	603	577	526	496	437	364
	rise	1.30	0.93	0.67	0.61	0.51	0.45	0.35	0.24
30 x 4	clear opening	350	298	245	232	213	197	175	149
	rise	0.60	0.44	0.29	0.27	0.22	0.19	0.15	0.11
40 x 4	clear opening	467	406	339	316	286	264	234	199
	rise	0.81	0.61	0.42	0.36	0.30	0.26	0.20	0.15
50 x 4	clear opening	583	508	435	416	378	342	296	249
	rise	1.00	0.76	0.56	0.51	0.41	0.34	0.26	0.18
60 x 4	clear opening	709	610	522	500	456	430	371	304
	rise	1.23	0.92	0.67	0.62	0.51	0.46	0.33	0.23
70 x 4	clear opening	856	722	609	583	532	502	441	369
	freccia	1.52	1.09	0.78	0.72	0.60	0.53	0.41	0.28

The table shows the maximum clear opening for which the LOAD CLASS is guaranteed.

STAIR TREADS LOADING CAPACITY WITH POINT LOAD

Made of S235JR steel - Sigma yield = 23.5 daN/mm² / 1,05 = Comparison sigma = 22.38 daN/mm²

Max. deflection 5 mm

Max. deflection 1/200 of clear opening

TABLE COLOURS:

Green: secondary private use, 100 daN on Ø 120 mm circular imprint

Red: main private use, 100 daN on Ø 120 mm circular imprint

Black: public use, 200 daN on Ø 120 mm circular imprint

BEARING BAR mm	BEARING BAR CENTRES DISTANCE									
	11	15	17	22	25	30	33	34	44	66
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
MAXIMUM CLEAR SPAN BETWEEN THE SUPPORTS										
20x2	1097	1040	984	872	748	737	622	622	611	481
25x2	1200	1200	1200	1200	1145	1129	951	951	935	735
30x2	1200	1200	1200	1200	1200	1200	1200	1200	1200	1038
35x2	1290	1233	1200	1200	1200	1200	1200	1200	1200	1200
40x2	1436	1368	1330	1289	1239	1235	1200	1200	1200	1200
45x2	1583	1506	1462	1414	1357	1352	1294	1294	1288	1200
50x2	1733	1645	1595	1541	1476	1471	1405	1405	1398	1279
25x3	1200	1200	1200	1200	1200	1200	1200	1200	1200	1073
30x3	1272	1216	1200	1200	1200	1200	1200	1200	1200	1200
35x3	1439	1371	1333	1291	1242	1238	1200	1200	1200	1200
40x3	1609	1530	1484	1436	1378	1373	1313	1313	1308	1233
45x3	1780	1690	1638	1582	1515	1510	1441	1441	1435	1349
50x3	1800	1800	1793	1730	1655	1648	1571	1571	1563	1466
60x3	2013	1919	1865	1807	1800	1800	1800	1800	1800	1702
70x3	2281	2168	2103	2033	1950	1942	1857	1857	1849	1800
80x3	2486	2400	2346	2264	2166	2157	2057	2057	2047	1921
90x3	2724	2593	2518	2438	2385	2375	2260	2260	2249	2103
100x3	2966	2818	2733	2641	2532	2522	2410	2410	2400	2288
30x4	1370	1307	1271	1232	1200	1200	1200	1200	1200	1200
40x4	1746	1658	1607	1552	1487	1482	1415	1415	1408	1324
45x4	1800	1800	1778	1715	1641	1634	1558	1558	1550	1454
50x4	1882	1800	1800	1800	1796	1788	1702	1702	1693	1584
60x4	2175	2069	2009	1944	1866	1859	1800	1800	1800	1800
70x4	2417	2347	2275	2196	2103	2095	1999	1999	1990	1869

For bearing bars sizes and bars centres distance availability please contact us.

FORKLIFT LOAD CAPACITY

Please refer to the extract of UNI EN 1991-1-1 norm dated August 2004.

ACTIONS INDUCED BY FORKLIFT

1. Forklift trucks should be classified into six different classes, from FL1 to FL6, depending on empty weight, size and loads carried. See chart 6.5.

CHART 6.5 - Forklift truck dimensions according to FL classes

FORKLIFT TRUCK CLASS	Empty weight	Carried load	Axe width A	Total width B	Total length L
	kN	kN	m	m	m
FL 1	21.00	10.00	0.85	1.00	2.60
FL 2	31.00	15.00	0.95	1.10	3.00
FL 3	44.00	25.00	1.00	1.20	3.30
FL 4	60.00	40.00	1.20	1.40	4.00
FL 5	90.00	60.00	1.50	1.90	4.60
FL 6	110.00	80.00	1.80	2.30	5.10

2. The axial static vertical load Q_x of a forklift truck it depends on classes FL1 to FL6 and should be obtained from Chart 6.6

CHART 6.6 - Forklift truck dimensions according to FL classes

FORKLIFT TRUCK CLASS	Axial load Q_x	Dinamic load on rigid wheels imprint	***Imprint
	kN	xN	mm
FL 1	26	26	150x130
FL 2	40	40	175x150
FL 3	63	63	200x200
FL 4	90	90	300x200
FL 5	140	140	375x200
FL 6	170	170	450x200

*** UNI resolution dated 21/10/2008 - "it is believed that the requirements of Eurocode 1 (UNI EN 1991-1-1) concerning the imprints of forklift trucks are not applicable to grating panels, since the vertical load distributes differently on an even base (e.g. concrete floor) and on an uneven base (grating panel) consisting of supporting bars, the number of which varies depending on the size of the imprint".

3. The axial static vertical load Q_x should be increased by the ϕ dynamic coefficient, using the equation (6.3)

$$Q_{x,dyn} = \phi Q_x$$

where:

$Q_{x,dyn}$ is the characteristic dynamic value;

ϕ is the dynamic amplification coefficient;

Q_x is the characteristic static value.

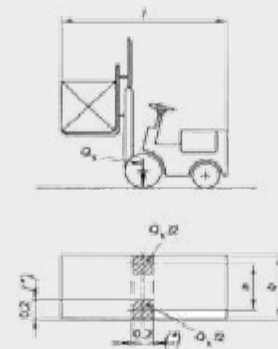
4. The dynamic coefficient ϕ for forklift trucks takes into account the inertial effects caused by acceleration and deceleration of the load carried, and should be set equal to:

$\phi = 1,40$ for forklift trucks on tires

$\phi = 2,00$ on rigid wheels

5. For forklift trucks with empty weight greater than 110 kN, the loads should be defined through a more accurate analysis.

6. The vertical axial load Q_x and $Q_{x,dyn}$ of a forklift truck should be positioned according to figure 6.1



PICTURE 6.1
Forklift truck dimensions

7. Horizontal loads due to acceleration or deceleration of forklift trucks can be equal to 30% of the axial vertical loads Q_x .

Note: dynamic coefficients shall not be applied.

(*) see UNI resolution dated 21/10/2008

Load tables can be accessed in the Download Area of our website.

The values have been calculated on the basis of:

- > The expected loads taken from the capacity table under subsection 6.1 herein, with imprint pursuant to said UNI resolution.
- > The calculations take into account the more unfavourable direction of transit.
- > Elastic deflection $5 \text{ mm} \leq 1/200$ of the clear opening.
- > Unitary yield stress 23.5 daN/mm^2
- > SR35JR steel.