

Solar systems from Schweizer



Data sheet PV mounting system

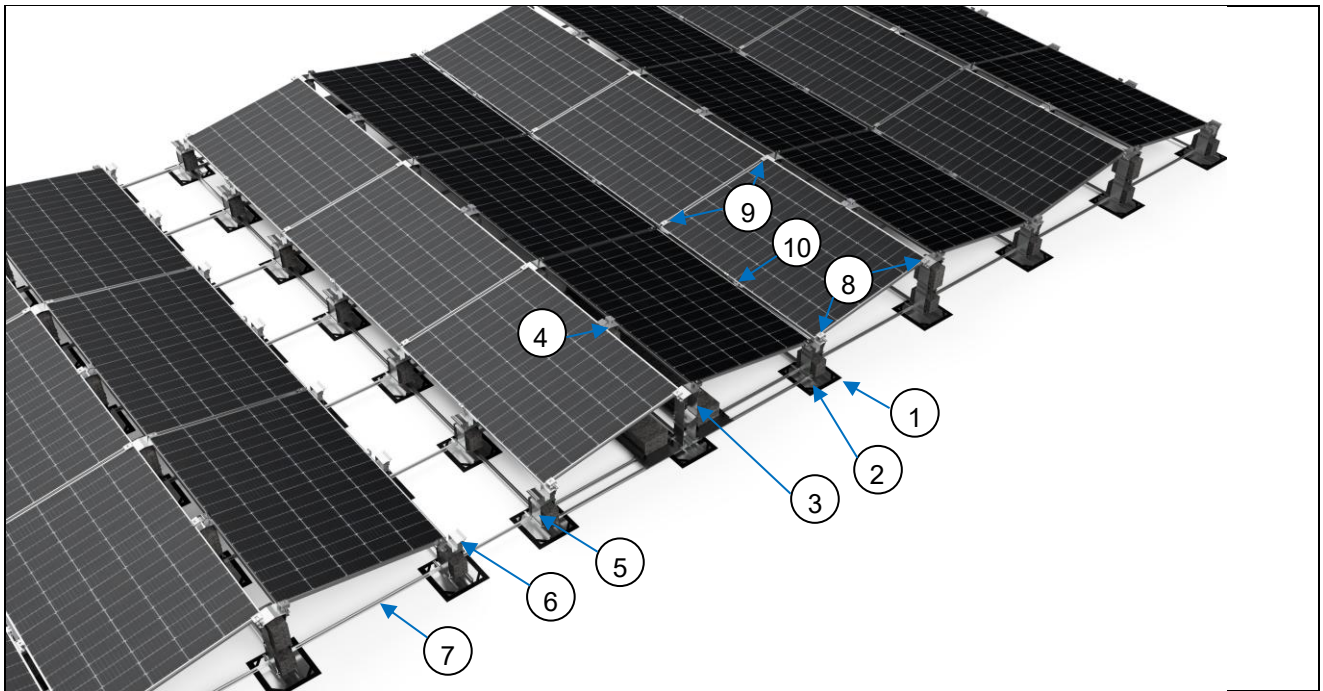
MSP Green Roof MSP-FR-G







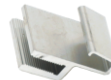

Read carefully before use and store in a safe place.



MSP-FR-G



1		MSP-FR-EW-PSF	Protective layer
2		MSP-FR-EW-BP	Base profile
3		MSP-FR-EW-SH90	Support high
4		MSP-FR-EW-SMH90	Support middle high
5		MSP-FR-G-AS	Adapter support
6		MSP-FR-EW-SL8/SL10 MSP-FR-S-SL8/SL10	Support (east-west) Support (south)
7		MSP-FR-EW-Cxxxx	Connection channel
8		MSP-PR-EC / -ECB / -ECG / -ECBG	End clamp

9		MSP-PR-MC / -MCB / -MCG / -MCBG	Middle clamp
10		MSP-FR-LC / -LCB	Complementary clamp low
	 	MSP-FR-S MSP-FR-TS	Screw M6 x 16 Screw 6.3 x 20 R (lightning current capable connection)
		MSP-FR-GS	Screw 6 x 60
		MSP-FR-CHE	Cable holder with edge-clip
		MSP-FR-CH	Cable holder clip
		MSP-FR-C-CL	Connection channel clip
		MSP-FR-OC33	Optimizer clamp 33 mm

1 Roof requirements

Slope	≤3.0° (optionally with on-site connection to the roof substructure up to 10°)
Unevenness	≤+2.5°, ≤-2.5°, ≤±1.25° Base plates should lie flat against each other. Individual plants may need to be cut back or removed. Height differences in the substrate should be levelled out.
Substrate	For extensive greening with stable green roof substrate. Layer thickness according to manufacturer's specifications.
Coefficient of friction	Relevant for design, minimum requirement depending on wind load and field geometry
Permanent compressive strength	≥ approx. 10 kN/m ² (depending on boundary conditions)

2 System properties

Block size max.	15 m x 15 m
Minimum block size	6 modules
System height	525 – 545 mm
Ground clearance MSP-FR-G	300 mm
Minimum edge distance	150 mm
Module tilt angle	8.6° – 12.4° (depending on module width)
Module width	926 mm – 1315 mm
Module length	1555 mm – 2399 mm
Module height	28 mm – 45 mm (up to 50 mm with prior loosening of the screw)
Ballast width	100 mm
Ballast length	200 mm
Ballast height	40 mm – 80 mm

2.1 System geometry, dimensions in east-west direction

Pavement dimensions - scale setting centred at 15/15 each.

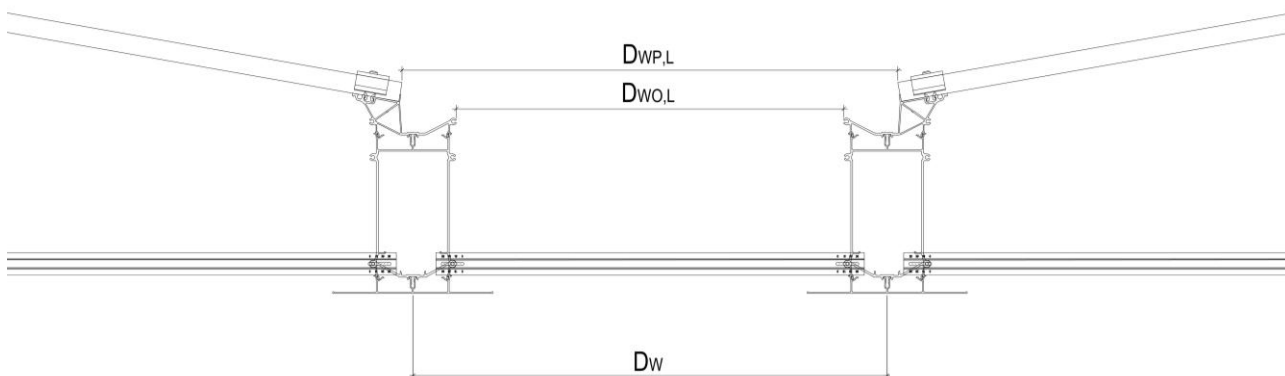


Fig. 1 : Walkway at the eaves – 30 mm module

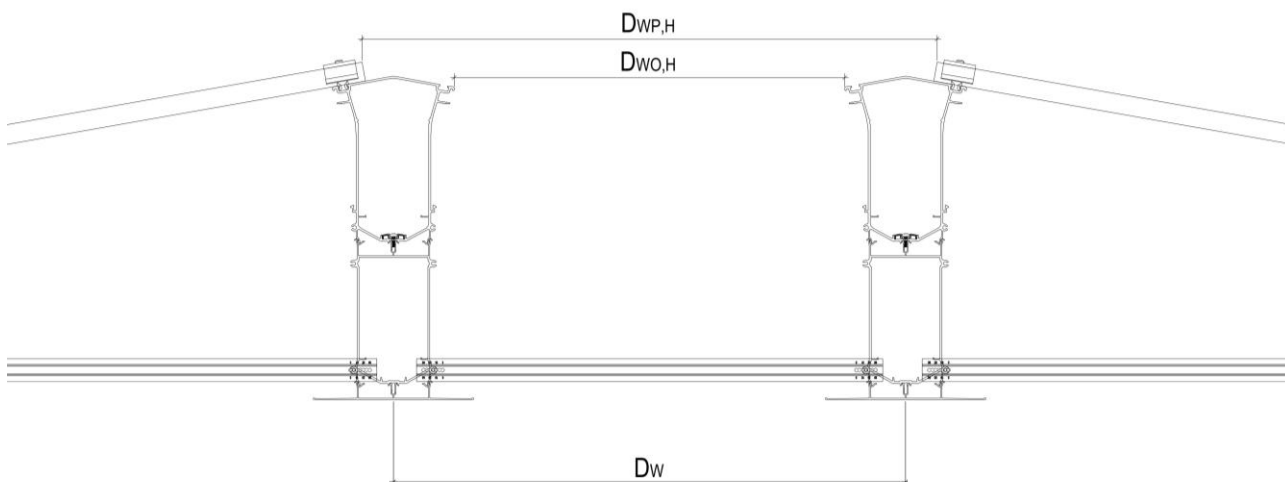
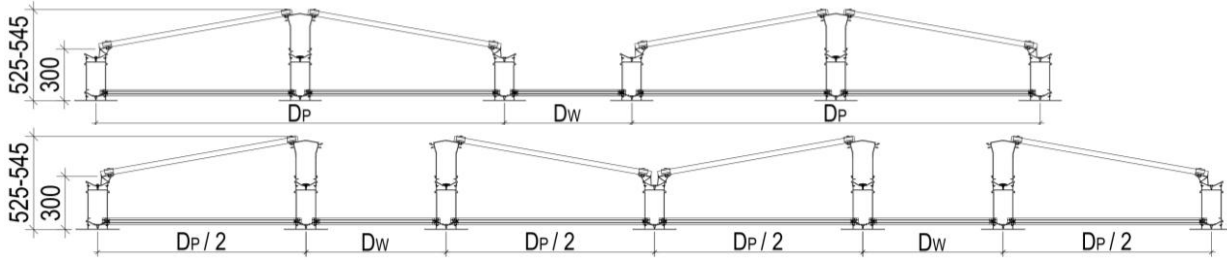


Fig.2 : Walkway at the ridge – 30 mm module

Item	D _w	D _{wo,L}	D _{wp,L}	D _{wo,H}	D _{wp,H}
Without pavement	0 mm	0 mm	44 mm	0 mm	92 mm
MSP-FR-C0230	301 mm	166 mm	345 mm	112 mm	395 mm
MSP-FR-C0400	471 mm	336 mm	515 mm	282 mm	565 mm
MSP-FR-C0566	637 mm	502 mm	681 mm	448 mm	731 mm
MSP-FR-C0625	696 mm	-	-	507 mm	790 mm
MSP-FR-C0666	737 mm	602 mm	781 mm	-	-
MSP-FR-C0725	796 mm	-	-	607 mm	890 mm
MSP-FR-C0935	1006 mm	871 mm	1050 mm	-	-
MSP-FR-C1065	1136 mm	1001 mm	1180 mm	-	-
MSP-FR-C1639	1710 mm	1575 mm	1754 mm	-	-
MSP-FR-C1964	2035 mm	1900 mm	2079 mm	-	-

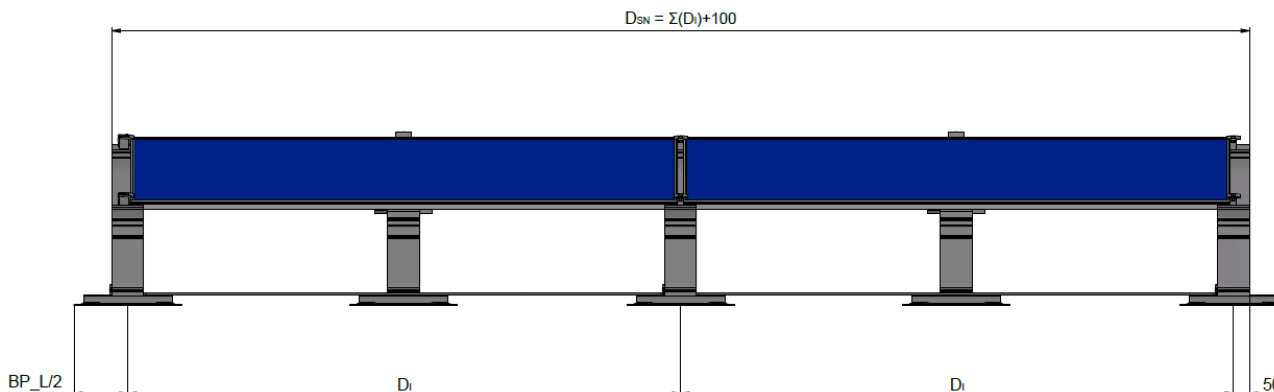
Grid dimensions, scale setting short connection channel



	Min. Module width	Max. Module width	Scale Support height	Scale Support low	Inclination	DP	Angle of attack nominal
C0935	926 mm	930 mm	0	0	12.4°	1952 mm	10°
	931 mm	935 mm	0	5	12.3°	1962 mm	10°
	936 mm	940 mm	5	5	12.3°	1972 mm	10°
	941 mm	945 mm	5	10	12.2°	1982 mm	10°
	946 mm	950 mm	10	10	12.1°	1992 mm	10°
	951 mm	955 mm	10	15	12.1°	2002 mm	10°
	956 mm	960 mm	15	15	12.0°	2012 mm	10°
	961 mm	965 mm	15	20	11.9°	2022 mm	10°
	966 mm	970 mm	20	20	11.8°	2032 mm	10°
	971 mm	975 mm	20	25	11.8°	2042 mm	10°
	976 mm	980 mm	25	25	11.7°	2052 mm	10°
C1000	981 mm	985 mm	25	30	11.7°	2062 mm	10°
	986 mm	990 mm	30	30	11.6°	2072 mm	10°
	991 mm	995 mm	0	0	11.5°	2083 mm	10°
	996 mm	1000 mm	0	5	11.5°	2093 mm	10°
	1001 mm	1005 mm	5	5	11.4°	2103 mm	10°
	1006 mm	1010 mm	5	10	11.3°	2113 mm	10°
	1011 mm	1015 mm	10	10	11.3°	2123 mm	10°
	1016 mm	1020 mm	10	15	11.2°	2133 mm	10°
	1021 mm	1025 mm	15	15	11.2°	2143 mm	10°
	1026 mm	1030 mm	15	20	11.1°	2153 mm	10°
	1031 mm	1035 mm	20	20	11.0°	2163 mm	10°
C1065	1036 mm	1040 mm	20	25	11.0°	2173 mm	10°
	1041 mm	1045 mm	25	25	10.9°	2183 mm	10°
	1046 mm	1050 mm	25	30	10.9°	2193 mm	10°
	1051 mm	1055 mm	30	30	10.8°	2203 mm	10°
	1056 mm	1060 mm	0	0	10.8°	2213 mm	10°
	1061 mm	1065 mm	0	5	10.7°	2223 mm	10°
	1066 mm	1070 mm	5	5	10.7°	2233 mm	10°
	1071 mm	1075 mm	5	10	10.6°	2243 mm	10°
	1076 mm	1080 mm	10	10	10.5°	2253 mm	10°
	1081 mm	1085 mm	10	15	10.5°	2263 mm	10°
	1086 mm	1090 mm	15	15	10.4°	2273 mm	10°
C1131	1091 mm	1095 mm	15	20	10.4°	2283 mm	10°
	1096 mm	1100 mm	20	20	10.3°	2293 mm	10°
	1101 mm	1105 mm	20	25	10.3°	2303 mm	10°
	1106 mm	1110 mm	25	25	10.2°	2313 mm	10°
	1111 mm	1115 mm	25	30	10.2°	2323 mm	10°
	1116 mm	1120 mm	30	30	10.1°	2333 mm	10°
	1121 mm	1125 mm	0	0	10.1°	2345 mm	10°
	1126 mm	1130 mm	0	5	10.0°	2355 mm	10°
	1131 mm	1135 mm	5	5	10.0°	2365 mm	10°
	1136 mm	1140 mm	5	10	9.9°	2375 mm	10°
	1141 mm	1145 mm	10	10	9.9°	2385 mm	10°
	1146 mm	1150 mm	10	15	9.8°	2395 mm	10°
	1151 mm	1155 mm	15	15	9.8°	2405 mm	10°
	1156 mm	1160 mm	15	20	9.8°	2415 mm	10°
	1161 mm	1165 mm	20	20	9.7°	2425 mm	10°
	1166 mm	1170 mm	20	25	9.7°	2435 mm	10°
	1171 mm	1175 mm	25	25	9.6°	2445 mm	10°
	1176 mm	1180 mm	25	30	9.6°	2455 mm	10°
	1181 mm	1185 mm	30	30	9.5°	2465 mm	10°

	Min. Module width	Max. Module width	Scale Support height	Scale Support low	Inclination	D _P	Angle of attack nominal
C-1197	1186 mm	1190 mm	0	0	9.5°	2477 mm	10°
	1191 mm	1195 mm	0	5	9.4°	2487 mm	10°
	1196 mm	1200 mm	5	5	9.4°	2497 mm	10°
	1201 mm	1205 mm	5	10	9.4°	2507 mm	10°
	1206 mm	1210 mm	10	10	9.3°	2517 mm	10°
	1211 mm	1215 mm	10	15	9.3°	2527 mm	10°
	1216 mm	1220 mm	15	15	9.2°	2537 mm	10°
	1221 mm	1225 mm	15	20	9.2°	2547 mm	10°
	1226 mm	1230 mm	20	20	9.2°	2557 mm	10°
	1231 mm	1235 mm	20	25	9.1°	2567 mm	10°
	1236 mm	1240 mm	25	25	9.1°	2577 mm	10°
C-1263	1241 mm	1245 mm	25	30	9.0°	2587 mm	10°
	1246 mm	1250 mm	30	30	9.0°	2597 mm	10°
	1251 mm	1255 mm	0	0	9.0°	2609 mm	10°
	1256 mm	1260 mm	0	5	9.0°	2619 mm	10°
	1261 mm	1265 mm	5	5	8.9°	2629 mm	8°
	1266 mm	1270 mm	5	10	8.9°	2639 mm	8°
	1271 mm	1275 mm	10	10	8.9°	2649 mm	8°
	1276 mm	1280 mm	10	15	8.8°	2659 mm	8°
	1281 mm	1285 mm	15	15	8.8°	2669 mm	8°
	1286 mm	1290 mm	15	20	8.8°	2679 mm	8°
	1291 mm	1295 mm	20	20	8.7°	2689 mm	8°
	1296 mm	1300 mm	20	25	8.7°	2699 mm	8°
	1301 mm	1305 mm	25	25	8.7°	2709 mm	8°
	1306 mm	1310 mm	25	30	8.6°	2719 mm	8°
	1311 mm	1315 mm	30	30	8.6°	2729 mm	8°

2.2 System geometry, dimensions in north-south direction



Dimensions of base profiles

Nominal length of base profile	Protective layer	BP_L/2	Area
150 mm	195 mm	67.5 mm	0.034 m ²
300 mm	340 mm	140 mm	0.070 m ²
450 mm	490 mm	215 mm	0.108 m ²
600 mm	640 mm	290 mm	0.145 m ²
900 mm	940 mm	440 mm	0.220 m ²
1200 mm	1240 mm	590 mm	0.295 m ²

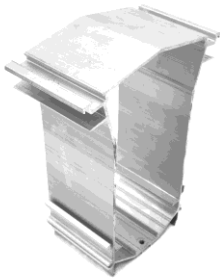
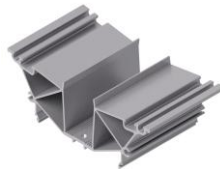
Grid dimensions, scale setting long connection channel



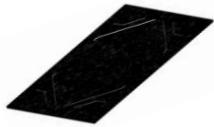
	Module length min.	Module length max.	Scale Support on the left	Scale Support on the right	D _i
C1574	1555 mm	1558 mm	0	0	1577 mm
	1559 mm	1563 mm	0	5	1582 mm
	1564 mm	1568 mm	5	5	1587 mm
	1569 mm	1573 mm	5	10	1592 mm
	1574 mm	1578 mm	10	10	1597 mm
	1579 mm	1583 mm	10	15	1602 mm
	1584 mm	1588 mm	15	15	1607 mm
	1589 mm	1593 mm	15	20	1612 mm
	1594 mm	1598 mm	20	20	1617 mm
	1599 mm	1603 mm	20	25	1622 mm
	1604 mm	1608 mm	25	25	1627 mm
	1609 mm	1613 mm	25	30	1632 mm
1614 mm	1619 mm	30	30	1637 mm	
C1639	1620 mm	1623 mm	0	0	1642 mm
	1624 mm	1628 mm	0	5	1647 mm
	1629 mm	1633 mm	5	5	1652 mm
	1634 mm	1638 mm	5	10	1657 mm
	1639 mm	1643 mm	10	10	1662 mm
	1644 mm	1648 mm	10	15	1667 mm
	1649 mm	1653 mm	15	15	1672 mm
	1654 mm	1658 mm	15	20	1677 mm
	1659 mm	1663 mm	20	20	1682 mm
	1664 mm	1668 mm	20	25	1687 mm
	1669 mm	1673 mm	25	25	1692 mm
	1674 mm	1678 mm	25	30	1697 mm
1679 mm	1684 mm	30	30	1702 mm	
C1704	1685 mm	1688 mm	0	0	1707 mm
	1689 mm	1693 mm	0	5	1712 mm
	1694 mm	1698 mm	5	5	1717 mm
	1699 mm	1703 mm	5	10	1722 mm
	1704 mm	1708 mm	10	10	1727 mm
	1709 mm	1713 mm	10	15	1732 mm
	1714 mm	1718 mm	15	15	1737 mm
	1719 mm	1723 mm	15	20	1742 mm
	1724 mm	1728 mm	20	20	1747 mm
	1729 mm	1733 mm	20	25	1752 mm
	1734 mm	1738 mm	25	25	1757 mm
	1739 mm	1743 mm	25	30	1762 mm
1744 mm	1749 mm	30	30	1767 mm	
C1769	1750 mm	1753 mm	0	0	1772 mm
	1754 mm	1758 mm	0	5	1777 mm
	1759 mm	1763 mm	5	5	1782 mm
	1764 mm	1768 mm	5	10	1787 mm
	1769 mm	1773 mm	10	10	1792 mm
	1774 mm	1778 mm	10	15	1797 mm
	1779 mm	1783 mm	15	15	1802 mm
	1784 mm	1788 mm	15	20	1807 mm
	1789 mm	1793 mm	20	20	1812 mm
	1794 mm	1798 mm	20	25	1817 mm
	1799 mm	1803 mm	25	25	1822 mm
	1804 mm	1808 mm	25	30	1827 mm
1809 mm	1814 mm	30	30	1832 mm	


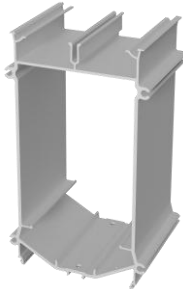
	Module length min.	Module length max.	Scale Support on the left	Scale Support on the right	D _i
C1834	1815	1818	0	0	1837 mm
	1819 mm	1823 mm	0	5	1842 mm
	1824 mm	1828 mm	5	5	1847 mm
	1829 mm	1833 mm	5	10	1852 mm
	1834 mm	1838 mm	10	10	1857 mm
	1839 mm	1843 mm	10	15	1862 mm
	1844 mm	1848 mm	15	15	1867 mm
	1849 mm	1853 mm	15	20	1872 mm
	1854 mm	1858 mm	20	20	1877 mm
	1859 mm	1863 mm	20	25	1882 mm
	1864 mm	1868 mm	25	25	1887 mm
	1869 mm	1873 mm	25	30	1892 mm
1874 mm	1879 mm	30	30	1897 mm	
C1899	1880 mm	1883 mm	0	0	1902 mm
	1884 mm	1888 mm	0	5	1907 mm
	1889 mm	1893 mm	5	5	1912 mm
	1894 mm	1898 mm	5	10	1917 mm
	1899 mm	1903 mm	10	10	1922 mm
	1904 mm	1908 mm	10	15	1927 mm
	1909 mm	1913 mm	15	15	1932 mm
	1914 mm	1918 mm	15	20	1937 mm
	1919 mm	1923 mm	20	20	1942 mm
	1924 mm	1928 mm	20	25	1947 mm
	1929 mm	1933 mm	25	25	1952 mm
	1934 mm	1938 mm	25	30	1957 mm
1939 mm	1944 mm	30	30	1962 mm	
C1964	1945 mm	1948 mm	0	0	1967 mm
	1949 mm	1953 mm	0	5	1972 mm
	1954 mm	1958 mm	5	5	1977 mm
	1959 mm	1963 mm	5	10	1982 mm
	1964 mm	1968 mm	10	10	1987 mm
	1969 mm	1973 mm	10	15	1992 mm
	1974 mm	1978 mm	15	15	1997 mm
	1979 mm	1983 mm	15	20	2002 mm
	1984 mm	1988 mm	20	20	2007 mm
	1989 mm	1993 mm	20	25	2012 mm
	1994 mm	1998 mm	25	25	2017 mm
	1999 mm	2003 mm	25	30	2022 mm
2004 mm	2009 mm	30	30	2027 mm	
C2029	2010 mm	2013 mm	0	0	2032 mm
	2014 mm	2018 mm	0	5	2037 mm
	2019 mm	2023 mm	5	5	2042 mm
	2024 mm	2028 mm	5	10	2047 mm
	2029 mm	2033 mm	10	10	2052 mm
	2034 mm	2038 mm	10	15	2057 mm
	2039 mm	2043 mm	15	15	2062 mm
	2044 mm	2048 mm	15	20	2067 mm
	2049 mm	2053 mm	20	20	2072 mm
	2054 mm	2058 mm	20	25	2077 mm
	2059 mm	2063 mm	25	25	2082 mm
	2064 mm	2068 mm	25	30	2087 mm
2069 mm	2074 mm	30	30	2092 mm	




	Module length min.	Module length max.	Scale Support on the left	Scale Support on the right	D ₁
C2094	2075 mm	2078 mm	0	0	2097 mm
	2079 mm	2083 mm	0	5	2102 mm
	2084 mm	2088 mm	5	5	2107 mm
	2089 mm	2093 mm	5	10	2112 mm
	2094 mm	2098 mm	10	10	2117 mm
	2099 mm	2103 mm	10	15	2122 mm
	2104 mm	2108 mm	15	15	2127 mm
	2109 mm	2113 mm	15	20	2132 mm
	2114 mm	2118 mm	20	20	2137 mm
	2119 mm	2123 mm	20	25	2142 mm
	2124 mm	2128 mm	25	25	2147 mm
	2129 mm	2133 mm	25	30	2152 mm
	2134 mm	2139 mm	30	30	2157 mm
C2159	2140 mm	2143 mm	0	0	2162 mm
	2144 mm	2148 mm	0	5	2167 mm
	2149 mm	2153 mm	5	5	2172 mm
	2154 mm	2158 mm	5	10	2177 mm
	2159 mm	2163 mm	10	10	2182 mm
	2164 mm	2168 mm	10	15	2187 mm
	2169 mm	2173 mm	15	15	2192 mm
	2174 mm	2178 mm	15	20	2197 mm
	2179 mm	2183 mm	20	20	2202 mm
	2184 mm	2188 mm	20	25	2207 mm
	2189 mm	2193 mm	25	25	2212 mm
	2194 mm	2198 mm	25	30	2217 mm
	2199 mm	2204 mm	30	30	2222 mm
C2224	2205 mm	2208 mm	0	0	2227 mm
	2209 mm	2213 mm	0	5	2232 mm
	2214 mm	2218 mm	5	5	2237 mm
	2219 mm	2223 mm	5	10	2242 mm
	2224 mm	2228 mm	10	10	2247 mm
	2229 mm	2233 mm	10	15	2252 mm
	2234 mm	2238 mm	15	15	2257 mm
	2239 mm	2243 mm	15	20	2262 mm
	2244 mm	2248 mm	20	20	2267 mm
	2249 mm	2253 mm	20	25	2272 mm
	2254 mm	2258 mm	25	25	2277 mm
	2259 mm	2263 mm	25	30	2282 mm
	2264 mm	2269 mm	30	30	2287 mm
C2289	2270 mm	2273 mm	0	0	2292 mm
	2274 mm	2278 mm	0	5	2297 mm
	2279 mm	2283 mm	5	5	2302 mm
	2284 mm	2288 mm	5	10	2307 mm
	2289 mm	2293 mm	10	10	2312 mm
	2294 mm	2298 mm	10	15	2317 mm
	2299 mm	2303 mm	15	15	2322 mm
	2304 mm	2308 mm	15	20	2327 mm
	2309 mm	2313 mm	20	20	2332 mm
	2314 mm	2318 mm	20	25	2337 mm
	2319 mm	2323 mm	25	25	2342 mm
	2324 mm	2328 mm	25	30	2347 mm
	2329 mm	2334 mm	30	30	2352 mm
C2354	2335 mm	2338 mm	0	0	2357 mm
	2339 mm	2343 mm	0	5	2362 mm
	2344 mm	2348 mm	5	5	2367 mm
	2349 mm	2353 mm	5	10	2372 mm
	2354 mm	2358 mm	10	10	2377 mm
	2359 mm	2363 mm	10	15	2382 mm
	2364 mm	2368 mm	15	15	2387 mm
	2369 mm	2373 mm	15	20	2392 mm
	2374 mm	2378 mm	20	20	2397 mm
	2379 mm	2383 mm	20	25	2402 mm
	2384 mm	2388 mm	25	25	2407 mm
	2389 mm	2393 mm	25	30	2412 mm
	2394 mm	2399 mm	30	30	2417 mm



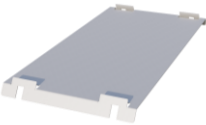

3 Components



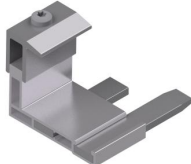
Description	Support high	Support	Support
Designation	MSP-FR-EW-SH90	MSP-FR-EW-SL8	MSP-FR-EW-SL10
Illustration			
Material	EN AW-6063 T66 - EN 755-2	EN AW-6063 T66 - EN 12020-2	



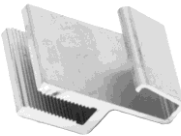

Description	Connection channel	Base profile	Protective layer
Designation	MSP-FR-EW-C0230 MSP-FR-EW-C0400 MSP-FR-EW-C0566 MSP-FR-EW-C0666 MSP-FR-EW-C0625 MSP-FR-EW-C0725 MSP-FR-EW-C0935 MSP-FR-EW-C1000 MSP-FR-EW-C1065 MSP-FR-EW-C1131 MSP-FR-EW-C1197 MSP-FR-EW-C1262	MSP-FR-EW-C1574 MSP-FR-EW-C1639 MSP-FR-EW-C1704 MSP-FR-EW-C1769 MSP-FR-EW-C1834 MSP-FR-EW-C1899 MSP-FR-EW-C1964 MSP-FR-EW-C2029 MSP-FR-EW-C2094 MSP-FR-EW-C2159 MSP-FR-EW-C2224 MSP-FR-EW-C2289 MSP-FR-EW-C2354	MSP-FR-EW-BP 300 MSP-FR-EW-BP 450 MSP-FR-EW-BP 600 MSP-FR-EW-BP 900 MSP-FR-EW-BP 1200
Illustration			
Material	EN AW-6063 T66 - EN 755-2	EN AW-6063 T66 - EN 755-2	PES fleece 500 g/m ² 3-4 mm thick, slotted

Description	Support middle high	Adapter support
Design	MSP-FR-EW-SMH90	MSP-FR-G-AS
Illustration		
Material	EN AW-6063 T66 - EN 755-2	EN AW-6063 T66 - EN 755-2

Description	Screw	Screw	Screw
Designation	MSP-FR-S M6 x 16	MSP-FR-TS 6.3 x 20 R (lightning current carrying capacity)	MSP-FR-GS 6 x 60
Illustration			
Material	Carbon steel / ZnNi-coated >10 µm	Carbon steel / ZnNi-coated >10 µm	Carbon steel / ZnNi-coated >10 µm

Description	Ballast tray holder	Ballast tray clamp	Ballast carrier start plate	Ballast fixation
Designation	MSP-FR-BT 1620-1749 MSP-FR-BT 1750-1879 MSP-FR-BT 1880-2009 MSP-FR-BT 2010-2139 MSP-FR-BT 2140-2269 MSP-FR-BT 2270-2399	MPS-FR-BC	MSP-FR-EW-BS	MSP-FR-BF
Illustration				
Material	S320GD + ZM250	Spring strip steel sheet - EN 10088-2	S320GD + ZM250	S320GD + ZM250

Description	End clamp	Middle clamp	Complementary clamp low
Designation	MSP-PR-EC MSP-PR-ECG MSP-PR-ECB MSP-PR-ECBG DIBt approval: abZ-14.4-926	MSP-PR-MC MSP-PR-MCG MSP-PR-MCB MSP-PR-MCBG DIBt approval: abZ-14.4-926	MSP-FR-LC MSP-FR-LCB
Illustration			
Material	<u>Clamp</u> EN AW-6063 T66 - EN 755-2 <u>Screw</u> A2-70 - ISO 3506-1 <u>Lock washer</u> PE-HD or PVC <u>Nut</u> A4-70 - ISO 3506-2	<u>Clamp</u> EN AW-6063 T66 - EN 755-2 <u>Screw</u> A2-70 - ISO 3506-1 <u>Lock washer</u> PE-HD or PVC	<u>Clamp</u> EN AW-6063 T66 - EN 755-2 <u>Screw</u> A2-70 - ISO 3506-1 <u>O-ring</u> NBR
Note	For a centre support for modules with a height of more than 30 mm, use the complementary clamp high MSP-FR-HC or MSP-FR-HCB. The load capacity corresponds to that of the complementary clamp low MSP-FR-LC.		

Description	Cable holder with edge-clip	Cable holder clip	Connection channel clip	Optimizer clamp 33 mm
Designation	MSP-FR-CHE	MSP-FR-CH	MSP-FR-C-CL	MSP-FR-OC33
Illustration				
Material	PA6.6 UV resistant	PA6.6 UV resistant	EN AW-6060 T66 - EN 755-2	1.4310 stainless spring steel

4 Rated resistances of components and connections

In order to verify the resistance values of MSP-FR flat roof systems, the values of each component must be taken into account individually.

By the customer:

- Load-bearing capacity of the roof
- Compressive strength of the thermal insulation
- Static friction between the roof waterproofing and the protective layer
- Design value of the module according to the manufacturer's specifications

According to this data sheet:

- Support MSP-FR-EW-SL8/SL10
- Support high MSP-FR-EW-SH
- Support middle high MSP-FR-EW-SMH
- Adapter support MSP-FR-G-AS
- Connection channel MSP-FR-EW-C
- Ballast support MSP-FR-BT
- End clamp MSP-PR-EC/-ECB/-ECG/-ECBG
- Middle clamp MSP-PR-MC/-MCG/-MCB/-MCBG
- Complementary clamp low MSP-FR-LC/-LCB

The component with the lowest resistance is relevant for dimensioning.

All resistances are calculated in accordance with the following standards and guidelines:

- DIN EN 1990 (EC1)
- DIN EN 1993-1-1 (EC3)
- DIN EN 1999-1-1 (EC9)
- VDI 2230 Sheet 1
- DIBt approval: abZ Z-14.4-926

The resistance values only apply if the complete MSP-FR-G system from Schweizer is used and the installation is carried out in accordance with the MSP-FR-G PV mounting system MSP green roof installation instructions.

4.1 Resistance values from the support MSP-FR-EW-SL8/SL10 and MSP-FR-S-SL8/SL10 with MSP-FR-G-AS

Compressive resistance	N_{Rd} in kN	5.40
Tensile resistance	N_{Rd} in kN	-3.0
Shear resistance	S_{Rd} in kN	0.4

Compressive strength	N_{Rd} in kN	2.70
Tensile strength	N_{Rd} in kN	-3.0
Shear resistance	S_{Rd} in kN	0.4

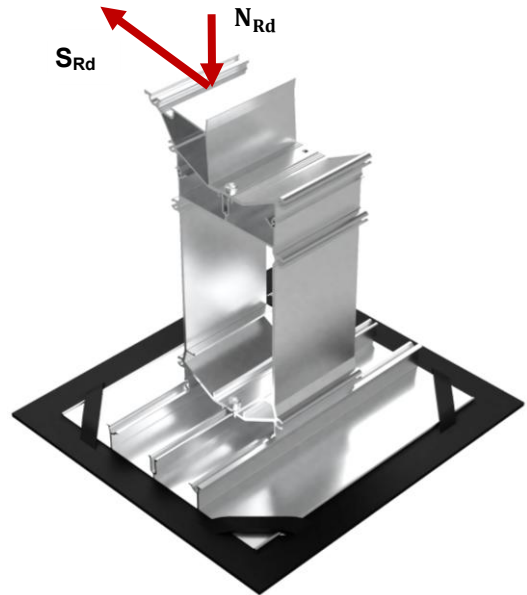
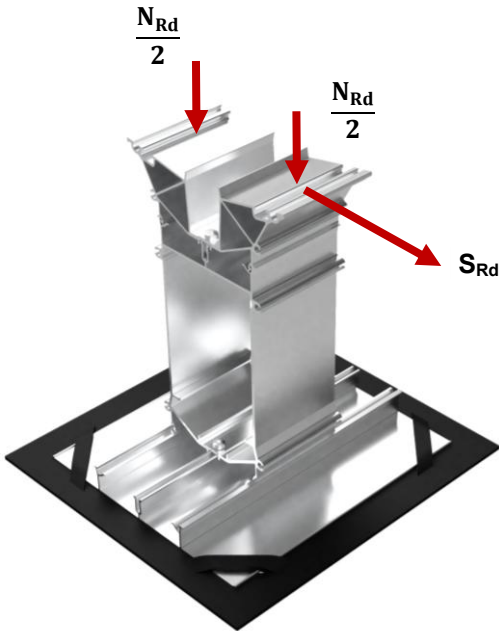


Fig. 3: Vectors of the resistances of MSP-FR-EW-SL8/SL10

Fig. 4: Vectors of the resistances of MSP-FR-S-SL8/SL10

4.2 Resistances of the supports MSP-FR-EW-SH 90 and MSP-FR-EW-SMH90 with MSP-FR-G-AS

Compressive resistance	N_{Rd} in kN	5.52
Tensile resistance	N_{Rd} in kN	-6.96
Shear resistance	S_{Rd} in kN	0.48

Compressive strength	N_{Rd} in kN	4.85
Tensile strength	N_{Rd} in kN	-6.13
Shear resistance	S_{Rd} in kN	0.43

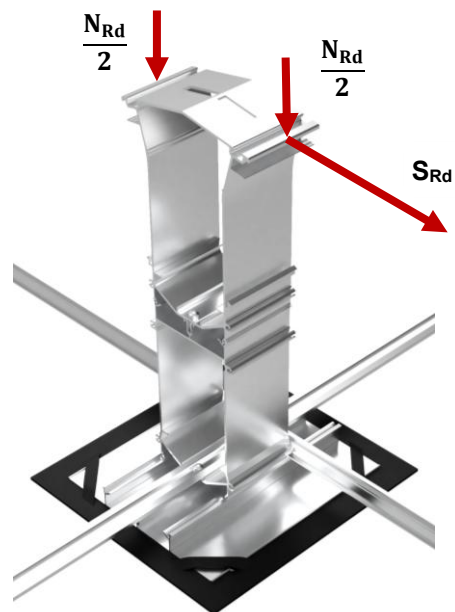
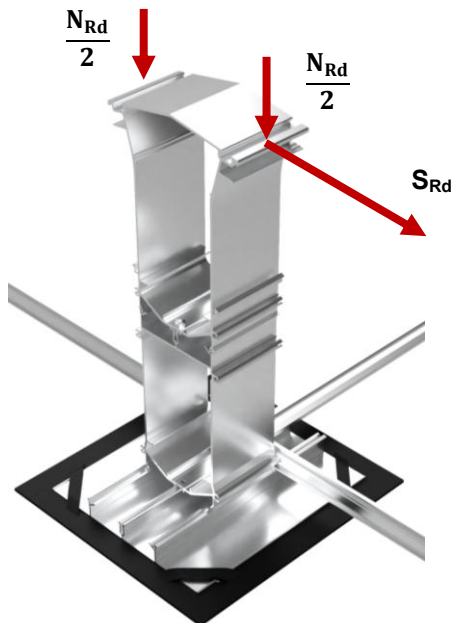


Fig.5 : Vectors of the resistances of MSP-FR-EW-SH90

Fig.6 : Vectors of the resistances of MSP-FR-EW-SMH90

4.3 Rated resistance of the MSP-FR-EW-C connection channel (even load distribution)

The following resistances apply to double connection channels MSP-FR-EW-C, even when using ballast fixation MSP-FR-BF.

Module width range	mm	950-1010	1011-1075	1076-1140	1141-1205	1206-1270	1271-1335
Compressive strength	N_{Rd} in kN	0.77	0.67	0.59	0.53	0.47	0.4

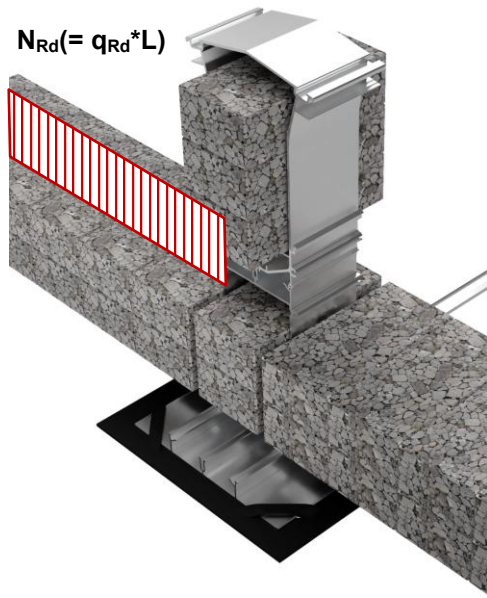


Fig.7 : Vectors of resistance of MSP-FR-EW-C and MSP-FR-BF

4.4 Rated resistance of the MSP-FR-BT ballast tray holder pair (stiffened connection channels)

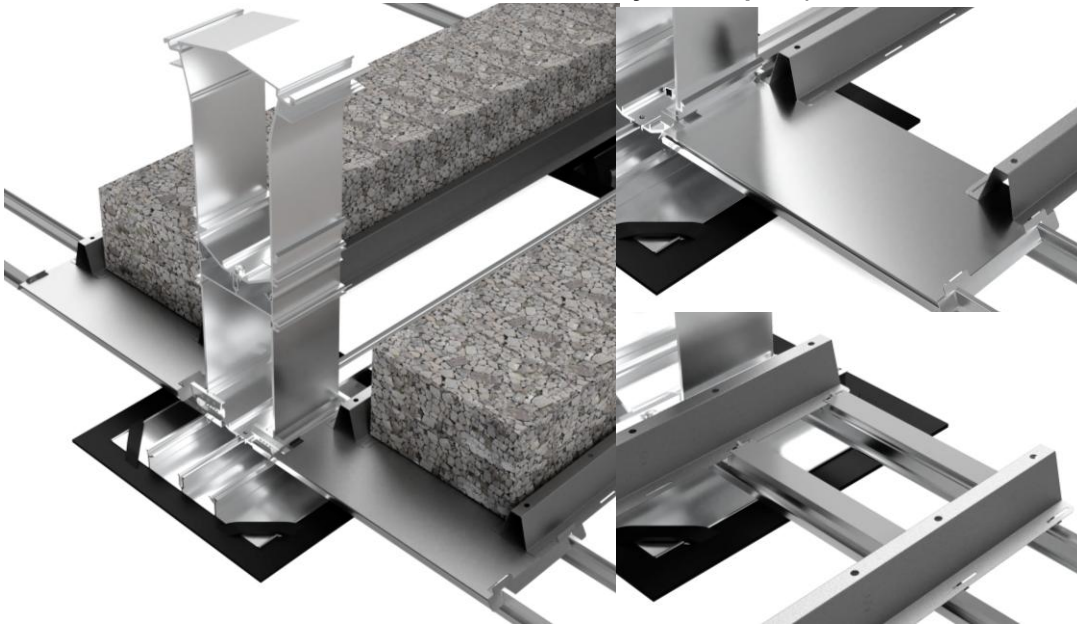


Fig.8 : Stiffening of the connection channels

4.5 Load capacity of the ballast tray holder pair MSP-FR-BT without middle support

Module width range	mm	950-1010	1011-1075	1076-1140	1141-1205	1206-1270	1271-1335
Pressure resistance (two supports)	N_{Rd} in kN	1.12	1.04	0.96	0.9	0.86	0.82

The load capacities are limited by the load-bearing capacity of the connection channels.

4.6 Load capacity of ballast tray holder pair MSP-FR-BT with middle support

Module width range	mm	950-1335	
Compressive strength (three supports)	N_{Rd} in kN	1.16	

The load capacity is limited by the load-bearing capacity of the ballast tray holders.

4.7 Rated resistance of the MSP-PR-MC/G & MSP-PR-MCB/G middle clamps

Rated load capacity of the middle clamp in accordance with abZ Z-14.4-926.

Rated resistance to tension	F_{tension} in kN	6.14
Rated resistance transverse	$V_{\text{transverse}}$ in kN	2.2
Rated resistance longitudinal	$V_{\text{longitudinal}}$ in kN	2.04

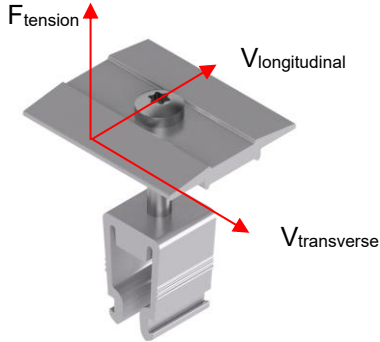


Fig.9 : Vectors of the resistances of the middle terminal

4.8 Rated resistances of the MSP-PR-EC/G & MSP-PR-ECB/G end clamps

Rated load capacity of the end clamp in accordance with abZ Z-14.4-926.

Rated resistance to tension	F_{tension} in kN	3.76
Rated resistance transverse	$V_{\text{transverse}}$ in kN	1.3
Rated resistance longitudinal	$V_{\text{longitudinal}}$ in kN	1.93

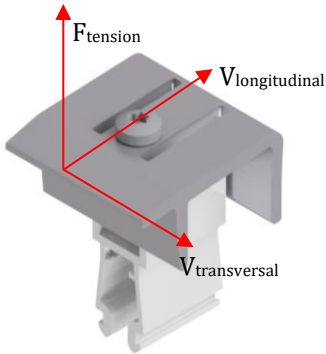


Fig.10 : Vectors of the resistance of the end clamp

4.9 Rated resistances of the complementary clamp low MSP-FR-LC/B

Rated value of the load capacity of the complementary clamp low.

Rated resistance to tension	F_{zug} in kN	1.89
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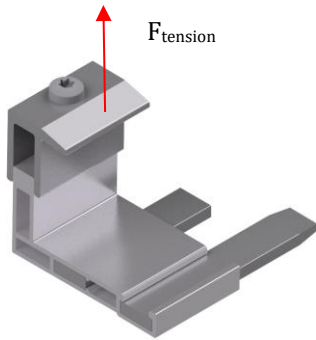


Fig.5 : Vectors of the resistance of the complementary clamp low