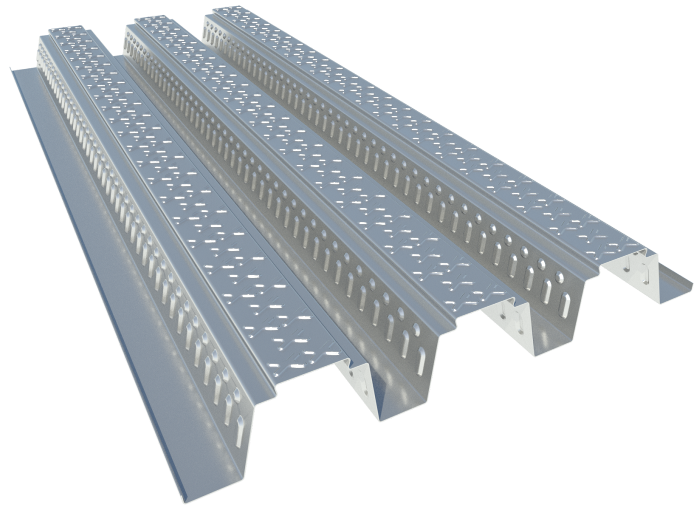
MT-100 COMPOSITE SLAB

COMPOSITE SLABS



RAW MATERIAL
Steel

FINISH
Galvanized

THICKNESSES mm (in.)
0.75 to 1.2
(0.029-0.047)

USEFUL WIDTH
675 mm (26.57 in.)

	THICKNESS mm (in.)			
	0.75 (0.029)	0.80 (0.031)	1.00 (0.039)	1.20 (0.047)
P (kg/m²)	10.90	11.63	14.54	17.44
I (cm4/m)	182.64	195.78	244.81	294.72
W (cm3/m) - upper fiber	31.95	34.50	43.09	52.06
Ap (mm2/m)	1297	1385	1732	2078

P=profile weight per square meter I=profile inertia per linear meter W=resistant module profile per linear meter
Ap=useful section of steel per line

ISO 9001
BUREAU VERITAS
Certification

DESCRIPTION AND APPLICATION

The composite slab represents the most suitable construction solution for all those constructions where both the maximum technical and mechanical performance are required, as well as quick execution and guarantees. Thanks to its superior characteristics, it adapts to any building type (industrial, commercial, sports, residential). It has significant economic benefits, especially if taken into account at the beginning of the project: it involves a decrease in the average thickness of the slab, and therefore a reduction in weight that translates into a reduction in the resistant section of the structure (pillars, beams, foundations).

The foundation of composite slabs lies in the technology used to enhance the adhesion between the shaped steel sheet and the concrete. This technology is also called composite slab (or what is known as forjado colaborante in Spanish) because of the “collaboration” between the two materials that make up the slab, to cope with the stresses generated by the loads. The mechanical adhesion of the two components is performed through the indentations in the sloping flanks of the galvanized steel profile. Chemical adhesion alone would not be sufficient to ensure efficient bonding that actually works the composite slab as a mixed structure.

The characteristics of the MT-100 composite slab have been developed in collaboration with the Structures Group of the Continuum Mechanics Department of the School of Senior Engineers of Seville (Spain), within a framework of cooperation with AICIA— Andalusian Association for Research and Industrial Cooperation.

The experimental tests carried out comply with the requirements of the Eurocode 4 and Eurocode 3 standards, the only reference standards and mandatory standards at the European level.

The values published in the tables refer to the permissible static overload and the section of reinforcement at the negative bending moment in the case of intermediate supports. Tests to break the slabs of different typology have provided the characteristic parameters "m" and "k" that define the reference line of the MT-100 composite slab. This reference line provides the allowable overload data depending on the thickness of the sheet and the depth of the floor slab.

After obtaining these values, following the testing procedures described in EC4, they have been verified by means of the mandatory verification tests.

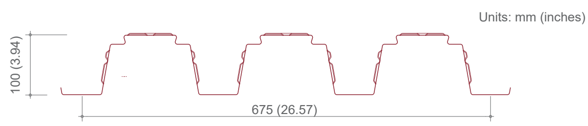
GEOMETRIC SPECIFICATIONS

Geometric Specifications				
Characteristic	Value	Units	Tolerance / Standard	
Profile thickness (h)	100 (3.94)	mm (in.)	±1.5	EN 1090
Wave pitch	225	mm	+4/-1	EN 1090
Width of the ridge and valley	132.5/65	mm	+4/-1	EN 1090
Useful width (w)	675 (26.57)	mm (in.)	(±0.1* h) and ≤15	EN 1090
Protruding surface of core depth	3.5	mm	-0.5/+1	EN 1090
Length (l)	1600 (62.99) to 14,000 (551.18)	mm (in.)	+20/-5	EN 1090
Height / Width stiffener	15/88	mm	-0.5 to +1/ +0.1	EN 1090
Execution class	EXC2		EN 1090	

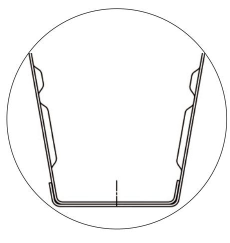
Features of the Profile				
Characteristic	Value	Units	Tolerance / Standard	
Deviation from straightness	≤ to the tolerance	mm	±2/ml (max.10)	EN 1090
Deviation from quadrature	≤ to the tolerance	mm	≤ 0.005 w	EN 1090
Deviation of the side overlap	≤ to the tolerance	mm	±2 s/500 mm	EN 1090
Sheet thickness	0.75 (0.029) to 1.2 (0.047)	mm (in.)	EN 10143	
Type of steel	S220GD to S350GD		EN 10346	
Emission of cadmium and compounds	COMPLIES - No emissions		EN 1090	
Radioactivity emission	COMPLIES - No emissions		EN 1090	
Behavior against fire	Broof (t1)		RD 110/2008	
Durability	Hot-dip galvanized		EN 10346	
Fire resistance	Class A1		EN 13501-1	
Load bearing capacity	See load tables		EN 1993 - EC3 and EC	

APPLIED STANDARDS

Ref. Standard	Description
EN 508-1	Products for sheet metal roofing and cladding: Specify for self-supporting steel sheet products. Part 1: steel.
EN 10143	Sheets and strips of steel with continuous metal coating by hot dipping. Dimensional and shape tolerances.
EN 10346	Flat steel products, continuous coated by hot dipping. Technical supply conditions.
EN 1090-2	Completion of steel and aluminum structures. Part 2: Technical requirements for steel structures.
EN 1090-4	Completion of steel and aluminum structures. Part 4: Technical requirements for cold-formed structural elements and steel structures for roof, ceiling, flooring and wall applications.



SECTION PROFILE



OVERLAP DETAIL

MT-100 - LAYOUT 1 OPENING - 2 SUPPORTS STATIC OVERLOADS (daN/m2) THICKNESS 0.75 mm

	H (cm)																
SPAN (m)	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2.00	1446	1621	1795	1927	2019	2109	2198	2285	2370	2453	2535	2615	2693	2770	2844	2917	2989
2.20	1212	1357	1503	1649	1795	1892	1971	2048	2123	2197	2267	2340	2409	2477	2543	2607	2670
2.40	1032	1156	1280	1404	1529	1653	1777	1850	1918	1983	2048	2111	2093	2196	2291	2349	2404
2.60	890	998	1105	1212	1320	1427	1534	1641	1405	1491	1576	1662	1748	1834	1919	2005	2091
2.80	778	871	965	1059	1153	967	1039	1112	1184	1256	1328	1400	1472	1544	1616	1688	1761
3.00	686	769	852	698	760	821	882	943	1004	1065	1126	1187	1248	1309	1370	1431	1493
3.20	440	492	544	596	648	700	752	804	856	908	960	1012	1064	1116	1168	1220	1272
3.40	377	421	466	510	554	599	643	688	732	776	821	865	910	954	998	1043	1087
3.60	324	362	400	438	476	514	552	590	628	666	704	742	780	818	856	894	932
3.80	278	311	343	376	408	441	474	506	539	571	604	636	669	701	734	766	799
4.00	239	267	295	323	351	379	406	434	462	490	518	546	574	601	629	657	685
4.20	206	229	253	277	301	325	348	372	396	420	444	468	492	515	539	562	586
4.40	176	196	217	237	257	277	298	318	338	358	379	399	419	439	460	480	500
4.60	150	167	185	202	219	236	253	270	287	304	322	339	356	373	390	407	424
4.80	127	142	156	171	185	199	214	228	243	257	271	286	300	314	329	343	358
5.00	107	119	131	143	155	167	179	191	203	215	227	238	250	262	274	286	298
5.20	89	99	109	118	128	138	148	157	167	177	187	196	206	216	226	235	245
5.40	73	81	88	96	104	112	120	127	135	143	151	159	166	174	182	190	198
5.60	58	64	70	76	82	88	94	100	107	113	119	125	131	137	143	149	155
5.80	45	49	54	58	63	67	72	76	81	85	89	94	98	103	107	112	116
6.00	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81
6.20	22	24	25	27	29	31	32	34	36	37	39	41	42	44	46	47	49
6.40	12	13	13	14	14	15	15	15	16	16	17	17	18	18	19	19	20
6.60	3	2															
6.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MT-100 - LAYOUT 2 OPENINGS - 3 SUPPORTS STATIC OVERLOADS (daN/m2) THICKNESS 0.75 mm

	H (cm)																
SPAN (m)	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2.00	1278	1351	1423	1494	1563	1631	1698	1763	1827	1890	1951	2010	2068	2125	2181	2235	2288
2.20	1146	1211	1275	1337	1398	1458	1516	1574	1630	1685	1738	1790	1841	1891	1940	1987	2033
2.40	1036	1094	1150	1206	1260	1313	1365	1416	1465	1514	1561	1607	1652	1696	1738	1780	1820
2.60	943	995	1045	1095	1143	1191	1237	1282	1326	1369	1411	1452	1492	1531	1568	1605	1641
2.80	864	910	956	1000	1043	1086	1127	1167	1207	1245	1283	1319	1355	1389	1423	1455	1486
3.00	795	837	878	918	957	995	1032	1068	1104	1138	1171	1204	1236	1266	1296	1325	1353
3.20	734	772	809	845	881	915	949	981	1013	1044	1074	1103	1132	1159	1186	1211	1236
3.40	681	716	749	782	814	845	875	905	933	961	988	1014	1040	1064	1088	1111	1133
3.60	634	665	604	662	720	778	810	836	862	887	912	935	958	980	1001	1022	1041
3.80	591	479	529	580	630	681	732	775	799	821	843	865	885	905	924	942	959
4.00	376	420	465	509	553	598	642	686	731	762	782	801	819	837	854	870	886
4.20	331	370	409	448	487	526	565	604	642	681	720	743	760	776	791	805	819
4.40	292	326	360	394	429	463	497	531	565	600	634	668	702	720	733	746	758
4.60	257	287	317	348	378	408	438	468	498	528	558	588	618	648	678	692	703
4.80	227	253	280	306	332	359	385	412	438	464	491	517	543	570	596	622	649
5.00	200	223	246	269	292	315	339	362	385	408	431	454	477	500	523	547	570
5.20	176	196	216	236	257	277	297	317	337	358	378	398	418	438	459	479	499
5.40	154	172	189	207	224	242	260	277	295	312	330	348	365	383	400	418	436
5.60	135	150	165	180	196	211	226	241	257	272	287	302	318	333	348	363	379
5.80	117	130	143	156	169	183	196	209	222	235	248	261	274	288	301	314	327
6.00	101	112	123	135	146	157	168	179	191	202	213	224	235	247	258	269	280
6.20	86	96	105	115	124	134	143	153	162	171	181	190	200	209	219	228	237
6.40	73	81	89	97	104	112	120	128	136	144	152	159	167	175	183	191	199
6.60	61	67	74	80	86	93	99	106	112	118	125	131	137	144	150	156	163
6.80	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130
7.00	39	43	47	51	55	58	62	66	70	73	77	81	85	89	92	96	100

MT-100 - LAYOUT 3 OPENINGS - 4 SUPPORTS STATIC OVERLOADS (daN/m2) THICKNESS 0.75 mm

	H (cm)																
SPAN (m)	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
2.00	1338	1416	1492	1566	1639	1711	1781	1850	1918	1983	2048	2111	2173	2233	2291	2349	2404
2.20	1201	1269	1337	1402	1467	1530	1592	1653	1712	1770	1827	1882	1936	1989	2040	2090	2139
2.40	1087	1148	1207	1266	1323	1379	1434	1488	1541	1592	1642	1691	1739	1785	1831	1875	1918
2.60	990	1044	1098	1150	1202	1252	1301	1349	1396	1441	1486	1530	1572	1612	1653	1692	1730
2.80	907	956	1004	1051	1097	1143	1187	1230	1271	1312	1352	1391	1429	1466	1502	1536	1570
3.00	835	880	923	966	1007	1048	1087	1126	1164	1201	1236	1271	1305	1338	1370	1401	1431
3.20	763	813	852	890	928	965	1001	1036	1070	1103	1135	1166	1197	1226	1255	1282	1309
3.40	685	753	789	824	757	818	879	940	986	1016	1045	1074	1101	1127	1153	1178	1202
3.60	618	693	553	606	659	712	765	817	870	923	966	991	1016	1040	1063	1085	1106
3.80	562	437	483	529	575	621	667	713	759	805	851	897	940	961	982	1002	1021
4.00	342	382	422	463	503	543	583	623	664	704	744	784	824	865	905	927	944
4.20	300	335	370	405	440	475	511	546	581	616	651	686	721	756	792	827	862
4.40	263	294	324	355	386	416	447	478	509	539	570	601	631	662	693	723	754
4.60	231	257	284	311	338	365	391	418	445	472	499	526	552	579	606	633	660
4.80	202	225	249	272	296	319	342	366	389	412	436	459	483	506	529	553	576
5.00	177	197	217	238	258	278	299	319	339	360	380	400	421	441	461	481	502
5.20	154	172	189	207	224	242	260	277	295	312	330	348	365	383	400	418	436
5.40	134	149	164	179	194	210	225	240	255	270	285	300	316	331	346	361	376
5.60	116	128	141	154	167	180	193	206	219	232	245	258	271	284	297	310	323
5.80	99	110	121	132	143	154	165	176	187	198	209	219	230	241	252	263	274
6.00	84	93	102	111	121	130	139	148	157	166	175	185	194	203	212	221	230
6.20	70	78	85	93	100	108	115	123	130	138	145	153	160	168	175	183	190
6.40	58	64	70	76	82	88	94	100	106	112	118	124	130	136	142	148	154
6.60	47	51	56	60	65	70	74	79	83	88	93	97	102	107	111	116	120
6.80	36	39	43	46	49	53	56	59	63	66	70	73	76	80	83	86	90
7.00	26	28	31	33	35	37	39	42	44	46	48	50	53	55	57	59	61

HA-25 - fck=25N/mm2 - Sheet - fy=220N/mm2 - Sag L/250 - 0% coef. negative redistribution

Shore up center of the opening

For other values, contact the **Technical Department** to evaluate the most optimal solution in each case and receive personalized advice.

HIANSA S.A. is not responsible for the effects caused by the breach of the conditions expressed in all points of these technical specifications.

MT-100 - LAYOUT 1 OPENING - 2 SUPPORTS STATIC OVERLOADS (daN/m2) **THICKNESS 0.8 mm**

SPAN (m)	H (cm) 14	15	16	17	18	19	20	21	22	23	24	25
2.00	1536	1720	1905	2014	2109	2201	2292	2381	2468	2553	2637	2718
2.20	1285	1440	1594	1748	1893	1975	2056	2135	2212	2288	2362	2434
2.40	1093	1225	1356	1488	1619	1750	1859	1930	1999	2066	2132	2197
2.60	943	1056	1170	1283	1396	1510	1623	1736	1819	1879	1689	1781
2.80	823	922	1021	1120	1219	1318	1417	1193	1270	1348	1425	1502
3.00	726	813	900	751	817	882	948	1013	1079	1145	1210	1276
3.20	645	530	586	642	698	754	810	866	922	978	1034	1090
3.40	407	455	503	551	598	646	694	742	790	838	886	934
3.60	350	391	433	474	515	556	597	638	679	721	762	803
3.80	302	337	373	408	444	479	514	550	585	620	656	691
4.00	261	291	322	352	382	413	443	474	504	534	565	595
4.20	225	251	277	303	329	355	382	408	434	460	486	512
4.40	194	216	238	261	283	305	328	350	373	395	417	440
4.60	166	185	204	223	243	262	281	300	319	338	357	376
4.80	142	158	174	191	207	223	239	255	271	287	304	320
5.00	121	134	148	161	175	188	202	216	229	243	256	270
5.20	101	113	124	135	146	158	169	180	191	203	214	225
5.40	84	93	103	112	121	130	139	149	158	167	176	185
5.60	69	76	83	91	98	105	113	120	127	135	142	149
5.80	55	60	66	72	77	83	89	94	100	106	111	117
6.00	30	46	50	54	58	63	67	71	75	79	83	87
6.20	3											61
6.40			12	24	26	27	29	30	32	33	35	36
6.60				3	11	12	12	12	13	13	13	14
6.80												
7.00												

MT-100 - LAYOUT 2 OPENINGS - 3 SUPPORTS STATIC OVERLOADS (daN/m2) **THICKNESS 0.8 mm**

SPAN (m)	H (cm) 14	15	16	17	18	19	20	21	22	23	24	25
2.00	1321	1418	1492	1564	1635	1705	1773	1840	1905	1969	2032	2093
2.20	1185	1271	1336	1400	1463	1524	1584	1643	1701	1757	1812	1865
2.40	1072	1149	1207	1264	1320	1374	1427	1479	1530	1580	1628	1676
2.60	976	1046	1098	1148	1198	1247	1294	1341	1386	1430	1473	1515
2.80	894	957	1004	1050	1094	1138	1180	1222	1262	1302	1340	1378
3.00	823	881	923	964	1004	1043	1081	1119	1155	1191	1225	1259
3.20	761	813	852	889	925	960	995	1029	1061	1093	1124	1154
3.40	706	754	789	823	855	888	919	949	979	1007	1035	1062
3.60	657	702	733	764	773	823	851	878	905	931	956	981
3.80	614	654	569	623	678	732	786	815	839	863	886	907
4.00	405	453	501	548	596	644	691	739	780	801	822	842
4.20	357	399	441	483	525	567	609	651	693	735	764	782
4.40	316	353	390	427	464	501	538	575	612	649	686	723
4.60	279	312	344	377	410	442	475	507	540	573	605	638
4.80	247	275	304	333	362	390	419	448	477	505	534	563
5.00	218	243	269	294	319	345	370	395	420	446	471	496
5.20	192	215	237	259	281	304	326	348	370	392	415	437
5.40	170	189	208	228	247	267	286	306	325	345	364	384
5.60	149	166	183	200	217	234	251	268	285	302	319	336
5.80	130	145	160	174	189	204	219	233	248	263	278	292
6.00	113	126	139	151	164	177	190	202	215	228	240	253
6.20	98	109	120	130	141	152	163	174	185	196	206	217
6.40	84	93	102	111	121	130	139	148	157	166	176	185
6.60	71	79	86	94	101	109	117	124	132	140	147	155
6.80	59	65	72	78	84	90	96	103	109	115	121	127
7.00	48	53	58	63	68	73	78	82	87	92	97	102

MT-100 - LAYOUT 3 OPENINGS - 4 SUPPORTS STATIC OVERLOADS (daN/m2) **THICKNESS 0.8 mm**

SPAN (m)	H (cm) 14	15	16	17	18	19	20	21	22	23	24	25
2.00	1383	1485	1563	1639	1714	1787	1859	1930	1999	2066	2132	2197
2.20	1242	1332	1401	1469	1535	1600	1663	1725	1786	1845	1903	1960
2.40	1124	1205	1266	1326	1385	1443	1499	1554	1608	1661	1712	1763
2.60	1024	1098	1152	1206	1259	1310	1361	1410	1458	1505	1551	1596
2.80	939	1005	1055	1103	1150	1197	1242	1286	1329	1371	1412	1452
3.00	865	925	970	1014	1057	1098	1139	1179	1218	1256	1292	1328
3.20	800	855	896	936	974	1012	1049	1085	1120	1154	1187	1220
3.40	723	794	831	867	902	936	943	1002	1034	1065	1095	1124
3.60	652	731	773	805	708	765	822	879	936	985	1012	1039
3.80	592	663	520	569	619	669	718	768	818	867	917	962
4.00	369	412	456	499	543	586	629	673	716	760	803	846
4.20	324	362	400	438	476	514	552	590	628	666	705	743
4.40	285	318	352	385	419	452	485	519	552	585	619	652
4.60	251	280	309	339	368	397	426	455	485	514	543	572
4.80	221	246	272	297	323	349	374	400	425	451	476	502
5.00	194	216	238	261	283	305	328	350	373	395	417	440
5.20	170	189	209	228	248	267	287	306	326	345	365	384
5.40	148	165	182	199	216	233	250	266	283	300	317	334
5.60	129	143	158	173	187	202	216	231	245	260	275	289
5.80	111	124	136	149	161	174	186	199	211	224	236	249
6.00	95	106	117	127	138	148	159	169	180	191	201	212
6.20	81	90	99	108	116	125	134	143	152	160	169	178
6.40	68	75	82	90	97	104	111	119	126	133	140	148
6.60	56	62	67	73	79	85	91	96	102	108	114	119
6.80	45	49	54	58	63	67	71	76	80	85	89	94
7.00	34	38	41	44	47	51	54	57	60	64	67	70

HA-25 - fck=25N/mm2 - Sheet - fy=220N/mm2 - Sag L/250 - 0% coef. negative redistribution

Shore up center of the opening (shaded cells)

For other values, contact the **Technical Department** to evaluate the most optimal solution in each case and receive personalized advice.

HIANSA S.A. is not responsible for the effects caused by the breach of the conditions expressed in all points of these technical specifications.

Hiansa
Grupo Hiemesa

REV.01 - January 2020

MT-100 - LAYOUT 1 OPENING - 2 SUPPORTS   STATIC OVERLOADS (daN/m2)   **THICKNESS 1.0 mm**

SPAN (m)	H (cm) 14	15	16	17	18	19	20	21	22	23	24	25
2.00	1686	1874	2060	2192	2284	2375	2464	2552	2638	2721	2804	2884
2.20	1517	1686	1853	1971	2053	2134	2213	2290	2366	2440	2513	2584
2.40	1326	1485	1644	1786	1860	1932	2003	2072	2140	2206	2271	2335
2.60	1141	1278	1415	1553	1690	1762	1826	1888	1949	2008	2066	2123
2.80	994	1113	1233	1352	1472	1591	1673	1730	1785	1838	1891	1942
3.00	874	979	1084	1190	1295	1400	1505	1593	1369	1452	1536	1619
3.20	776	869	963	1056	1149	961	1032	1104	1176	1248	1319	1391
3.40	694	777	861	706	768	829	891	953	1015	1077	1139	1201
3.60	625	505	558	612	665	719	773	826	880	933	987	1041
3.80	392	439	485	532	578	625	672	718	765	811	858	904
4.00	342	382	423	463	504	544	585	625	666	706	747	787
4.20	298	333	369	404	439	475	510	545	580	616	651	686
4.40	260	291	322	352	383	414	444	475	506	537	567	598
4.60	227	254	280	307	334	360	387	414	440	467	494	521
4.80	198	221	244	267	290	313	337	360	383	406	429	452
5.00	172	192	212	232	252	272	292	312	332	352	372	392
5.20	148	166	183	200	217	234	252	269	286	303	321	338
5.40	128	142	157	172	186	201	216	231	245	260	275	290
5.60	109	121	134	146	159	171	184	196	209	221	234	246
5.80	84	102	113	123	134	144	155	165	176	186	196	207
6.00	49	77	94	102	111	120	128	137	146	154	163	171
6.20	19	41	70	84	90	97	104	111	118	125	132	139
6.40		10	32	62	72	77	83	88	93	99	104	110
6.60			1	24	53	59	63	67	71	75	79	83
6.80					14	41	44	47	50	52	55	58
7.00						4	27	29	30	32	34	35

MT-100 - LAYOUT 2 OPENINGS - 3 SUPPORTS   STATIC OVERLOADS (daN/m2)   **THICKNESS 1.0 mm**

SPAN (m)	H (cm) 14	15	16	17	18	19	20	21	22	23	24	25
2.00	1314	1460	1604	1705	1775	1844	1911	1976	2041	2103	2165	2225
2.20	1178	1310	1439	1529	1590	1650	1709	1767	1824	1879	1932	1985
2.40	1066	1184	1300	1381	1436	1489	1542	1593	1643	1691	1739	1785
2.60	970	1078	1184	1257	1305	1353	1400	1445	1490	1533	1575	1616
2.80	889	987	1084	1150	1194	1236	1278	1319	1358	1397	1435	1471
3.00	818	908	997	1057	1097	1135	1172	1209	1245	1279	1313	1346
3.20	756	839	921	976	1012	1046	1080	1113	1145	1176	1207	1236
3.40	701	778	854	905	937	968	999	1028	1057	1085	1113	1139
3.60	652	724	794	841	870	899	926	953	979	1005	1029	1053
3.80	609	676	741	784	811	837	862	886	910	932	954	976
4.00	570	632	693	733	757	781	803	825	847	867	887	906
4.20	534	593	650	618	673	727	751	771	790	808	826	844
4.40	502	453	501	550	598	646	694	721	738	755	771	787
4.60	361	404	446	489	532	575	618	660	691	706	721	734
4.80	322	360	398	436	474	512	550	588	626	661	674	687
5.00	287	321	355	389	422	456	490	524	558	592	626	643
5.20	256	286	316	346	377	407	437	467	497	528	558	588
5.40	228	255	282	309	336	362	389	416	443	470	497	523
5.60	203	227	251	275	299	322	346	370	394	418	442	466
5.80	181	202	223	244	265	286	308	329	350	371	392	413
6.00	160	179	198	216	235	254	272	291	310	329	347	366
6.20	142	158	175	191	208	224	241	257	273	290	306	323
6.40	125	139	154	168	183	197	211	226	240	255	269	283
6.60	109	122	135	147	160	172	185	197	210	222	235	248
6.80	95	106	117	128	139	149	160	171	182	193	204	215
7.00	82	91	101	110	119	129	138	147	156	166	175	184

MT-100 - LAYOUT 3 OPENINGS - 4 SUPPORTS   STATIC OVERLOADS (daN/m2)   **THICKNESS 1.0 mm**

SPAN (m)	H (cm) 14	15	16	17	18	19	20	21	22	23	24	25
2.00	1376	1529	1680	1786	1860	1932	2003	2072	2140	2206	2271	2335
2.20	1235	1372	1508	1602	1667	1731	1793	1854	1914	1972	2029	2085
2.40	1117	1242	1364	1449	1507	1563	1619	1673	1726	1777	1828	1877
2.60	1018	1131	1242	1319	1371	1421	1471	1519	1566	1612	1657	1701
2.80	933	1036	1138	1208	1254	1300	1344	1387	1429	1471	1511	1550
3.00	859	954	1047	1111	1153	1194	1234	1273	1311	1348	1384	1419
3.20	794	882	968	1027	1065	1102	1138	1173	1207	1241	1273	1305
3.40	737	819	899	952	987	1020	1053	1085	1116	1146	1175	1204
3.60	687	762	837	886	917	948	978	1007	1035	1062	1088	1114
3.80	641	712	781	827	855	883	910	936	962	987	1010	1034
4.00	601	666	731	774	695	751	807	863	896	919	940	961
4.20	564	625	686	565	614	664	713	763	812	857	877	896
4.40	530	413	457	500	544	588	632	675	719	763	807	836
4.60	327	366	405	444	482	521	560	599	637	676	715	754
4.80	291	325	359	394	428	462	497	531	565	600	634	668
5.00	258	288	319	349	380	410	441	471	501	532	562	593
5.20	229	256	283	310	337	364	391	418	445	471	498	525
5.40	203	227	251	274	298	322	346	370	394	417	441	465
5.60	180	201	222	243	264	285	306	327	348	369	390	411
5.80	159	177	195	214	232	251	269	288	306	325	343	362
6.00	139	156	172	188	204	220	236	253	269	285	301	317
6.20	122	136	150	164	178	192	206	221	235	249	263	277
6.40	106	118	130	143	155	167	179	191	204	216	228	240
6.60	92	102	112	123	133	144	154	165	175	185	196	206
6.80	78	87	96	105	114	122	131	140	149	158	167	175
7.00	54	73	81	88	95	103	110	118	125	132	140	147

Shore up center of the opening

HA-25 - fck=25N/mm2 - Sheet - fy=220N/mm2 - Sag L/250 - 0% coef. negative redistribution

For other values, contact the **Technical Department** to evaluate the most optimal solution in each case and receive personalized advice.

MT-100 - LAYOUT 1 OPENING - 2 SUPPORTS   STATIC OVERLOADS (daN/m2)   THICKNESS 1.2 mm

SPAN (m)	H (cm) 14	15	16	17	18	19	20	21	22	23	24	25
2.00	1731	1924	2115	2302	2486	2611	2702	2791	2878	2963	3046	3128
2.20	1558	1731	1902	2071	2236	2348	2428	2507	2584	2660	2733	2806
2.40	1413	1571	1726	1878	2028	2129	2201	2271	2340	2407	2473	2537
2.60	1291	1435	1576	1715	1851	1943	2008	2071	2133	2193	2253	2310
2.80	1167	1307	1447	1575	1700	1784	1842	1900	1956	2010	2064	2116
3.00	1025	1148	1271	1394	1517	1640	1699	1751	1802	1851	1900	1947
3.20	909	1018	1127	1236	1345	1454	1563	1621	1667	1519	1607	1694
3.40	812	909	1006	1104	1201	1299	1090	1166	1242	1318	1393	1469
3.60	730	818	905	993	818	884	950	1016	1082	1148	1214	1280
3.80	661	740	599	657	715	772	830	888	946	1003	1061	1119
4.00	424	475	526	576	627	677	728	778	829	879	930	981
4.20	373	417	462	506	550	595	639	684	728	772	817	861
4.40	328	367	406	445	484	523	562	601	640	679	718	757
4.60	289	323	357	392	426	460	495	529	563	598	632	666
4.80	254	284	315	345	375	405	435	465	495	526	556	586
5.00	224	250	276	303	329	356	382	409	435	462	488	515
5.20	196	219	243	266	289	312	335	359	382	405	428	451
5.40	172	192	212	233	253	273	293	314	334	354	375	395
5.60	150	167	185	203	220	238	256	273	291	308	326	344
5.80	106	145	160	175	191	206	221	237	252	267	282	298
6.00	68	100	138	151	164	177	191	204	217	230	243	256
6.20	35	61	93	129	140	151	162	174	185	196	207	218
6.40	8	27	53	86	118	128	137	146	156	165	174	184
6.60			18	45	78	106	114	121	129	137	144	152
6.80				9	36	68	92	98	105	111	117	123
7.00						26	58	77	82	87	92	97

MT-100 - LAYOUT 2 OPENINGS - 3 SUPPORTS   STATIC OVERLOADS (daN/m2)   THICKNESS 1.2 mm

SPAN (m)	H (cm) 14	15	16	17	18	19	20	21	22	23	24	25
2.00	1350	1500	1648	1793	1936	2032	2100	2167	2232	2296	2358	2419
2.20	1211	1345	1478	1608	1736	1821	1881	1940	1997	2054	2108	2162
2.40	1095	1217	1336	1454	1570	1646	1699	1751	1802	1851	1900	1947
2.60	997	1108	1217	1324	1429	1497	1545	1591	1636	1680	1723	1765
2.80	913	1015	1114	1212	1308	1370	1413	1454	1495	1534	1572	1610
3.00	841	934	1025	1115	1203	1260	1298	1335	1372	1407	1441	1475
3.20	777	863	947	1030	1111	1163	1198	1231	1264	1296	1327	1357
3.40	721	800	879	955	1030	1078	1109	1140	1169	1198	1225	1252
3.60	671	745	818	889	959	1002	1031	1058	1085	1111	1136	1160
3.80	626	695	763	829	894	935	960	985	1009	1033	1055	1077
4.00	586	651	714	776	836	874	897	919	941	962	983	1002
4.20	550	610	669	727	784	818	840	860	880	899	917	935
4.40	517	573	629	683	736	768	787	806	824	841	858	874
4.60	487	540	592	603	656	709	740	757	773	788	803	818
4.80	459	509	493	540	588	635	682	712	726	740	753	766
5.00	357	400	442	485	527	569	612	654	683	696	708	719
5.20	321	359	397	435	473	511	549	587	626	655	665	675
5.40	288	322	356	391	425	459	493	527	562	596	626	635
5.60	259	289	320	351	381	412	443	474	504	535	566	596
5.80	232	260	287	315	342	370	397	425	452	480	507	535
6.00	208	233	258	282	307	332	356	381	406	430	455	479
6.20	187	209	231	253	275	297	319	341	363	385	407	429
6.40	167	186	206	226	245	265	285	304	324	344	363	383
6.60	149	166	184	201	219	236	254	271	289	306	324	341
6.80	132	148	163	179	194	209	225	240	256	271	287	302
7.00	117	130	144	158	171	185	199	212	226	240	253	267

MT-100 - LAYOUT 3 OPENINGS - 4 SUPPORTS   STATIC OVERLOADS (daN/m2)   THICKNESS 1.2 mm

SPAN (m)	H (cm) 14	15	16	17	18	19	20	21	22	23	24	25
2.00	1413	1571	1726	1878	2028	2129	2201	2271	2340	2407	2473	2537
2.20	1269	1410	1549	1685	1819	1909	1973	2035	2095	2155	2212	2269
2.40	1148	1276	1401	1525	1646	1726	1783	1838	1892	1944	1995	2045
2.60	1046	1162	1276	1389	1499	1572	1622	1671	1719	1766	1812	1856
2.80	959	1065	1170	1272	1373	1439	1484	1528	1571	1613	1654	1694
3.00	883	981	1077	1171	1264	1324	1365	1405	1443	1481	1518	1553
3.20	817	907	996	1083	1169	1224	1260	1296	1331	1365	1398	1430
3.40	758	842	924	1005	1084	1135	1168	1201	1232	1263	1293	1322
3.60	706	784	861	936	1009	1056	1086	1116	1144	1172	1199	1225
3.80	660	733	804	874	942	985	1013	1040	1066	1091	1115	1139
4.00	618	686	753	818	882	922	947	971	995	1018	1040	1061
4.20	580	644	706	768	828	864	887	910	931	952	972	991
4.40	546	606	664	722	778	725	779	833	873	892	910	927
4.60	514	571	626	550	598	647	695	743	791	837	853	869
4.80	486	539	448	491	534	577	620	664	707	750	793	815
5.00	324	362	401	439	478	516	555	593	631	670	708	747
5.20	290	324	358	393	427	461	496	530	565	599	633	668
5.40	259	290	320	351	382	413	443	474	505	535	566	597
5.60	231	259	286	314	341	369	396	423	451	478	506	533
5.80	207	231	256	280	305	329	353	378	402	427	451	476
6.00	184	206	228	250	271	293	315	337	358	380	402	424
6.20	164	183	203	222	241	260	280	299	318	338	357	376
6.40	145	162	179	197	214	231	248	265	282	299	316	333
6.60	128	143	158	173	188	204	219	234	249	264	279	294
6.80	106	126	139	152	165	179	192	205	218	231	244	258
7.00	73	106	121	133	144	156	167	179	190	202	213	224

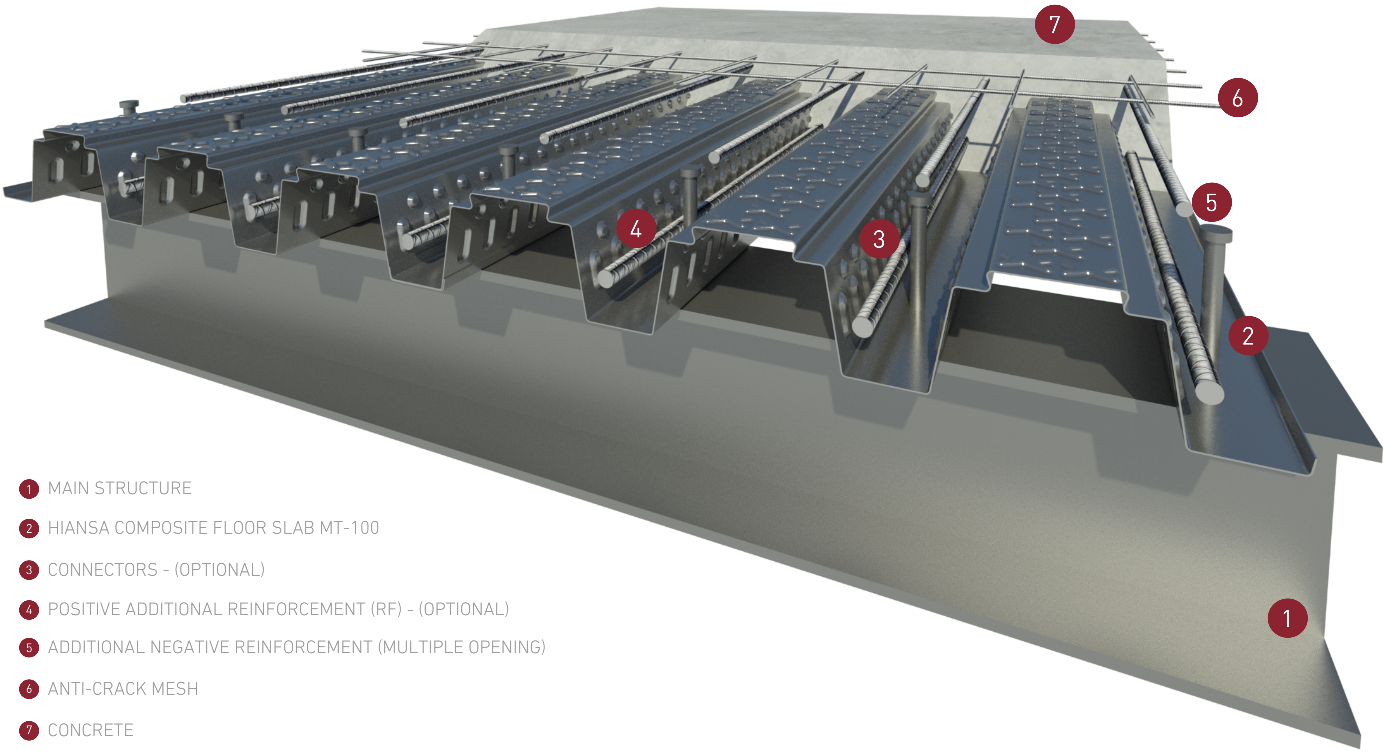
HA-25 - fck=25N/mm2 - Sheet - fy=220N/mm2 - Sag L/250 - 0% coef. negative redistribution

Shore up center of the opening

For other values, contact the **Technical Department** to evaluate the most optimal solution in each case and receive personalized advice.

HIANSA S.A. is not responsible for the effects caused by the breach of the conditions expressed in all points of these technical specifications.

TYPE DETAILS

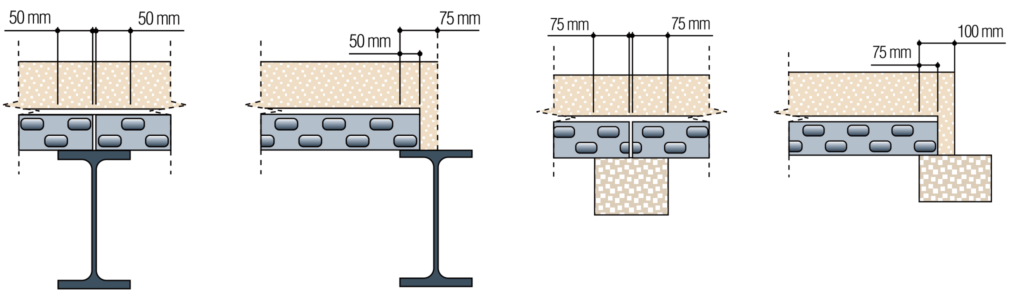


Illustrative view

Section type MT-100 composite slab, in which all the reinforcements that can be placed according to the calculation requirements set by the Designer are indicated. Even connectors that are welded or bolted will be necessary when the slab is required to work integrally with the supporting metal beam.

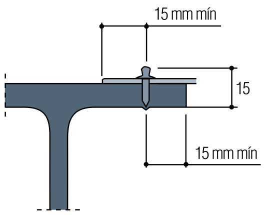
CONDITION OF SUPPORT OF THE SHEETS ON BEAMS

SUPPORT ON STEEL AND CONCRETE		SUPPORT ON OTHER MATERIALS (BRICK OR BLOCK)	
DUAL SUPPORT	END SUPPORT	DUAL SUPPORT	END SUPPORT

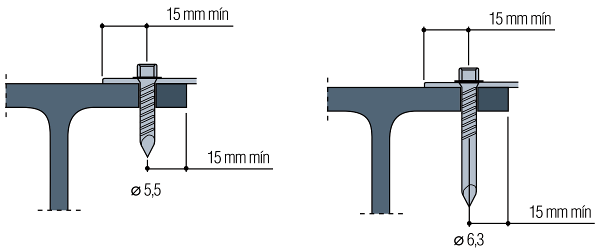


The attachment of the slab to the structure will be by screw, nail or welding, at the discretion of the Designer and always respecting the minimum measurements indicated for each case in the attached figures. It is recommended to attach each sheet one at a time and check at the end that they are all secured.

FASTENING BY GUN

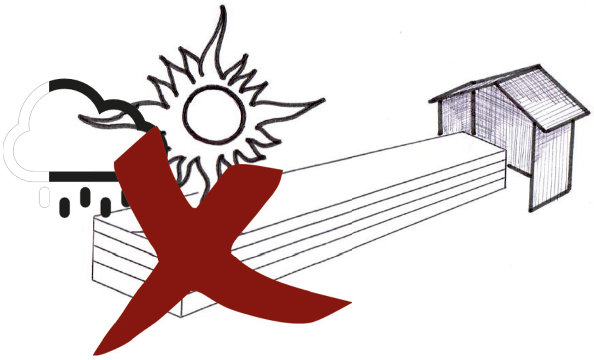


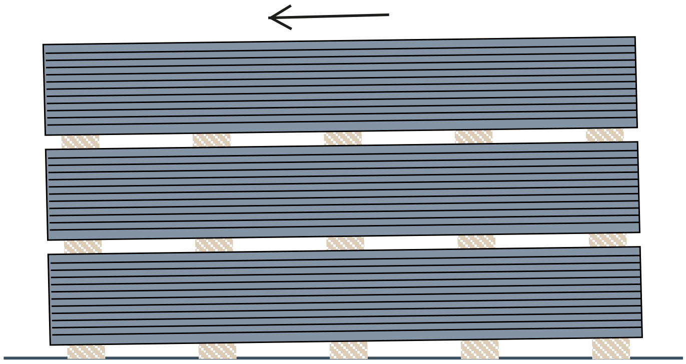
FASTENING BY SCREW



STOCKING OF MATERIAL

In order to avoid the action of wind, humidity, condensation and rain, it is recommended that the galvanized steel material be stored in covered, ventilated areas and in an atmosphere that is as dry as possible.
In case of outdoor storage, the packages must be isolated from the ground by means of blocks of different height in order to obtain a slope that favors the evacuation of the water. They must also be covered with tarpaulins or plastics ensuring proper ventilation to avoid the concentration of water or excessive humidity that can cause white oxide to appear that only affects the aesthetics of the material without reducing its resistant properties.

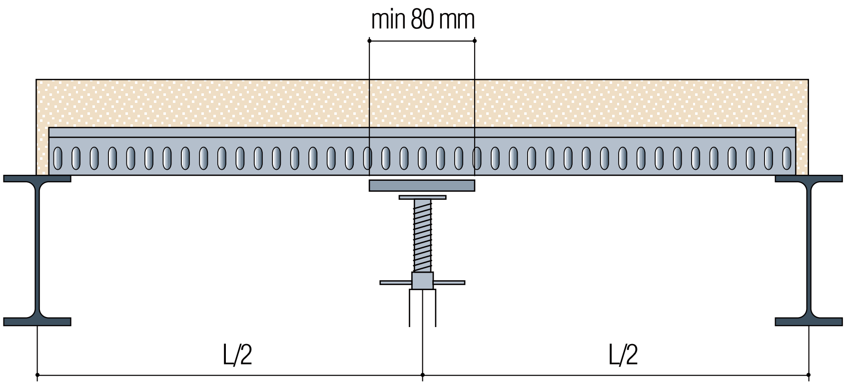




Elevation view

STRUTTING THE SLAB

Strutting the slab is understood as the placement of intermediate supports to temporarily reduce the distance between supports during the pouring and setting phases of concrete. Once the sheets have been secured, where necessary, a strut will be placed in the middle of the section. In case of needing two struts (large section of free span) the struts will be placed at 1/3 and 2/3 of the free span of the section. The sketch illustrates the correct way to place a strut.



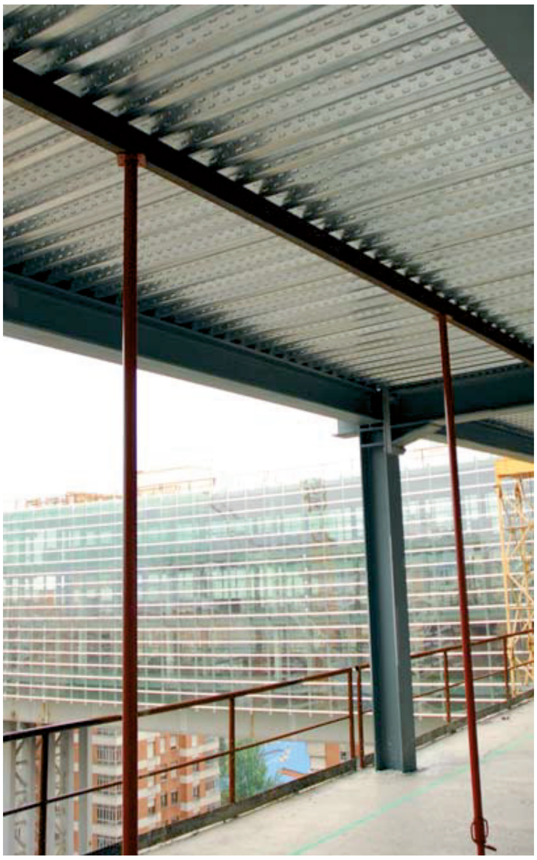
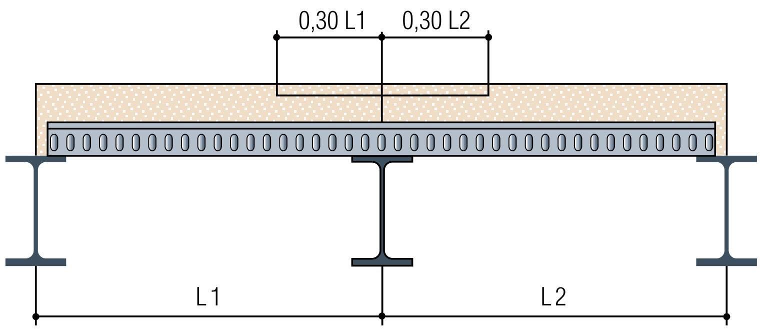


Image of temporary strutting

NEGATIVE REINFORCEMENT

When the designed slab is continuous, that is, it has intermediate supports, negative bending moments occur on these. It is then necessary to place this type of reinforcement, at a depth of 25 mm with respect to the upper face of the slab. The corrugated bars must be of sufficient length to cover one third of the span of each of the adjacent openings, as shown in the attached sketch. The minimum section of reinforcement required withstand these negative bending moments is detailed in the corresponding calculations.



Additional reinforcement

ANTI-CRACK MESH

Its main mission is to cope with the retraction efforts generated by the drying of concrete, avoiding its cracking. It also contributes to the distribution of small point loads acting on the slab. It must be placed at a depth of 20 mm with respect to the upper face of the slab, covering its entire surface.

ANTI-CRACKING MESH IN SLAB COMPRESSION LAYER (mm)

			H (cm)														
			10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Mesh	MT-100	200x200x4	-	-	-	-	✓	✓	✓	-	-	-	-	-	-	-	-	-
		200x200x5	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-
		200x200x6	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓

OWN WEIGHT AND VOLUME OF CONCRETE

VALUES OF OWN WEIGHT OF THE COMPOSITE SLAB [kN/ m2]

		H (cm)															
		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Profile	MT-100 e=0.75 mm					1.9	2.14	2.38	2.62	2.86	3.1	3.34	3.58	3.82	4.07	4.3	4.54
	MT-100 e=0.8 mm	-	-	-	-	1.91	2.15	2.39	2.63	2.87	3.11	3.35	3.59	3.83	4.07	4.31	4.55
	MT-100 e=1.0 mm	-	-	-	-	1.93	2.17	2.41	2.65	2.89	3.13	3.37	3.61	3.85	4.09	4.33	4.57
	MT-100 e=1.2 mm	-	-	-	-	1.96	2.2	2.44	2.68	2.92	3.16	3.4	3.64	3.88	4.12	4.36	4.6

VOLUME OF CONCRETE PER UNIT AREA [m3/ m2]

		H (cm)															
		10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Profile	MT-100 e=0.75 mm	-	-	-	-	0.075	0.085	0.095	0.105	0.115	0.125	0.135	0.145	0.155	0.165	0.175	0.185
	MT-100 e=0.8 mm	-	-	-	-	0.075	0.085	0.095	0.105	0.115	0.125	0.135	0.145	0.155	0.165	0.175	0.185
	MT-100 e=1.0 mm	-	-	-	-	0.075	0.085	0.095	0.105	0.115	0.125	0.135	0.145	0.155	0.165	0.175	0.185
	MT-100 e=1.2 mm	-	-	-	-	0.075	0.085	0.095	0.105	0.115	0.125	0.135	0.145	0.155	0.165	0.175	0.185

BEHAVIOR AGAINST FIRE

The R factor is the load bearing capacity of a composite slab in a fire situation. According to Eurocode 4 Part 1.2, for this type of solution it will be 30 minutes (R-30). This data does not need any verification, as long as the calculation of the composite slab has been made in accordance with the specifications of Eurocode 4 Part 1.1.

If the project requires a fire resistance of more than 30 minutes (R-30), the designer can opt for different solutions:

- Incorporate a fire protection system on the underside of the slab. One option is to create a continuous coating of homogeneous thickness with mortars or paints or incorporate false ceilings of plasterboard or other materials (taking special care to ensure watertightness of the joints between elements).

- Incorporate traction reinforcements into the slab. This increases the bearing capacity of the slab in a fire situation (criterion R), but not the thermal insulation capacity (I). The thermal insulation capacity continues to depend on the effective thickness of the slab and the additional protection provided by the underside of the steel profile (*).

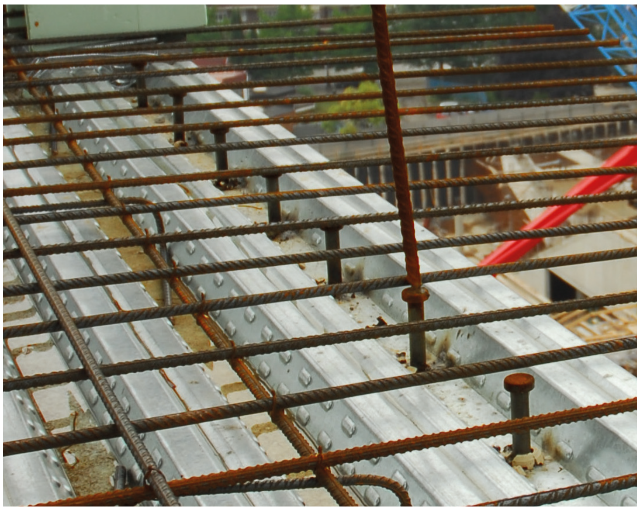
(*) Contact our Technical Department for cases in which an R factor greater than 30 minutes is required, in order to evaluate the most optimal solution in each case and receive personalized advice.

CONNECTORS - MIXED BEAM SOLUTION CONNECTED TO STRUCTURE

It is important to note that the connectors do not influence the actual strength of the composite slab. That is, the fact of having connectors, does not make the slab more resistant than when they are not used.

In this constructive solution, the profile for composite slab is attached to the metal structure by means of the connectors. The slab becomes part of the same load-bearing structure of the building, ceasing to be a monolithic element whose weight is supported by the beams and pillars on which it rests. It functions as a compression layer of the resistant section, which in this way sees its strength properties noticeably increased. This allows considering in the calculations, the sum of the resistant sections of the metal beam and the slab. The decision about the type of structure to be adopted and the corresponding calculation are the responsibility of the Designer.

These connectors may be welded through the slab sheet to the support structure or mechanically fixed by pneumatic gun and flashing or the like.


Soldered connectors


Mechanically fixed connectors

RECOMMENDATIONS FOR ASSEMBLY

Pouring of the concrete:

The concreting on the corrugated sheets will be carried out by traditional methods: pumps and pipes or cupola. Any oil, dirt, remaining greasiness from the manufacturing process or harmful substance, present on the upper face of the profile, must be removed before starting the pouring phase of the concrete. To achieve the final properties of the slab specified in the project, utmost care must be taken in this phase, avoiding excessive deformation of the slab, segregation of the aggregate or loss of slurry. The concrete will be poured as far as possible on the support beams of the slab, from the minimum possible height. It is necessary to use a concrete outlet pipe equipped with a handle that allows easy and practical handling, since in no case will the concrete be poured from a height greater than 30 cm. It is necessary to avoid any accumulation of material, and distribute it longitudinally to the ribs of the steel profile, from the beams to the spans. The forklift circulation will be carried out on 30 mm thick planks placed on the mesh, making sure that no more than three operators coincide in the same area of the slab at the same time.
To ensure the proper functioning of the slab, a satisfactory compaction must be made around the connectors, the reinforcements and on the relief of the sheet. It is not necessary to vibrate the concrete. In case of grout losses with the consequent appearance of stains on the lower part of the profile, it is advisable to clean with a simple stream of water before the drying.

Opening of holes in the slabs:

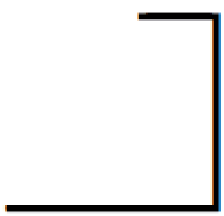
Generally, in the works it is necessary to provide apertures for the installations to pass through and downspouts through the slab. In this case, the apertures must be made prior to concreting, using expanded polystyrene blocks or any other type of formwork. When the side of the aperture is larger than a wave, it will be necessary to reinforce the perimeter of the aperture longitudinally and transversely at the structural level.
In general, it can be said that:

- Apertures up to 300 mm on the side do not require reinforcement.
- Apertures with sides between 300 and 700 mm in length require reinforcement bars.
- The apertures with a side greater than 700 mm in length require the placement of auxiliary support structures. To make these apertures, the metal profile will be cut as long as the concrete is cured. It is important not to drill the slab with percussive equipment once it is set, since vibrations can affect the collaboration between the steel sheet and the concrete, generating a loss of adhesion and therefore of load bearing capacity.

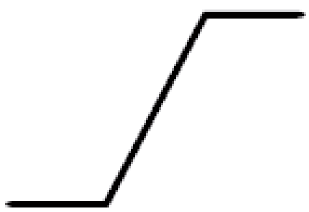
Type of trims:

To expedite the construction of a composite slab and optimize the completion time, Hiansa S.A. has created exclusive galvanized steel finishes. These are pieces that, even without being essential, are very useful, since they replace certain formwork operations that would otherwise be done in a more artisanal way and approximatively in the construction:

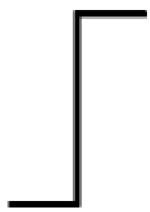
- Trim for edge of slab (R1).
- Trim for brace (R2).
- Trim for shifting direction of slab (R3)



Trim for edge of
slabs (R1) – LINEAR



Trim for brace
(R2) - SINGLE-POINT



Trim for shifting
of slab
(R3) – LINEAR

CALCULATION CONSIDERATIONS

Calculation hypotheses:

The results contained in the static overload tables, obtained according to the procedure established by the EC4 and EC3 Regulations, are based on the following calculation hypotheses:

- The loads acting on the slab are distributed and predominantly static.
- The spans of the slab are located in the direction of the ribs of the sheet.
- For the study of the slabs in the service phase, elastic analysis is used; for the flexural strength test, plastic theory is considered.
- The results of the tables refer to a composite slab without connectors; that is, they do not describe the behavior of the mixed beam solution.
- The concrete considered in the calculation is an HA-25 (*).
- The yield strength considered in the calculation of the steel of the MT-100 profile is 220 MPa (*), and the partial safety coefficient for Ultimate Limit States of the steel of the profile is 1.10.
- The calculation model used considers the following limit states: in the execution phase, bending represents the ultimate limit state, and deformation represents the service limit state. In the service phase, the ultimate limit states are represented by the bending, the shear forces, the vertical shears, while the ultimate limit state is the deformation.
- Deflection criterion when the ribbed steel sheet acts as a formwork: f⟵l/250 or f⟵20 mm(*), with L= clear span between supports. In the calculation of these deformations, the weight of the sheet and fresh concrete are considered, but the setting loads are not considered, since they are temporary.
- Deflection criterion in the service phase: f⟵l/250 (*) in any case referred to in the tables.
- Coefficients of increase of the loads used in the calculations:
  - Coefficient of increase of own weight: 1.35.
  - Coefficient of increase of permanent loads: 1.35.
  - Coefficient of increase of use loads: 1.50.
- The values of the "Service Load Tables for Profile MT-100" have been calculated in accordance with the specifications of EC4 part 1.1 in the construction phase of the slab, and as a mixed slab in the service phase thereof. The tables refer to a generic type of slab defined in the previous points. The project calculator is responsible for calculating the floor slab according to the specifics of the loads involved, the materials used and others specific to each project. The static overload values contained in the tables are the maximum allowable overload values in service, where the loads represent the sum of the permanent loads and the overloads of use acting on the slab. The weight of the composite slab itself has already been taken into account in the calculations.

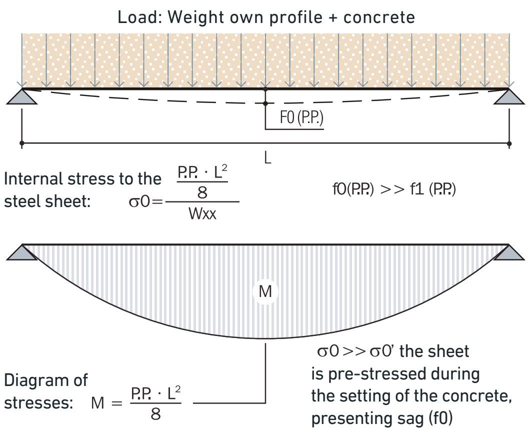
[*] For other values, contact the Technical Department to evaluate the most optimal solution in each case and receive personalized advice.

CALCULATION CONSIDERATIONS

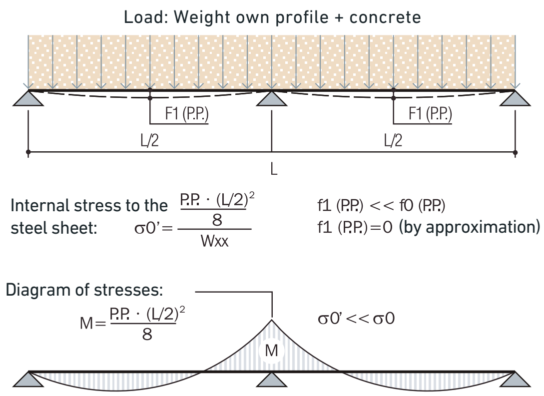
Interpretation of the different shadings in the allowable overload tables: diversity of theoretical approach by insertion of the strut (during the setting of the slab).

The user of the overload tables of the composite slab with MT-100 profile might be surprised to see how, at a certain point, by increasing the thickness of the concrete slab by 1 cm, the allowable overload drops significantly. This jump in the values corresponds to entering into the shoring area, shaded in pink of the tables. This is due to the different theoretical approach that sustains the study and verification of a structure that is detached and that of an attached structure (as set out in Eurocode 4 and Eurocode 3). An unsupported steel sheet, in the phase of setting the floor slab, is deformed proportionally to the weight of the concrete poured.
Once set, the slab presents sagging (f0) and the sheet has an internal tension corresponding to its deformation.
When this slab is loaded with weight (load Q evenly distributed), the maximum value of bending moment (corresponding to load Q) will be recorded in the center of the span. It is time to check the slab at the various stresses present (bending moment, shear stress, bond stress): in almost all cases the slab will break by reaching the maximum bond stress moment. It is fair to say that the load that has determined the slippage between the concrete and the steel sheet is equal to the sum of the slab's own weight and the applied load Q.
In the detached structures, the intermediate strut divides the free span between supports in two, and the sag (f0') that is registered is significantly lower than the sag f0 (registered by the same unshored slab). By approximation it can be said that the sag f0' is equal to 0. During the setting of the concrete, the sheet does not present tension, it being the strut that supports the weight of the poured concrete. Once the concrete has been set, removing the strut and applying a Q load to the structure, the slab is checked for all the stresses present. Once again the collapse occurs by reaching the Ultimate Limit State at bond stress: in this case, the load Q determines the breakage of the slab. In the tables of admissible overload it is not permissible to add the weight of the slab itself to the value recorded during the test to break the slab.
In summary, in a detached structure, it is permissible to add the own weight of the slab to the overload value of registered use, because the structure had already assumed this load (the own weight) before setting: the sag f0 represents the deformation corresponding to the internal stress of the sheet generated by the pouring of the concrete.

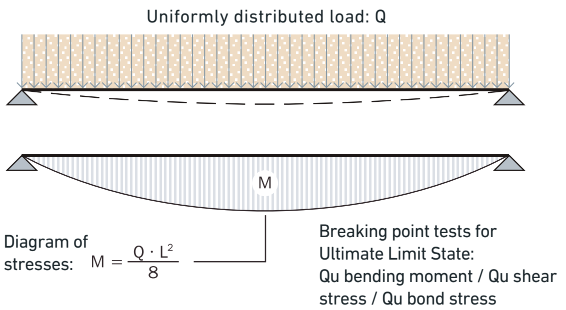
UNSHORED CONSTRUCTION, UNHARDENED STATE



SHORED CONSTRUCTION, UNHARDENED STATE



UNSHORED CONSTRUCTION, HARDENED STATE



SHORED CONSTRUCTION, HARDENED STATE