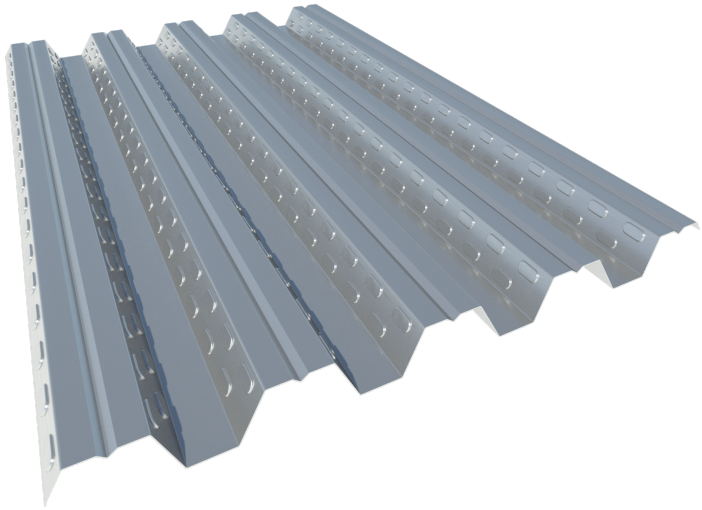
MT-60 COMPOSITE SLAB

COMPOSITE SLABS



RAW MATERIAL
Steel

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

FINISH
Galvanized

USEFUL WIDTH
820 mm (32.28 in.)

	THICKNESS mm (in.)			
	0.75 (0.029)	0.80 (0.031)	1.00 (0.039)	1.20 (0.047)
P (kg/m²)	8.97	9.57	11.97	14.36
I (cm4/m)	58.75	60.38	75.47	90.56
W (cm3/m) - upper fiber	17.79	18.56	23.14	27.68
Ap (mm2/m)	1043.00	1081.85	1352.15	1622.45

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

CE

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-60 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-60 composite slab. This reference line provides the allowable overload data depending on the thickness of the sheet and the thickness 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)	58.8 (2.31)	mm (in.)	±1.5	EN 1090
Wave pitch	205	mm	+4/-1	EN 1090
Width of the ridge and valley	84/58	mm	+4/-1	EN 1090
Useful width (w)	820 (32.28)	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
Execution class	EXC2		EN 1090	

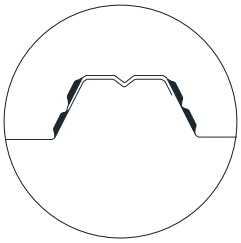
Features of the Profile				
Characteristic	Value	Units	Tolerance / Standarc	
Deviation from straightness	≤to the tolerance	mm	±2/ml (max.10)	EN 1090
Deviation from quadrature	≤to the tolerance	mm	≤ 0.005 w	EN 1090
Deviation of the side overlap	≤to the tolerance	mm	±2 s/500 mm	EN 1090
Sheet thickness	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 EC4	

STANDARDS APPLIED

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.

Units: mm (inches)

SECTION PROFILE



OVERLAP DETAIL

MT-60 - LAYOUT 1 OPENING - 2 SUPPORTS — STATIC OVERLOADS (daN/m2) **THICKNESS 0.75 mm**

SPAN (m) \ H (cm)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	774	889	1005	1120	1236	1351	1467	1582	1698	1468	1562	1656	1750	1844	1938	2032
2.20	650	747	844	941	1038	877	952	1028	1103	1179	1254	1330	1405	1480	1556	1631
2.40	555	638	527	589	650	711	773	834	895	956	1018	1079	1140	1201	1263	1324
2.60	330	381	431	481	531	581	631	681	732	782	832	882	932	982	1032	1082
2.80	271	312	354	394	436	477	518	559	601	642	683	724	766	807	848	889
3.00	222	256	290	324	358	392	426	460	494	528	562	596	630	664	698	732
3.20	182	210	238	266	294	322	350	378	406	434	462	490	518	546	574	602
3.40	149	172	195	218	241	264	287	310	333	356	379	402	425	448	471	494
3.60	120	139	158	177	195	214	233	252	271	289	308	327	346	364	383	402
3.80	96	111	126	142	157	172	187	202	217	233	248	263	278	293	309	324
4.00	75	87	99	111	124	136	148	160	172	184	196	208	220	232	244	256
4.20	57	67	76	85	95	104	113	123	132	142	151	160	170	179	188	198
4.40	41	48	55	62	70	77	84	91	98	105	112	119	126	133	140	147
4.60	28	33	37	42	47	52	57	62	67	72	77	82	87	92	97	102
4.80	15	18	22	25	28	31	34	37	40	43	46	50	53	56	59	62
5.00	4	6	7	9	10	12	13	15	16	18	19	21	22	24	25	27

MT-60 - LAYOUT 2 OPENINGS - 3 SUPPORTS — STATIC OVERLOADS (daN/m2) **THICKNESS 0.75 mm**

SPAN (m) \ H (cm)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	1032	1186	1296	1399	1501	1600	1698	1794	1888	1981	2072	2160	2247	2333	2416	2498
2.20	867	996	1126	1252	1343	1431	1518	1604	1687	1769	1850	1929	2006	2081	2155	2228
2.40	740	851	961	1072	1182	1290	1368	1445	1520	1593	1665	1736	1805	1745	1834	1923
2.60	641	737	832	928	1024	1119	1215	1311	1378	1157	1231	1305	1379	1453	1527	1601
2.80	562	645	729	813	897	980	784	846	909	971	1033	1095	1157	1219	1282	1344
3.00	497	399	451	504	564	609	662	714	767	819	872	924	977	1029	1082	1134
3.20	293	337	382	427	471	516	560	605	649	694	738	783	827	872	917	961
3.40	248	286	324	362	400	438	476	513	551	589	627	665	703	741	779	816
3.60	210	243	275	307	339	372	404	436	468	501	533	565	597	630	662	694
3.80	178	206	233	261	288	315	343	370	398	425	453	480	507	535	562	590
4.00	151	174	197	221	244	267	290	314	337	360	383	407	430	453	477	500
4.20	126	146	166	186	205	225	245	264	284	304	323	343	363	383	402	422
4.40	105	122	138	155	172	188	205	221	238	254	271	288	304	321	337	354
4.60	87	101	114	128	142	156	170	183	197	211	225	239	252	266	280	294
4.80	70	82	93	105	116	127	139	150	161	173	184	195	207	218	229	241
5.00	56	65	74	83	93	102	111	120	129	139	148	157	166	175	184	194

MT-60 - LAYOUT 3 OPENINGS - 4 SUPPORTS — STATIC OVERLOADS (daN/m2) **THICKNESS 0.75 mm**

SPAN (m) \ H (cm)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	967	1112	1256	1400	1545	1678	1780	1881	1981	2078	2173	2267	2358	2448	2536	2622
2.20	813	934	1055	1177	1298	1419	1541	1662	1771	1858	1942	2025	2107	2186	2264	2340
2.40	694	798	901	1005	1108	1212	1316	1419	1523	1626	1730	1824	1897	1609	1691	1773
2.60	601	691	780	870	960	1049	1139	1229	1318	1063	1131	1199	1267	1336	1404	1472
2.80	526	605	684	762	841	919	718	775	832	889	945	1002	1059	1116	1173	1230
3.00	466	363	411	459	507	555	603	651	699	746	794	842	890	938	986	1034
3.20	265	306	346	386	427	467	508	548	589	629	669	710	750	791	831	871
3.40	223	257	292	326	360	394	428	462	497	531	565	599	633	667	702	736
3.60	188	217	246	275	303	332	361	390	419	448	477	506	534	563	592	621
3.80	158	182	206	231	255	280	304	328	353	377	401	426	450	475	499	523
4.00	132	152	173	193	214	234	255	275	296	316	337	357	378	398	419	439
4.20	109	126	143	160	178	195	212	229	246	263	280	297	315	332	349	366
4.40	89	104	118	132	146	160	174	189	203	217	231	245	259	274	288	302
4.60	72	84	95	107	118	130	142	153	165	176	188	199	211	223	234	246
4.80	57	66	75	85	94	103	112	122	131	140	150	159	168	177	187	196
5.00	43	50	58	65	72	79	87	94	101	108	116	123	130	137	145	152

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-60 - LAYOUT 1 OPENING - 2 SUPPORTS — STATIC OVERLOADS (daN/m2) **THICKNESS 0.8 mm**

SPAN (m) \ H (cm)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	807	928	1048	1168	1289	1409	1530	1650	1771	1546	1645	1744	1842	1941	2040	2139
2.20	678	779	880	981	1082	924	1004	1083	1163	1242	1322	1402	1481	1561	1640	1720
2.40	578	665	557	621	686	751	816	880	945	1010	1074	1139	1204	1269	1333	1398
2.60	349	402	456	509	562	615	668	721	774	827	880	933	986	1039	1092	1146
2.80	287	331	374	418	462	506	550	593	637	681	725	768	812	856	900	943
3.00	236	272	309	345	381	417	453	490	526	562	598	634	671	707	743	779
3.20	194	224	254	284	314	344	374	404	434	464	494	524	554	584	614	643
3.40	159	184	209	233	258	283	308	332	357	382	406	431	456	481	505	530
3.60	130	150	170	191	211	231	252	272	292	312	333	353	373	394	414	434
3.80	104	121	138	154	171	187	204	220	237	253	270	286	303	320	336	353
4.00	83	96	109	123	136	149	163	176	189	202	216	229	242	256	269	282
4.20	64	74	85	95	106	116	127	137	148	158	169	179	190	200	211	221
4.40	47	55	63	72	80	88	96	104	112	120	128	136	144	152	160	168
4.60	33	39	45	51	56	62	68	74	80	86	92	98	104	109	115	121
4.80	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
5.00	9	11	13	16	18	20	22	25	27	29	31	34	36	38	41	43

MT-60 - LAYOUT 2 OPENINGS - 3 SUPPORTS — STATIC OVERLOADS (daN/m2) **THICKNESS 0.8 mm**

SPAN (m) \ H (cm)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	1076	1237	1348	1451	1552	1651	1749	1844	1938	2031	2121	2209	2296	2381	2465	2546
2.20	904	1038	1173	1299	1389	1477	1564	1649	1733	1814	1895	1973	2050	2126	2199	2271
2.40	771	886	1001	1116	1231	1333	1410	1487	1561	1634	1706	1776	1845	1836	1929	2023
2.60	667	767	866	966	1065	1165	1265	1349	1416	1218	1296	1374	1452	1530	1608	1686
2.80	584	671	758	845	933	1020	826	892	958	1023	1089	1154	1220	1285	1351	1416
3.00	516	421	476	532	587	643	698	754	809	865	920	975	1031	1086	1142	1197
3.20	309	357	404	451	498	545	592	639	687	734	781	828	875	922	969	1016
3.40	263	303	343	383	423	464	504	544	584	624	664	705	745	785	825	865
3.60	223	258	292	326	360	395	429	463	498	532	566	600	635	669	703	738
3.80	190	219	248	278	307	336	365	395	424	453	482	512	541	570	599	629
4.00	161	186	211	236	261	285	310	335	360	385	410	435	460	485	510	535
4.20	136	157	178	199	220	242	263	284	305	326	348	369	390	411	432	454
4.40	114	132	150	167	185	203	221	239	257	275	293	311	329	347	365	383
4.60	94	109	124	140	155	170	185	200	215	230	245	260	275	290	305	320
4.80	77	90	102	115	127	140	152	165	177	190	202	215	227	240	252	265
5.00	62	72	83	93	103	113	124	134	144	154	164	175	185	195	205	216

MT-60 - LAYOUT 3 OPENINGS - 4 SUPPORTS — STATIC OVERLOADS (daN/m2) **THICKNESS 0.8 mm**

SPAN (m) \ H (cm)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	1009	1160	1310	1461	1611	1731	1833	1934	2033	2130	2225	2318	2409	2499	2586	2672
2.20	847	973	1100	1226	1353	1479	1606	1731	1818	1904	1989	2072	2153	2232	2310	2386
2.40	723	831	939	1047	1154	1262	1370	1478	1586	1694	1793	1867	1939	1694	1780	1866
2.60	625	719	812	905	999	1092	1186	1279	1372	1120	1192	1264	1336	1407	1479	1551
2.80	547	629	711	793	874	956	757	817	877	938	998	1058	1118	1178	1238	1298
3.00	484	384	434	485	536	586	637	688	738	789	840	890	941	991	1042	1093
3.20	281	324	366	409	452	495	538	581	623	666	709	752	795	838	880	923
3.40	237	273	310	346	382	418	455	491	527	564	600	636	673	709	745	782
3.60	200	231	262	292	323	354	385	415	446	477	508	539	569	600	631	662
3.80	168	194	221	247	273	299	325	351	377	403	429	455	481	508	534	560
4.00	141	163	185	207	229	251	273	295	318	340	362	384	406	428	450	472
4.20	118	136	155	173	192	210	229	247	266	284	303	321	340	358	377	396
4.40	97	113	128	143	159	174	190	205	221	236	252	267	283	298	313	329
4.60	79	92	105	117	130	143	156	168	181	194	207	219	232	245	258	270
4.80	63	73	84	94	104	115	125	136	146	156	167	177	187	198	208	219
5.00	49	57	65	74	82	90	98	106	115	123	131	139	148	156	164	172

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.

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MT-60 - LAYOUT 1 OPENING - 2 SUPPORTS — STATIC OVERLOADS (daN/m2) **THICKNESS 1.0 mm**

SPAN (m) \ H (cm)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	956	1098	1240	1382	1525	1667	1809	1951	2093	2235	2377	2520	2662	2804	2491	2612
2.20	801	920	1039	1158	1277	1396	1515	1634	1753	1872	1623	1720	1818	1915	2013	2110
2.40	682	783	884	986	1087	1189	1008	1088	1167	1247	1327	1407	1486	1566	1646	1726
2.60	588	676	763	634	699	765	831	897	963	1029	1095	1161	1227	1293	1359	1425
2.80	361	416	471	526	581	635	690	745	800	855	910	965	1019	1074	1129	1184
3.00	301	347	392	438	484	530	576	622	667	713	759	805	851	897	942	988
3.20	251	289	328	366	405	443	481	520	558	597	635	673	712	750	789	827
3.40	209	241	274	306	338	370	403	435	467	499	532	564	596	628	660	693
3.60	174	201	228	255	282	309	336	363	390	417	444	471	498	525	552	579
3.80	144	167	189	212	234	257	279	302	325	347	370	392	415	437	460	482
4.00	118	137	156	175	193	212	231	249	268	287	306	324	343	362	381	399
4.20	96	111	127	142	158	173	189	204	219	235	250	266	281	296	312	327
4.40	77	89	102	114	127	139	152	164	177	189	202	214	227	239	252	264
4.60	60	70	79	89	99	109	119	129	139	149	159	169	179	189	199	209
4.80	44	52	60	68	75	83	91	99	106	114	122	130	137	145	153	160
5.00	31	37	43	48	54	60	65	71	77	83	88	94	100	106	111	117

MT-60 - LAYOUT 2 OPENINGS - 3 SUPPORTS — STATIC OVERLOADS (daN/m2) **THICKNESS 1.0 mm**

SPAN (m) \ H (cm)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	1231	1337	1441	1544	1644	1743	1840	1936	2029	2121	2211	2299	2385	2469	2552	2633
2.20	1068	1200	1292	1384	1473	1561	1647	1732	1815	1896	1976	2054	2131	2205	2279	2350
2.40	909	1044	1168	1250	1330	1409	1486	1562	1636	1709	1781	1850	1919	1985	2051	2115
2.60	785	901	1018	1135	1210	1281	1350	1419	1486	1551	1615	1678	1739	1799	1858	1915
2.80	685	787	889	991	1093	1171	1234	1296	1356	1415	1473	1416	1497	1577	1657	1738
3.00	605	694	784	874	964	794	862	930	999	1067	1135	1204	1272	1340	1408	1477
3.20	538	618	698	561	619	678	736	794	853	911	970	1028	1087	1145	1203	1262
3.40	482	380	430	480	531	581	631	681	731	782	832	882	932	982	1032	1083
3.60	283	326	370	413	456	499	542	586	629	672	715	758	802	845	888	931
3.80	243	280	318	355	392	430	467	504	541	579	616	653	690	728	765	802
4.00	209	241	273	305	338	370	402	434	466	498	531	563	595	627	659	691
4.20	179	207	235	262	290	318	346	373	401	429	457	484	512	540	568	595
4.40	153	177	201	225	249	273	297	320	344	368	392	416	440	464	488	512
4.60	130	151	171	192	212	233	253	274	294	315	335	356	377	397	418	438
4.80	110	128	145	163	180	198	215	233	250	268	285	303	320	338	356	373
5.00	92	107	122	137	152	167	182	196	211	226	241	256	271	286	300	315

MT-60 - LAYOUT 3 OPENINGS - 4 SUPPORTS — STATIC OVERLOADS (daN/m2) **THICKNESS 1.0 mm**

SPAN (m) \ H (cm)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	1195	1373	1510	1617	1723	1827	1929	2029	2127	2223	2318	2411	2501	2590	2677	2763
2.20	1001	1150	1299	1447	1544	1637	1729	1817	1904	1990	2074	2156	2237	2315	2393	2468
2.40	851	979	1106	1232	1359	1479	1560	1640	1718	1795	1870	1944	2016	2086	2155	2223
2.60	736	845	954	1064	1173	1283	1392	1490	1561	1630	1698	1764	1829	1892	1812	1900
2.80	642	738	834	929	1025	1120	1216	1311	1407	1489	1550	1303	1377	1451	1525	1599
3.00	567	651	735	820	904	728	790	853	916	978	1041	1104	1167	1229	1292	1355
3.20	504	579	654	512	566	619	672	726	779	833	886	940	993	1046	1100	1153
3.40	452	345	391	437	483	528	574	620	665	711	757	802	848	894	939	985
3.60	256	295	334	373	412	452	491	530	569	608	647	687	726	765	804	843
3.80	218	252	286	319	353	386	420	454	487	521	554	588	622	655	689	722
4.00	186	215	244	273	301	330	359	388	417	446	474	503	532	561	590	618
4.20	158	183	208	232	257	282	306	331	356	380	405	430	454	479	504	528
4.40	134	155	176	197	218	239	260	281	302	324	345	366	387	408	429	450
4.60	113	131	148	166	184	202	220	238	256	274	291	309	327	345	363	381
4.80	94	109	124	139	154	169	184	199	214	229	245	260	275	290	305	320
5.00	77	90	102	115	127	140	153	165	178	190	203	215	228	241	253	266

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-60 - LAYOUT 1 OPENING - 2 SUPPORTS — STATIC OVERLOADS (daN/m2) **THICKNESS 1.2 mm**

SPAN (m) \ H (cm)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	1119	1286	1453	1619	1786	1953	2120	2286	2453	2620	2786	2953	3120	3286	3409	3515
2.20	936	1075	1214	1354	1493	1632	1772	1911	2050	2190	2329	2469	2608	2747	2430	2547
2.40	795	913	1032	1150	1269	1387	1506	1624	1743	1512	1609	1706	1803	1899	1996	2093
2.60	685	787	889	991	1093	1195	1013	1094	1174	1255	1335	1415	1496	1576	1657	1737
2.80	597	686	775	645	712	780	847	914	982	1049	1116	1184	1251	1318	1386	1453
3.00	526	428	485	542	598	655	712	769	825	882	939	996	1052	1109	1166	1223
3.20	313	361	409	457	505	553	601	649	697	745	793	841	889	937	985	1033
3.40	264	305	345	386	427	467	508	549	590	630	671	712	753	793	834	875
3.60	223	257	292	326	361	395	430	465	499	534	568	603	638	672	707	741
3.80	187	217	246	276	305	334	364	393	422	452	481	510	540	569	598	628
4.00	157	182	207	232	257	282	307	331	356	381	406	431	456	481	505	530
4.20	131	152	173	194	215	236	257	278	299	320	341	362	383	404	425	446
4.40	108	126	144	161	179	196	214	232	249	267	284	302	320	337	355	372
4.60	88	103	118	132	147	162	176	191	205	220	235	249	264	279	293	308
4.80	71	83	95	107	119	131	143	155	167	179	191	203	215	227	239	251
5.00	55	65	75	84	94	104	113	123	133	142	152	162	171	181	191	200

MT-60 - LAYOUT 2 OPENINGS - 3 SUPPORTS — STATIC OVERLOADS (daN/m2) **THICKNESS 1.2 mm**

SPAN (m) \ H (cm)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	1321	1427	1531	1633	1733	1831	1928	2023	2116	2207	2296	2384	2470	2554	2636	2716
2.20	1187	1281	1373	1464	1553	1641	1727	1811	1893	1974	2054	2131	2208	2282	2355	2426
2.40	1060	1160	1242	1324	1404	1482	1559	1634	1708	1781	1852	1921	1989	2055	2120	2184
2.60	913	1050	1132	1205	1277	1348	1417	1485	1552	1617	1681	1743	1804	1864	1922	1979
2.80	796	915	1034	1103	1169	1233	1296	1357	1418	1476	1534	1591	1646	1700	1752	1803
3.00	701	806	910	1015	1075	1133	1190	1246	1210	1293	1376	1458	1508	1557	1605	1651
3.20	623	716	809	901	992	1046	896	967	1038	1110	1181	1252	1323	1394	1466	1518
3.40	558	641	724	807	649	711	772	834	895	957	1018	1080	1141	1203	1264	1326
3.60	503	578	455	508	562	615	668	722	775	828	882	935	988	1041	1095	1148
3.80	302	348	394	441	487	533	580	626	672	719	765	811	858	904	950	997
4.00	261	302	342	382	423	463	504	544	584	625	665	705	746	786	826	867
4.20	227	262	297	332	367	402	438	473	508	543	578	614	649	684	719	754
4.40	196	227	258	288	319	350	380	411	442	472	503	534	564	595	626	656
4.60	170	196	223	250	276	303	330	357	383	410	437	463	490	517	543	570
4.80	146	169	193	216	239	262	285	309	332	355	378	401	425	448	471	494
5.00	125	145	165	186	206	226	246	266	286	306	326	346	366	387	407	427

MT-60 - LAYOUT 3 OPENINGS - 4 SUPPORTS — STATIC OVERLOADS (daN/m2) **THICKNESS 1.2 mm**

SPAN (m) \ H (cm)	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
2.00	1383	1494	1603	1710	1815	1918	2020	2120	2217	2313	2407	2500	2590	2678	2765	2850
2.20	1170	1342	1439	1534	1628	1720	1810	1899	1986	2071	2155	2237	2317	2395	2472	2547
2.40	994	1142	1290	1388	1472	1555	1636	1715	1793	1870	1944	2018	2089	2159	2228	2295
2.60	856	984	1111	1239	1340	1415	1488	1560	1630	1699	1766	1832	1897	1960	2021	2081
2.80	747	858	969	1080	1191	1295	1362	1427	1490	1553	1614	1673	1732	1789	1844	1899
3.00	657	755	853	951	1049	1147	1245	1311	1114	1190	1266	1343	1419	1495	1572	1648
3.20	584	671	758	845	932	1019	822	888	953	1018	1084	1149	1215	1280	1345	1411
3.40	523	601	679	757	594	650	706	763	819	875	932	988	1044	1101	1157	1213
3.60	471	542	414	463	511	560	609	657	706	755	803	852	901	949	998	1046
3.80	273	315	357	399	441	484	526	568	610	652	694	736	778	820	862	905
4.00	235	272	308	345	381	418	454	491	527	564	600	637	673	710	746	783
4.20	203	234	266	298	329	361	392	424	456	487	519	551	582	614	646	677
4.40	174	202	229	256	284	311	339	366	393	421	448	476	503	530	558	585
4.60	149	173	197	220	244	268	291	315	339	362	386	410	433	457	481	505
4.80	127	148	168	189	209	229	250	270	291	311	331	352	372	393	413	433
5.00	108	125	143	160	178	195	213	230	248	265	283	300	318	335	353	370

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

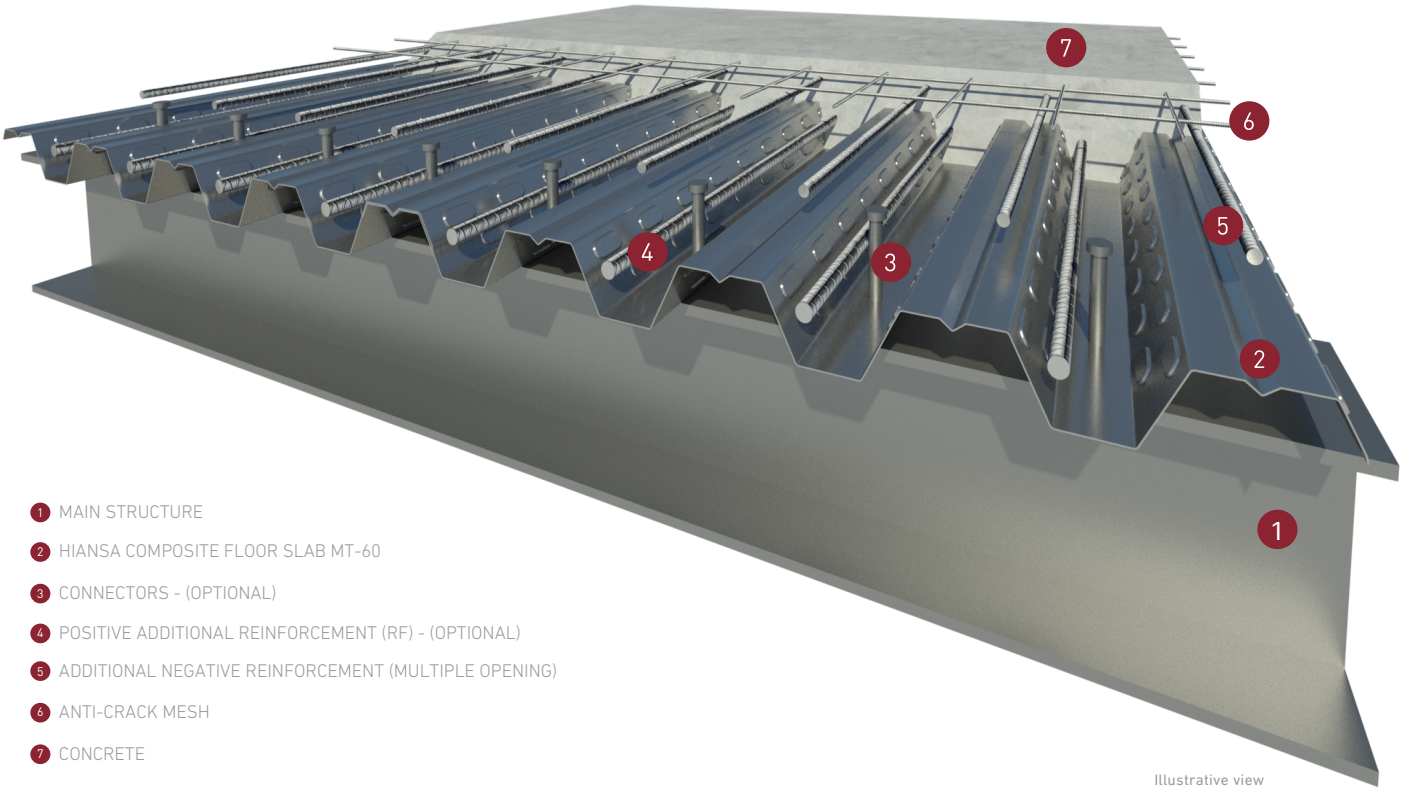
Shore up center of the opening

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-60 COMPOSITE SLAB

TYPE DETAILS



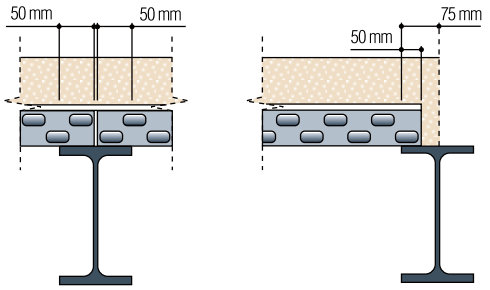
1. MAIN STRUCTURE
2. HIANSA COMPOSITE FLOOR SLAB MT-60
3. CONNECTORS - (OPTIONAL)
4. POSITIVE ADDITIONAL REINFORCEMENT (RF) - (OPTIONAL)
5. ADDITIONAL NEGATIVE REINFORCEMENT (MULTIPLE OPENING)
6. ANTI-CRACK MESH
7. CONCRETE

Illustrative view

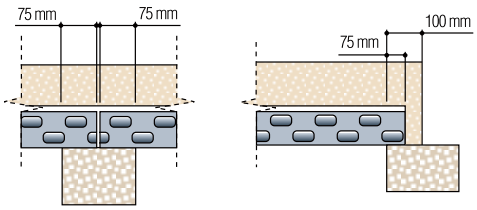
Section type MT-60 composite slab, in which all the reinforcements that can be placed according to the calculation requirements set by the Designer are indicated. Even connectors that are welded or bolted will be necessary when the slab is required to work integrally with the supporting metal beam.

CONDITION OF SUPPORT OF THE SHEETS ON BEAMS

SUPPORT ON STEEL AND CONCRETE	
DUAL SUPPORT	END SUPPORT

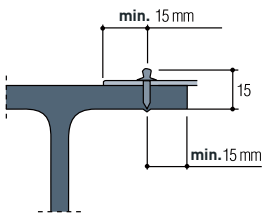


SUPPORT ON OTHER MATERIALS (BRICK OR BLOCK)	
DUAL SUPPORT	END SUPPORT

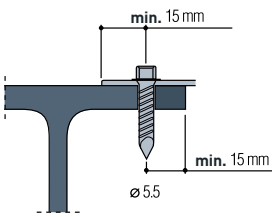


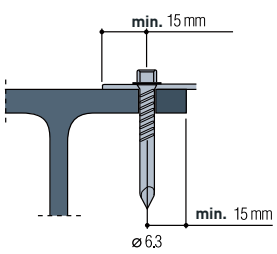
The attachment of the slab to the structure will be by screw, nail or welding, at the discretion of the Designer and always respecting the minimum measurements indicated for each case in the attached figures. It is recommended to attach each sheet one at a time and check at the end that they are all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

FASTENING BY GUN



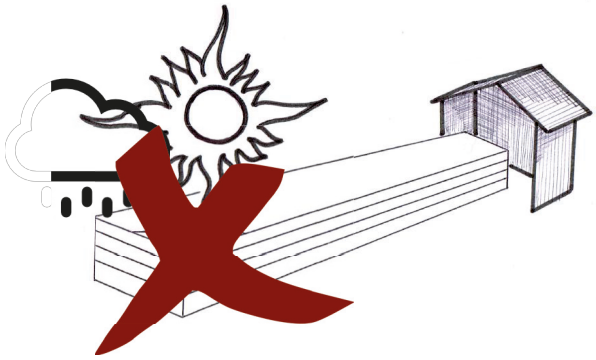
FASTENING BY SCREW

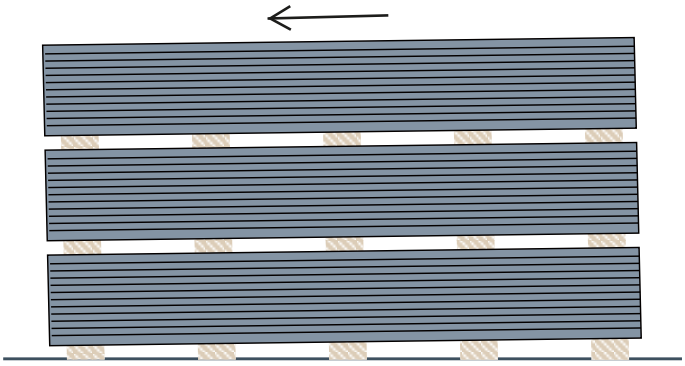




STOCKING OF MATERIAL

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.

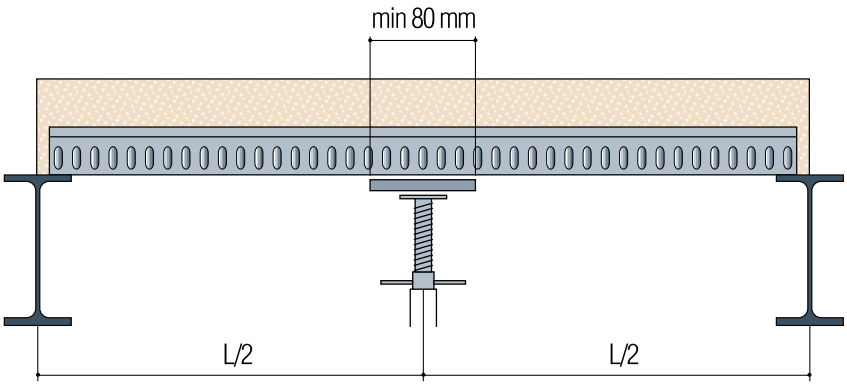




Elevation view

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.



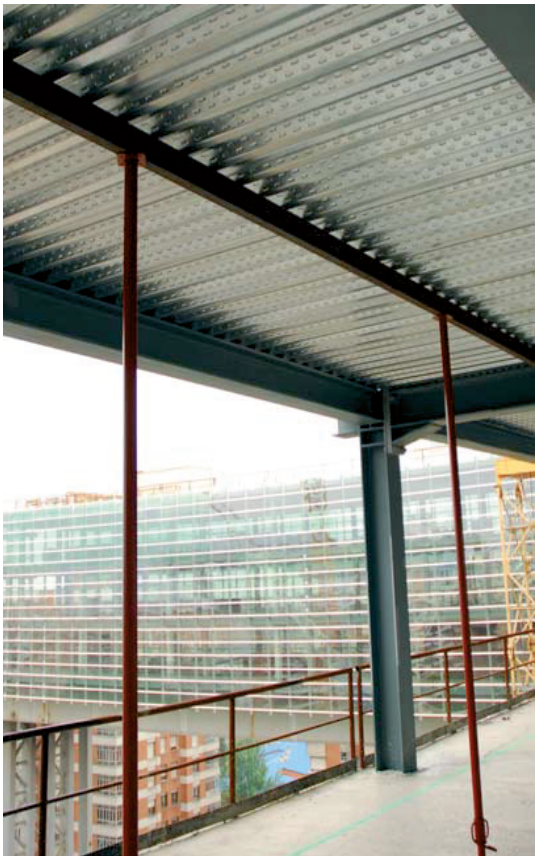
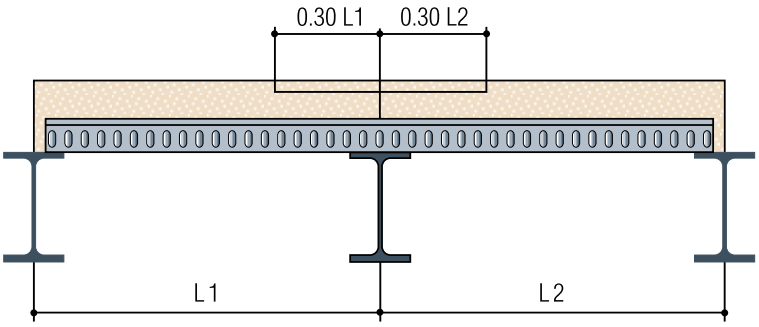


Image of temporary strutting

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-60	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-60 e=0.75 mm	1.67	1.91	2.15	2.39	2.63	2.87	3.11	3.35	3.59	3.83	4.07	4.31	4.55	4.79	5.03	5.27
	MT-60 e=0.8 mm	1.68	1.92	2.16	2.4	2.64	2.88	3.12	3.36	3.6	3.84	4.08	4.32	4.56	4.8	5.04	5.28
	MT-60 e=1.0 mm	1.69	1.93	2.17	2.41	2.65	2.9	3.14	3.38	3.62	3.86	4.1	4.34	4.58	4.82	5.06	5.3
	MT-60 e=1.2 mm	1.72	1.96	2.2	2.44	2.68	2.92	3.16	3.4	3.64	3.88	4.12	4.36	4.6	4.84	5.08	5.32

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-60 e=0.75 mm	0.066	0.076	0.086	0.096	0.106	0.116	0.126	0.136	0.146	0.156	0.166	0.176	0.186	0.196	0.206	0.216
	MT-60 e=0.8 mm	0.066	0.076	0.086	0.096	0.106	0.116	0.126	0.136	0.146	0.156	0.166	0.176	0.186	0.196	0.206	0.216
	MT-60 e=1.0 mm	0.066	0.076	0.086	0.096	0.106	0.116	0.126	0.136	0.146	0.156	0.166	0.176	0.186	0.196	0.206	0.216
	MT-60 e=1.2 mm	0.066	0.076	0.086	0.096	0.106	0.116	0.126	0.136	0.146	0.156	0.166	0.176	0.186	0.196	0.206	0.216

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 (*).

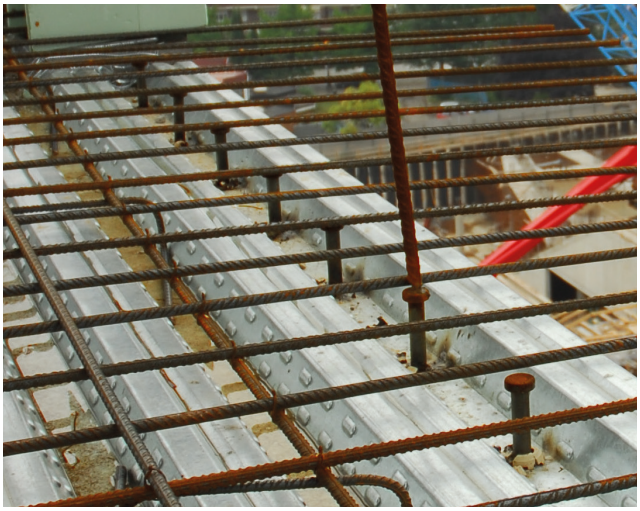
(*) Contact our Technical Department for cases in which an R factor greater than 30 minutes is required, in order to evaluate the most optimal solution in each case and receive personalized advice.

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 startingv 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 (R 1).
- 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 direction 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-60 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-60" 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-60 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 shored structure and an unshored 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 opening. 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 shored 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 an unshored 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.