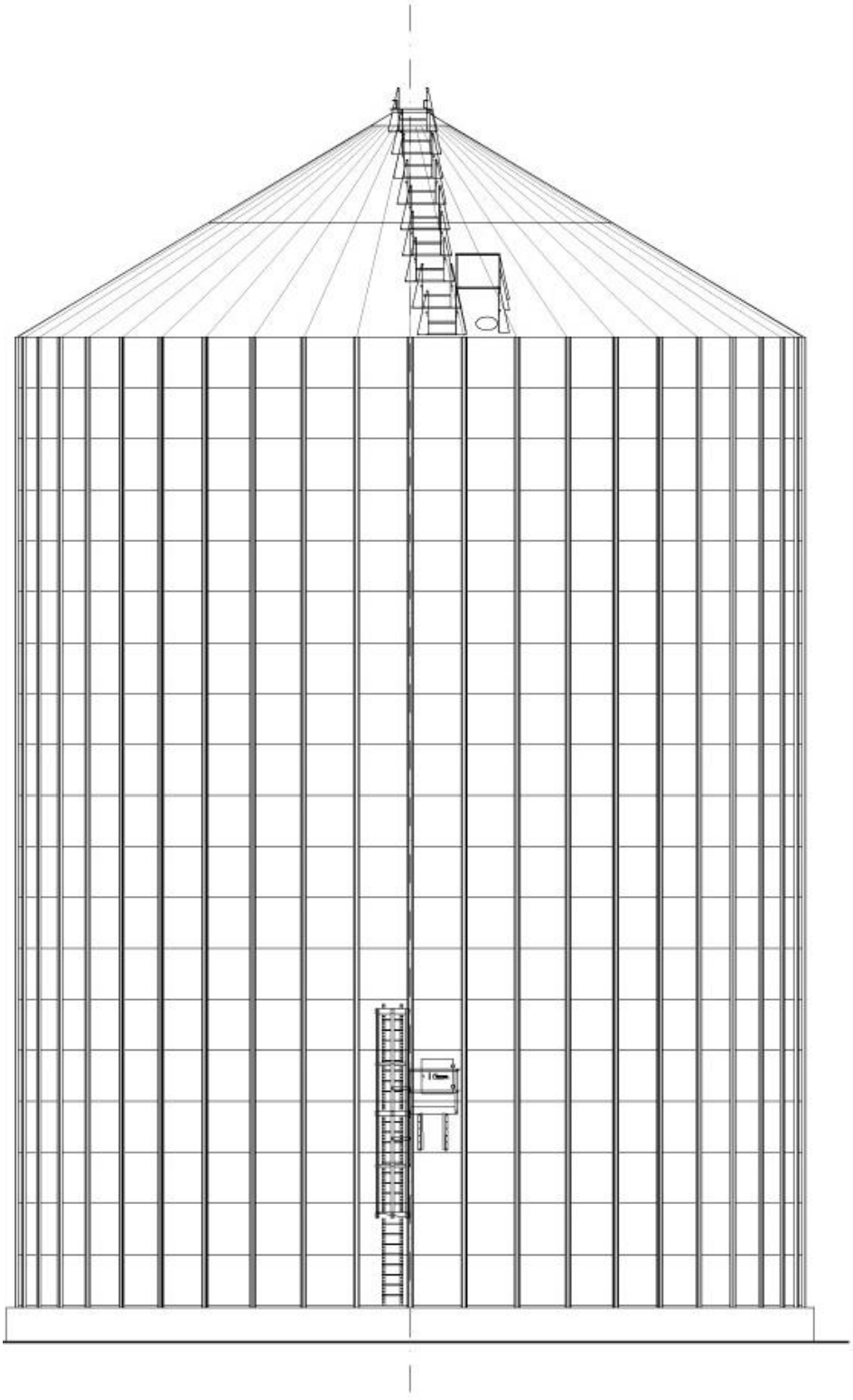
FLAT BOTTOM SILO

Ø7,60-/10 MEPU PEV--SYM19-00766



Assembly Instructions

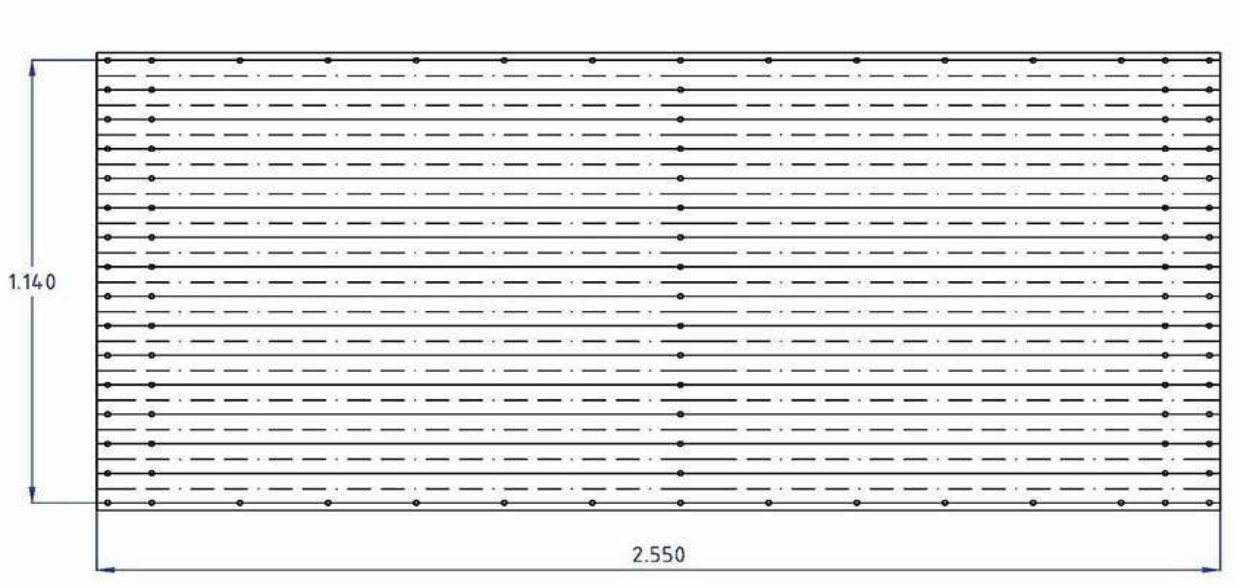
MARK	DESCRIPTION	THICKNESS	QUANTITY
	ROOF		
120500	ROOF SHEET	0,8	26
120537	ROOF SHEET WITH CIRCULAR HOLE	0,8	4
110088	ROOF COLLAR	3	1
124162	ROOF CENTER COLLAR D808mm	5	1
120241	TOP FOR ROOF CENTER COLLAR D800mm	3	1
120261	REINFORCEMENT FOR TOP FOR ROOF CENTER COLLAR D800mm	3	4
111418	FLASHING FOR ROOF COLLAR R1080mm FOR 2 REINFORCEMENTS	0,8	4
120383	REINFORCEMENT CENTER COLLAR "U" 75x30x456mm	2	8
110094A	FLASHING SHEET	0,8	30
110011	SMALL ROOF'S CLIP	2	30
110012A	LARGE ROOF'S CLIP	2	30
120692	ROOF LADDER RUNG L= 418mm	3	14
120691	ROOF LADDER RUNG L= 1100mm	3	7
120715A	RING FOR MANHOLE	2	1
124128	COVER OF INSPECTION DOOR	2	1
120780	"U" HINGE FOR MANHOLE	3	1
120779	"U" FOR HINGE-MANHOLE	3	1
121811	WEATHER STRIP L=1500 mm		1
124132	SEAL SET FOR INSPECTION DOOR		1
	BOLT 8 X 40 ISO 4017 GALVANISED C-8.8		530
	BOLT 10 X 25 ISO 4017 GALVANISED C-8.8		110
	NUT M-8 ISO 4161 WITH FLANGE		530
	NUT M-10 ISO 4032 GALVANISED C-8.8		110
	FLAT WASHER M-10 DISO 7091 GALVANISED		110
	WEATHERSEAL WASHER M-8 GALVANISED		530
	WEATHERSEAL WASHER M-10 GALVANISED		110
	METRE OF PLASTILINE D 6mm		12
	BODYSHEET		
110000A	BODYSHEET 2 STIFFENERS DOUBLE JOINT	0,8	39
122303	BODYSHEET 2 STIFFENERS DOUBLE JOINT WITH LOGO	0,8	1
122981	BODYSHEET 2 STIFFENERS TRIPLE JOINT	0,8	60
123994	ACCESS DOOR SET TYPE 3		1
122984	BODYSHEET WITH MANHOLE 2 STIFFENERS TRIPLE JOINT	0,8	1
119714	LADDER'S RAIL L= 1326mm	1,5	4
119610	PLASTIC COVER FOR LADDER'S RAIL		4
119611	LADDER SUPPORT	3	8
119616	LADDER RUNG L= 460mm	1,5	10
	STIFFENERS		
113362	UPPER SHORT STIFFENER 75x988mm	1,5	20
111885	STIFFENER 1 BODYSHEET 75x1140mm	1,5	20
111886	STANDARD STIFFENER 2 BODYSHEETS 75x2280mm	2	20
111886	STANDARD STIFFENER 2 BODYSHEETS 75x2280mm	2,8	20
111886	STANDARD STIFFENER 2 BODYSHEETS 75x2280mm	4	20
113363	LOWER STIFFENER 75x2432mm	4	20
113364	LOWER INSIDE STIFFENER 67x2660mm	1,5	20
111882	STIFFENER'S SPLICE 67x456mm	1,5	40
111882	STIFFENER'S SPLICE 67x456mm	2	20
111882	STIFFENER'S SPLICE 67x456mm	3	20
119973	ANCHOR PLATE TYPE "C" 160x120x25mm D25	5 y 25 mm	20
	BOLT 8 X 30 ISO 4017 GALVANISED C-8.8		50
	BOLT 8 X 60 ISO 4017 GALVANISED C-8.8		30
	BOLT 10 X 20 ISO 4017 GALVANISED C-8.8		2220
	BOLT 10 X 25 ISO 4017 GALVANISED C-8.8		4620
	BOLT 10 X 30 ISO 4017 GALVANISED C-8.8		1890
	BOLT 10 X 35 ISO 4017 GALVANISED C-8.8		130

MARK	DESCRIPTION	THICKNESS	QUANTITY
	BOLT 10 X 40 ISO 4017GALVANISED C-8.8		70
	NUT M-8 ISO 4032 GALVANISED C-8.8		80
	NUT M-10 ISO 4032 GALVANISED C-8.8		8920
	WEATHERSEAL WASHER M-10 GALVANISED		7720
	FLAT WASHER M-8 ISO 7091 GALVANISED		80
	FLAT WASHER M-10 DISO 7091 GALVANISED		6780
	METRE OF PLASTILINE D 6mm		186
	SILICONE TUBE		3
	COLD GALVANIZING SPRAY 985 ZINC		2
ROOF ACCESSORIES			
	INSULATOR FOR EAVE		30
	INSULATOR FOR WAVES OF ROOF SHEETS		30
119173	WAVE REINFORCEMENT L= 3600mm	0,8	30
HANDRAIL FOR ROOF LADDER			
120691	ROOF LADDER RUNG L= 1100mm	3	3
113915	HANDRAIL BRACKET	3	11
110026	GUSSET FOR HANDRAIL BRACKET	3	14
110129A	BANISTER L= 990mm	1,5	4
110059B	BANISTER L=1028mm	1,5	4
110058A	BANISTER L= 1488mm	1,5	2
110027B	BANISTER L= 1986mm	1,5	4
	BOLT 10 X 20 ISO 4017 GALVANISED C-8.8		130
	NUT M-10 ISO 4032 GALVANISED C-8.8		130
LADDER TO ROOF			
119608	LADDER'S RAIL L= 1138mm	1,5	20
119714	LADDER'S RAIL L= 1326mm	1,5	4
119610	PLASTIC COVER FOR LADDER'S RAIL		4
119611	LADDER SUPPORT	3	28
119612	LADDER SUPPORT ON EAVE-RING-HOPPER	3	2
119613	UPPER SAFETY BAND	2	1
119614	SAFETY BAND	2	9
119615	TRANSITION SAFETY BAND	2	1
119616	LADDER RUNG L= 460mm	1,5	50
119617	"U" SAFETY L= 1140mm	2	60
119619	ANGLE TO FLOOR	3	1
119764	HANDRAIL	1,5	2
119620	HANDRAIL BRACKET LEFT TRANSITION	3	1
119622	HANDRAIL BRACKET RIGHT TRANSITION	3	1
111663	VERTICAL ANGLE FOR PLATFORM	3	2
121152A	CANTILEVERED ANGLE L= 950mm	3	2
121123	LONG VERTICAL RAIL L=1250mm	3	2
119861	LONG VERTICAL RAIL	3	6
121127	HORIZONTAL ANGLE L= 800mm	3	2
121109A	PLATAFORM'S FLOOR 110x800mm	3	1
	BOLT 8 X 20 ISO 4017 GALVANISED C-8.8		260
	BOLT 8 X 60 ISO 4017 GALVANISED C-8.8		110
	BOLT 10 X 20 ISO 4017 GALVANISED C-8.8		60
	BOLT 10 X 40 ISO 4017GALVANISED C-8.8		30
	NUT M-8 ISO 4032 GALVANISED C-8.8		370
	NUT M-10 ISO 4032 GALVANISED C-8.8		90
	WEATHERSEAL WASHER M-10 GALVANISED		50
	FLAT WASHER M-8 ISO 7091 GALVANISED		370
	FLAT WASHER M-10 DISO 7091 GALVANISED		30
	SLEEVE ANCHOR M10x75		2
122207	LINTEL	3	3
122208	DOOR SIDE	3	2

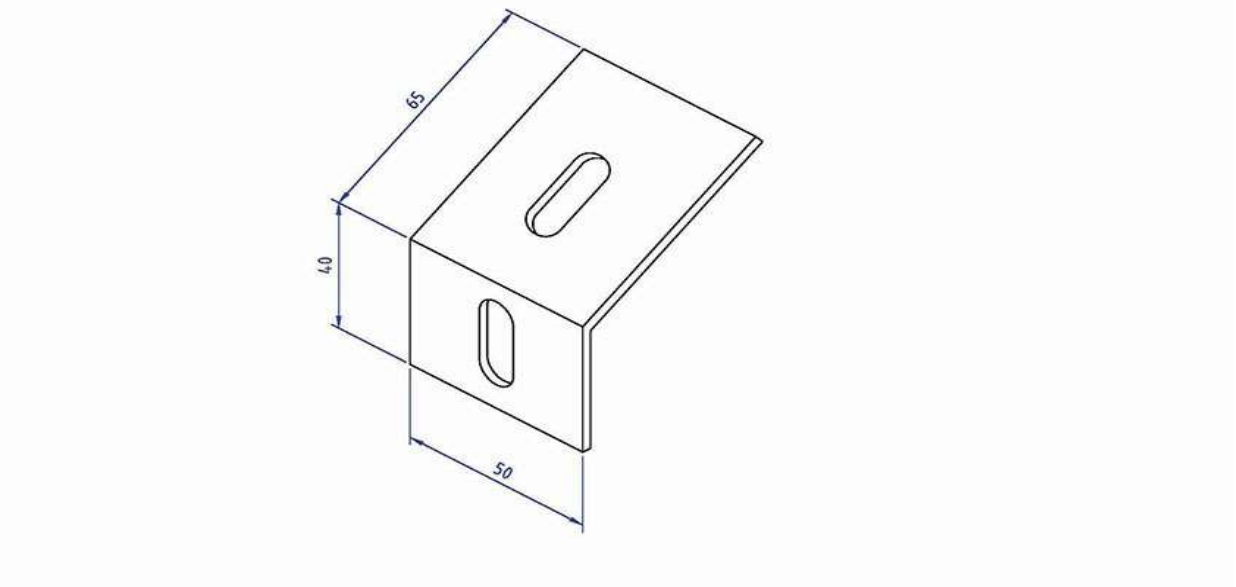
MARK	DESCRIPTION	THICKNESS	QUANTITY
122209	HINGE TYPE A		2
	CLOSING DOOR SPRING		1
	SELF DRILLING BOLT 4,8 X 13 WITHOUT WASHER		10
	AERATION ROOF VENT		
119623	TOP COVER FOR AERATION	2	1
119624	BODY FOR AERATION	2	1
119625	SUPPORT CLIP	2	4
119626	MESH FOR AERATION		1
119627	FLANGE FOR AERATION	2	1
	BOLT 8 X 20 ISO 4017 GALVANISED C-8.8		40
	NUT M-8 ISO 4032 GALVANISED C-8.8		40
	FLAT WASHER M-8 ISO 7091 GALVANISED		40
	WEATHERSEAL WASHER M-8 GALVANISED		40
	METRE OF PLASTILINE D 6mm		3,5
	AERATION SYSTEM		
112872	CONNECTION TO FAN		1
	FAN CMR-1240-2T/N, 5,5CV, 200/380V, 50Hz, LG-270		1
	ASPIRATION CLAMP WITH GRILL B-400/350/ESP		1
122167	CLOSE ANGLE 7,60	3	10
123964	SHIM 160x75x2mm	2	20
123963	SHIM 160x75x3mm	3	20
122203	SPLICE	3	10
	Mts. POLYETHILENE JOINT 10x3 mm		24
	Mts. POLYETHILENE JOINT 40x15 mm		24
	BOLT 10 X 40 ISO 4017GALVANISED C-8.8		120
	NUT M-10 ISO 4032 GALVANISED C-8.8		240
	FLAT WASHER M-10 DISO 7091 GALVANISED		240
	WEATHERSEAL WASHER M-10 GALVANISED		240
	VENTICONO T30 ELEVADO		1
122046	UPPER VENTILATED CONE SECTOR T30	3	20
122047	LOWER VENTILATED CONE SECTOR T30	3	20
122048	BEAM T30 L=4038 mm	3	20
122049	OUTLET SHEET	10	1
122054	OUTSIDE SUPPORT T30 L=2930 mm	2	20
122055	INTERMEDIATE SUPPORT 1 T30 L=2453 mm	2	20
122056	INTERMEDIATE SUPPORT 2 T30 L=1976 mm	2	20
122057	INSIDE SUPPORT T30 L=1498mm	2	20
121622	OUTSIDE BRACING	2	60
121623	INTERMEDIATE BRACING 1	2	60
121624	INTERMEDIATE BRACING 2	2	40
121625	INSIDE BRACING	2	20
121483	SUPPORT CLIP	3	80
120351	BEAM CLIP	3	20
122058	CROSS RAFTER L= 986mm	3	20
122059	CLIP FOR CROSS RAFTER 1	2	20
122060	CLIP FOR CROSS RAFTER 2	2	20
122061	INCLINED BRACING 1	2	10
122062	INCLINED BRACING 2	2	10
121864	CLOSING SHEET	0,8	10
122063	CENTRAL PILLAR		4
123002	FLAT SHEET WITH TUBE D400	3 y 5 mm	1
123994	ACCESS DOOR SET TYPE 3		1
122984	BODYSHEET WITH MANHOLE 2 STIFFENERS TRIPLE JOINT	0,8	1

MARK	DESCRIPTION	THICKNESS	QUANTITY
	BOLT 12 X 30 ISO 7380 GALVANISED C-8.8		1225
	BOLT 12 X 30 ISO 4017 GALVANISED C-8.8 SB		1300
	BOLT 12 X 40 ISO 4017 GALVANISED C-8.8 SB		25
	BOLT 10 X 40 ISO 4017GALVANISED C-8.8		325
	FLAT WASHER M-12 ISO 7091 GALVANISED		2550
	NUT M-12 ISO 4032 GALVANISED C-8.8 SB		2550
	FLAT WASHER M-10 DISO 7091 GALVANISED		325
	WEATHERSEAL WASHER M-10 GALVANISED		325
	NUT M-10 ISO 4032 GALVANISED C-8.8		650
	SELF DRILLING BOLT TRAXX 5,5X32 WITH GALVANIZED HEAD		275
	SLEEVE ANCHOR M10x75		125
	METRE OF PLASTILINE D 6mm		29
WALL SUPPORT 2U			
117805	WALL SILO ANGLE L= 250mm 99º	3	2
117817	WALL SUPPORT "U" 263x4484mm	3	2
117840	HORIZONTAL BRACING "U" 60x50x1120mm	3	8
117841	BRACING "U" 60x50x1362mm	3	8
117846	OMEGA 273x190x2400mm	3	1
	BOLT 10 X 25 ISO 4017 GALVANISED C-8.8		140
	NUT M-10 ISO 4032 GALVANISED C-8.8		140
	FLAT WASHER M-10 DISO 7091 GALVANISED		280
	WEATHERSEAL WASHER M-10 GALVANISED		60

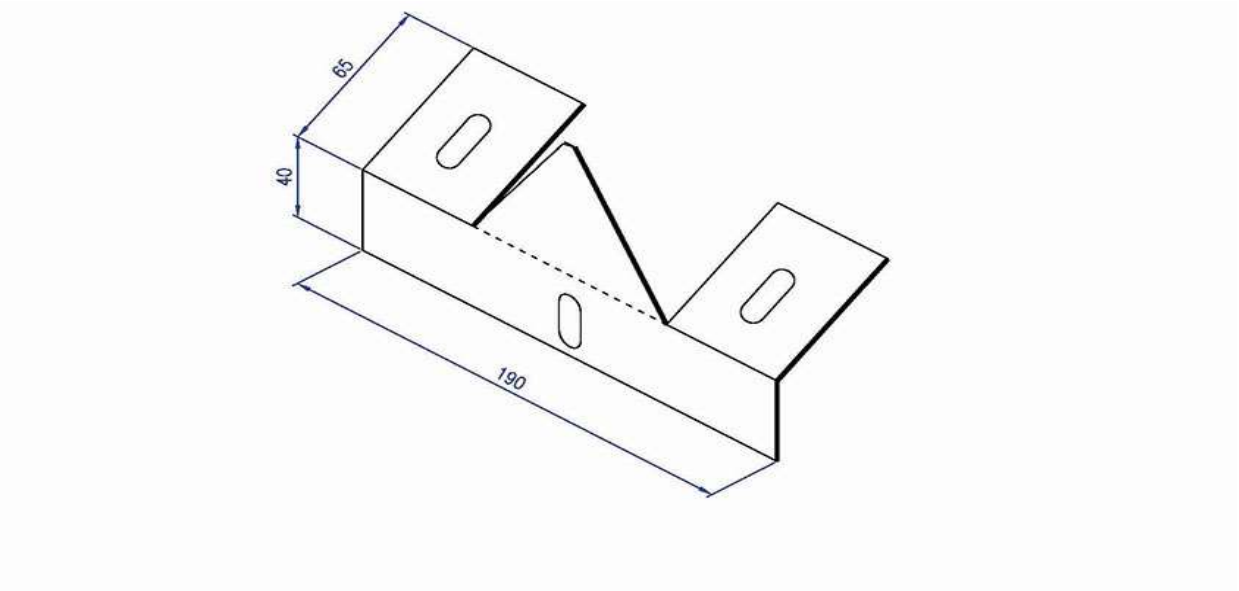
IDENTIFICATION OF MARKS



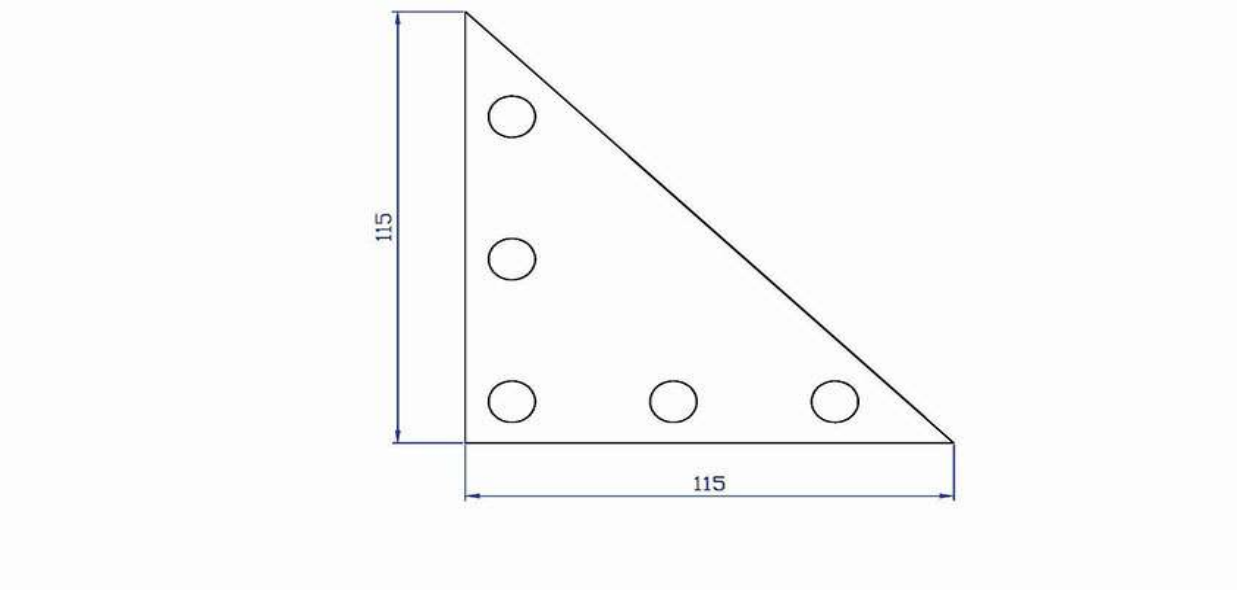
110000A BODYSHEET 2 STIFFENERS DOUBLE JOINT



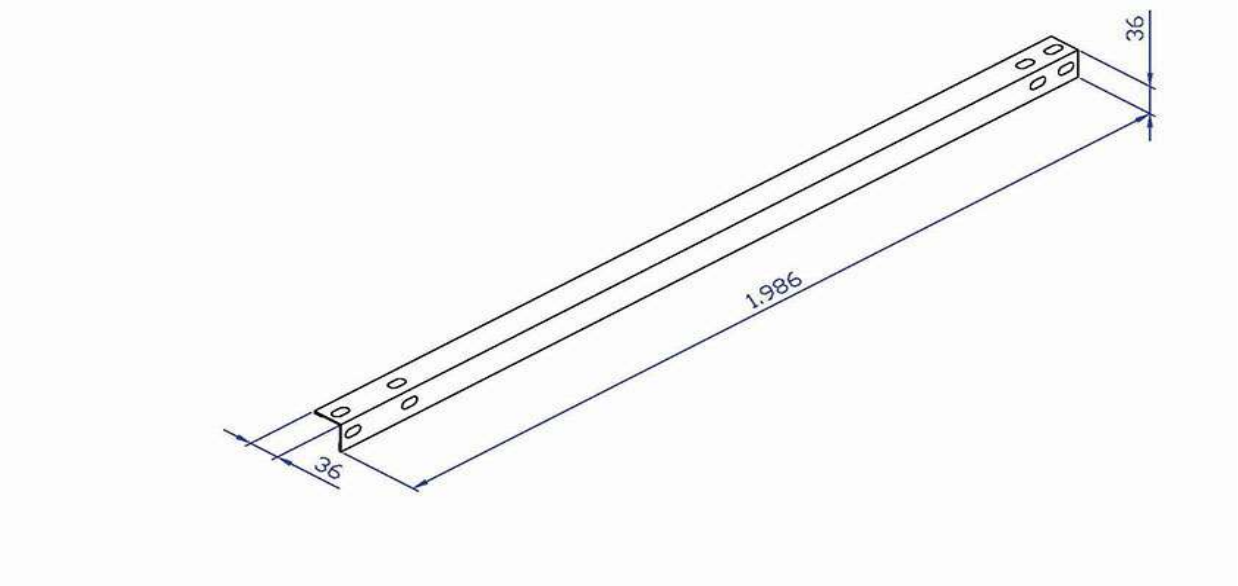
110011 SMALL ROOF'S CLIP



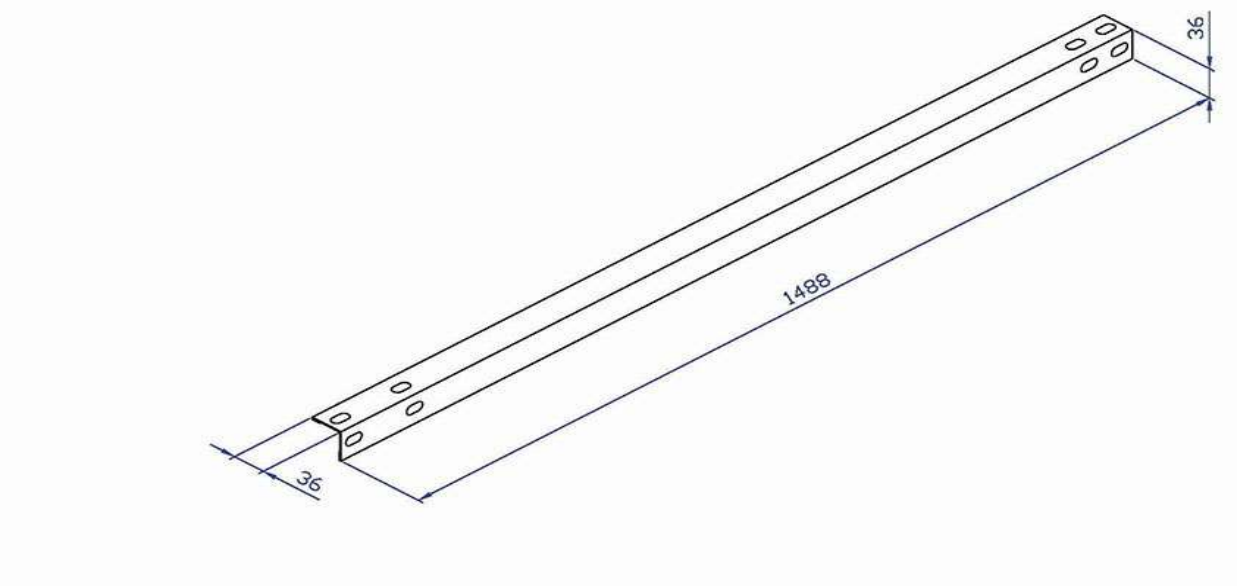
110012A LARGE ROOF'S CLIP



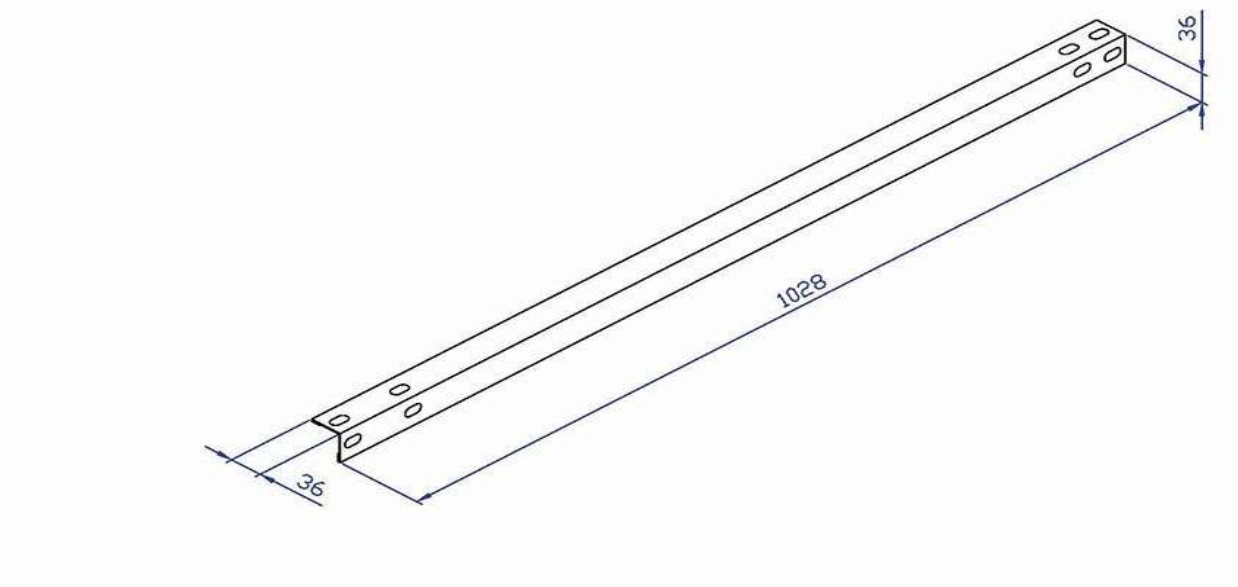
110026 GUSSET FOR HANDRAIL BRACKET



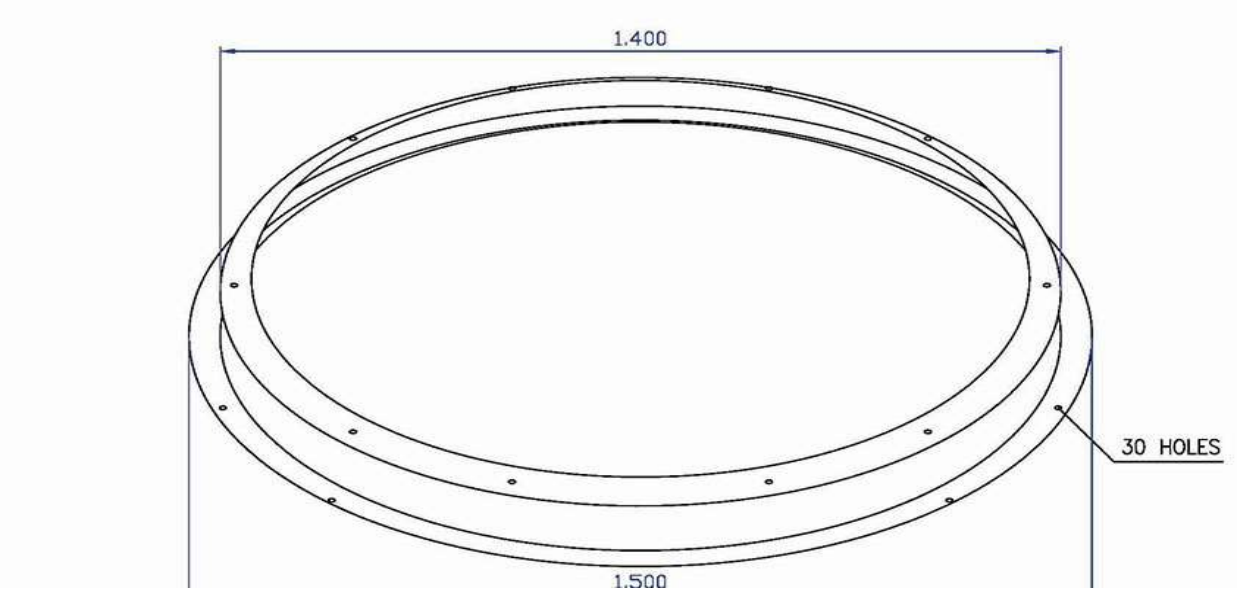
110027B BANISTER L= 1986mm



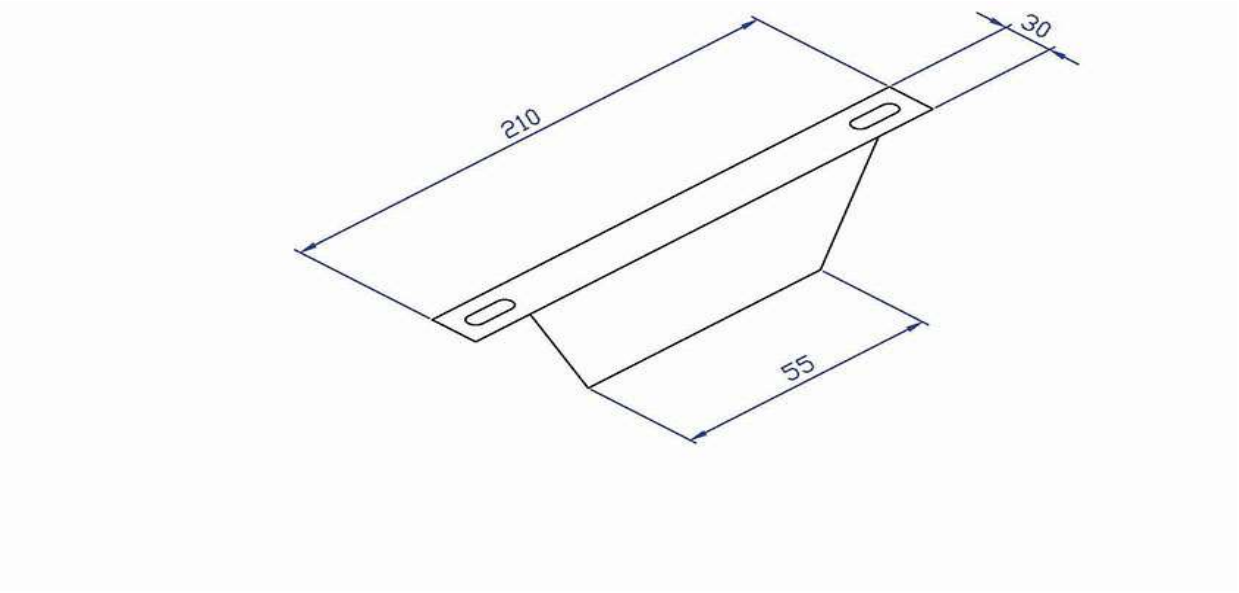
110058A BANISTER L= 1488mm



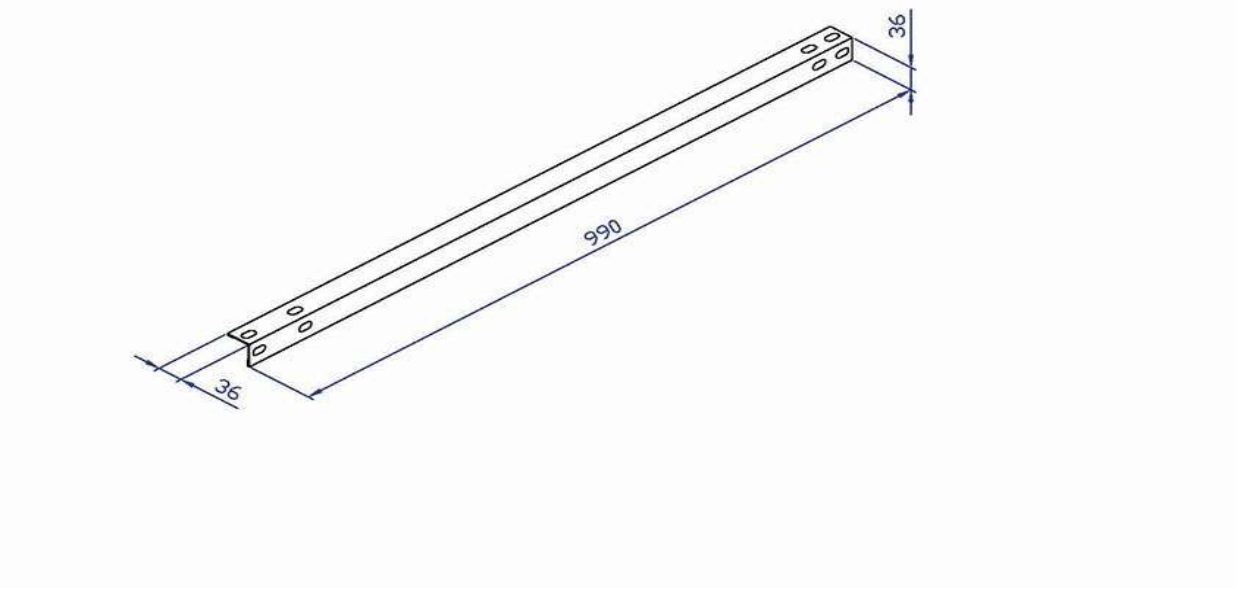
110059B BANISTER L=1028mm



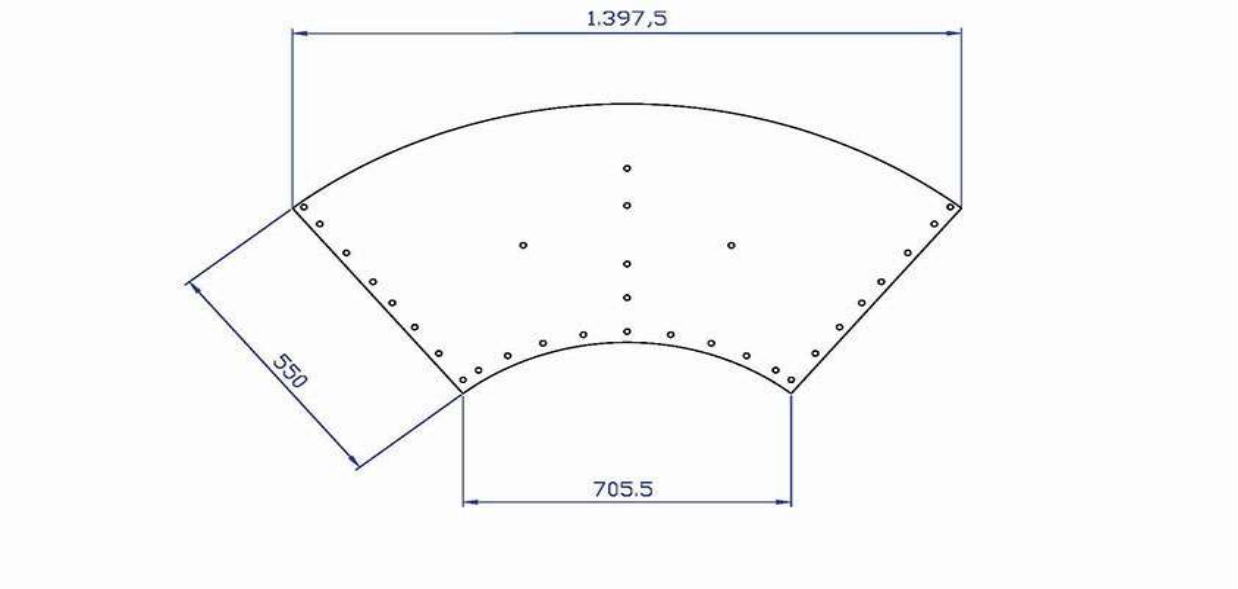
110088 ROOF COLLAR



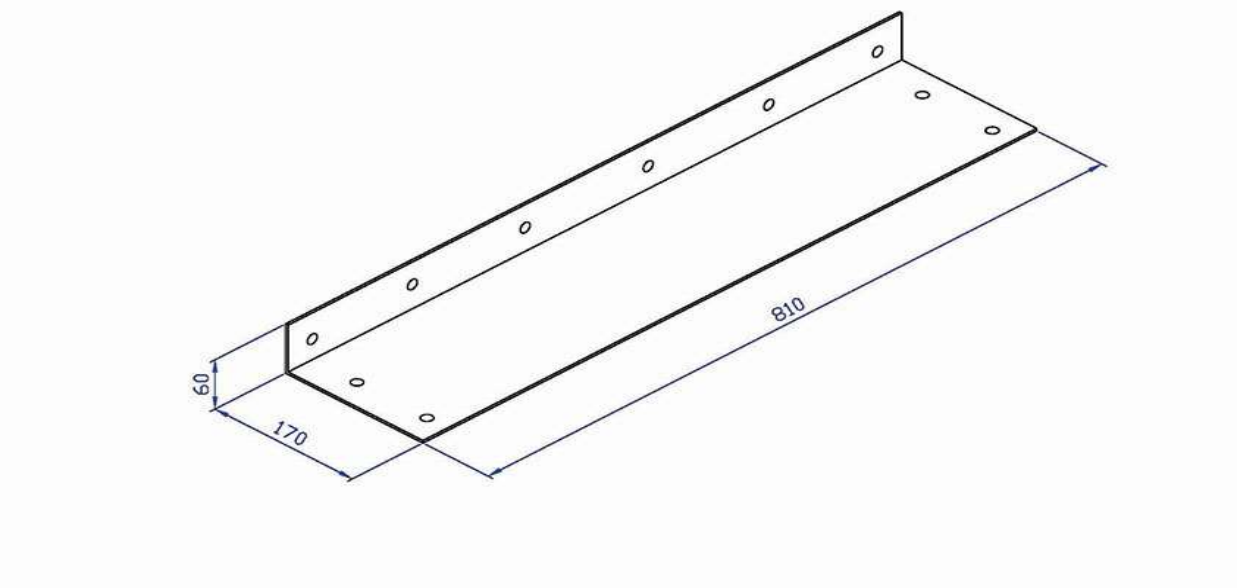
110094A FLASHING SHEET



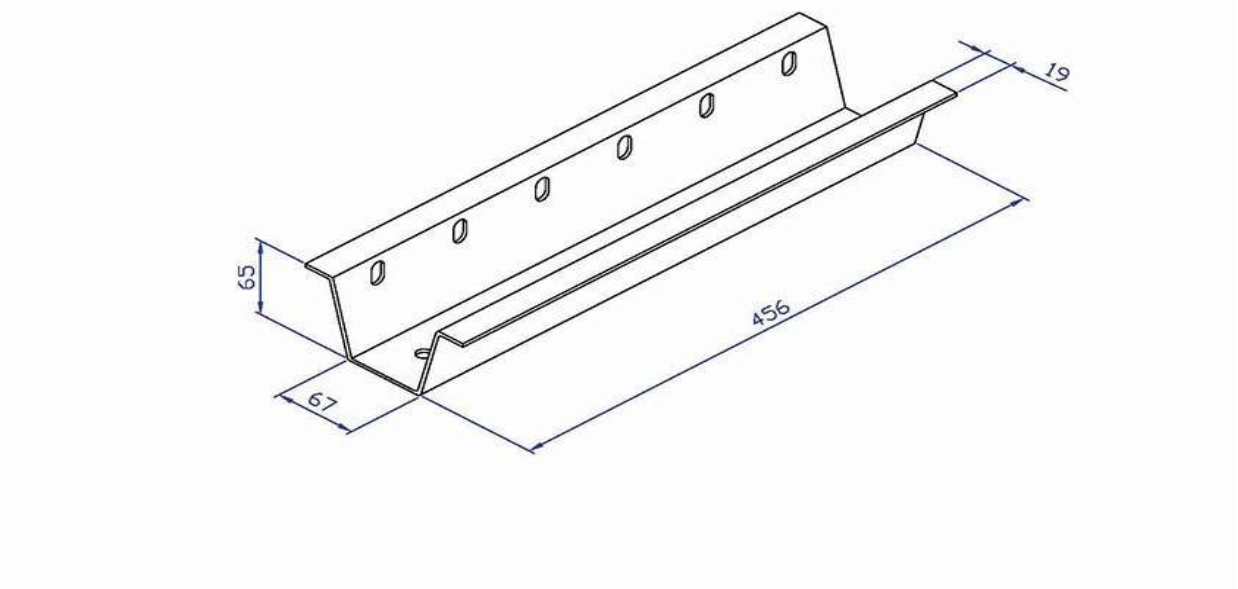
110129A BANISTER L= 990mm



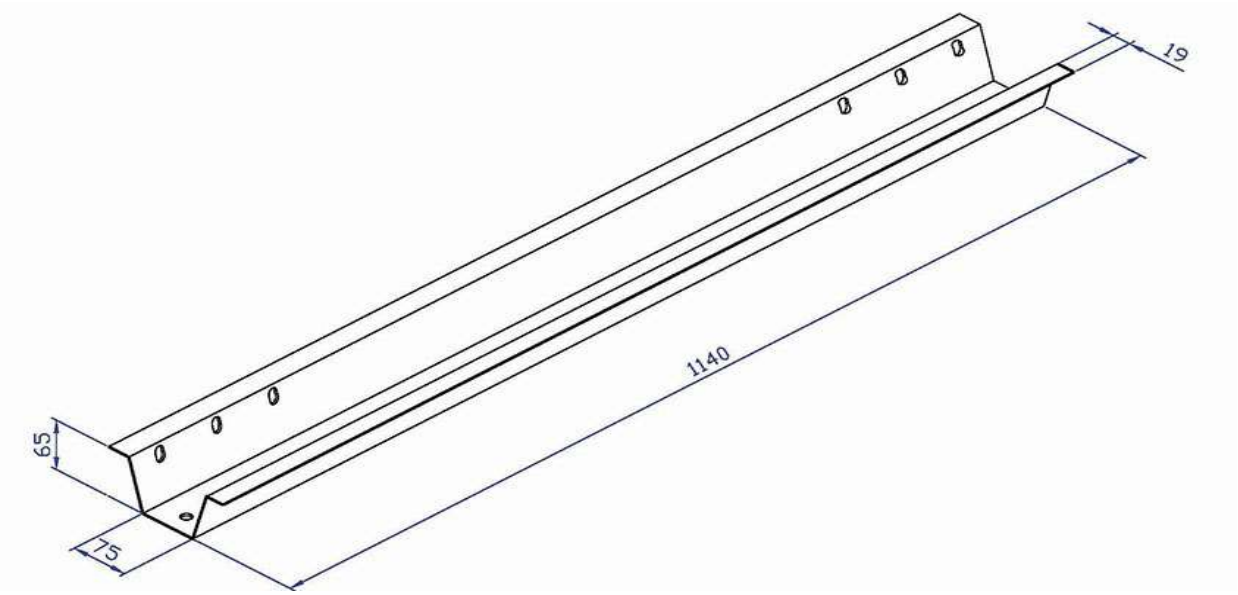
111418 FLASHING FOR ROOF COLLAR R1080mm FOR 2 REINFORCEMENTS



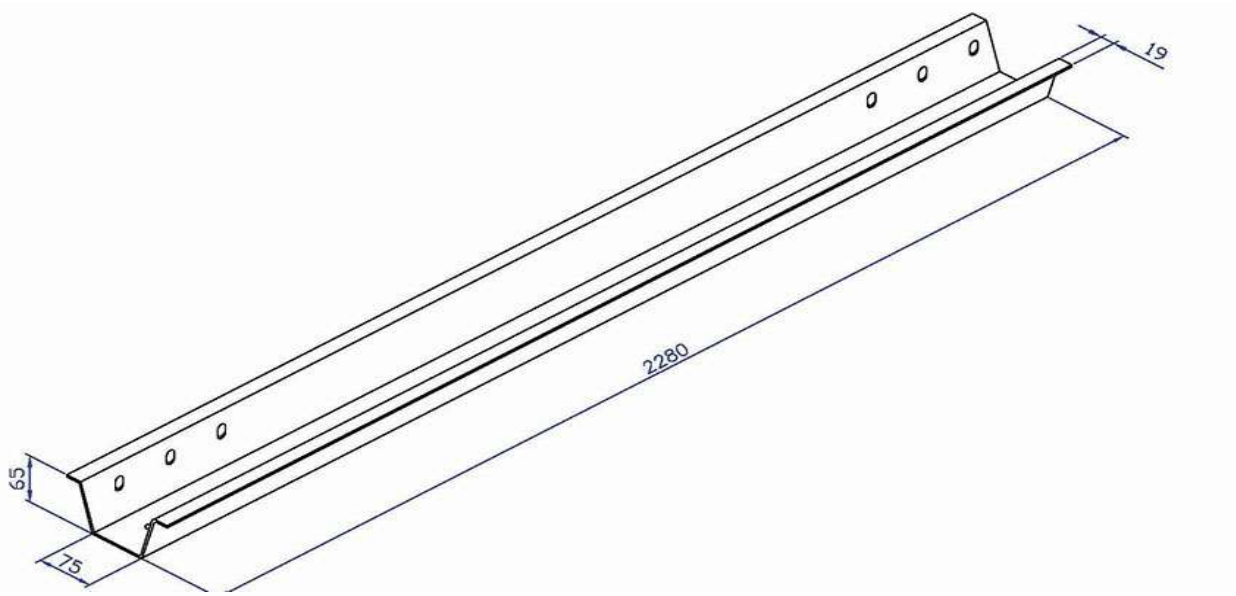
111663 VERTICAL ANGLE FOR PLATFORM



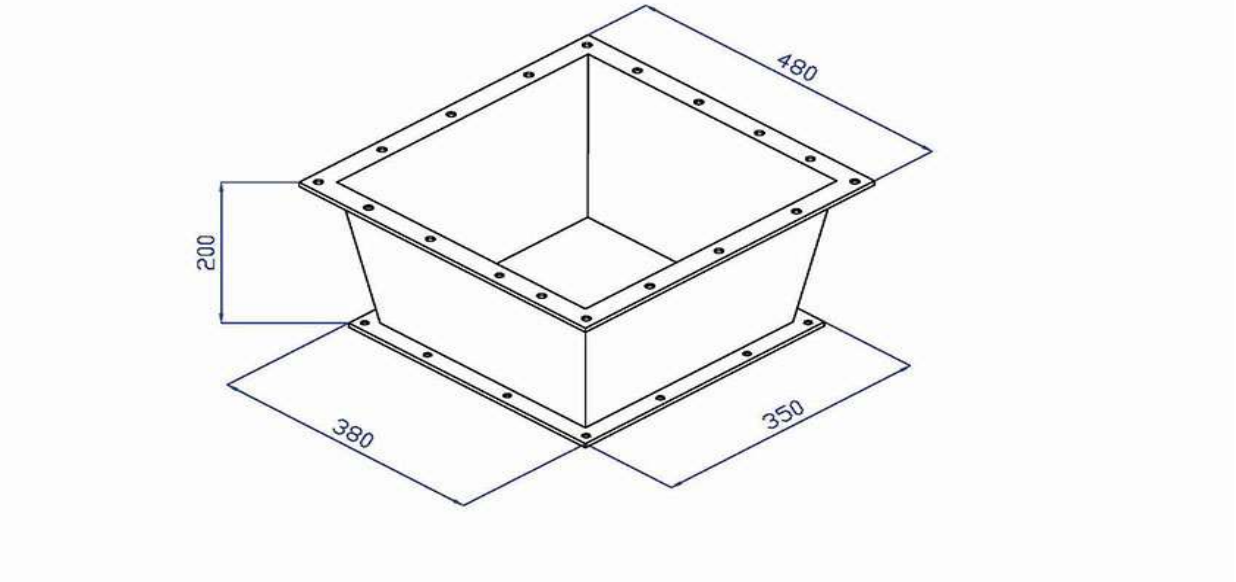
111882 STIFFENER'S SPLICE 67x456mm



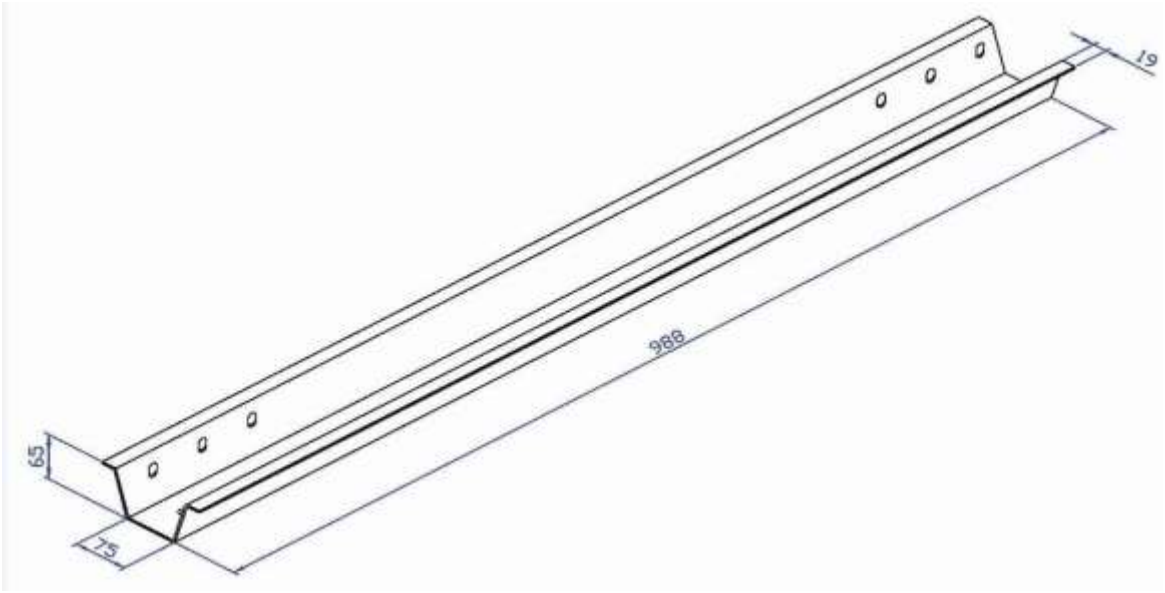
111885 STIFFENER 1 BODYSHEET 75x1140mm



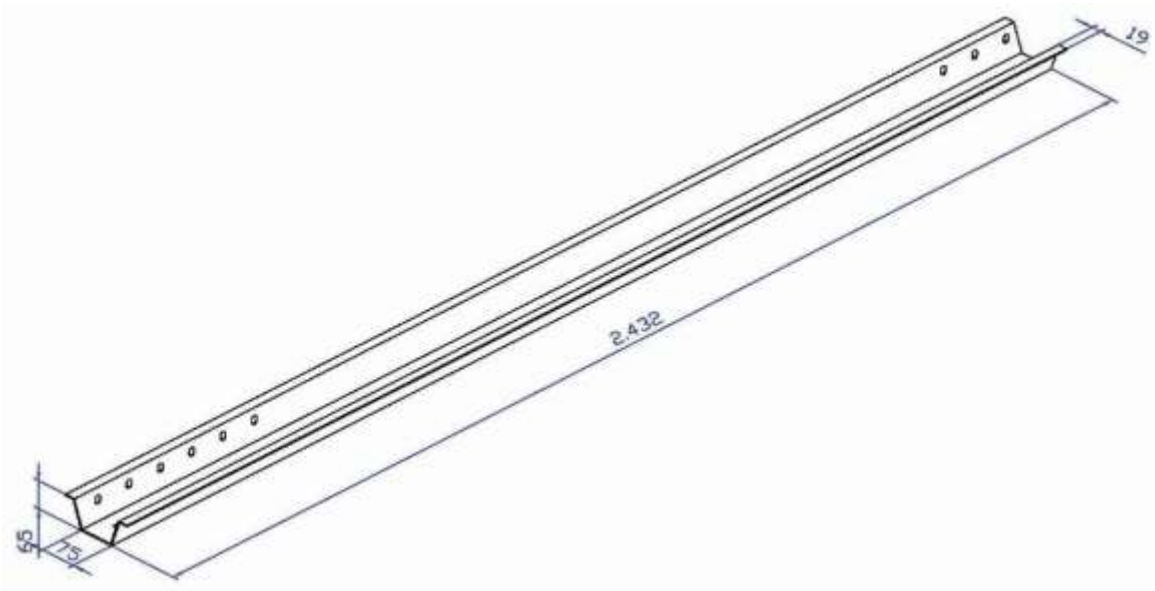
111886 STANDARD STIFFENER 2 BODYSHEETS 75x2280mm



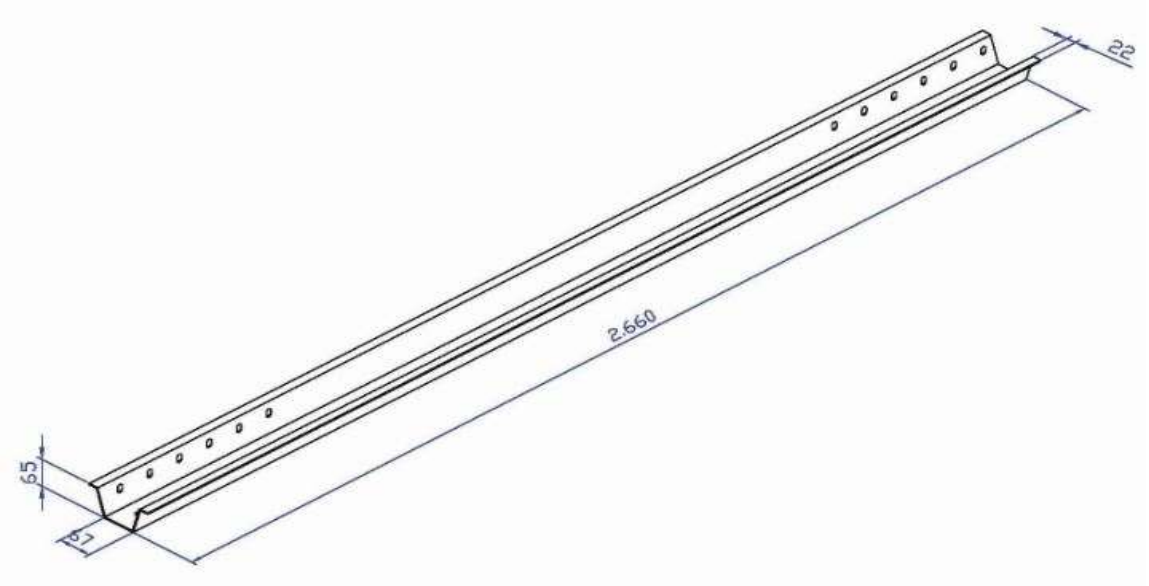
112872 CONNECTION TO FAN



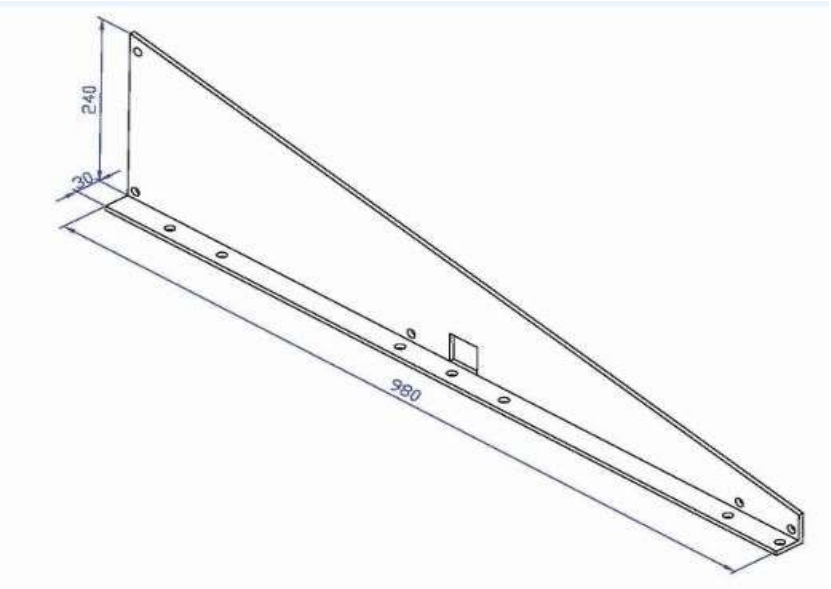
113362 UPPER SHORT STIFFENER 75x988mm



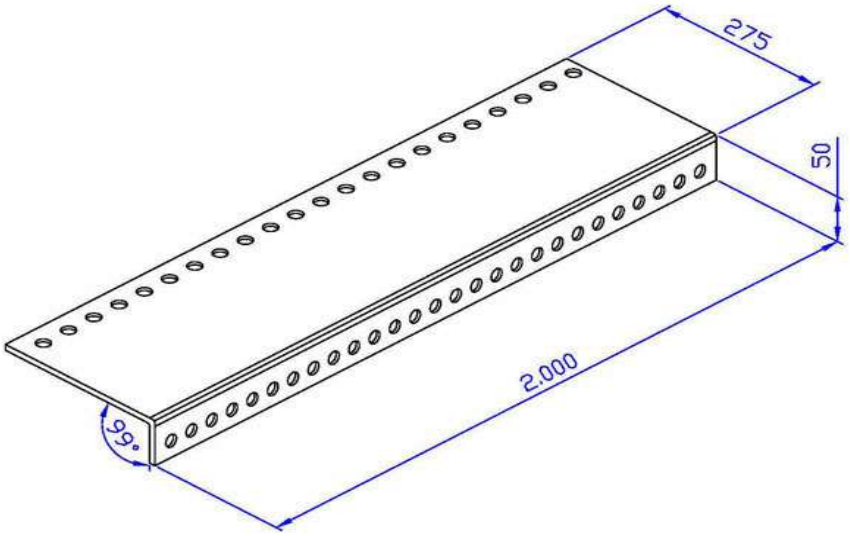
113363 LOWER STIFFENER 75x2432mm



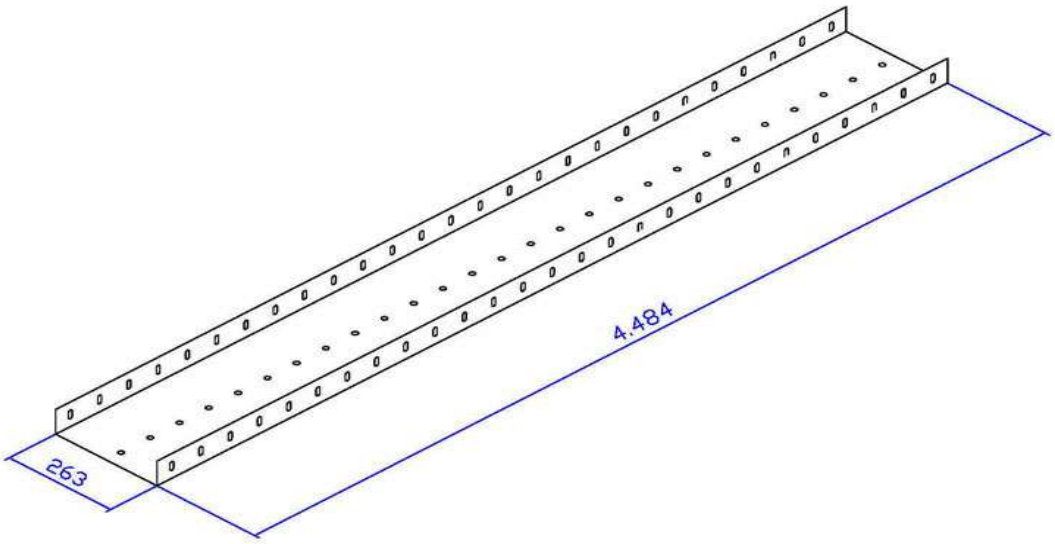
113364 LOWER INSIDE STIFFENER 67x2660mm



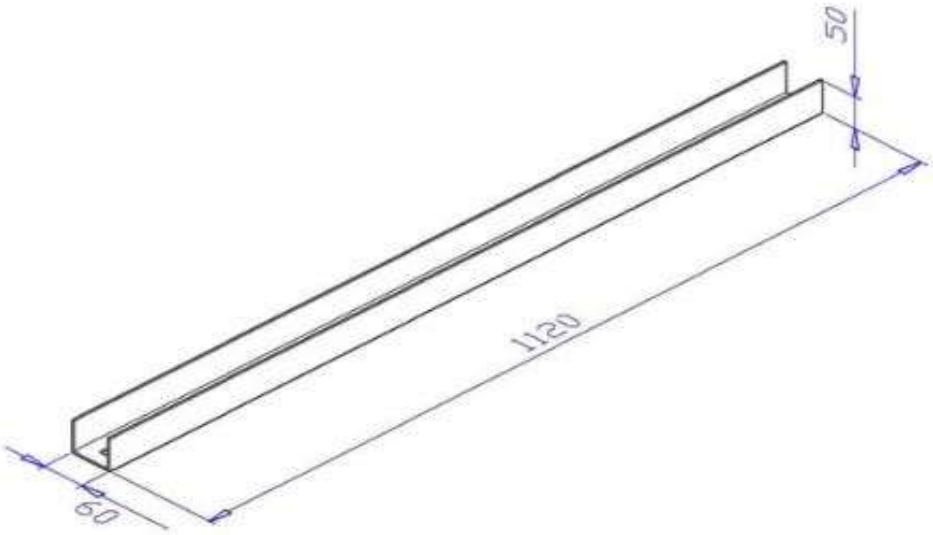
113915 HANDRAIL BRACKET



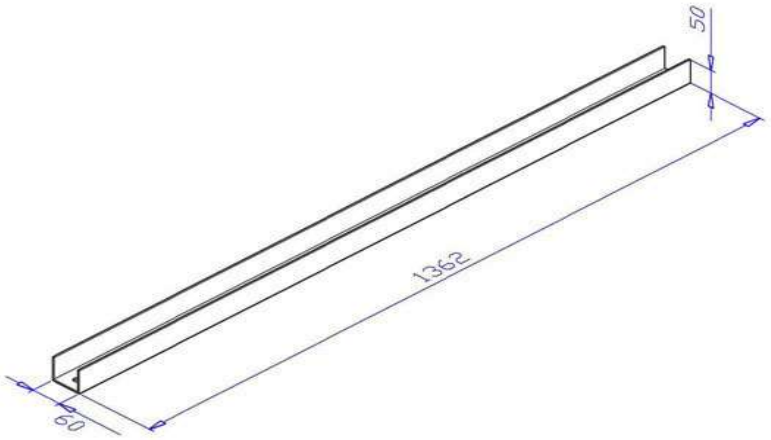
117805 WALL SILO ANGLE L= 250mm 99º



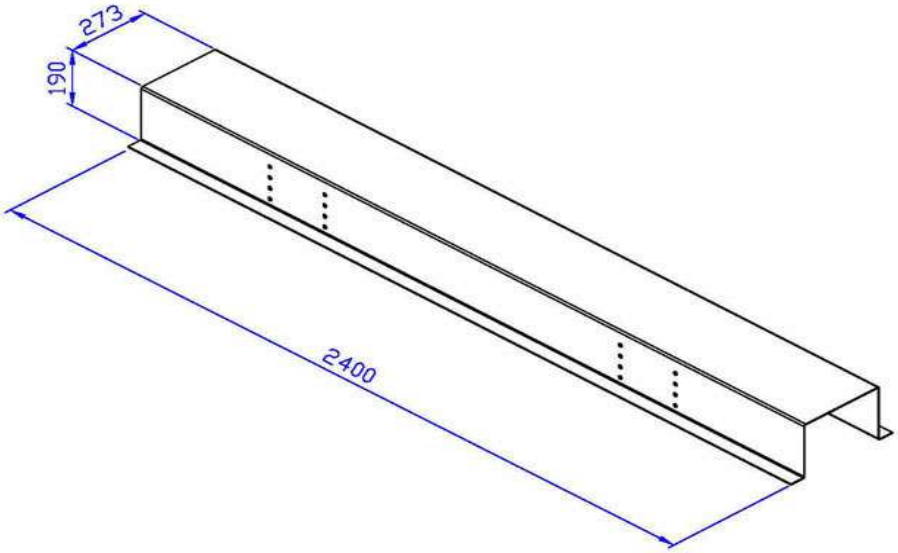
117817 WALL SUPPORT "U" 263x4484mm



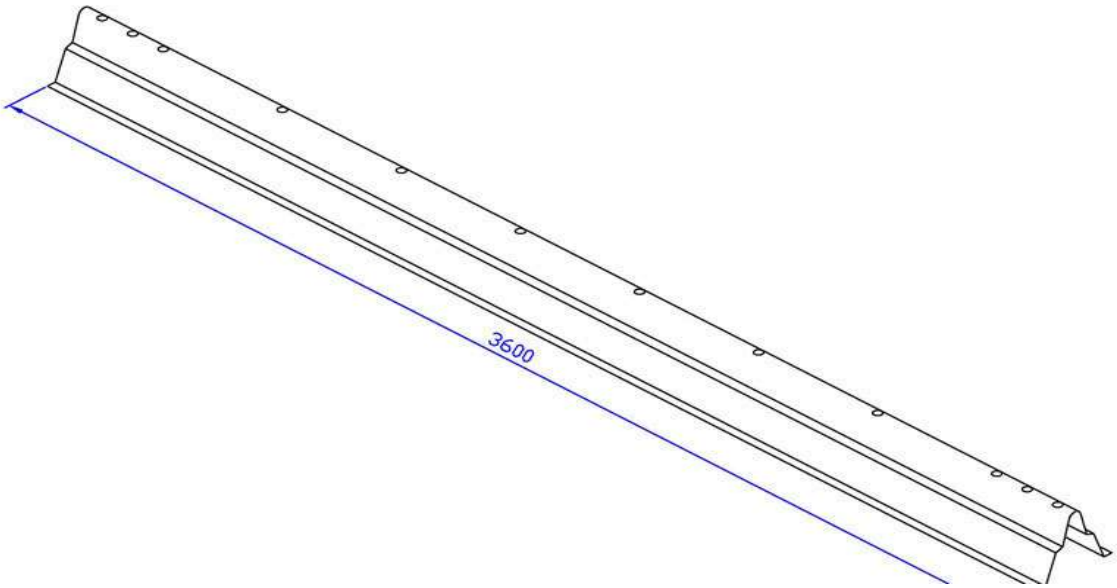
117840 HORIZONTAL BRACING "U" 60x50x1120mm



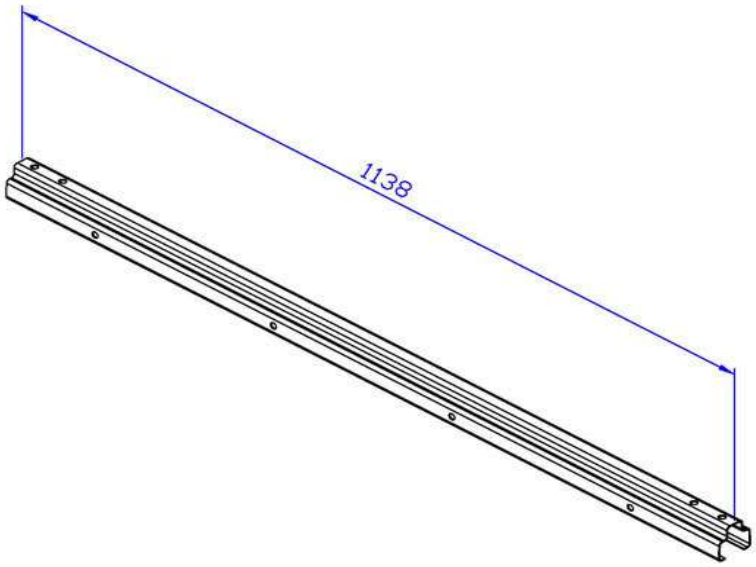
117841 BRACING "U" 60x50x1362mm



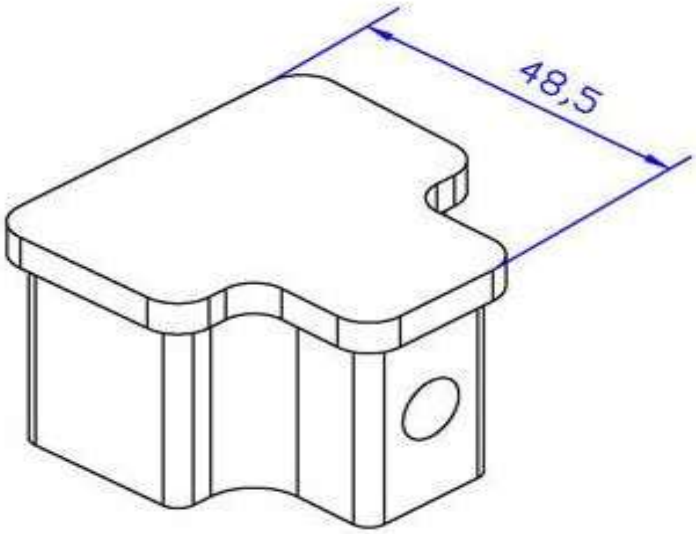
117846 OMEGA 273x190x2400mm



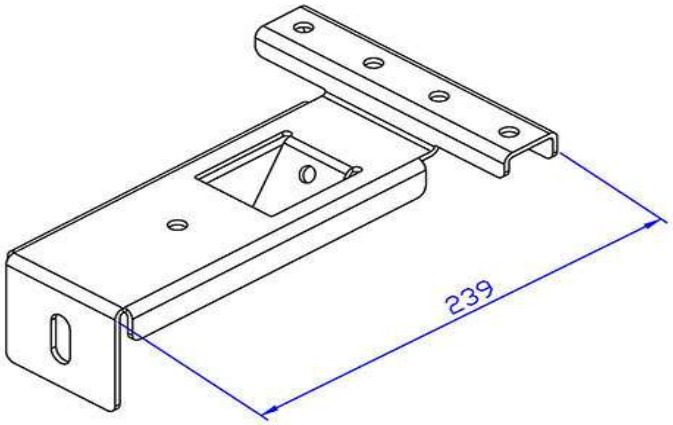
119173 WAVE REINFORCEMENT L= 3600mm



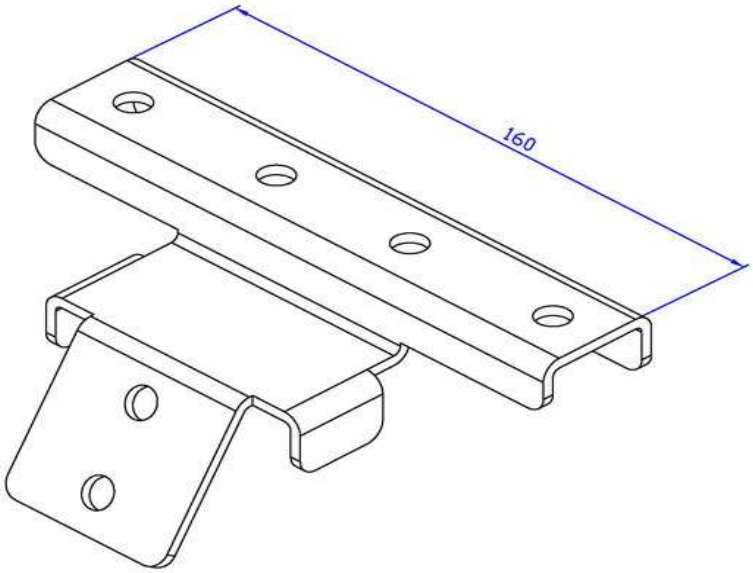
119608 LADDER'S RAIL L= 1138mm



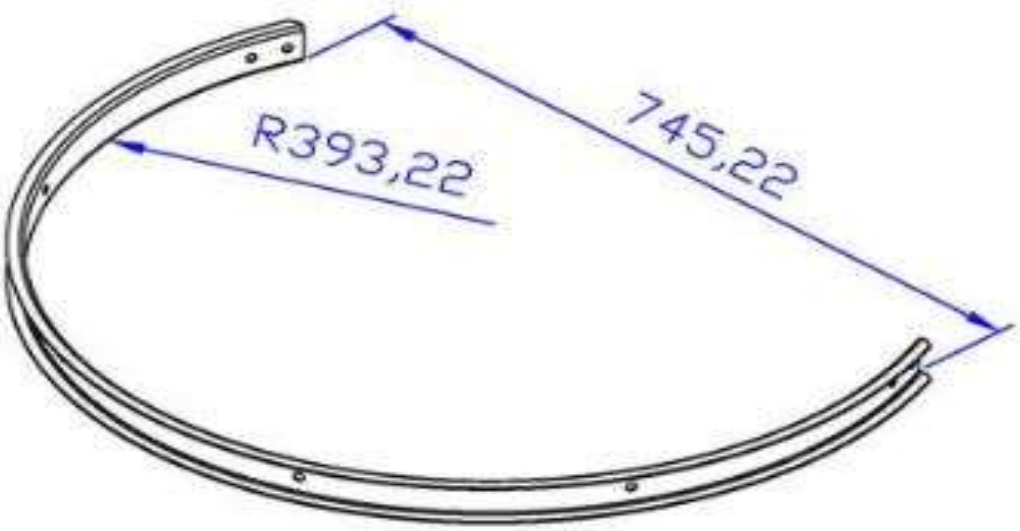
119610 PLASTIC COVER FOR LADDER'S RAIL



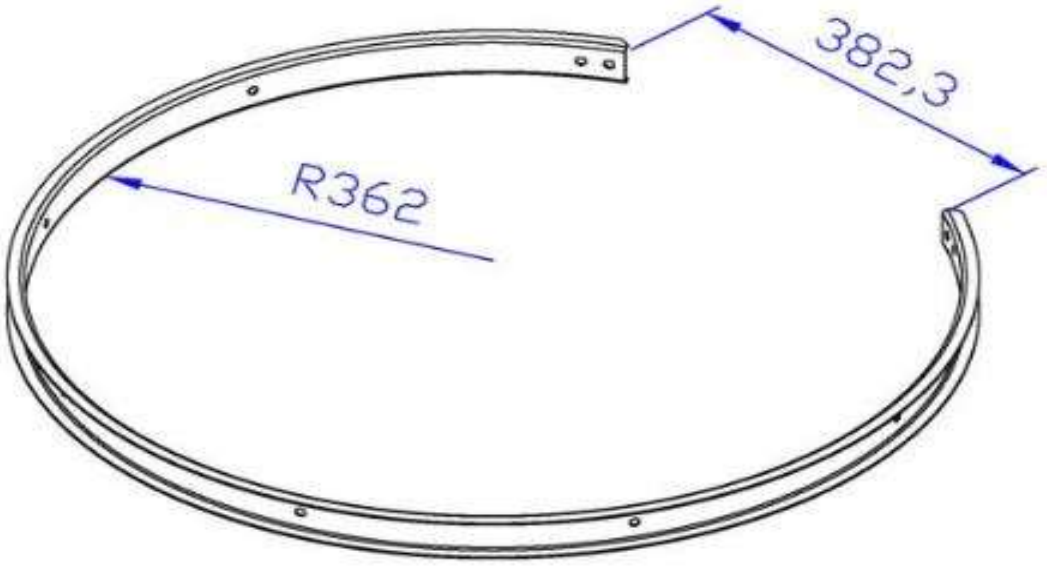
119611 LADDER SUPPORT



119612 LADDER SUPPORT ON EAVE-RING-HOPPER

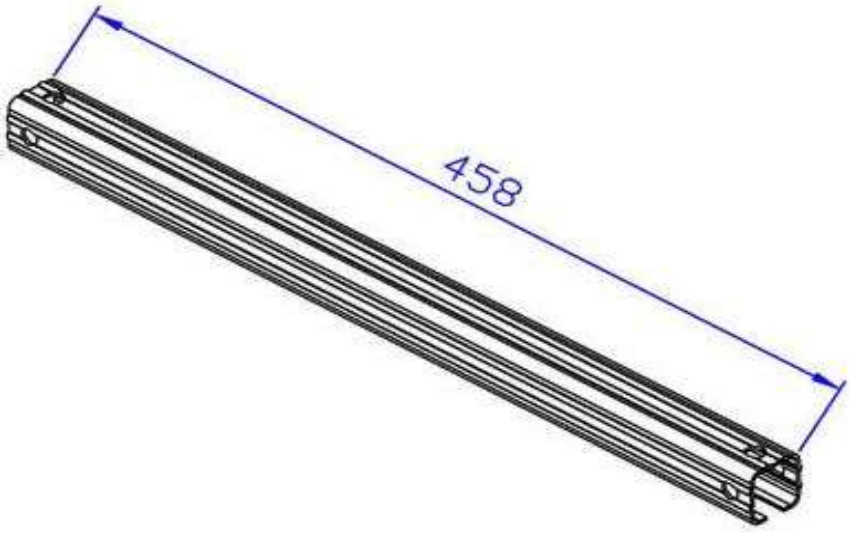


119613 UPPER SAFETY BAND

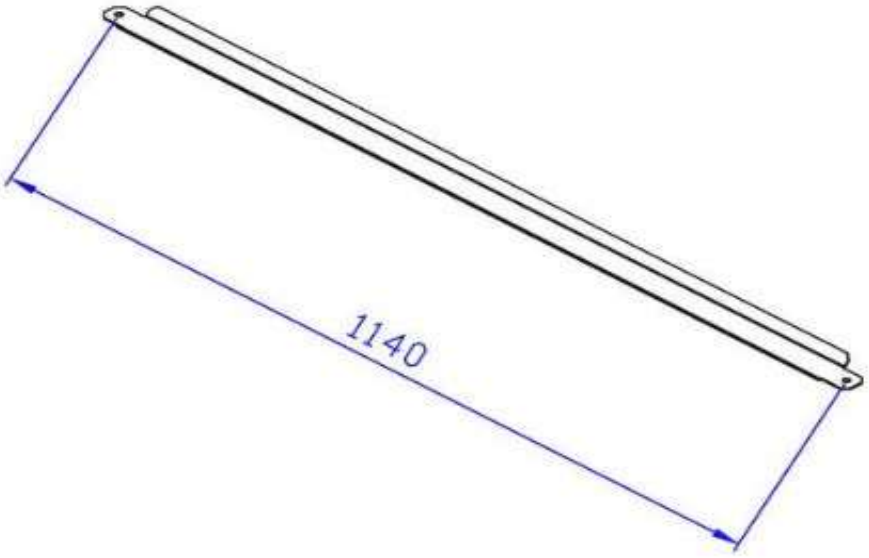


119614 SAFETY BAND

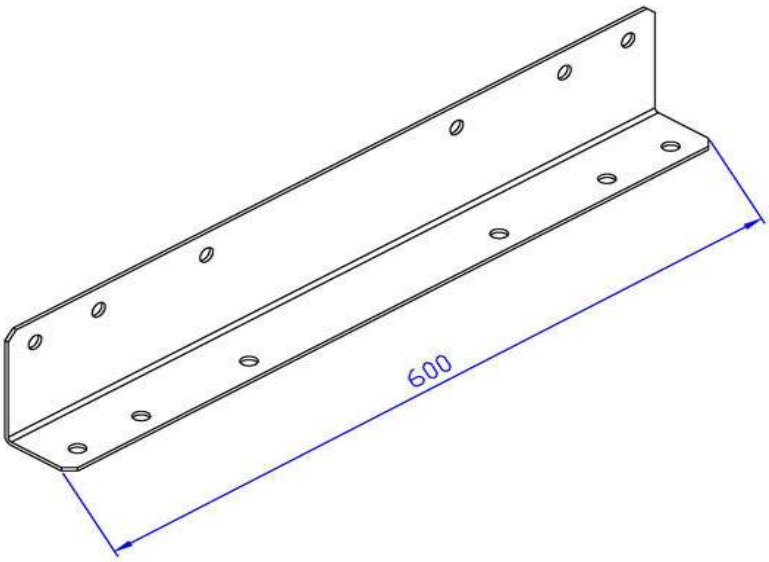
119615 TRANSITION SAFETY BAND



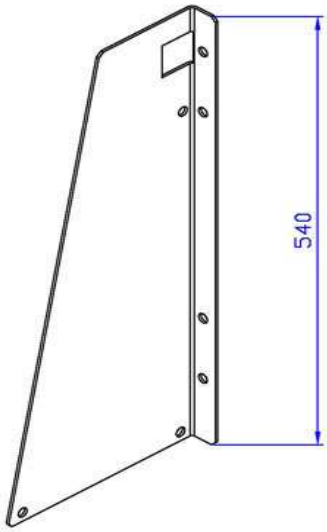
119616 LADDER RUNG L= 460mm



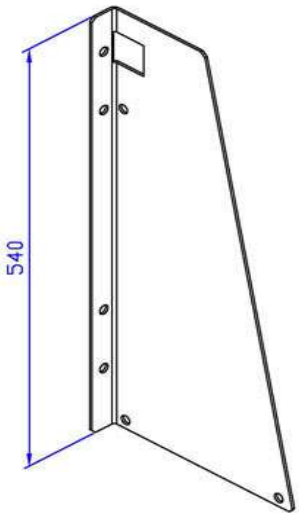
119617 "U" SAFETY L= 1140mm



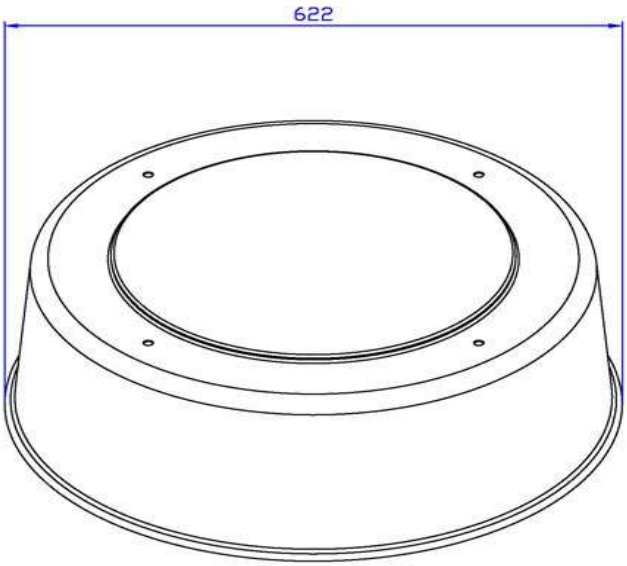
119619 ANGLE TO FLOOR



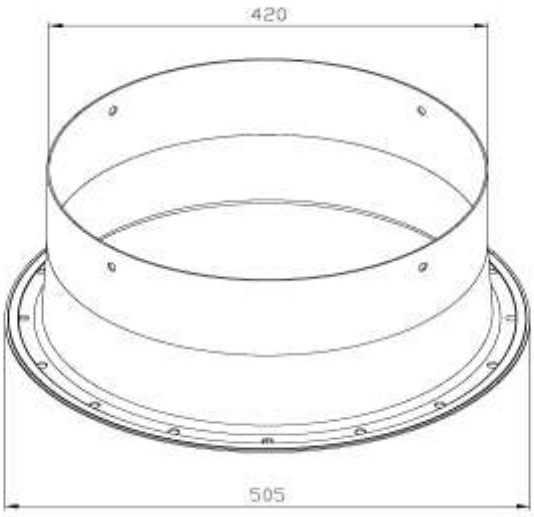
119620 HANDRAIL BRACKET LEFT TRANSITION



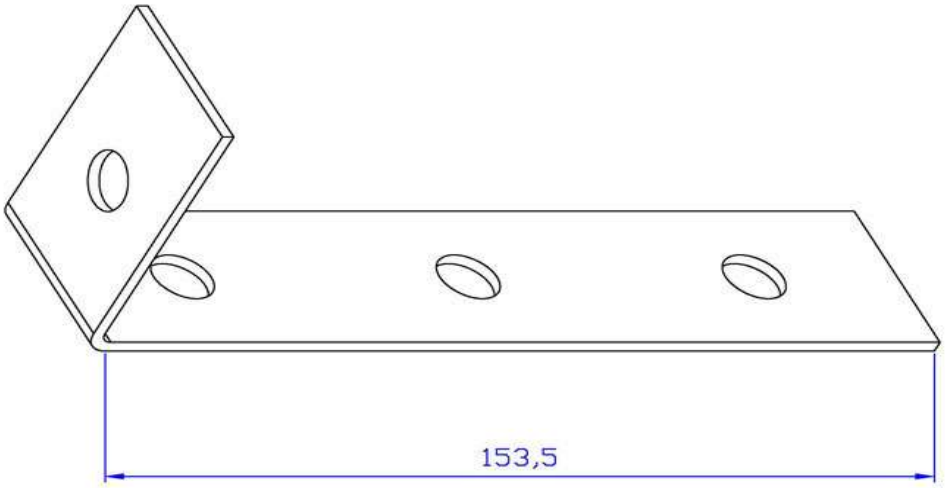
119622 HANDRAIL BRACKET RIGHT TRANSITION



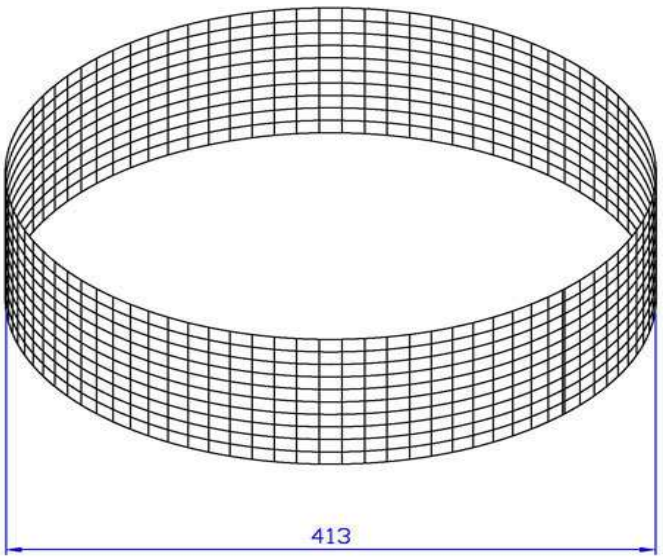
119623 TOP COVER FOR AERATION



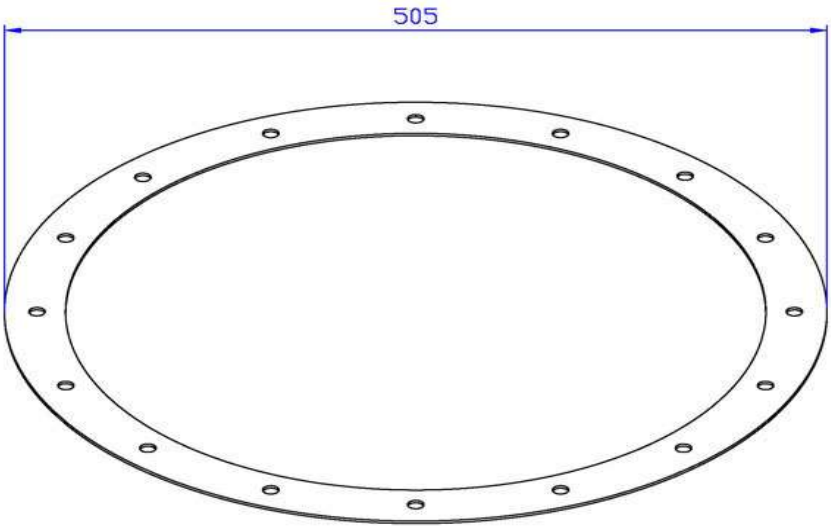
119624 BODY FOR AERATION



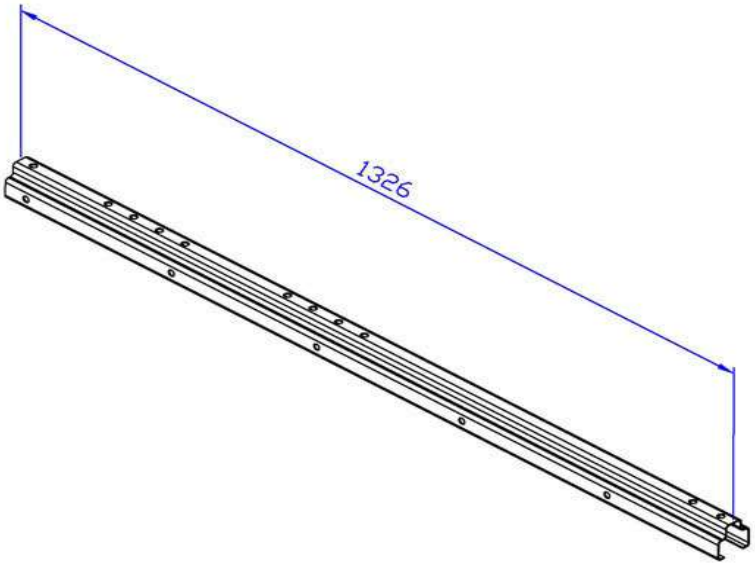
119625 SUPPORT CLIP



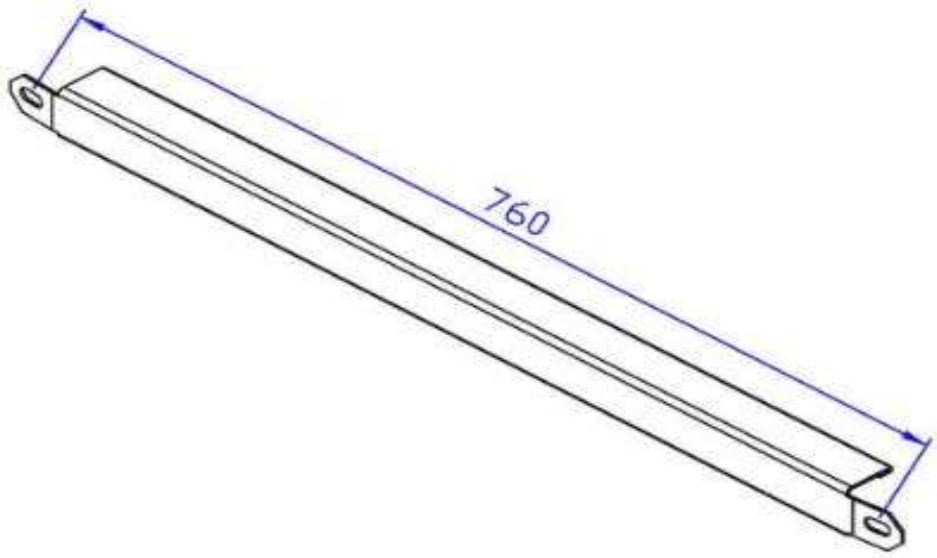
119626 MESH FOR AERATION



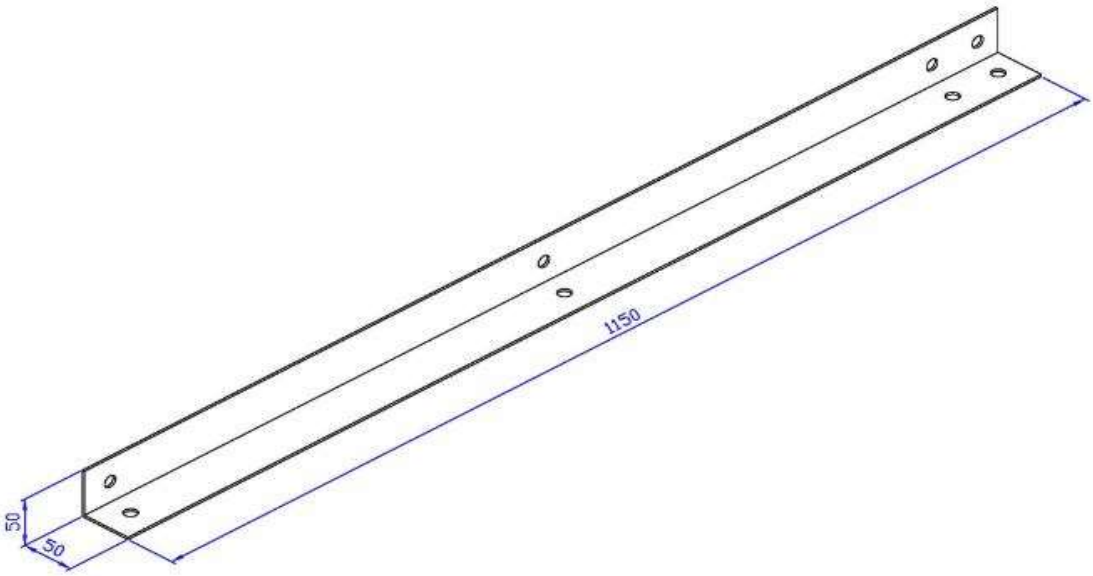
119627 FLANGE FOR AERATION



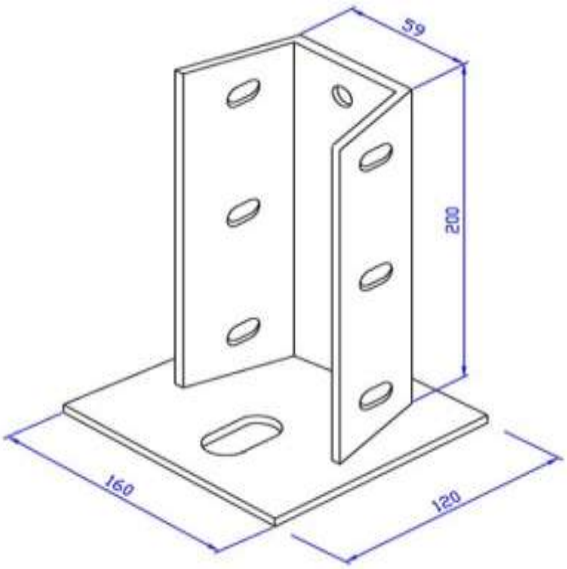
119714 LADDER'S RAIL L= 1326mm



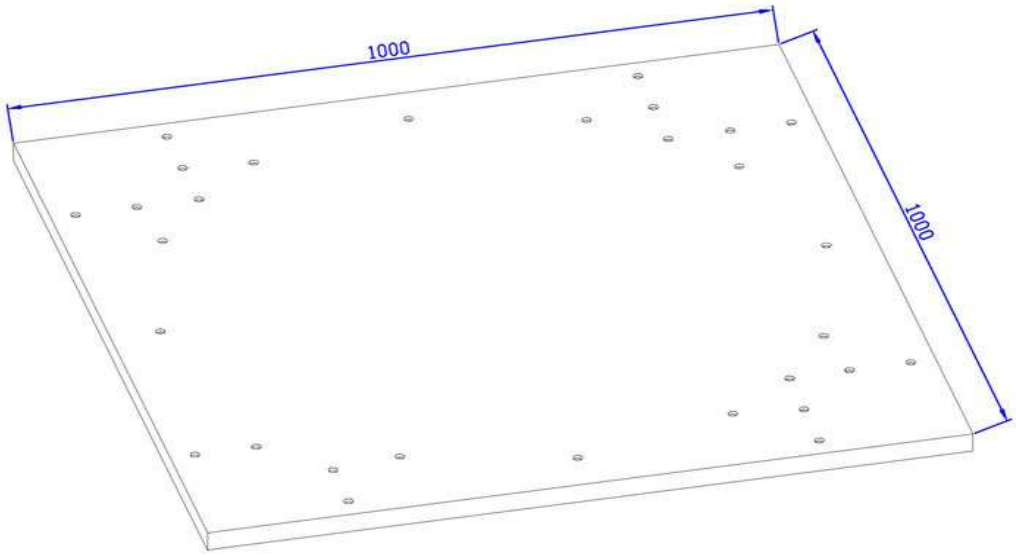
119764 HANDRAIL



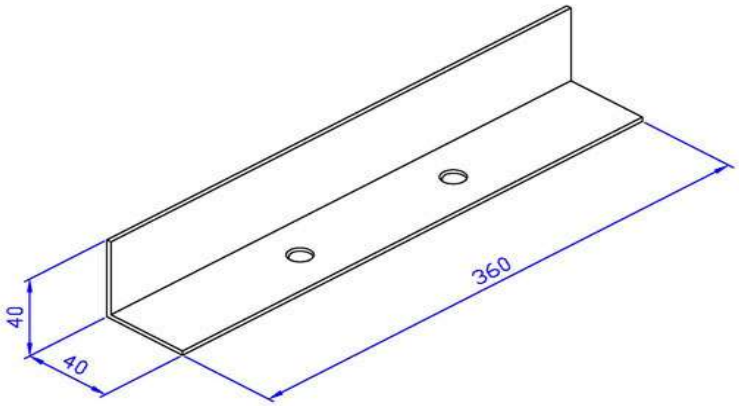
119861 LONG VERTICAL RAIL



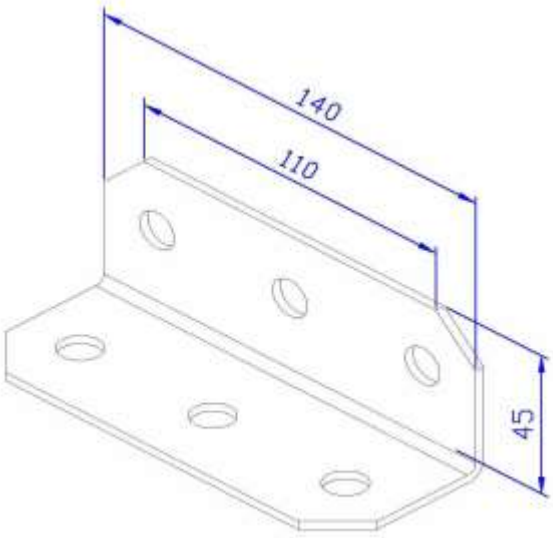
119973 ANCHOR PLATE TYPE "C" 160x120x25mm D25



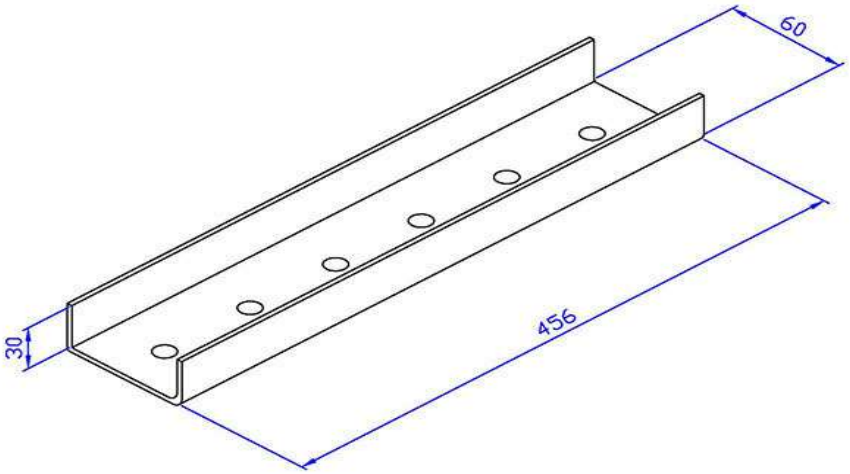
120241 TOP FOR ROOF CENTER COLLAR D800mm



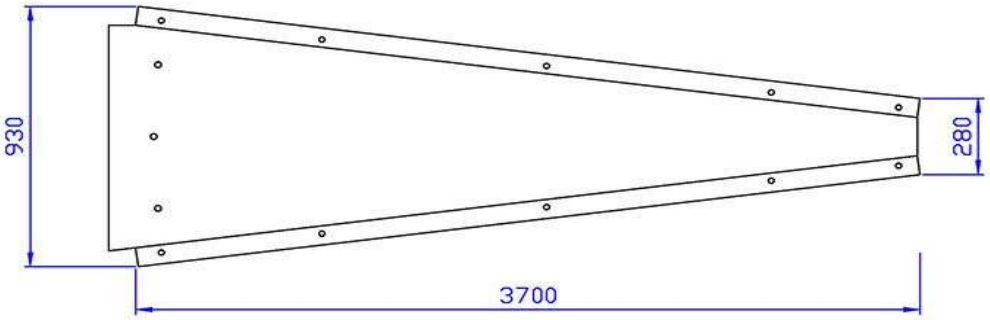
120261 REINFORCEMENT FOR TOP FOR ROOF CENTER COLLAR D800mm



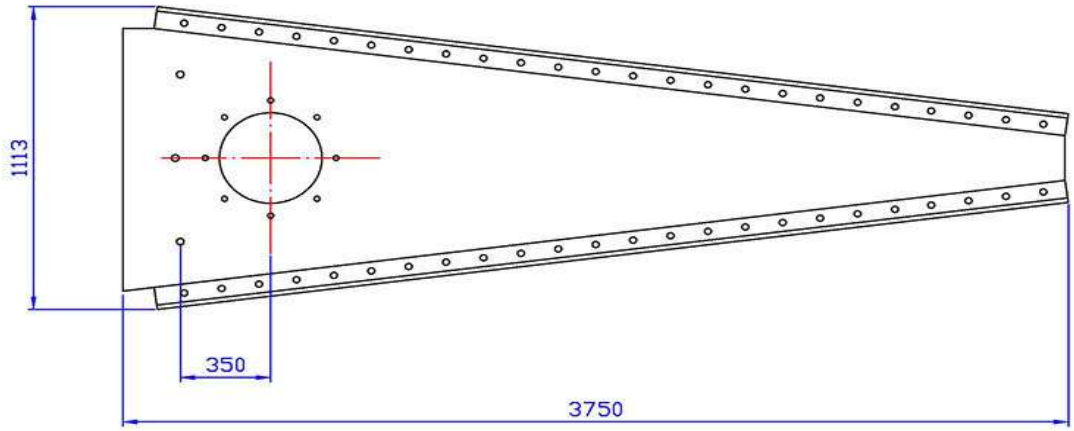
120351 BEAM CLIP



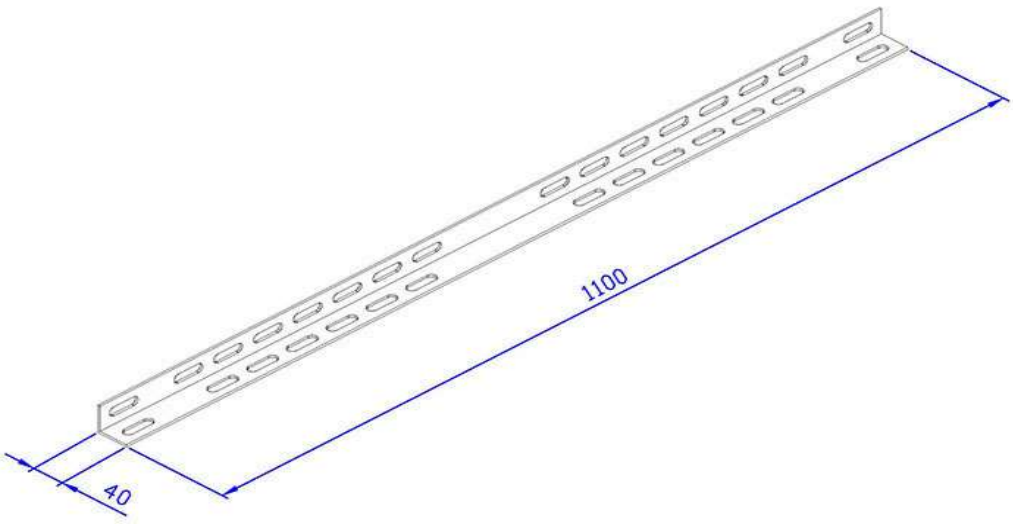
120383 REINFORCEMENT CENTER COLLAR "U" 75x30x456mm



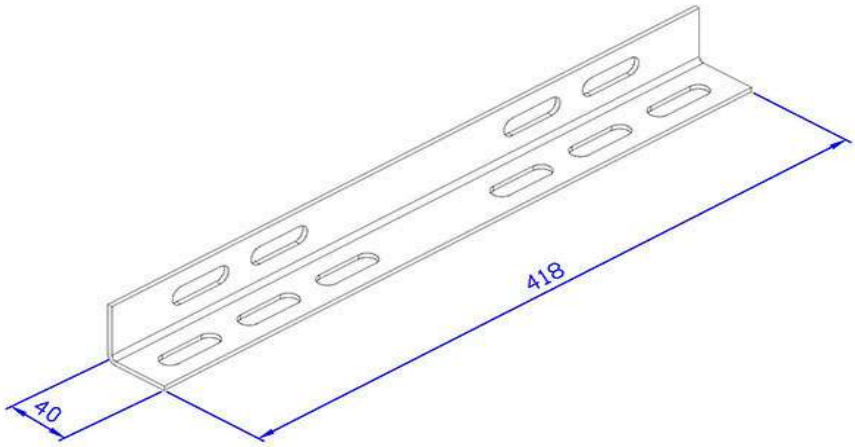
120500 ROOF SHEET



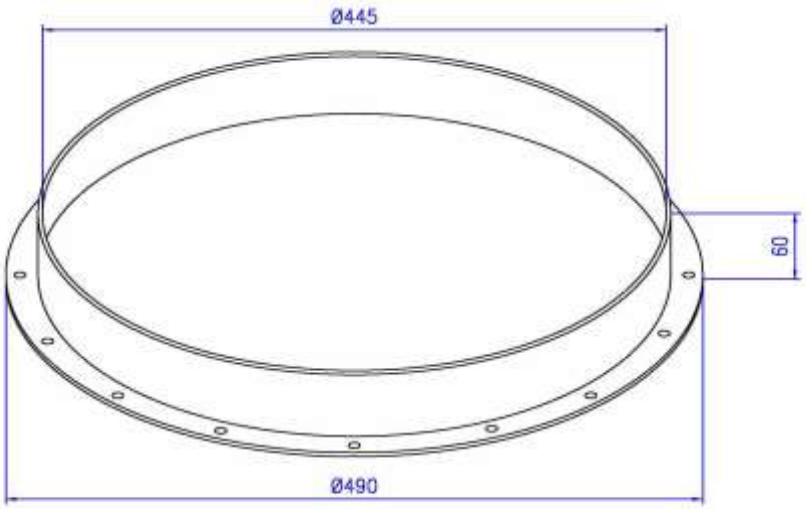
120537 ROOF SHEET WITH CIRCULAR HOLE



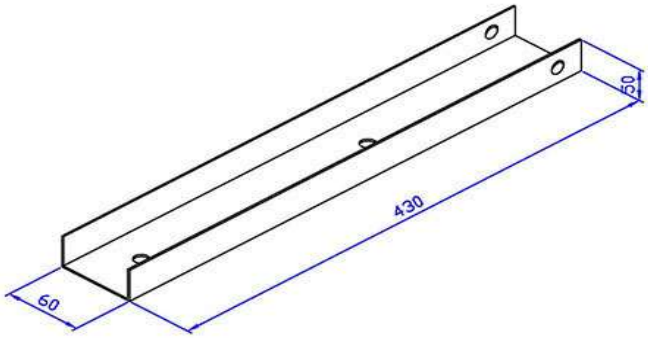
120691 ROOF LADDER RUNG L= 1100mm



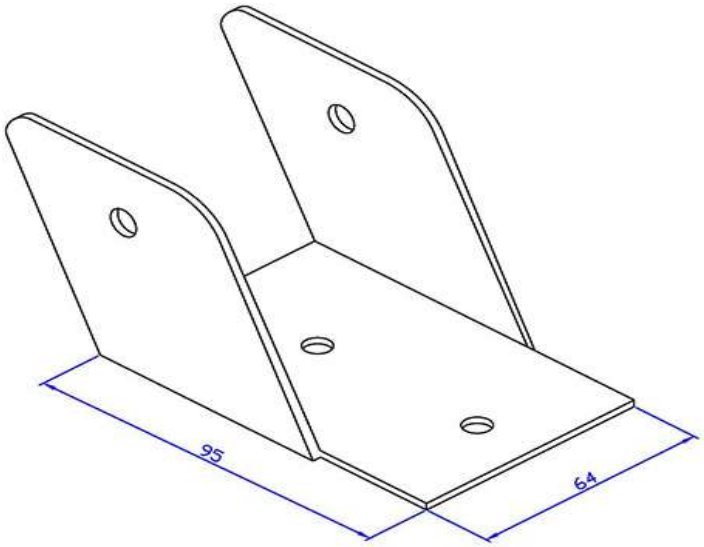
120692 ROOF LADDER RUNG L= 418mm



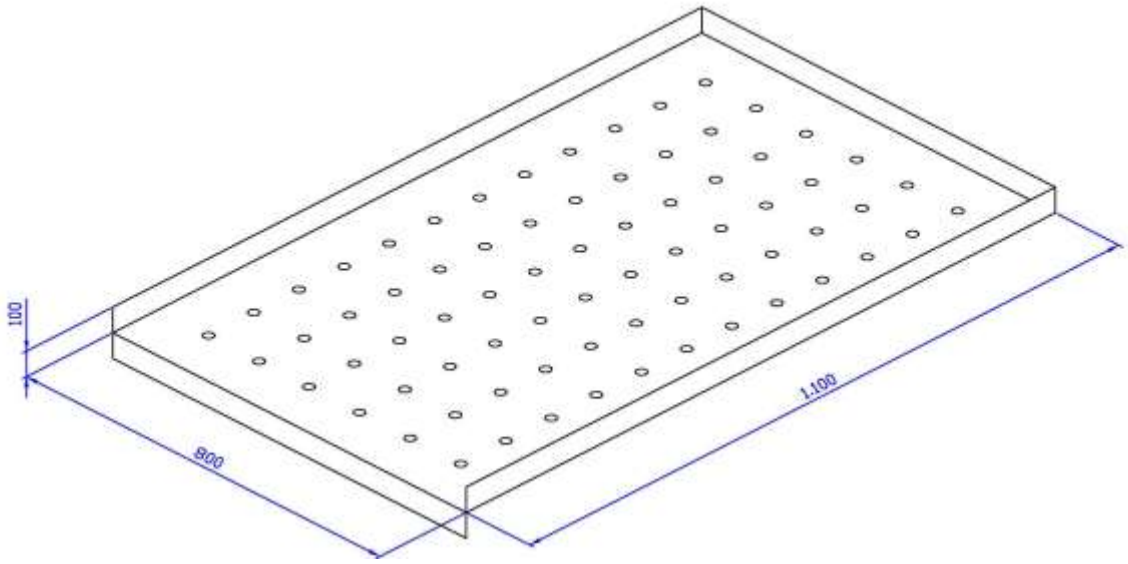
120715A RING FOR MANHOLE



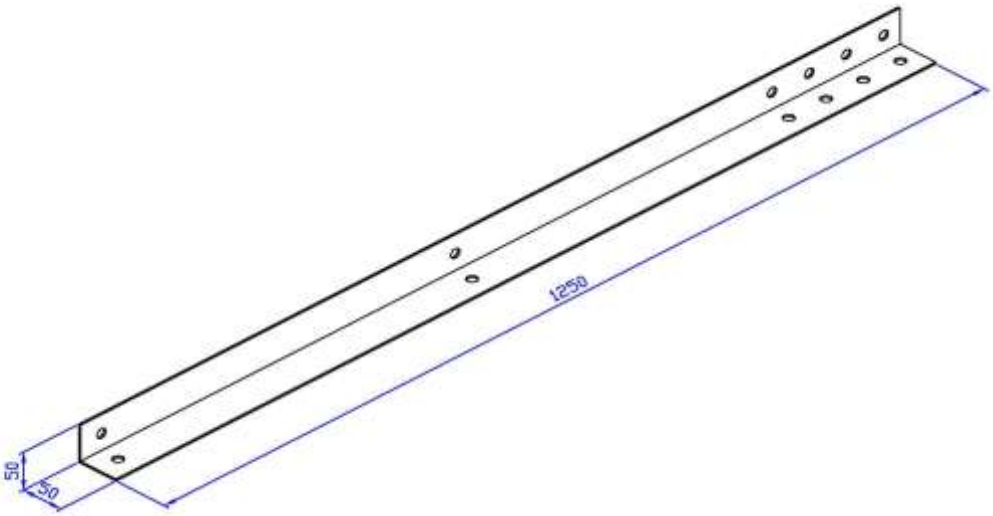
120779 "U" FOR HINGE-MANHOLE



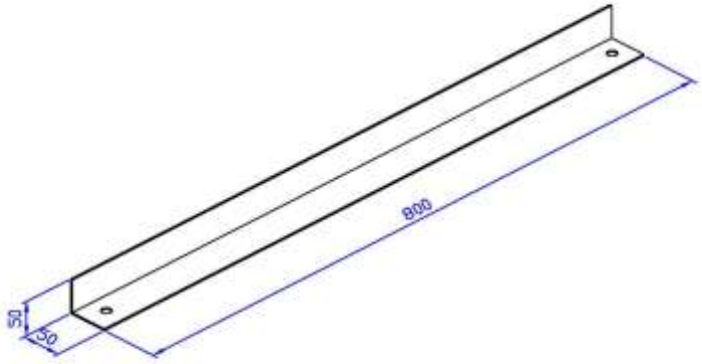
120780 "U" HINGE FOR MANHOLE



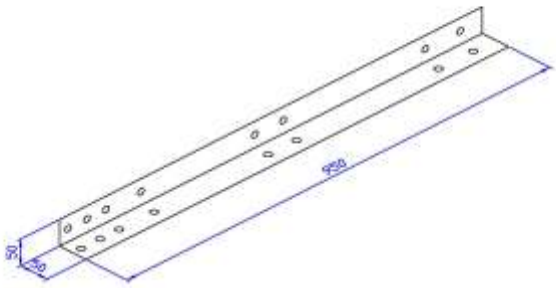
121109A PLATAFORM'S FLOOR 110x800mm



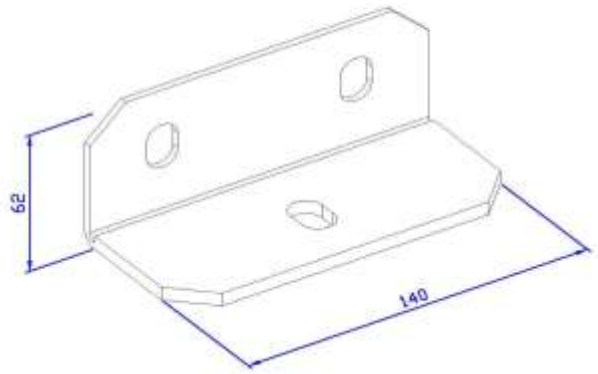
121123 LONG VERTICAL RAIL L=1250mm



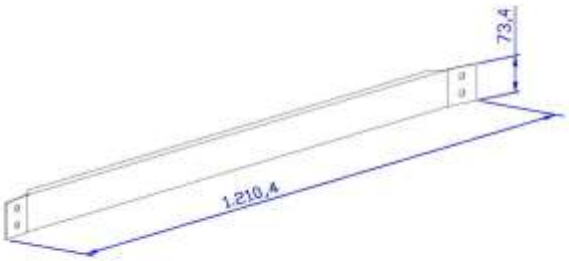
121127 HORIZONTAL ANGLE L= 800mm



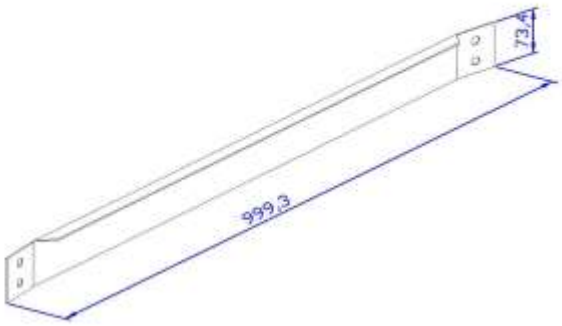
121152A CANTILEVERED ANGLE L= 950mm



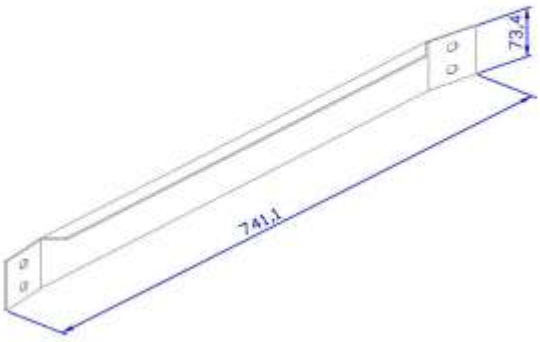
121483 SUPPORT CLIP



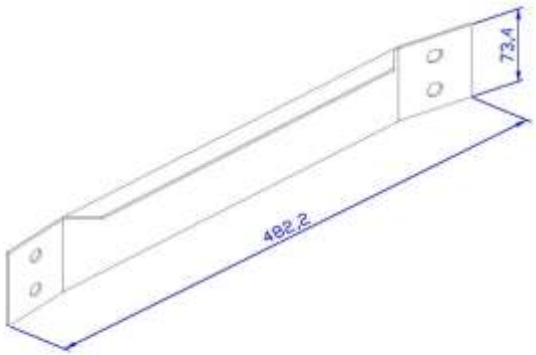
121622 OUTSIDE BRACING



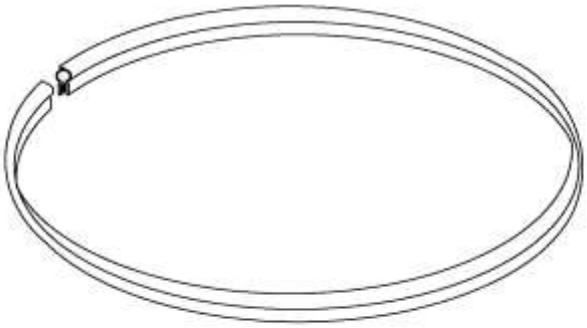
121623 INTERMEDIATE BRACING 1



121624 INTERMEDIATE BRACING 2

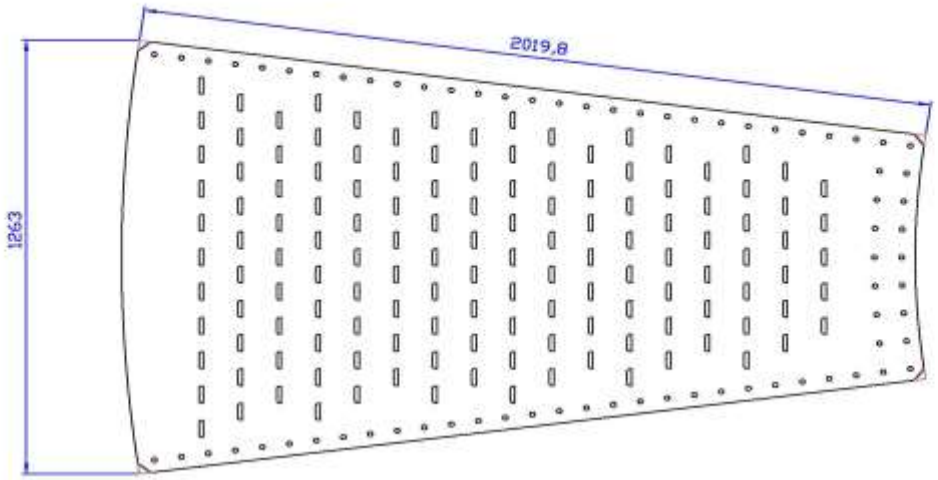


121625 INSIDE BRACING

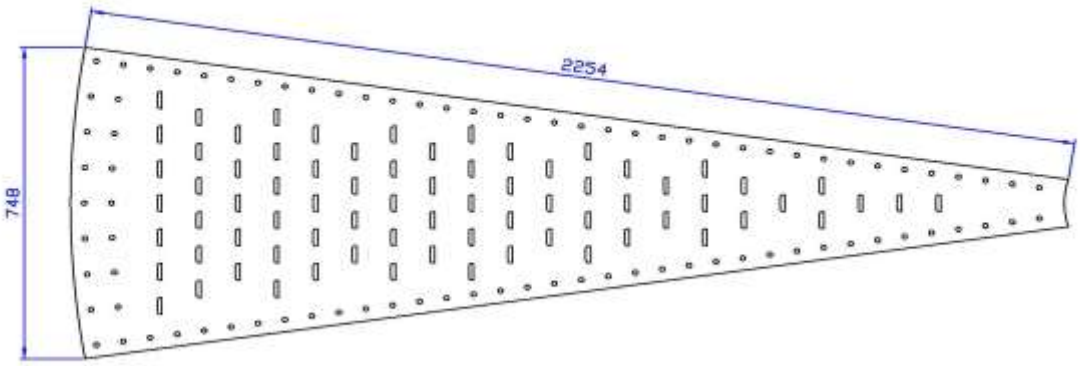


121811 WEATHER STRIP L=1500 mm

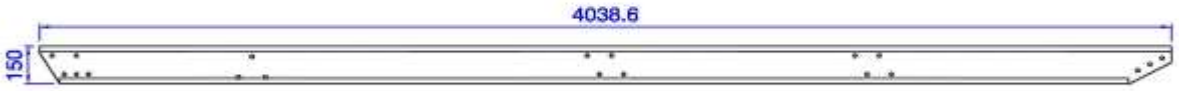
121864 CLOSING SHEET



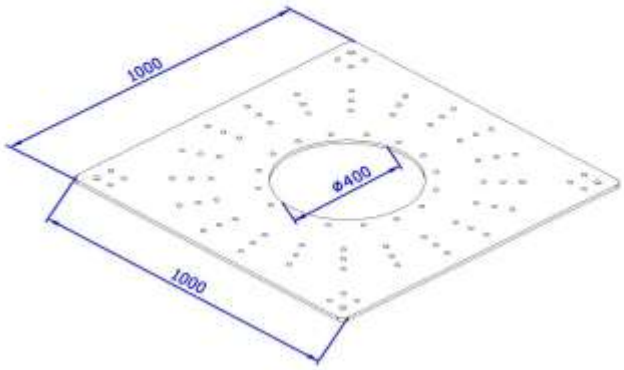
122046 UPPER VENTILATED CONE SECTOR T30



122047 LOWER VENTILATED CONE SECTOR T30



122048 BEAM T30 L=4038 mm



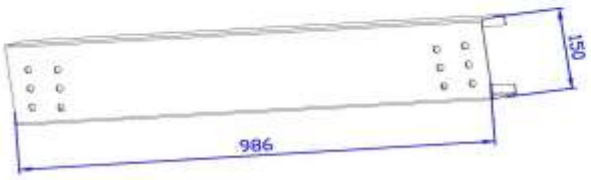
122049 OUTLET SHEET

122054 OUTSIDE SUPPORT T30 L=2930 mm

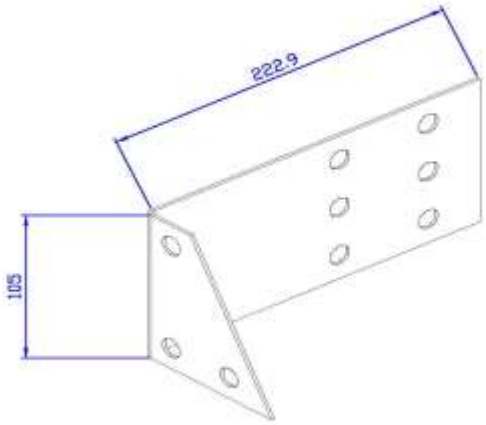
122055 INTERMEDIATE SUPPORT 1 T30 L=2453 mm

122056 INTERMEDIATE SUPPORT 2 T30 L=1976 mm

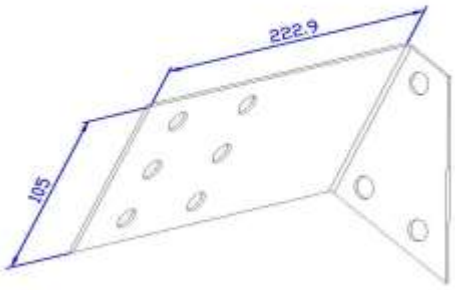
122057 INSIDE SUPPORT T30 L=1498mm



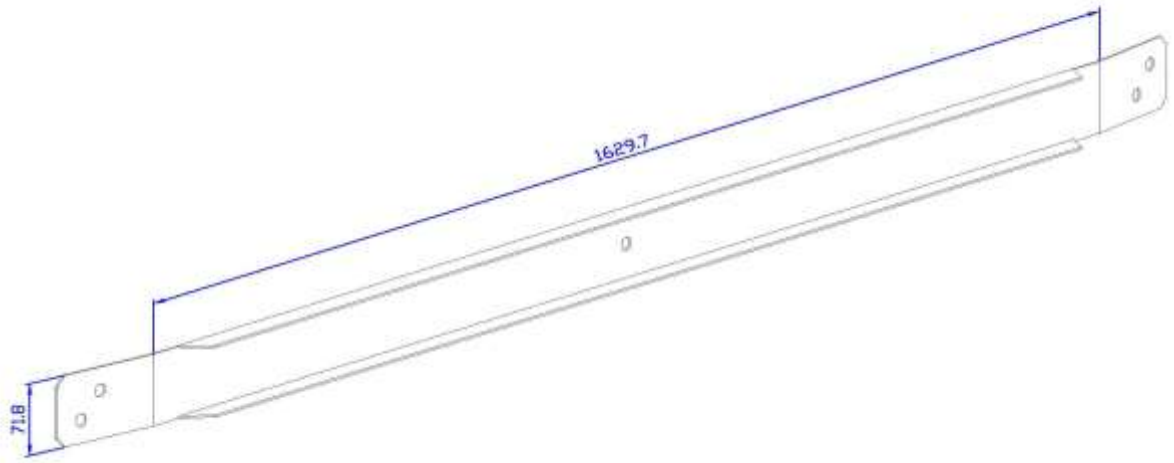
122058 CROSS RAFTER L= 986mm



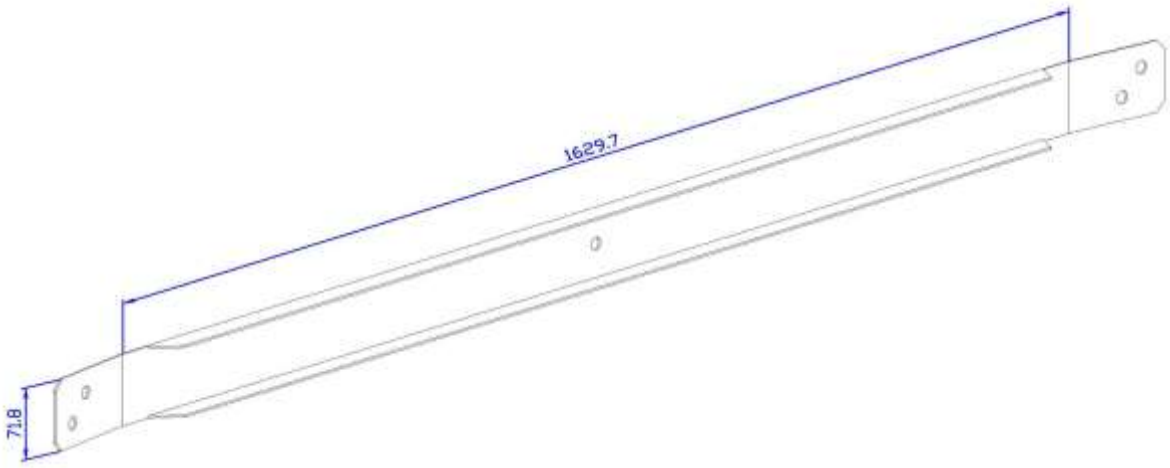
122059 CLIP FOR CROSS RAFTER 1



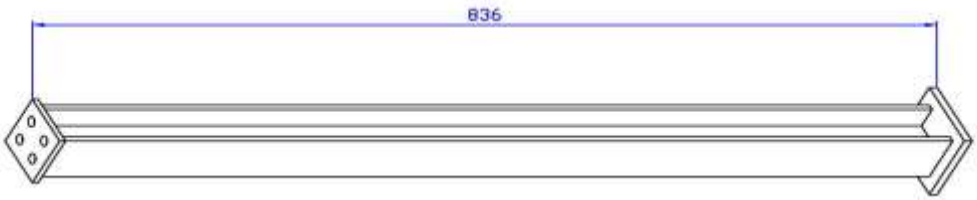
122060 CLIP FOR CROSS RAFTER 2



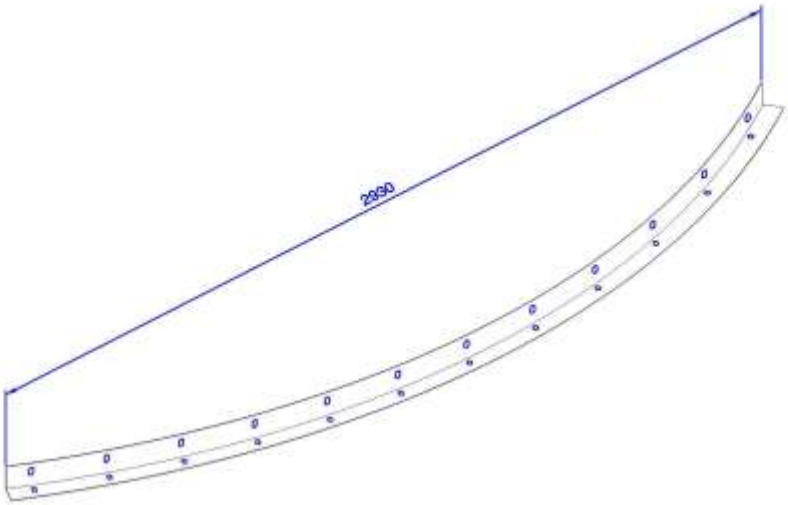
122061 INCLINED BRACING 1



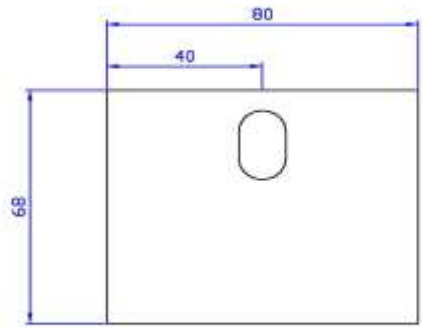
122062 INCLINED BRACING 2



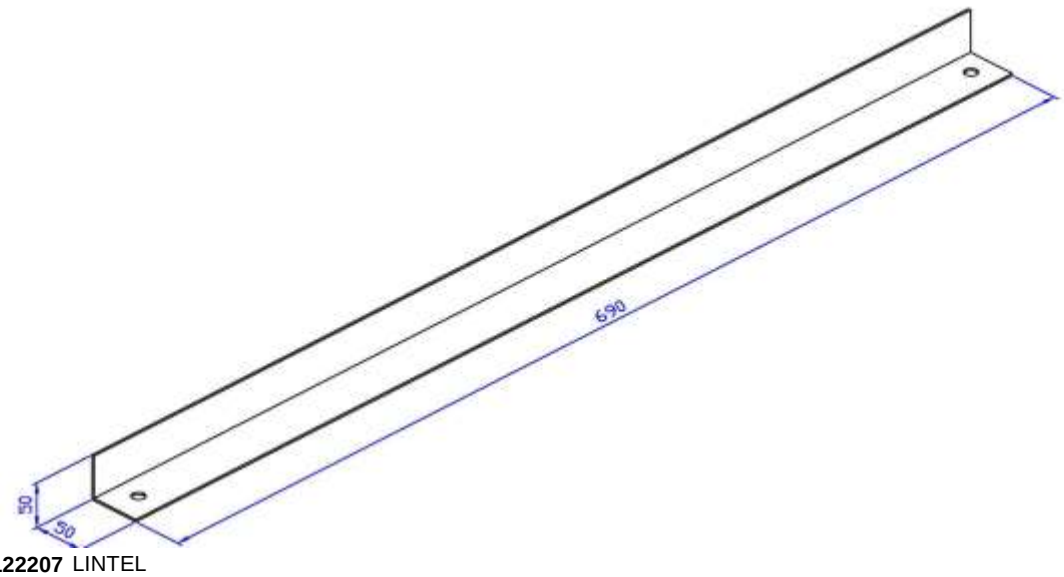
122063 CENTRAL PILLAR



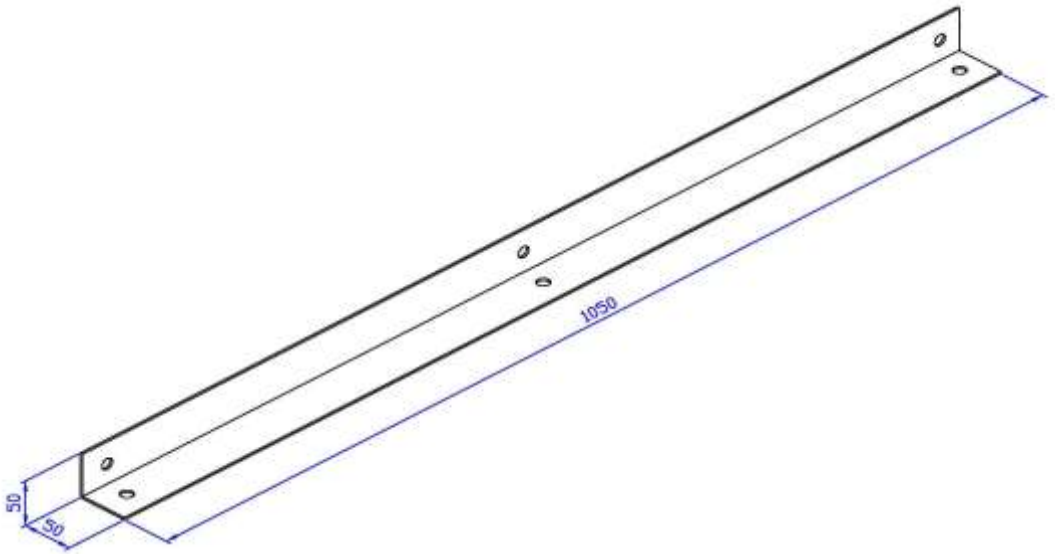
122167 CLOSE ANGLE 7,60



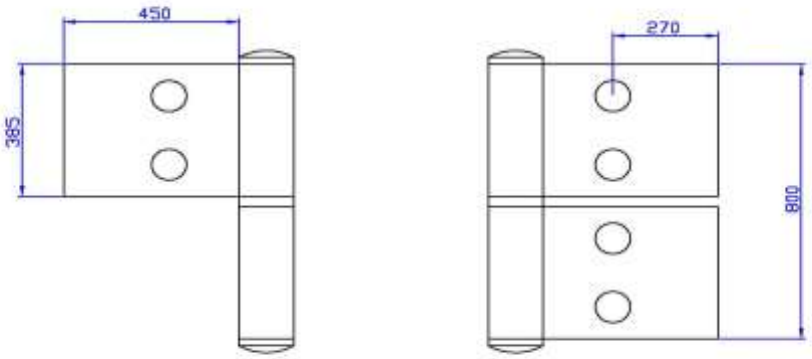
122203 SPLICE



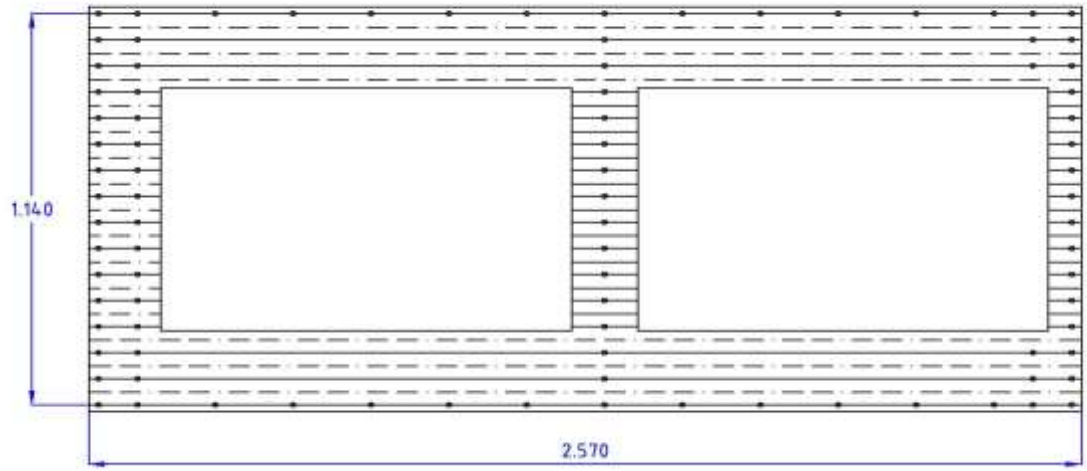
122207 LINTEL



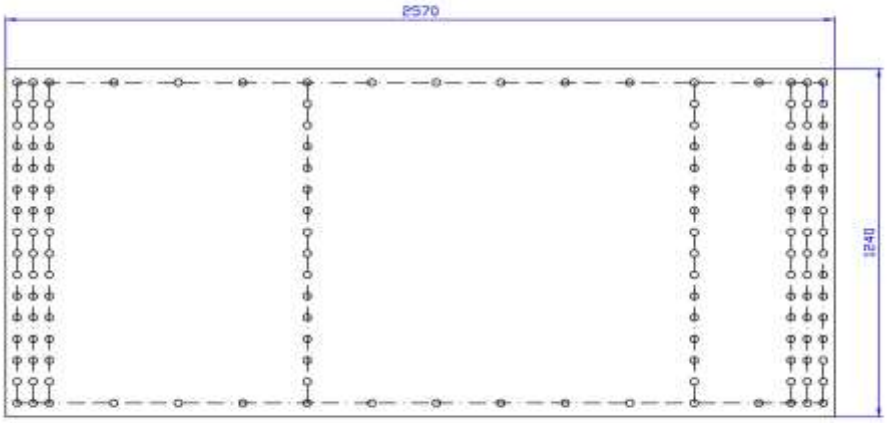
122208 DOOR SIDE



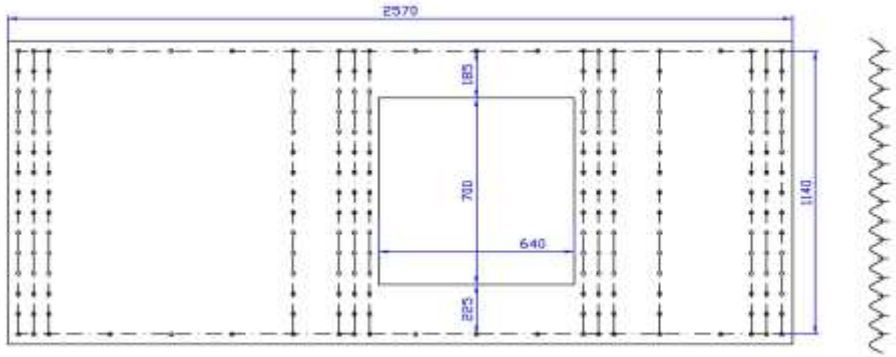
122209 HINGE TYPE A



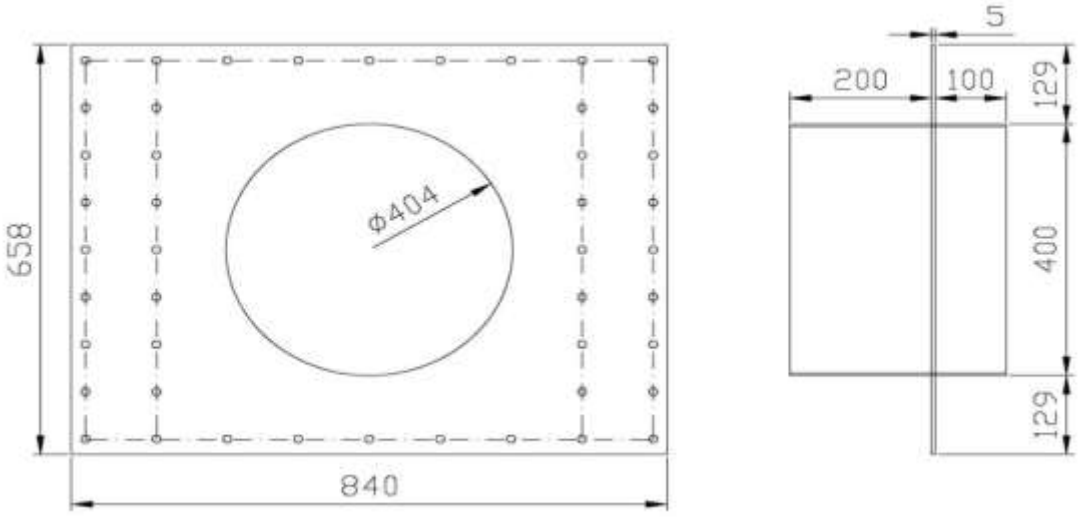
122303 BODYSHEET 2 STIFFENERS DOUBLE JOINT WITH LOGO



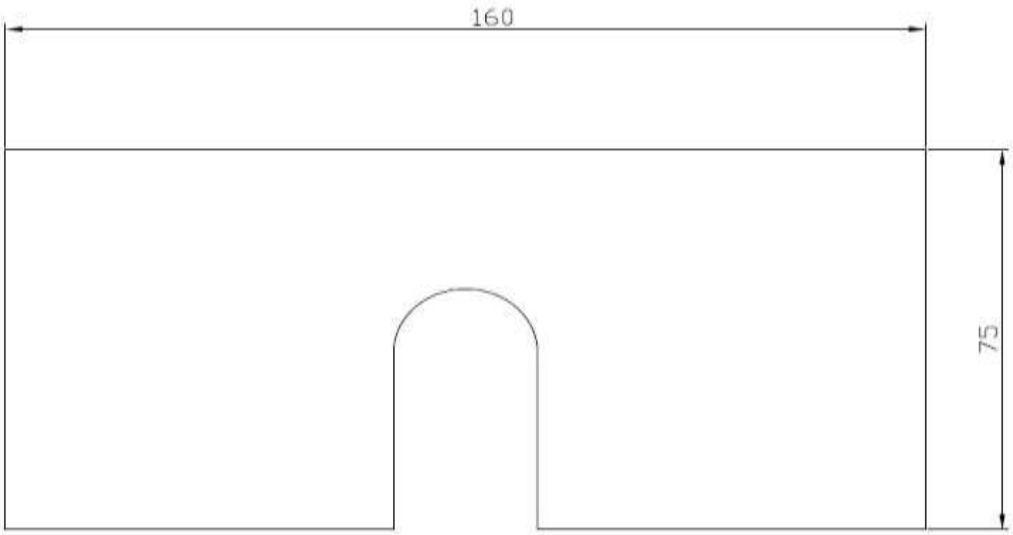
122981 BODYSHEET 2 STIFFENERS TRIPLE JOINT



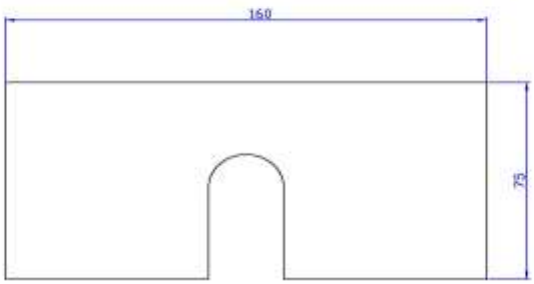
122984 BODYSHEET WITH MANHOLE 2 STIFFENERS TRIPLE JOINT



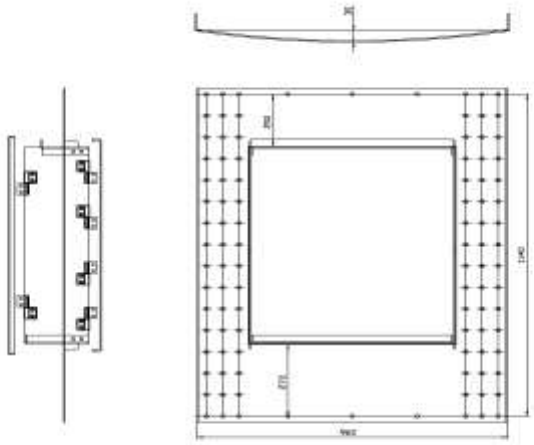
123002 FLAT SHEET WITH TUBE D400



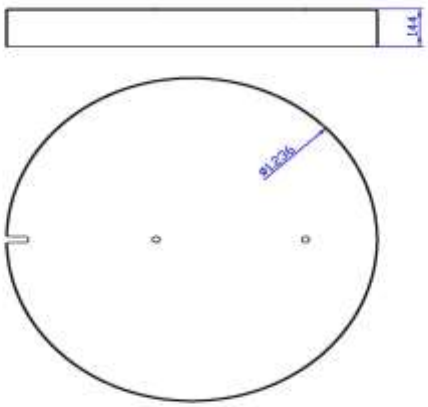
123963 SHIM 160x75x3mm



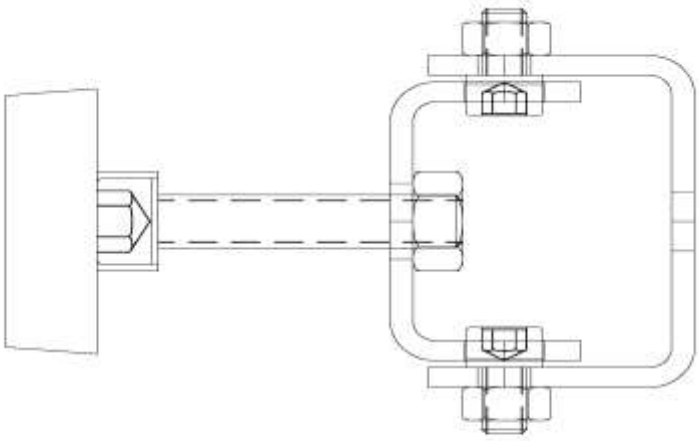
123964 SHIM 160x75x2mm



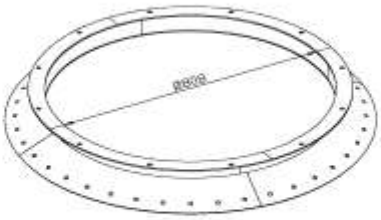
123994 ACCESS DOOR SET TYPE 3



124128 COVER OF INSPECTION DOOR



124132 SEAL SET FOR INSPECTION DOOR



124162 ROOF CENTER COLLAR D808mm

GENERAL WARRANTY CONDITIONS OF SYMAGA, S.A.

JANUARY 2013

SYMAGA S.A. MANUFACTURES AND SUPPLIES SILOS FOR FREE FLOWING GRAIN STORAGE UNDER MOST MODERN DESIGNS. THE LOAD CALCULATION IN THE SILOS FOLLOWS INTERNATIONAL NORMS LIKE “ANSI-ASAE”, “DIN” OR EUROCODE, ALWAYS ACCORDING TO THE SPECIFIC OFFER OR ORDER CONFIRMATION.

SYMAGA WARRANTS ALL PRODUCTS WHICH IT MANUFACTURES TO BE FREE OF DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USAGE AND CONDITIONS FOR A PERIOD OF 24 MONTHS AFTER DELIVERY, UNLESS OTHERWISE SPECIFICALLY PROVIDED IN WRITING BY SYMAGA PRIOR TO DELIVERY.

IF SYMAGA´S PRODUCTS FAIL TO CONFORM THE ABOVE WARRANTY, AND IF SYMAGA IS INFORMED IN WRITING PRIOR TO THE TO THE END OF THE WARRANTY PERIOD, SYMAGA´S ONLY OBLIGATION SHALL BE TO REPAIR OR REPLACE, AT ITS EXPENSE, PRODUCTS THAT, IN SYMAGA´S SOLE JUDGMENT, CONTAIN A MATERIAL DEFECT DUE TO MATERIALS OR WORKMANSHIP.

OFF-CENTER UNLOADING OF SILOS IS NOT APPROVED AND WILL BE STRUCTURALLY DETRIMENTAL TO A GRAIN SILO. ANY OFF-CENTER DISCHARGE OPENINGS SHOULD BE USED FOR THE SOLE PURPOSE OF CLEAN-OUT THE SILO AFTER CENTER DISCHARGE HAS BEEN COMPLETED TO THE GRAINS ANGLE OF REPOSE. THE USER IS RESPONSIBLE TO GUARANTEE THE PROPER USE OF ANY OFF-CENTER DISCHARGE OPENING. ANY DAMAGES OCCURRED DUE AN OFF-CENTER UNLOADING SHALL NOT BE COVERED BY SYMAGA´S STRUCTURAL WARRANTY.

ALL DELIVERY AND SHIPMENT CHARGES TO AND FROM SYMAGA’S FACTORY WILL BE PURCHASER’S RESPONSIBILITY. EXPENSES INCURRED BY OR ON BEHALF OF THE PURCHASER WITHOUT PRIOR WRITTEN AUTHORIZATION FROM SYMAGA SHALL BE THE SOLE RESPONSIBILITY OF THE PURCHASER.

COMPONENTS MANUFACTURED BY OTHERS, SUCH AS MOTORS, FANS, SWEEP AUGERS, CONTROL SYSTEMS, OR OTHER TRADE ACCESORIES ARE ONLY WARRANTED TO THE EXTENT WARRANTED BY THEIR RESPECTIVE MANUFACTURERS.

SYMAGA DOES NOT WARRANT AGAINST, OR SHALL NOT LIABLE FOR, LOSSES OR DAMAGES ARISING OUT OF CIRCUMSTANCES NOT SUBJECT TO ITS CONTROL, SUCH AS: OCCURENCES DURING SHIPMENT, HANDLING OR STORAGE; IMPROPER INSTALLATION, USE OR MAINTENANCE; ACTS OF THE OWNER; DESIGN, ENGINEERING OR INSTALLATION PROCEDURES NOT APPROVED BY SYMAGA IN WRITING .

SYMAGA SHALL NOT BE LIABLE FOR LOSS OR DAMAGE, INCLUDING WITHOUT LIMITATION DAMAGE TO THE CONTENTS OF A STRUCTURE, LOSS OF USE OF A PRODUCT, DAMAGE TO OTHER PROPERTY. ESPECIALLY SYMAGA SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOSS OF ANTICIPATED PROFITS OR BENEFITS.

FURTHERMORE FOLLOWING CONDITIONS SHALL APPLY:

LIMITED MATERIAL WARRANTY GALVANIZED COATED SHEET STEEL PROTECTION, 600 GR/M² (Z-600)

GALVANISED COATED SHEET STEEL, PROTECTION Z 600 ACCORDING UNE- EN -36130 , SOLD FOR USE AS STEEL SILO COMPONENTS, WILL NOT RUPTURE, FAIL STRUCTURALLY OR PERFORATE WITHIN A PERIOD OF 18 MONTHS AFTER SHIPMENT FROM OUR FACTORY DUE TO NORMAL ATMOSPHERIC CORROSION. THIS WARRANTY ONLY COVERS THE MATERIAL AND NOT THE INSTALLATION.

THE MANUFACTURER WARRANTS ONLY THAT ITS PRODUCTS ARE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP ON THE DATE OF SHIPMENT FROM ITS PLANT.

THIS WARRANTY DOES NOT APPLY TO SHEETS EXPOSED AT ANY TIME TO CORROSIVE OR AGGRESSIVE ATMOSPHERIC CONDITIONS, INCLUDING BUT NOT LIMITED TO:

A) AREAS SUBJECT TO CONSTANT SPRAYING OF EITHER SALT OR FRESH WATER.
B) AREAS SUBJECT TO FALLOUT OR EXPOSURES TO CORROSIVE CHEMICALS, ASH, FUMES,CEMENT DUST OR ANIMAL WASTE.
C) AREAS SUBJECT TO WATER RUN-OFF FROM LEAD OR COPPER FLASHING OR AREAS IN METALLIC CONTACT WITH LEAD OR COPPER.
D) CONDITIONS OR CIRCUMSTANCES WHERE CORROSIVE FUMES OR CONDESATES ARE GENERATED OR RELEASED INSIDE OF SILOS.
E) TECHNICALLY THE LIFE OF THE GALVANIZATION IS REGULATED BY THE EUROPEAN STANDARDS ISO 9223, 9224 AND 9225

ISO – 9223: CORROSION OF METALS AND ALLOYS – CORROSIVITY OF ATMOSPHERES – CLASSIFICATION

ISO – 9224: CORROSION OF METALS AND ALLOYS – CORROSIVITY OF ATMOSPHERES – GUIDING VALUES FOR THE CORROSIVITY CATEGORIES

ISO – 9225: CORROSION OF METALS AND ALLOYS – CORROSIVITY OF ATMOSPHERES – MEASUREMENT OF POLLUTION.

THIS WARRANTY DOES NOT APPLY IN THE EVENT OF:

A) MECHANICAL, CHEMICAL OR OTHER DAMAGE SUSTAINED DURING THE SHIPMENT,STORAGE, ERECTION, OR AFTER ERECTION.

B) DAMAGE CAUSED BY IMPROPER SCOURING OR CLEANING PROCEDURES.
C) PRESENCE OF CORROSIVE DAMPS OR MATERIALS IN CONTACT WITH OR CLOSE PROXIMITY TO THE SHEETS.
D) DETERIORATION OF SHEETS CAUSED DIRECTLY OR INDIRECTLY BY OVERDRIVING THE BOLTS.
E) FLYING, BLOWN, OR FALLING OBJECTS, EXPLOSION, FIRE, ACTS OF GOD, OR OTHER SIMILAR EXTERNAL FORCES BEYOND SYMAGA REASONABLE CONTROL.
F) IMPROPER ERECTION OR CONSTRUCTION METHODS.
G) THE GALVANIZED MATERIALS LEAVE OUR PLANT IN PRIME CONDITION. DAMAGE CAUSED BY
H) WET OR UNPROPER STORAGE IS NOT COVERED BY THE WARRANTY. STORE MATERIALS IN DRY HIGH GROUND UNDER COVERED AREA, ELEVATED ON WOOD BLOQUING. DO NOT COVER WITH PLASTIC OR TARPAULINS SO AS TO PREVENT FREE AIR CIRCULATION. INSPECT BUNDLES DAILY FOR MOISTURE. IF BUNDLES CONTAINS MOISTURE, IT SHALL BE IMMEDIATELY OPENED AND DRIED.

THIS WARRANTY SHALL BE SUBJECT TO THE STIPULATIONS, LIMITATIONS AND CONDITIONS HEREIN AFTER SET FORTH:

A) SYMAGA'S LIABILITY FOR BREACH OF THIS WARRANTY SHALL BE LIMITED EXCLUSIVELY TO REPAIRING DEFECTIVE SHEETS OR AT SYMAGA'S SOLE OPTION, OF FURNISHING F.O.B. SYMAGA'S PLANT SUFFICIENT REPLACEMENT SHEETS FOR THE DEFECTIVE PIECES.

B) SYMAGA SHALL NOT IN ANY EVENT BE LIABLE FOR THE COST OF LABOUR TO REPLACE AND DEFECTIVE SHEET OR FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES TO ANYONE BY REASON OF THE FACT THAT SUCH SHEETS SHALL HAVE BEEN DEFECTIVE.

C) TITLE TO ANY REPLACED MATERIAL SHALL PASS TO SYMAGA.

D) CLAIMS MUST BE PROMPTLY REPORTED IN WRITING TO SYMAGA, AND SYMAGA SHALL BE GIVEN A REASONABLE OPPORTUNITY TO INSPECT THE SHEETS CLAIMED TO BE DEFECTIVE. ADEQUATE IDENTIFICATION OF THE MATERIAL INVOLVED IN THE CLAIM, INCLUDING DATE OF INSTALLATION, INVOICE NUMBER AND DATE OF SHIPMENT MUST BE ESTABLISHED BY THE BUYER.

E) SYMAGA DOES NOT WARRANT ANY PART, PRODUCT OR MATERIAL TO MEET LOCAL, MUNICIPAL OR STATE ORDINANCES, CODES LAWS OR REGULATIONS.

F) THE BUYER SHALL EXERCISE DILIGENCE IN INSPECTION OF SHEETS AS RECEIVED FROM SYMAGA SO AS TO MITIGATE REPAIR OR REPLACEMENT.

G) THIS WARRANTY SHALL EXTEND ONLY TO THE NAMED OWNER, SUCH NAMED OWNER WITHOUT THE WRITTEN CONSENT OF SYMAGA MAY NOT MAKE THIS WARRANTY SUBJECT TO ANY ASSIGNMENT OR TRANSFER.

H) SYMAGA RESERVES THE RIGHT TO TERMINATE THIS WARRANTY AT ANY TIME, (EXCEPT AS TO ORDERS ALREADY ACCEPTED) UPON THE GIVING OF WRITING NOTICE THERE OF.

I) WARRANTY DOES NOT COVER DAMAGE OR LOSS DURING SHIPMENT OF THE SYMAGA MATERIAL.

J) THE OBLIGATION OF SYMAGA UNDER THIS WARRANTY SHALL NOT ARISE UNLESS SYMAGA IS NOTIFIED AND THE WARRANTY IS PRESENTED TOGETHER WITH A WRITING STATEMENT SPECIFYING THE CLAIM OR FAILURE WITHIN THIRTY (30) DAYS AFTER A FAILURE IS FIRST CALLED TO THE ATTENTION OF THE OWNER AND NOT LATER THAN THE EXPIRATION OF THE APPLICABLE WARRANTY PERIOD.

K) SYMAGA'S LIABILITY FOR MISSING PARTS IS 15 DAYS. MATERIALS AND BUNDLES MUST BE CHECKED INMEDIATLY ON ARRIVAL TO INSTALLATION SITE BY PURCHASER ALONG WITH THE PACKING LIST PROVIDED BY SYMAGA.

RUST DAMAGE DUE TO IMPROPER STORAGE ISN'T COVERED BY SYMAGA'S WARRANTY

PROPER STORAGE OF GRAIN SILOS

MATERIALS PRIOR TO CONSTRUCTION TO PREVENT WET STORAGE STAIN:

WET STORAGE STAIN (RUST) WILL DEVELOP WHEN CLOSELY PACKED BUNDLES OF GALVANIZED MATERIAL SUCH AS SIDEWALL, ROOF AND HOPPER SHEETS AND HOPPER SILO LEGS HAVE MOISTURE PRESENT FROM ANY SOURCE. ROOF AND SIDEWALL BUNDLES SHOULD BE INSPECTED ON ARRIVAL FOR THE PRESENCE OF MOISTURE. IF MOISTURE IS PRESENT, MOISTURE MUST NOT BE PERMITTED TO REMAIN BETWEEN THE SHEETS. IN THE CASE OF MOISTURE PRESENCE, SHEETS OR PANELS SHOULD BE SEPARATED IMMEDIATELY, WIPED DOWN, DRIED AND SPRAYED WITH A LIGHT OIL OR DIESEL FUEL.

WHERE POSSIBLE, SIDEWALL BUNDLES, ROOF SHEETS AND OTHER CLOSELY PACKED MATERIALS (E.G. HOPPER SHEETS AND HOPPER SILO LEGS) SHOULD BE STORED IN A DRY, CLIMATE CONTROLLED BUILDING. STORAGE INSIDE A DRY BUILDING SHOULD BE DONE IF AT ALL POSSIBLE. WHERE OUTDOOR STORAGE IS UNAVOIDABLE, THE MATERIALS SHOULD BE RAISED OUT OF CONTACT FROM THE GROUND OR VEGETATION. STACKING AND SPACING MATERIALS SHOULD NOT BE CORROSIVE OR WET. MATERIALS MUST BE PROTECTED FROM THE WEATHER. WEATHER PROTECTION THAT PERMITS MORE AIR MOVEMENT AROUND THE BUNDLES IS BEST.

THE STORAGE METHOD OF THE ROOF BUNDLES AND SIDEWALL SHEETS MAY ALSO HELP MINIMIZE MOISTURE PRESENCE. ROOF BUNDLES SHOULD BE STORED INCLINED. THE BUNDLES SHOULD BE STORED AND SECURED IN A SAFE & STABLE MANNER. TURNING THE BUNDLES OVER AND STORING WITH THE CENTER OF THE DOME "UP" LIKE AN ARCH IS AN OPTION. SIDEWALL BUNDLES MAY BE STORED ON EDGE, HOWEVER THESE BUNDLES SHOULD BE SECURED IN SUCH AS WAY AS THEY CANNOT FALL OVER AND CAUSE INJURY.

SHOULD "WHITE RUST" OR "WET STORAGE STAIN" OCCUR, CONTACT THE MANUFACTURER IMMEDIATELY CONCERNING METHODS TO MINIMIZE THE ADVERSE EFFECT UPON THE GALVANIZED COATING.

PLASTILINE / SEALANT FOR SILO JOINTS HAS TO BE STORED UNDER DRY CONDITIONS BETWEEN + 5º AND +20 ºC.

GENERAL SAFETY STATEMENT

Our principal concern is your safety and the safety of others associated with grain handling equipment. This manual is to help you understand safe operating procedures and some problems which may be encountered by the operator and other personnel.

As owner and/or operator, it is your responsibility to know what requirements, hazards and precautions exist and inform all personnel associated with the equipment or in the area. Safety precautions may be required from the personnel.

Avoid any alterations to the equipment. Such alterations may produce a very dangerous situation, where serious injury or death may occur.

You should consider the location of the bin site relative to power line locations or electrical transmission equipment. We recommend you contact your local power company to review your installation plan or for information concerning required equipment clearance.

Clearance of portable equipment that may be taken to the bin site should be reviewed and considered as well. Any electrical control equipment in contact with the bin should be properly grounded and installed in accordance with National Electric Code provisions and other local or national codes.

This product is intended for the use of grain storage only. Any other use is a misuse of the product!

This product has sharp edges! These sharp edges may cause serious injury. To avoid injury, handle sharp edges with caution and use proper protective clothing and equipment at all times.

Sidewall bundles or sheets must be stored in a safe manner. The safest method of storing sidewall bundles is laying horizontally with the arch of the sheet upward or over like a dome.

Sidewall sheets stored on edge must be secured in a way that they cannot fall over and cause injury. Care should be taken in the handling and movement of sidewall bundles.

Personnel operating or working around equipment should read this manual. This manual must be delivered with equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

To avoid anyone becoming caught or trapped by grain, do NOT empty the silo whenever there are people inside it.

Keep hands, feet and clothing away from moving parts.

Fall from grain bins at any height can and will cause injury. Make sure all needed safety measures are taken.

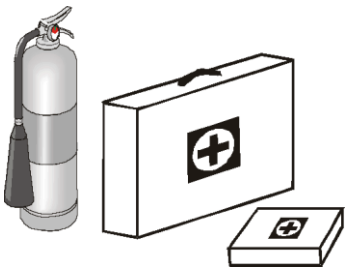
PROTECTION EQUIPMENT

PREPARE FOR EMERGENCIES

Be prepared if fire starts

Keep a first aid kit and fire extinguisher handy

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone



Keep emergency Equipment Quickly Accessible

WEAR PROTECTIVE CLOTHING

Wear close fitting clothing and safety equipment appropriate to the job.

Safety glasses should be worn at all times to protect eyes from debris.

Wear gloves to protect your hands from sharp edges on plastic or steel parts.

A respirator may be needed if a hog house has poor ventilation. Waste fumes can be toxic.

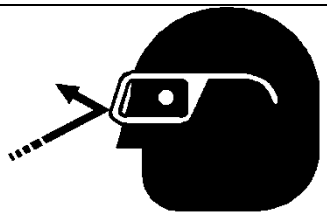
Wear hard hat and steel toe boots to help protect your head and toes from falling debris.

Remove all jewelry.

Tuck in any loose or dangling shoe strings.

Long hair should be tied up and back.

Eye protection



Gloves

Steel Toe Boots

Respirator

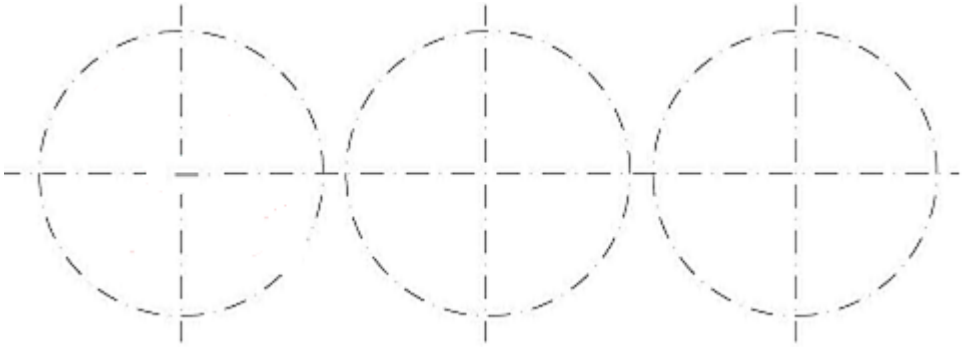
Hard hat

PRIOR TO THE ERECTION

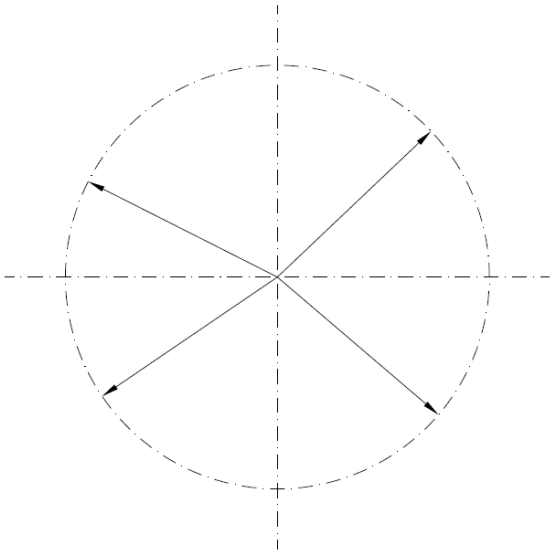
Do the following tasks before starting the assembly:

Axis tracing:

Trace the axis of the silos (both longitudinal and transverse) on the foundations. Trace as well the circumferences and ensure the measure of the radius corresponding to the diameters of the silos. This will help to centre the silo properly.



After assembling the last ring and before the silo lays on the foundation, it is necessary to ensure the correct position of the bodysheets and the stiffeners. For this purpose, a verification needs to be done, with an element of the exact measure of the silo radius (cable, tube, rod…). With this element, several measures have to be taken from the centre of the silo circle to the walls of the silo, in order to check that is perfectly centered on the foundation.



Materials marking:

All the body-sheets, stiffeners and stiffener splices delivered by SYMAGA for the assembly of the silos are marked with a specific code that helps to identify the different body-sheets and stiffeners (according to their thickness and type of joint). These marks are introduced in the tables below:

Body-sheets

E 0.8	E 1	E 1.2	E 1.5	E 1.8	E 2	E 2.2	E 2.5	E 2.8	E 3	E 3.5	E 4	E 5
Body sheets with thickness of **0,8 mm**	Body sheets with thickness of **1,0 mm**	Body sheets with thickness of **1,2 mm**	Body sheets with thickness of **1,5 mm**	Body sheets with thickness of **1,8 mm**	Body sheets with thickness of **2,0 mm**	Body sheets with thickness of **2,2 mm**	Body sheets with thickness of **2,5 mm**	Body sheets with thickness of **2,8 mm**	Body sheets with thickness of **3,0 mm**	Body sheets with thickness of **3,5 mm**	Body sheets with thickness of **4,0 mm**	Body sheets with thickness of **5,0 mm**

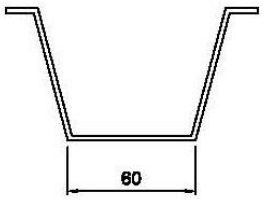
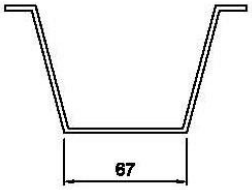
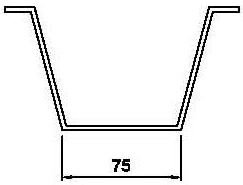
A	Body sheets with **double joint**
B	Body sheets with **triple joint**
C	Body sheets with **quadruple joint**
E	Body sheets with **quintuple joint**
G	Body sheets with **sextuple joint**

The packages of body sheets are also marked with a colour in the edge of the body sheets according to their thickness and based on the following table. In addition to this, each package can be identified with its label, where the drawing number, thickness, designation and number of pieces is indicated.

	COLOR	ESPESOR	RAL
	White	**0,80 mm**	**9016**
	Red	**1,00 mm**	**3020**
	Yellow	**1,20 mm**	**1016**
	Blue	**1,50 mm**	**5015**
	Light green	**1,80 mm**	**6032**
	Black	**2,00 mm**	**9017**
	Gray khaki	**2,20 mm**	**7008**
	Orange	**2,50 mm**	**1028**
	Dark grey	**2,80 mm**	**9007**
	Brown	**3,00 mm**	**8012**
	Magenta	**3,50 mm**	**4003**
	Pink	**4,00 mm**	**3015**

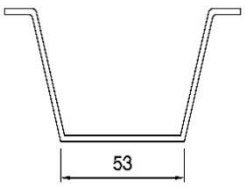
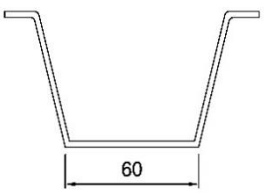
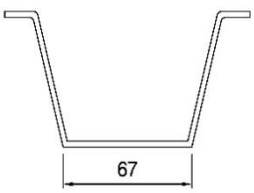
Stiffeners

E 1.5	E 2	E 2.5	E 3	E 3.5	E 4
Stiffeners with thickness of **1,5 mm**	Stiffeners with thickness of **2,0 mm**	Stiffeners with thickness of **2,5 mm**	Stiffeners with thickness of **3,0 mm**	Stiffeners with thickness of **3,5 mm**	Stiffeners with thickness of **4,0 mm**

F	I	N
		

Stiffener splices

E 1.5	E 2	E 3
Splices with thickness of **1,5 mm**	Splices with thickness of **2,0 mm**	Splices with thickness of **3,0 mm**

NO MARKED	F	I
		

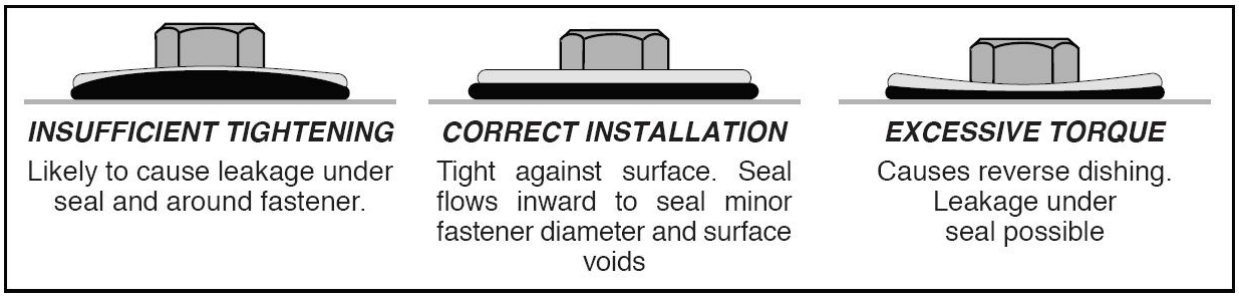
Torque value

To tighten the bolts SYMAGA suggests different torque values depending on the quality and thread of the bolts provided. It is very important not to exceed these values because greater values could damage the bolts or the coating.

TORQUE VALUE (Cs, N x m)

THREAD	QUALITY	
	8.8	**10.9**
M-8	25/23	36/33
M-10	49/47	72/65
M-12	85/80	125/113
M-16	210/230	310/338

The indicated grip-torques are exclusively for joints without neoprene washers. In joints with neoprene washers it shall be tightened until the neoprene expands as shown in the drawing.



Recommendations before and during the assembly:

1. Before installing the lifting jacks, it is necessary to verify that the place where they will be located is flat and accessible for people and for machines. In addition to this, the ground where the 3 legs of the lifting jacks will be placed is strong enough to allow the anchorage. Ideally, the concrete slab should be able to resist a traction of 1TN and allow an anchor of 500mm inside it.

2. It is necessary one person per lifting jack to lift the silo in a synchronous way.

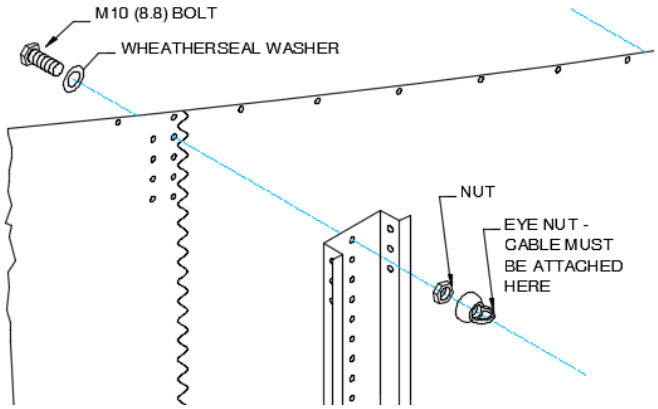
In the case that no concrete slab is available, it is necessary to ensure that the sand is compacted enough. For this purpose, a steamroller should be used. Concrete blocks can be also used to support the rear leg of the lifting jack (front legs must be always anchored to the silo foundation).

3. The space for the workers around the silo must be, at least, of 1 meter to allow the workers to walk and do their work properly. If it is necessary, a scaffolding will be installed around the silo foundation.

   In all these cases, it is necessary to ensure that the workers have all the necessary equipment to avoid falls from the foundation, like harness, handrails or any other thing that prevent them from falling down.

4. Silos have to be secured tightly during all the assembly process. This has to be done by using cables.

   a. If the silo diameter is 8,40m or less, eyenuts will be placed on the stiffeners every each 2 bodysheets in the silo perimeter and every each 4 rings in height. Eyenuts have to be bolted to the bolts of the stiffeners, bolting them till they touch the nut already installed.



   b. If the silo diameter is greater than 8,40m cables must be attached to all the wind rings in height, locating one cable every each 2 bodysheets in the perimeter.

5. Right after finishing the assembly of the last ring, the silo has to be anchored to the ground with the anchor bolts. If it is not possible to locate the anchor bolts, it has to be secured by any other method.

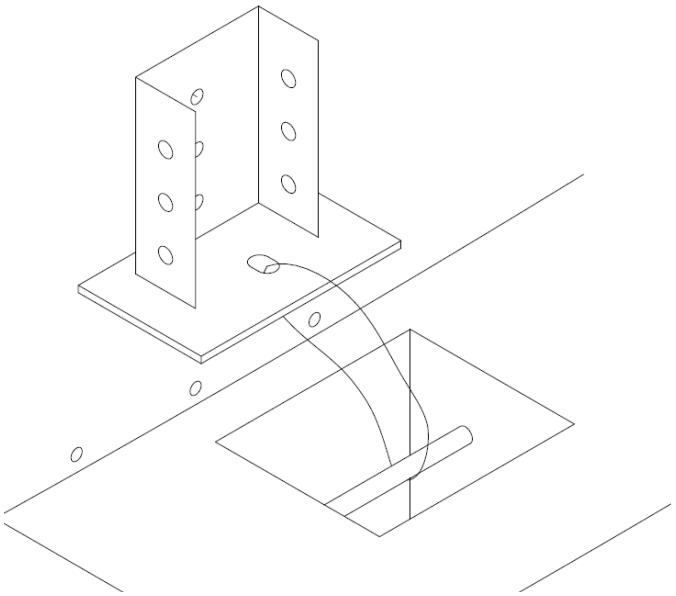
6. It is not recommended to lift the silo or assembling any bodysheet when the wind is blowing. It is highly recommended to check the weather forecast to prevent these situations. If the weather forecast is not good, other tasks like catwalk, ladder or roof support assembly.

7. The synchronization of the workers is very important when lifting the silo. A possible solution for the lifting jacks synchronization could be the use of a whistle.

8. It is very important that the foreman in charge checks the thickness of the bodysheets and stiffeners before assembling them to prevent incidences.

9. At the end of the working day, it is mandatory to secure the silo to avoid any damage during the absence of the workers.

    a. If the silo will be anchored with mechanical anchor bolts, it is recommended to install one of each 3 anchor plates temporarily, and tie them to the bar embedded in the concrete inside the pocket for the anchor bolt.



    b. If the silo will be anchored with chemical anchor bolts, it is recommended to let the silo rest on the lifting jacks, leaving the chains tensioned. For more security, another cable can be tied from an upper part of the stiffeners to the lower part of the lifting jacks, which are already anchored to the foundation.

10. It is very important to take into account the weight of the silo if crane is needed to lift the silo on the silo legs. It is recommended that the foreman in charge of that task has meetings on site to set the location, weights and measures of the crane.

SILOS OPERATION AND MANAGEMENT

Loading and unloading:

Silos must be loaded through the centre roof cover. Off centre loading can lead to structural damages in the silo. Especially in larger silos it is recommended not to fill it with only one stage. It should be filled with multiple stages to allow proper settlement.

Before loading, make sure all gates are closed and sweep auger (in case it is supplied) is placed over intermediate sumps, so it will be visible when there is no grain in that area.

It is necessary to know maximum silo capacity in order not to overfill the silo. Overfilling may cause grain silo failure.

Start unloading through the centre sump until there is not any more grain flowing by gravity. Off centre unloading can cause structural damage.

Do not simultaneously fill and discharge the silo. Simultaneous filling and unloading results in a fluidic behaviour of the grain. This can cause increased sidewall loads. The service life of bins can be drastically reduced and risk of structural failure, economic loss, and personnel injury will increase by simultaneously loading and unloading.

Storing material:

Silos are designed to store dry and cool grain. It is not recommended to fill grain over 16% moisture in a storage bin.

Do not fill grain to top. Maximum fill height is 3 cm below eave.

Avoid increased pressures inside the silo. For this purpose, let the air leave the silo through roof vents or manhole (make sure they are not blocked by grain).

In case temperature cables are supplied, it is advisable to attach the temperature cables among them, in order to avoid the natural displacement to the outer regions of the silo.

ASSEMBLY INSTRUCTIONS FOR GRAIN SILOS

CONCRETE FOUNDATION

The fastest and most economical way to erect the grain silos is from the top to the bottom using lifting jacks. The suggested assembly procedure is explained below.

1- Assemble the top ring of body-sheets on the finished foundation bolting the vertical joint line free of stiffener with M10x20 bolts, and doing it in the clockwise direction; in other words, placing the one on the left over the one on the right, as it is shown in the drawing. (See figure 1)

2- Caulk with sealant the vertical joint according to the assembly instructions (see detail of vertical and horizontal seam sealant detail). The vertical lines for the holes stiffeners must be aligned with the anchor bolts in the foundation. Check to be sure that the body-sheets are positioned correctly, as they are not symmetrical. This position can be checked in manual drawings “Bodysheets and Stiffeners Installation”.

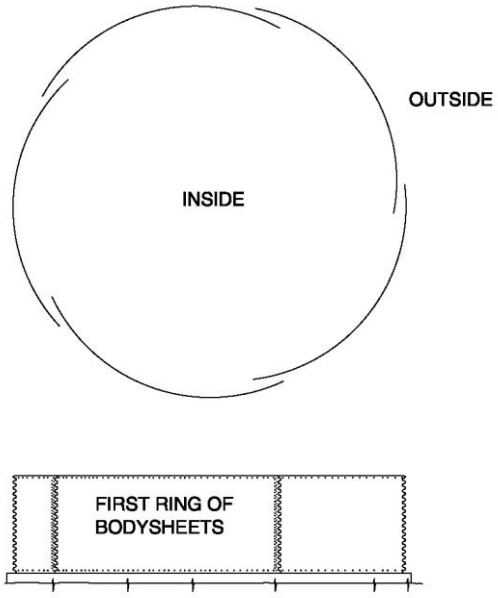


Figure 1

2.1- SILO WITHOUT STRUCTURAL ROOF

Place the central collar support in the centre of the foundation and adjust to obtain the required height (see detail). Choose the location of the manhole sheet and roof ladder and bolt the roof clips to the top of the body-sheets.

Begin the roof assembly installing four sheets at quarter points to stabilize the central collar and make the assembly of the rest of the sectors easier. (See figure 2)

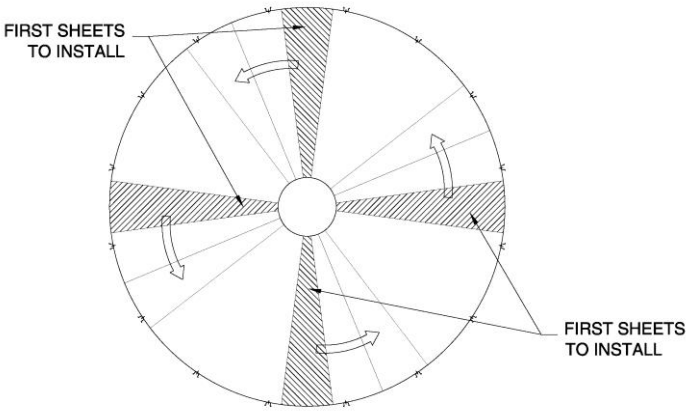


Figure 2

Complete the roof assembly and place the ladder rungs on the sheet right on the left of the manhole sheet. (See figure 4). It is recommended to install the roof ladder on the side of the walkway of the catwalk, so that the access will be easier.

2.2- SILO WITH STRUCTURAL ROOF

Place the central collar support in the centre of the foundation and adjust to obtain the required height (see detail). Choose the location of the manhole sheet and roof ladder and bolt the roof clips to the top of the body-sheets.

Attach the rafter support brackets to the top of the body-sheets leaving the bolts finger tight until the roof structure is complete (see detail included in the drawings). Start with two roof rafters with the bracing rods between them. Install the purlins, circular rafter and bracing rods between the rafters. Tighten the bolts. Repeat the same steps for the other braced bays to stabilize the roof. (See figure 3).

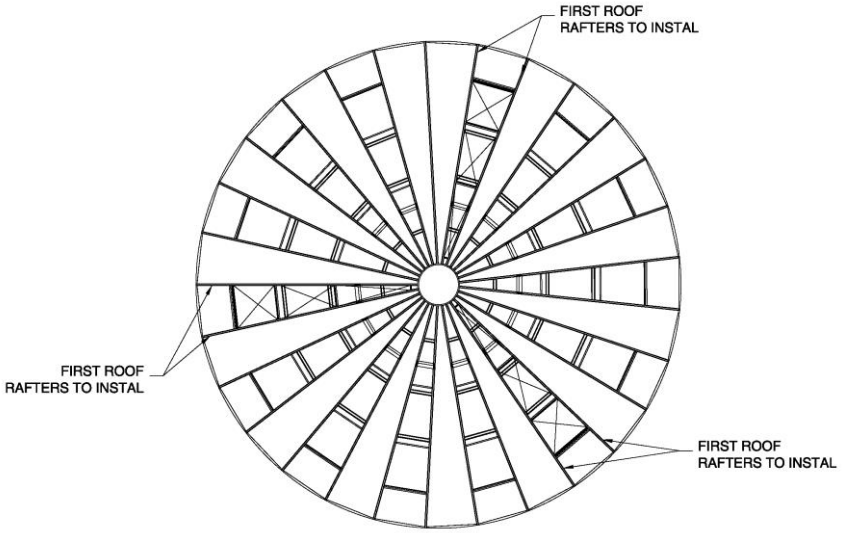


Figure 3

The pairs of beams can be assembled on the ground and locate them in the roof collar and the eave afterwards.

Install the remaining roof rafters, assembling the purlins and the circular rafter as it is being done by pairs, as it is shown in Figure 3. Leave the bolts finger-tight until all the purlins and circular rafter are installed. Use brace rods to square the roof structure before starting the roof sheets installation. Tighten all roof bolts.

Choose the location of the manhole sheet and roof ladder and start assembling the roof sheets there, placing the ladder sheet directly over a rafter and the manhole sheet on the right of the roof ladder. It is recommended to install the roof ladder on the side of the walkway of the catwalk, so that the access will be easier (See figure 4).

Assemble the roof flashings and the roof centre cover. Tighten all bolts.

It is important to study carefully all the roof details and read all the instructions before starting the roof assembly.

Assemble the manhole according to the detail drawing.

If the roof has any aeration, see the detail drawing to install it. In case no different information is given, the aeration will be distributed uniformly around the roof.

If the silo has temperature cables, see the detail drawings to install the additional support requirements.

If roof ladder has handrail, see the detail drawing to install it.

After the roof assembly, it is recommended to do the water testing in order the check the roof sealing. For this purpose, a hose can be used to water the roof checking all the points where the water can come inside the silo. In this test, the water must fall down by gravity, a jet of water should not be directly thrown on the roof. If there is any leakage point where the water can come inside the silo easily, it should be sealed.

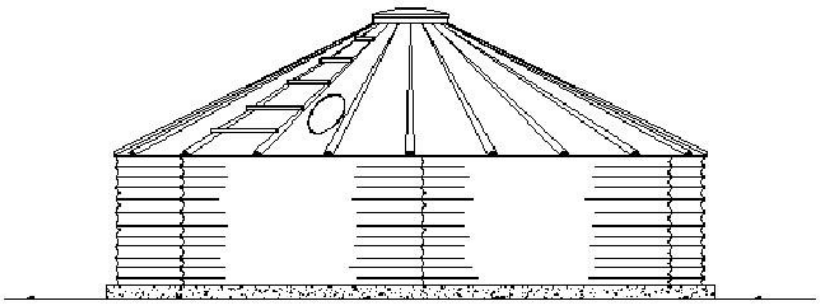


Figure 4

3- Attach the lifting jacks to the stiffeners (or to the holes lines of stiffeners in case they are not installed yet) and raise the silo high enough to let the assembly of the next body-sheets ring. (See figure 5)

The number of lifting jacks has had to be determined according to the silo diameter and weight, with a high safety coefficient.

The vertical joint of body-sheets must be staggered (as shown in the manual drawings) to allow all the stiffener holes to be aligned.

The body-sheets are assembled inside of the previous ring (in order to avoid the water leakage).

Caulk with sealant the vertical joint (as shown in the drawings “Horizontal and Vertical seam sealant detail).

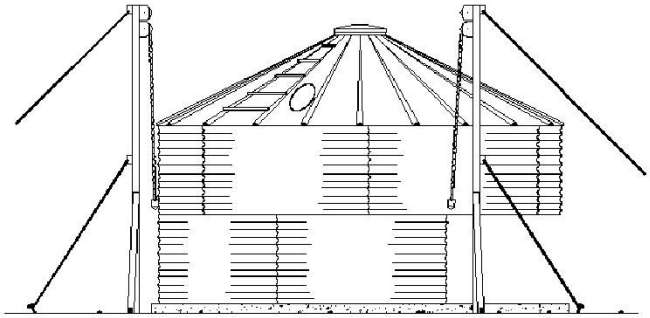


Figure 5

After the assembly of the first ring of bodysheets, the stiffeners must be installed lifting the silo one or two rings more, according to the length of the next stiffener to install. From thereon, it will be necessary to lift the solo 2 rings of bodysheets to be able to install the stiffeners. Bolt the stiffeners to the bodysheets, as specified in the detail (See figure 6).

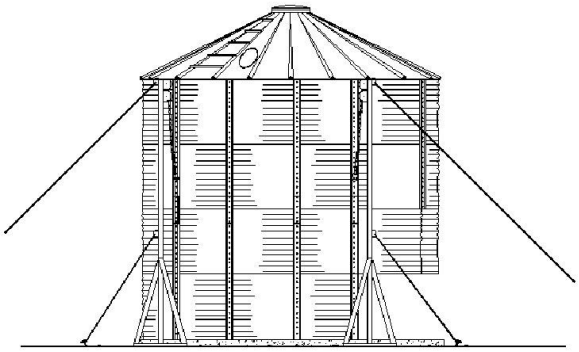


Figure 6

If the silo has any ladder, attach it to the body-sheets as the silo is raised. See ladder and safety cage details to assemble it.

If wind rings are required, see the detail drawing and assemble it as the silo is lifted.

If the silo has any columns attached to it, install these attachments according to the details included in the Columns Assembly Instructions.

If the silo has any Wall supports, install them according to Catwalks and Supports Assembly Instructions.

While the silo is being erected the watering test should be done as well in order to check the sealing at every point.

4- Repeat step 3 as additional body-sheets are added.

Install the access body-sheet. See the drawing for the position. In silos with access body-sheet in the second ring from bottom, body-sheet with access door must be located in the axis of the silos and on the side of the bottom outlets.

5- After completing the bottom ring, level the silo, anchor it securely to the foundation and seal the base of the silo.

CAUTION

1- DO NOT LIFT THE SILO UNDER WINDY CONDITIONS. THIS COULD RESULT IN SILO DAMAGE. CONLLEVAR DAÑOS EN EL SILO.

If the wind blows during the installation so that the silo wobbles and it is unstable, proceed as follows:

1.1.-Rest the silo on the floor. Let the chain hoists tying the silo, tensed but not working.

1.2.-Fix anchor plates and tie them to the foundation by elements that can be released easily (as cables for example).

1.3.-Once that the wind stops, the anchor plates will be dismantled, and we will proceed with the assembly.

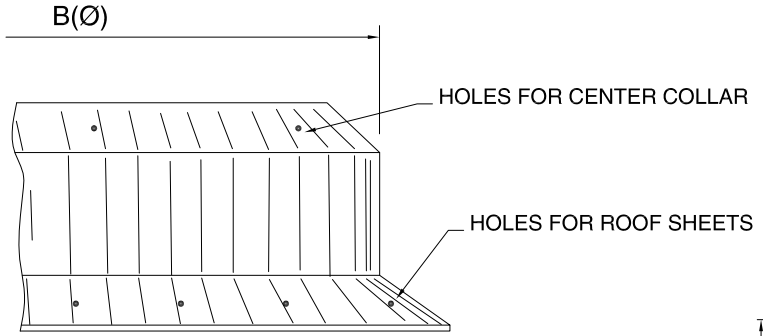
2- WHEN ASSEMBLING, RAISE THE SILO JUST ENOUGH TO ADD ONE BODY-SHEETS RING.

3- START ASSEMBLING EVERY NEW RING OF BODY-SHEETS BY THE WINDWARD SIDE OF THE TANK.

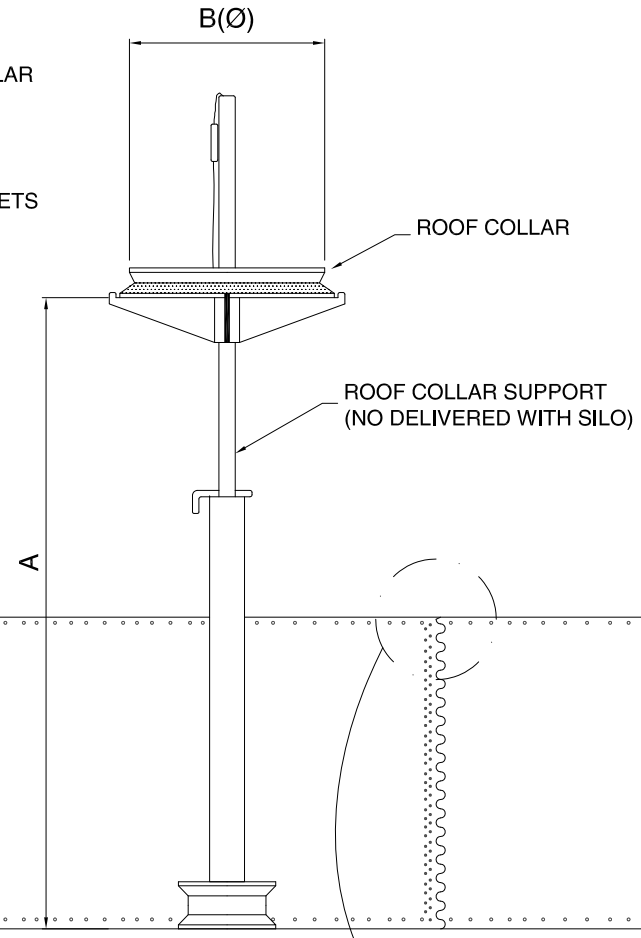
4- WHEN ASSEMBLING A NEW RING LEAVE THE BOLTS LOOSE UNTIL ALL THE BODY-SHEETS ARE ATTACHED.

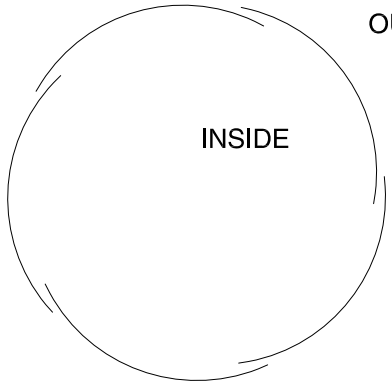
5- LOWER THE SILO AND SECURE IT TO THE FOUNDATION BEFORE LEAVING THE JOBSITE.

6- CHECK THE THICKNESS OF THE BODY-SHEETS AND STIFFENERS AND INSTALL THEM IN THE PROPER POSITION ACCORDING TO THE DRAWING.



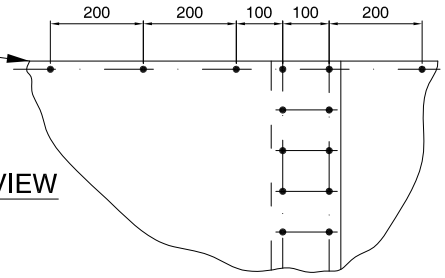
ROOF COLLAR DETAIL





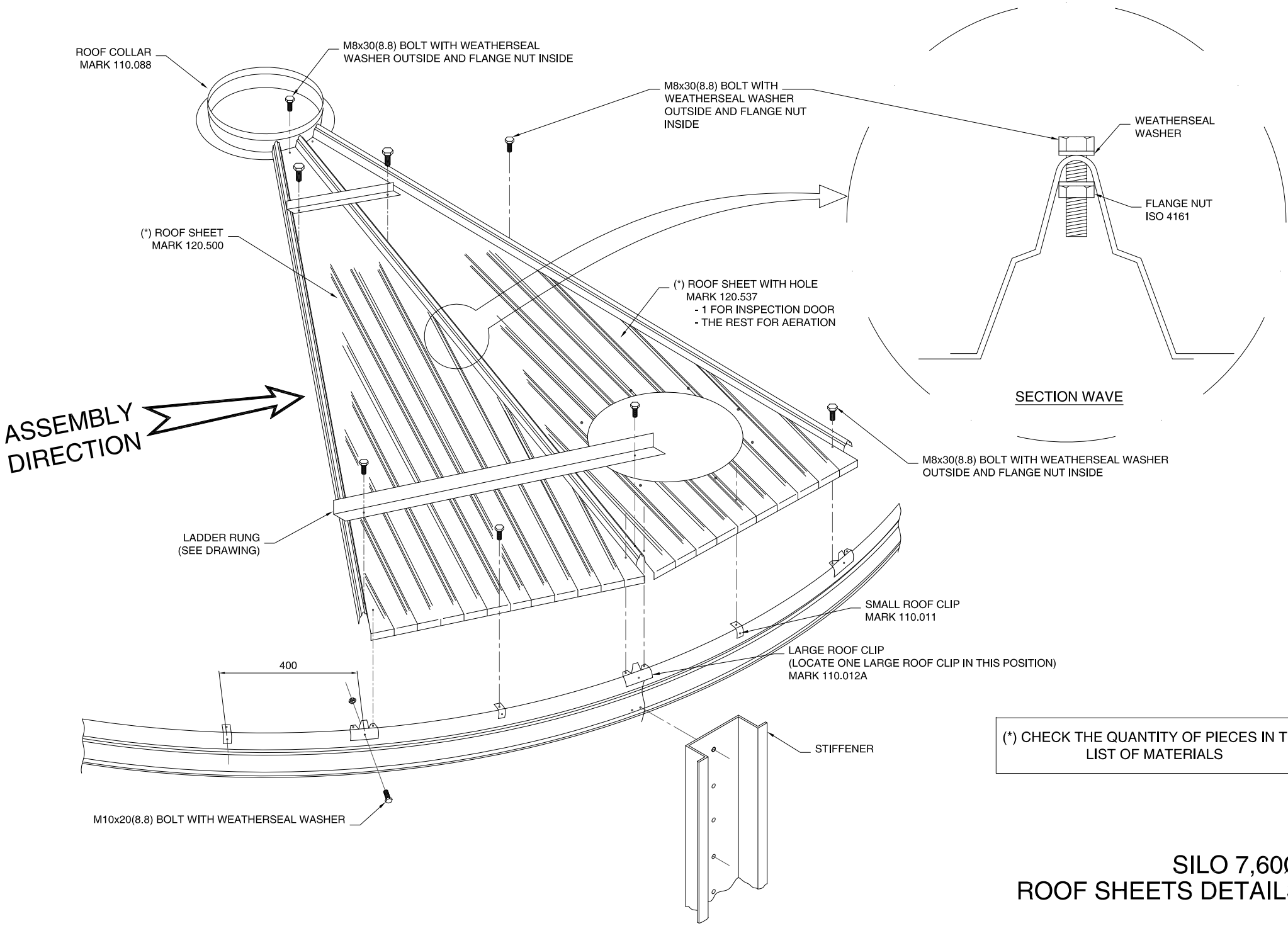
BODY SHEETS INSTALLATION

SILO MODEL	(A) mm	(B) mm	MARK
4.60	2.070	1.400	110.079
5.35	2.290	1.400	110.135
6.10	2.510	1.400	110.037
6.87	2.730	1.400	110.110
7.60	2.950	1.400	110.088
8.40	3.170	1.400	110.008
8.42	3.170	1.400	110.110
9.20	3.390	1.400	110.144
9.93	3.460	1.930	110.155
10.70	3.680	1.930	110.044
11.45	3.900	1.930	116.719
12.23	4.120	1.930	110.098



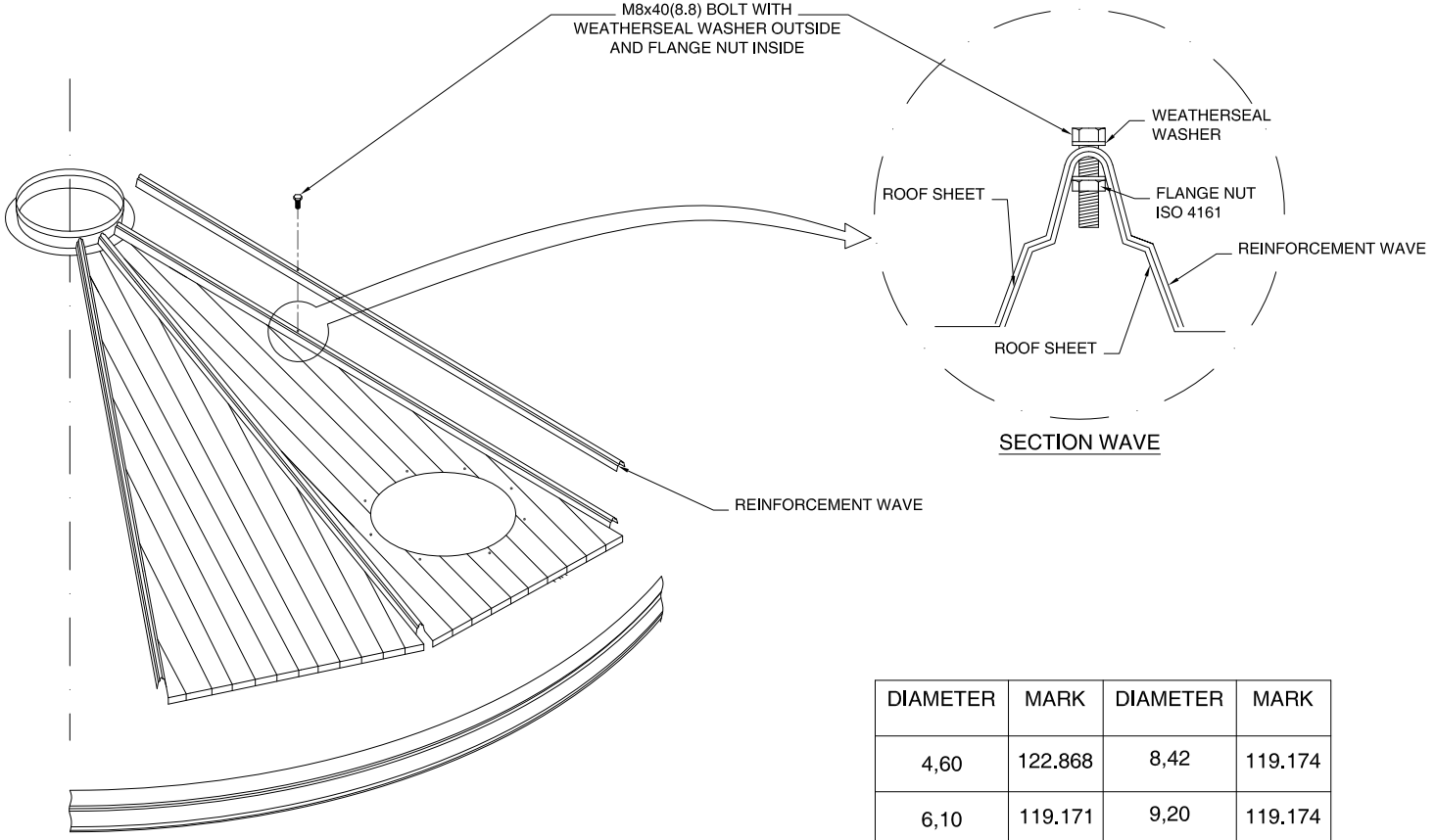
OUTSIDE VIEW

ROOF ASSEMBLY INSTRUCTIONS



(*) CHECK THE QUANTITY OF PIECES IN THE LIST OF MATERIALS

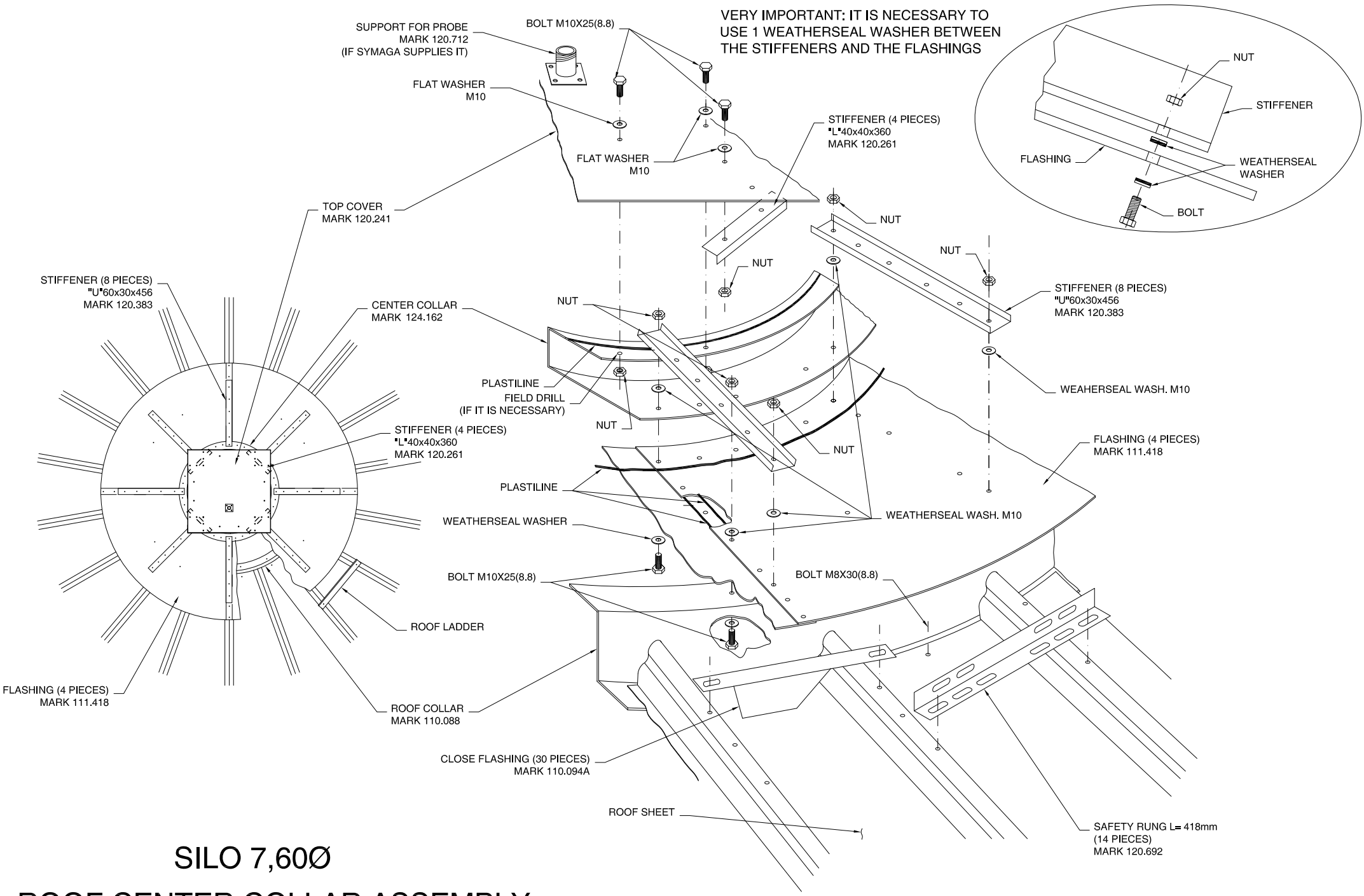
SILO 7,60Ø
ROOF SHEETS DETAILS



DIAMETER	MARK	DIAMETER	MARK
4,60	122.868	8,42	119.174
6,10	119.171	9,20	119.174
6,87	119.172	9,93	119.175
7,60	119.173	10,70	119.176
8,40	119.174	11,45	119.176
		12,23	119.177

NOTE:
THE REINFORCEMENT WAVES MUST BE ASSEMBLED ON EVERY ROOF WAVE

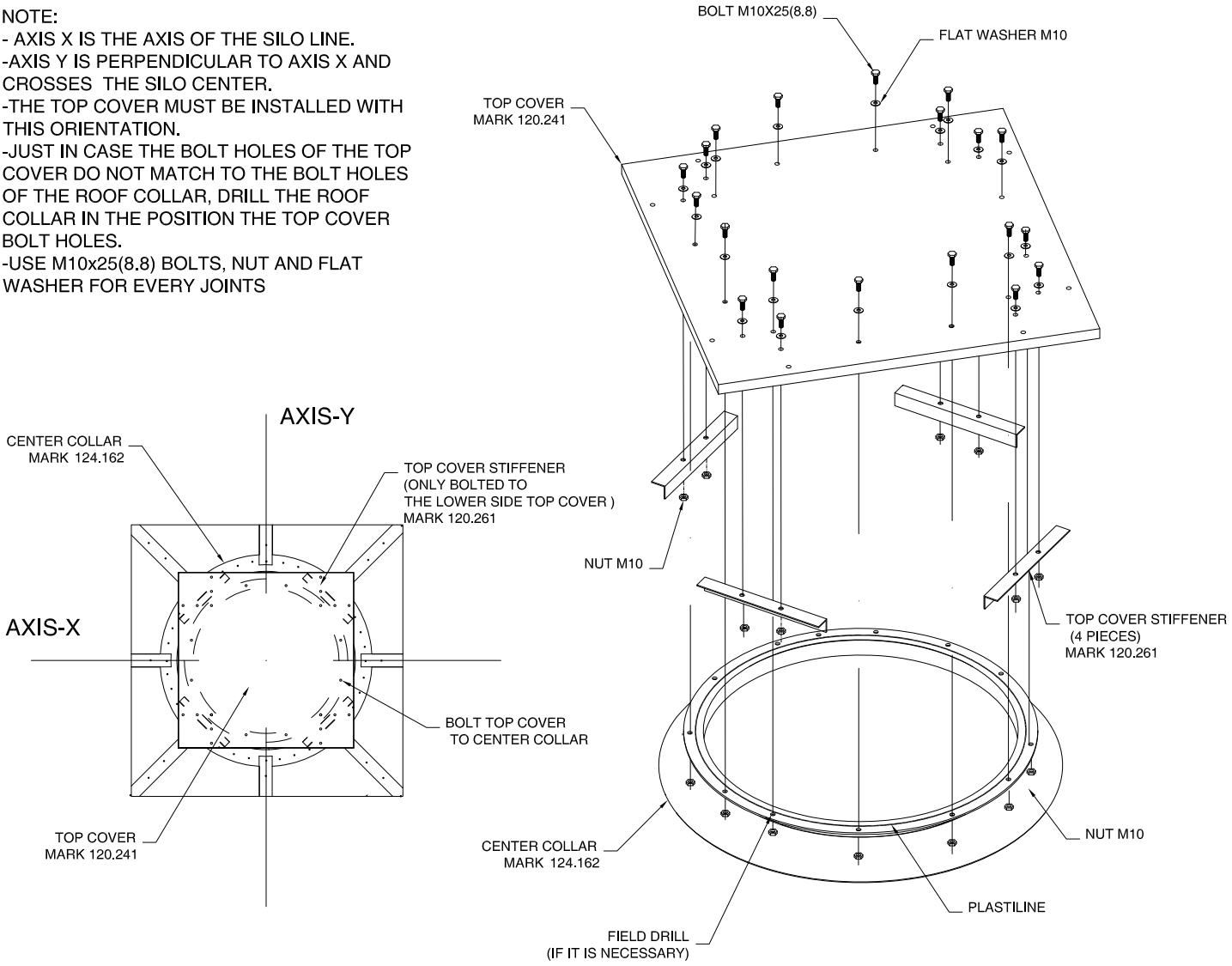
REINFORCEMENT WAVES DETAILS



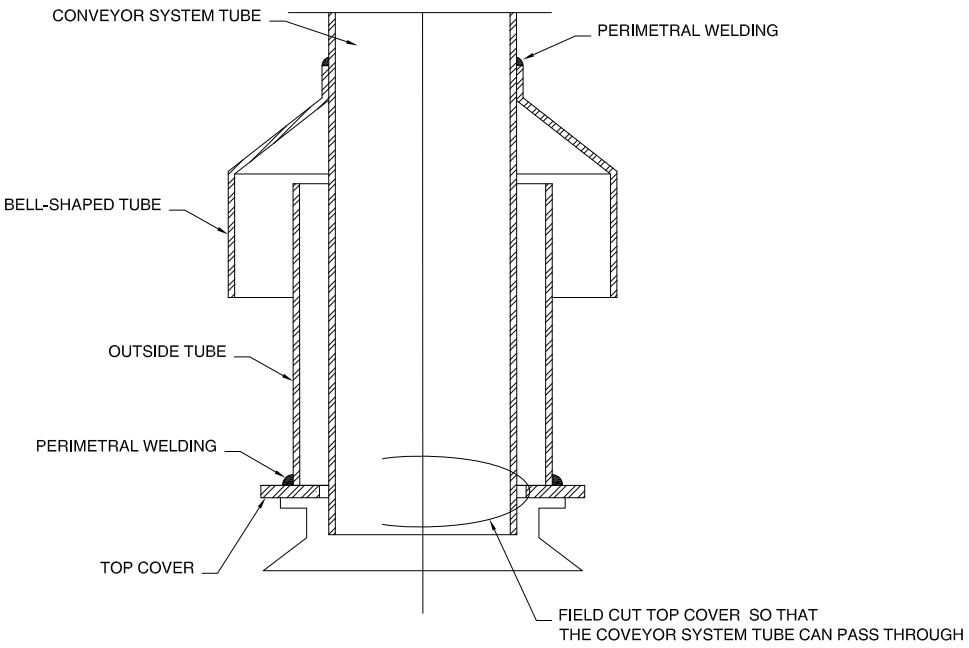
SILO 7,60Ø

ROOF CENTER COLLAR ASSEMBLY

NOTE:
- AXIS X IS THE AXIS OF THE SILO LINE.
-AXIS Y IS PERPENDICULAR TO AXIS X AND CROSSES THE SILO CENTER.
-THE TOP COVER MUST BE INSTALLED WITH THIS ORIENTATION.
-JUST IN CASE THE BOLT HOLES OF THE TOP COVER DO NOT MATCH TO THE BOLT HOLES OF THE ROOF COLLAR, DRILL THE ROOF COLLAR IN THE POSITION THE TOP COVER BOLT HOLES.
-USE M10x25(8.8) BOLTS, NUT AND FLAT WASHER FOR EVERY JOINTS

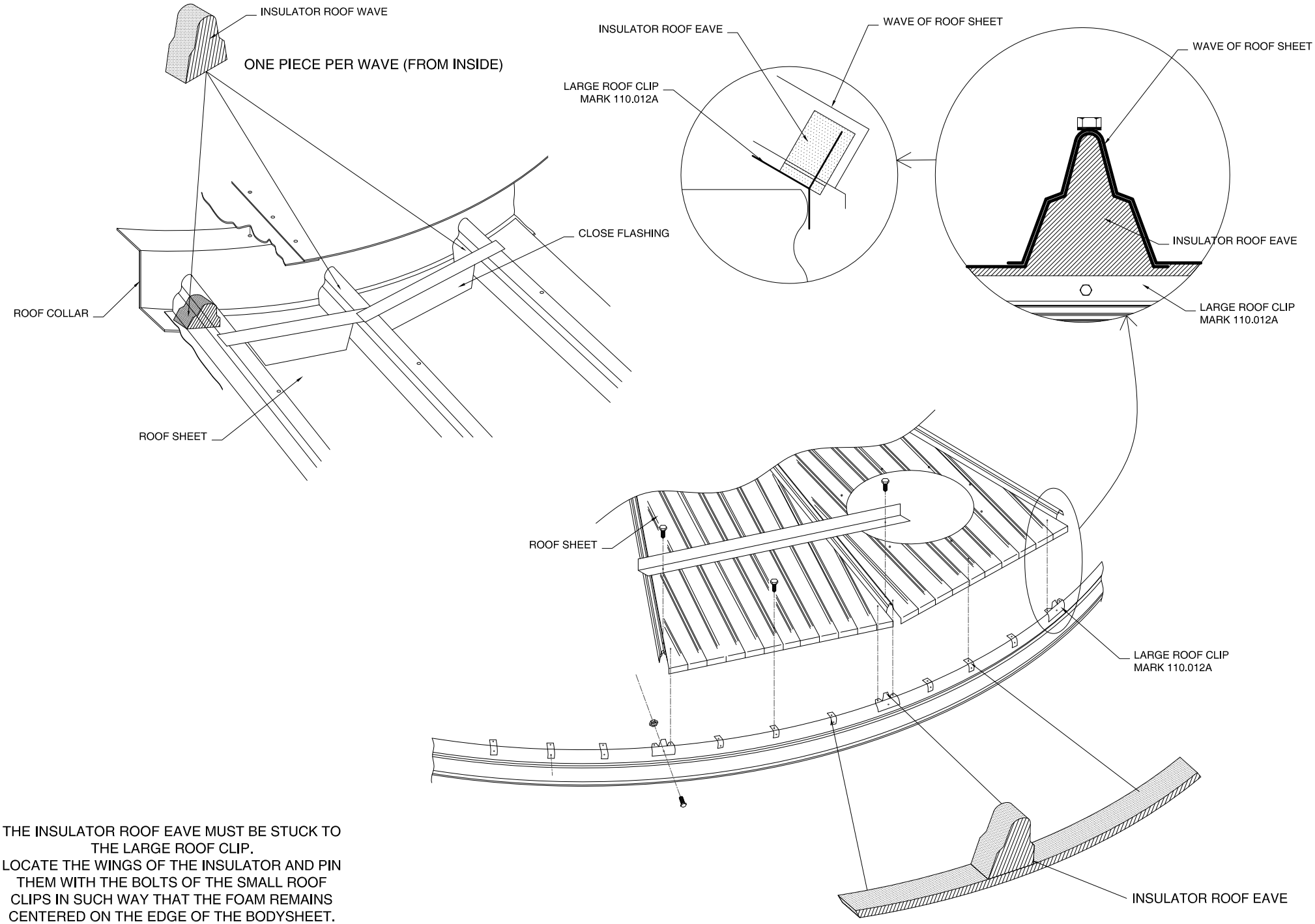


TOP COVER-CENTER COLLAR UNION DETAIL



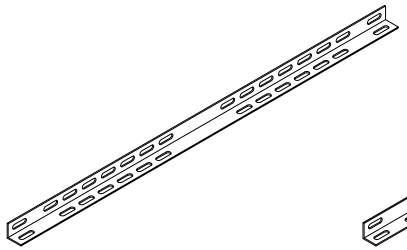
RECOMMENDED CONVEYOR SYSTEM-TOP COVER UNION

ASSEMBLY TOP COVER DETAIL

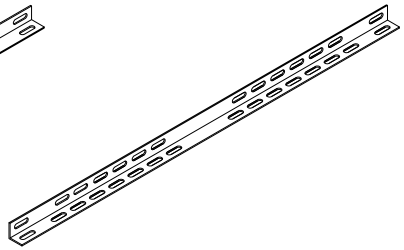


THE INSULATOR ROOF EAVE MUST BE STUCK TO THE LARGE ROOF CLIP.
LOCATE THE WINGS OF THE INSULATOR AND PIN THEM WITH THE BOLTS OF THE SMALL ROOF CLIPS IN SUCH WAY THAT THE FOAM REMAINS CENTERED ON THE EDGE OF THE BODYSHEET.

SEALING DETAIL OF ROOF SHEETS WAVES

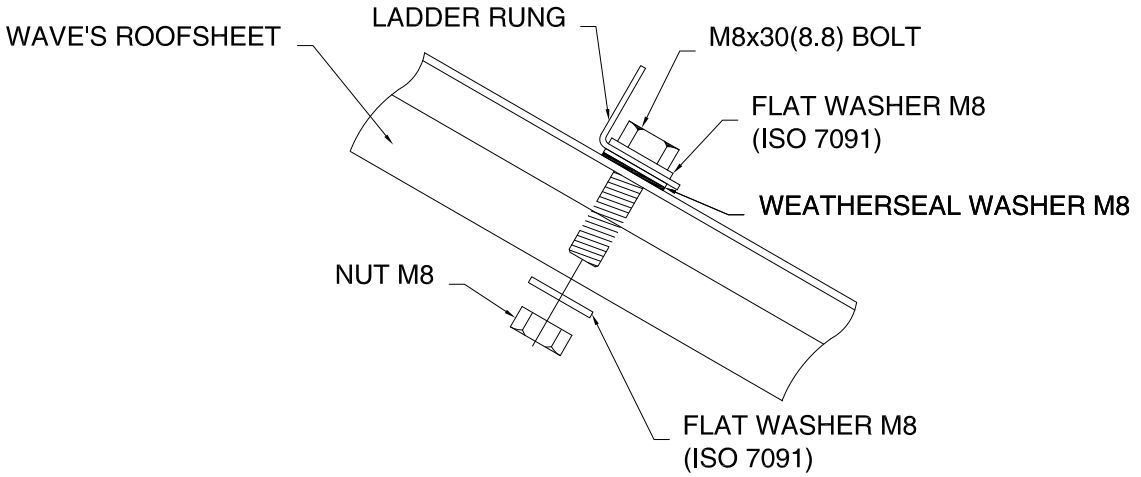


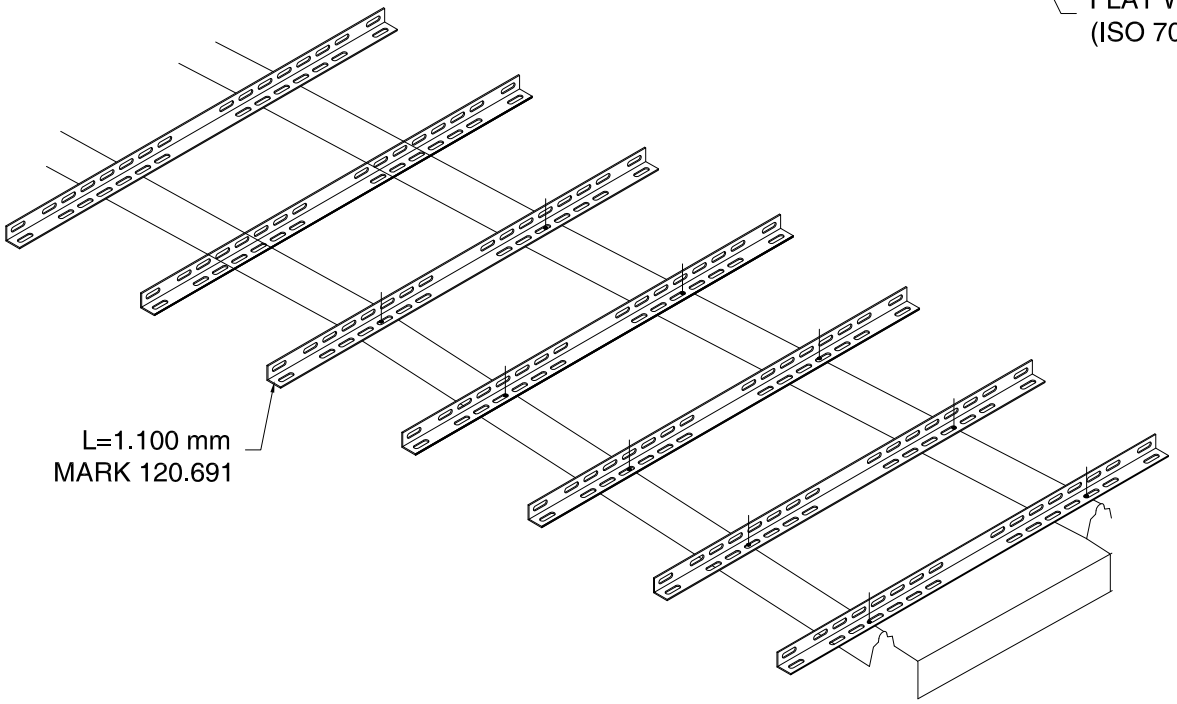
POSITION "A"



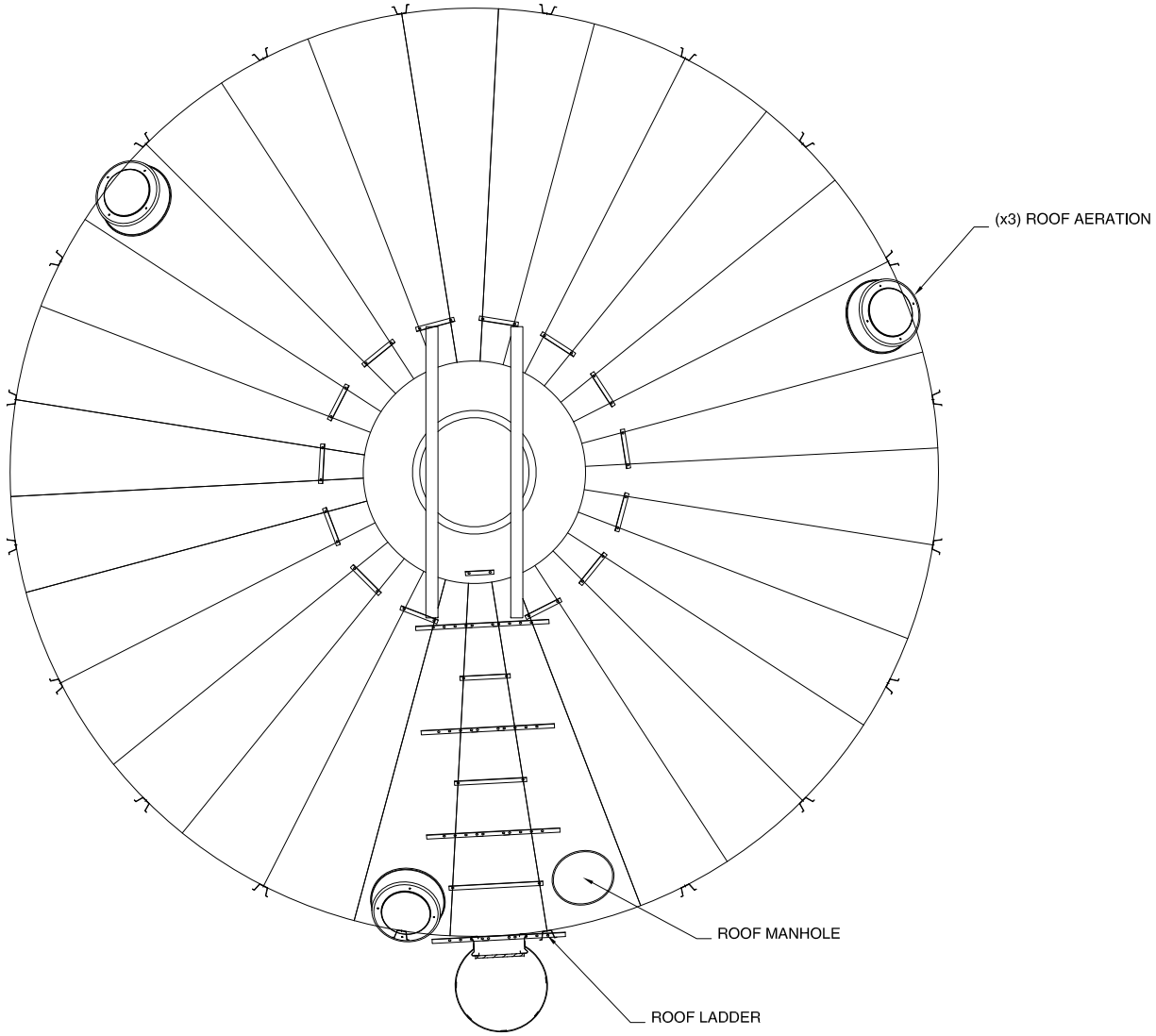
POSITION "B"

NOTE:
-INSTALL THE RUNGS IN THE POSITION WHERE THE LONG HOLES FIT BETTER WITH THE BOLT HOLE OF ROOF SHEETS.
-TAKE INTO ACCOUNT THE RUNGS ARE SEPARATED 500 mm AMONG THEM





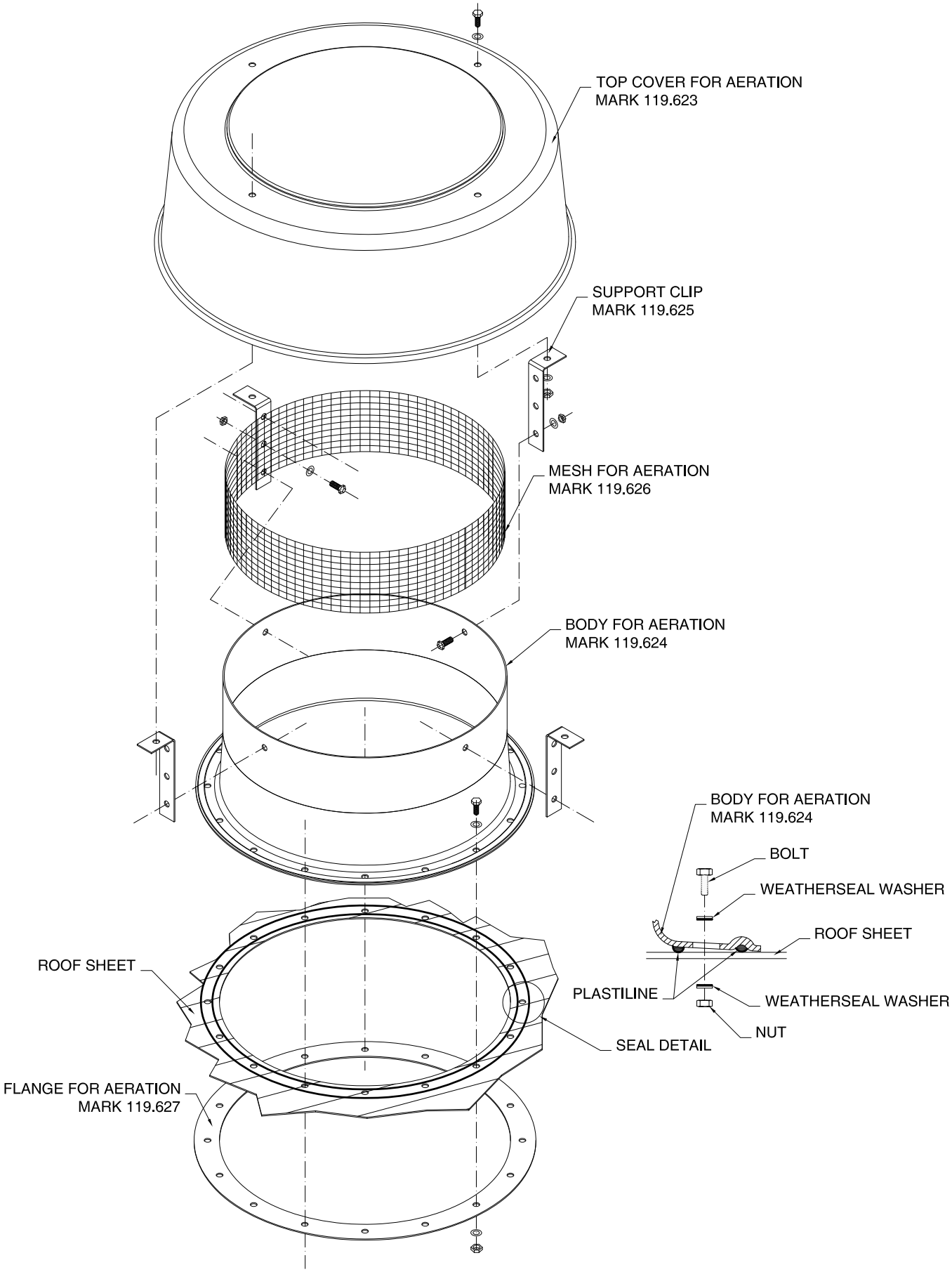
LADDER RUNG ROOF ASSEMBLY SILO 7,60Ø



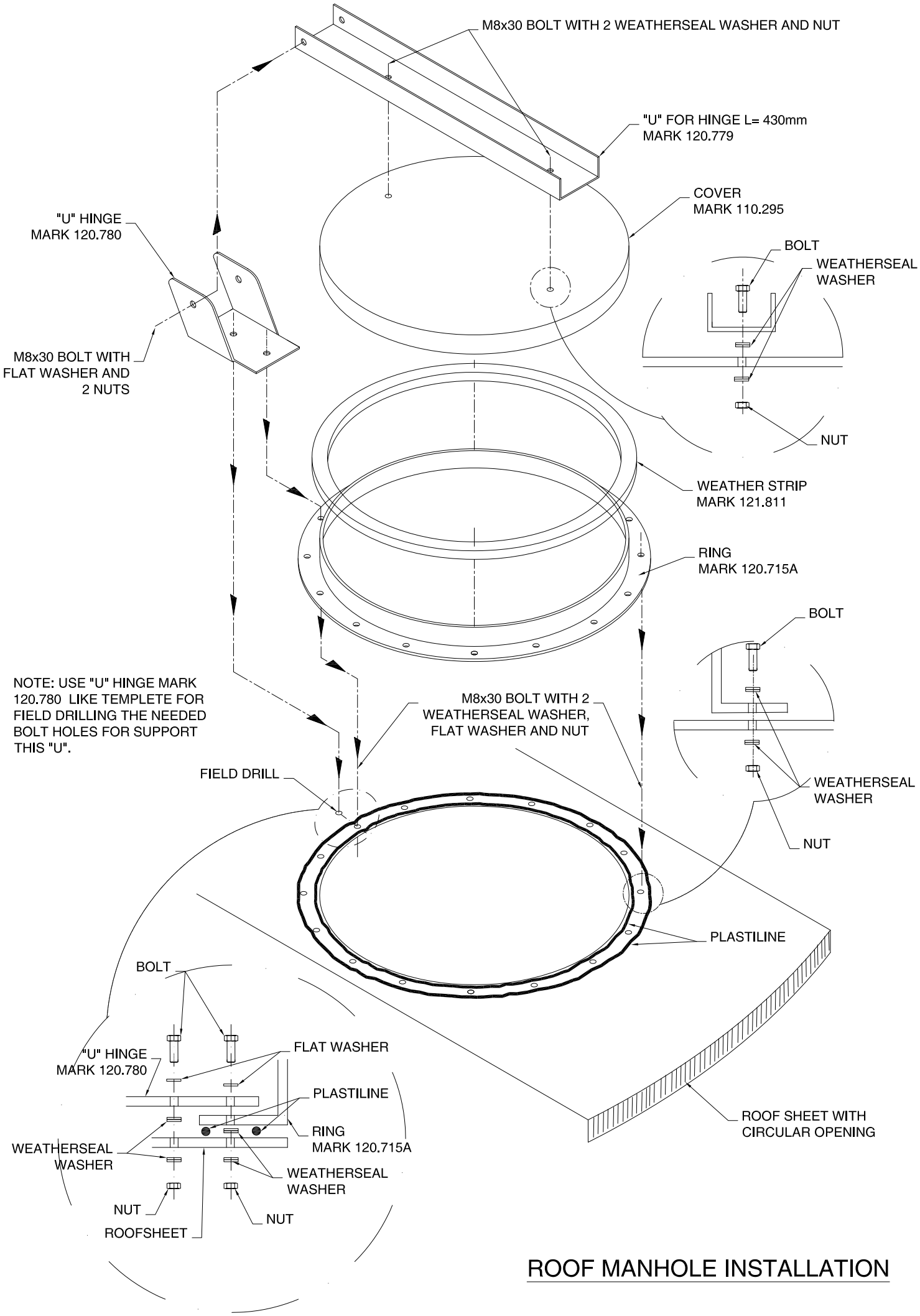
NOTE:
THIS DRAWING SHOWS THE STANDARD CONFIGURATION OF SYMAGA FOR THE DISTRIBUTION OF ROOF VENTS.
IF THE QUANTITY OF ROOF VENTS ORDERED IS DIFFERENT THAN THE QUANTITY SHOWN IN THE DRAWING, IT IS RECOMMENDED TO DISTRIBUTE UNIFORMLY THE ROOF VENTS ON THE ROOF OF THE SILO.

DISTRIBUTION OF ROOF AERATION

- IT IS VERY IMPORTANT TO SEAL CORRECTLY ALL JOINTS BETWEEN PARTS WITH PLASTILINE
- USE BOLTS M8x20 (8.8) WITH HEAD OUTSIDE, WEATHERSEAL WASHER OUTSIDE, FLAT WASHER AND NUT INSIDE
- THE DISTRIBUTION OF ROOF AERATION MUST BE UNIFORM AROUND THE SILO ROOF

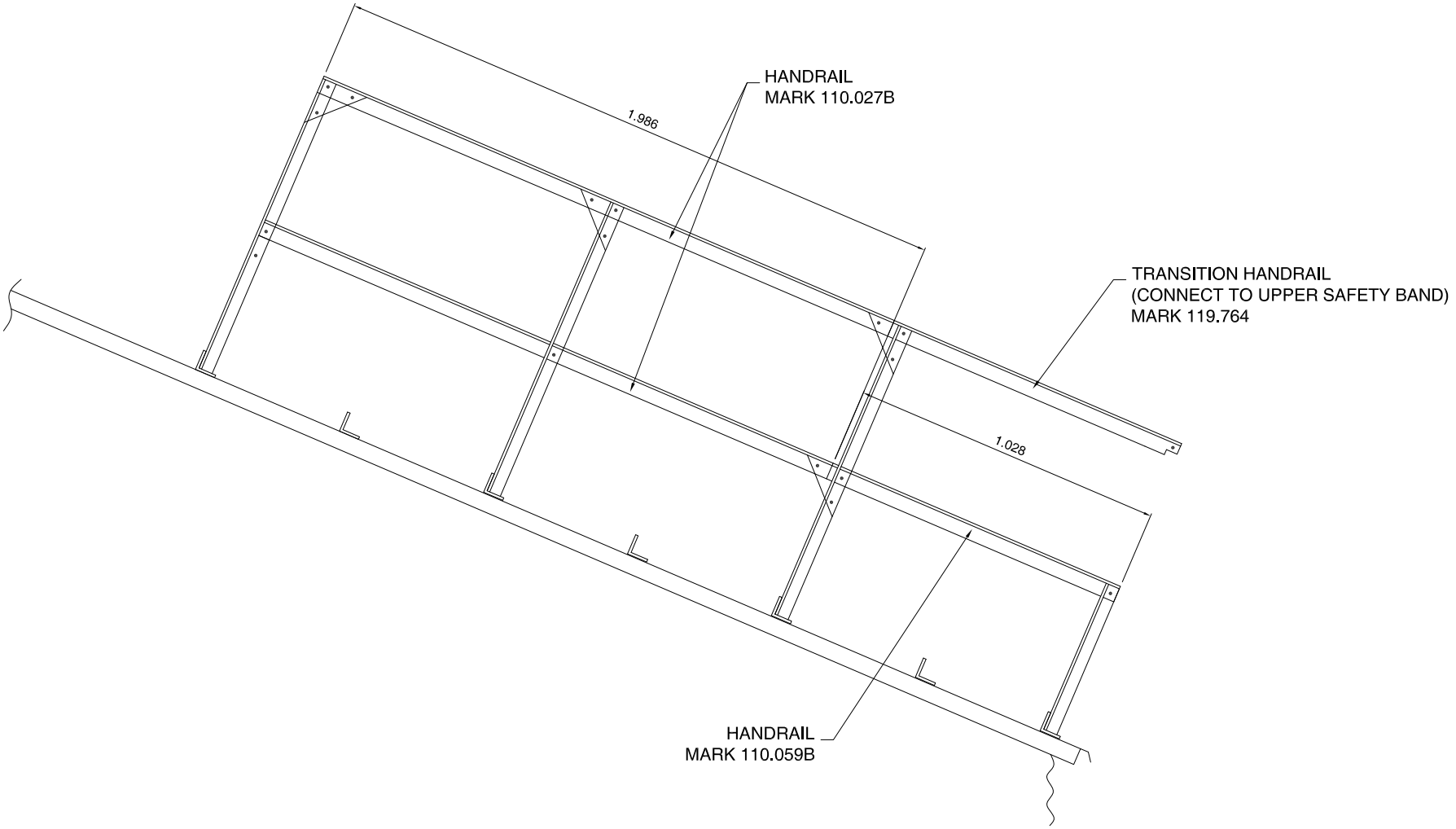


INSTALLATION OF ROOF AERATION



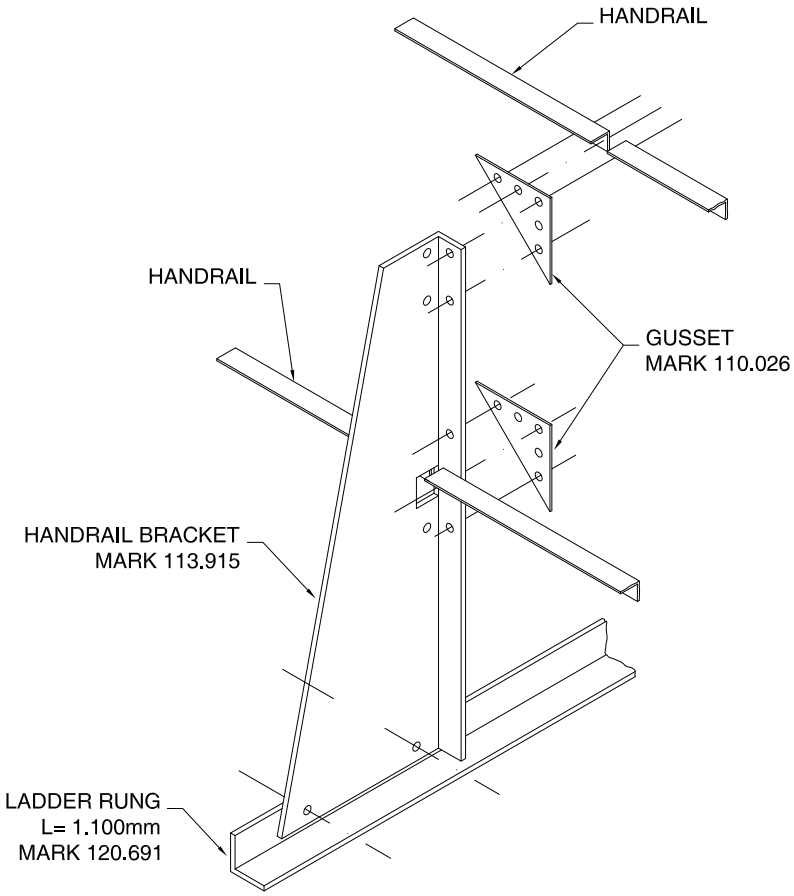
ROOF MANHOLE INSTALLATION

- USE M10x20(8.8) BOLTS WITH NUTS IN ALL CONNECTIONS
- INSTALL HANDRAIL ON BOTH SIDES OF ROOF LADDER

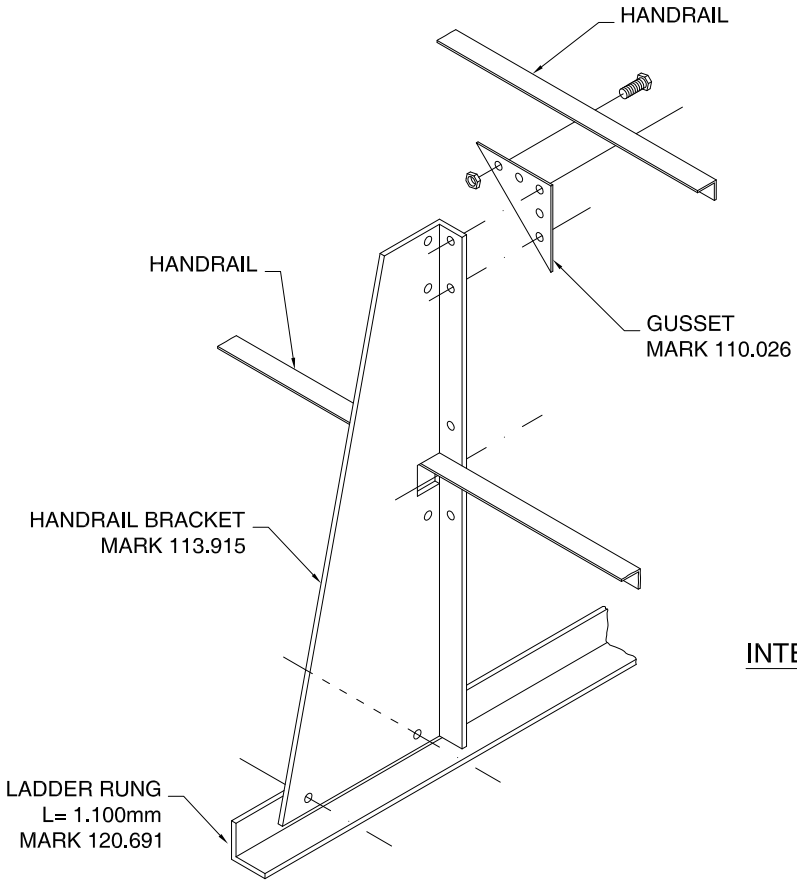


SILO 7,60Ø

ROOF HANDRAIL DETAILS



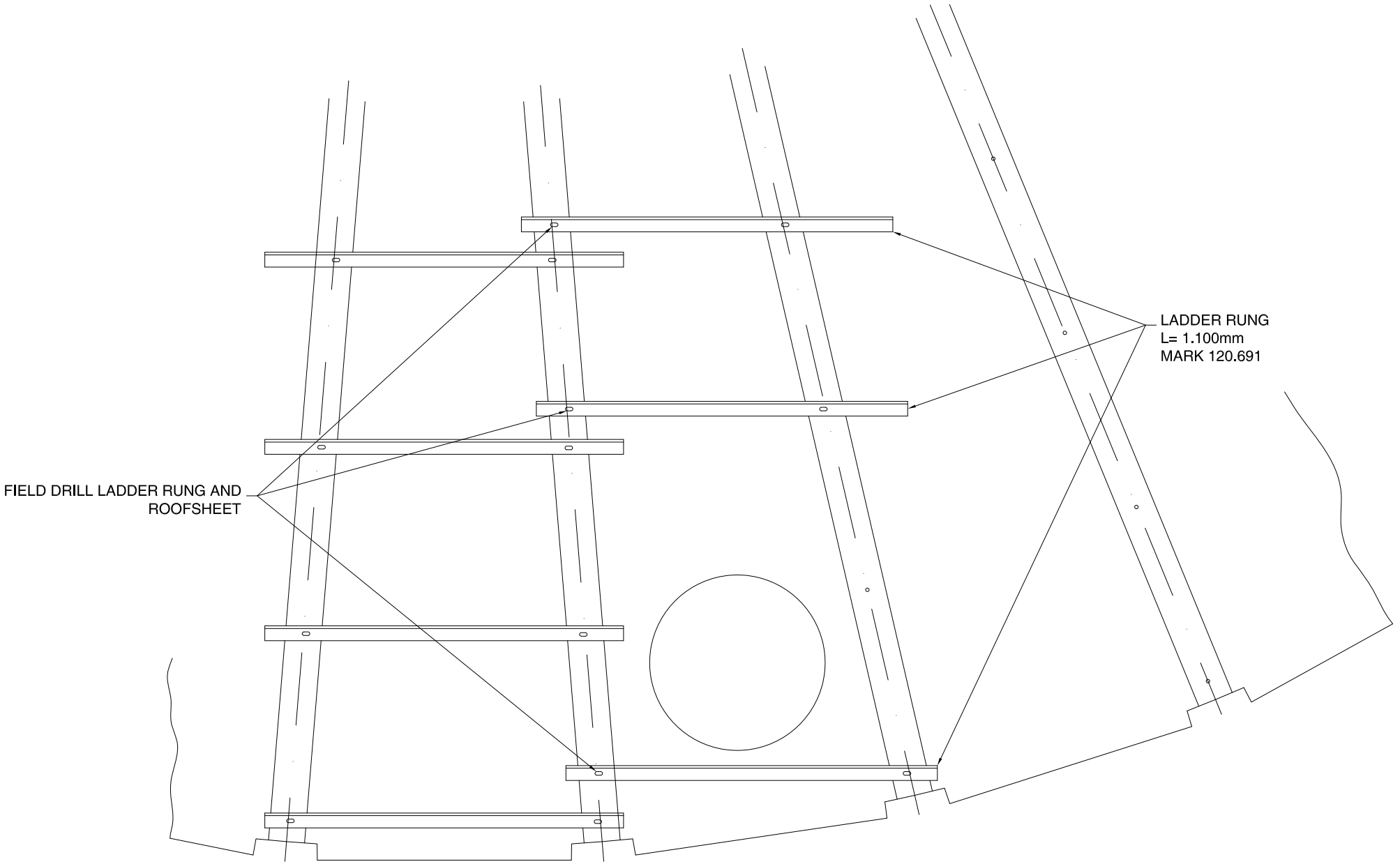
SPLICE DETAIL



INTERMEDIATE DETAIL

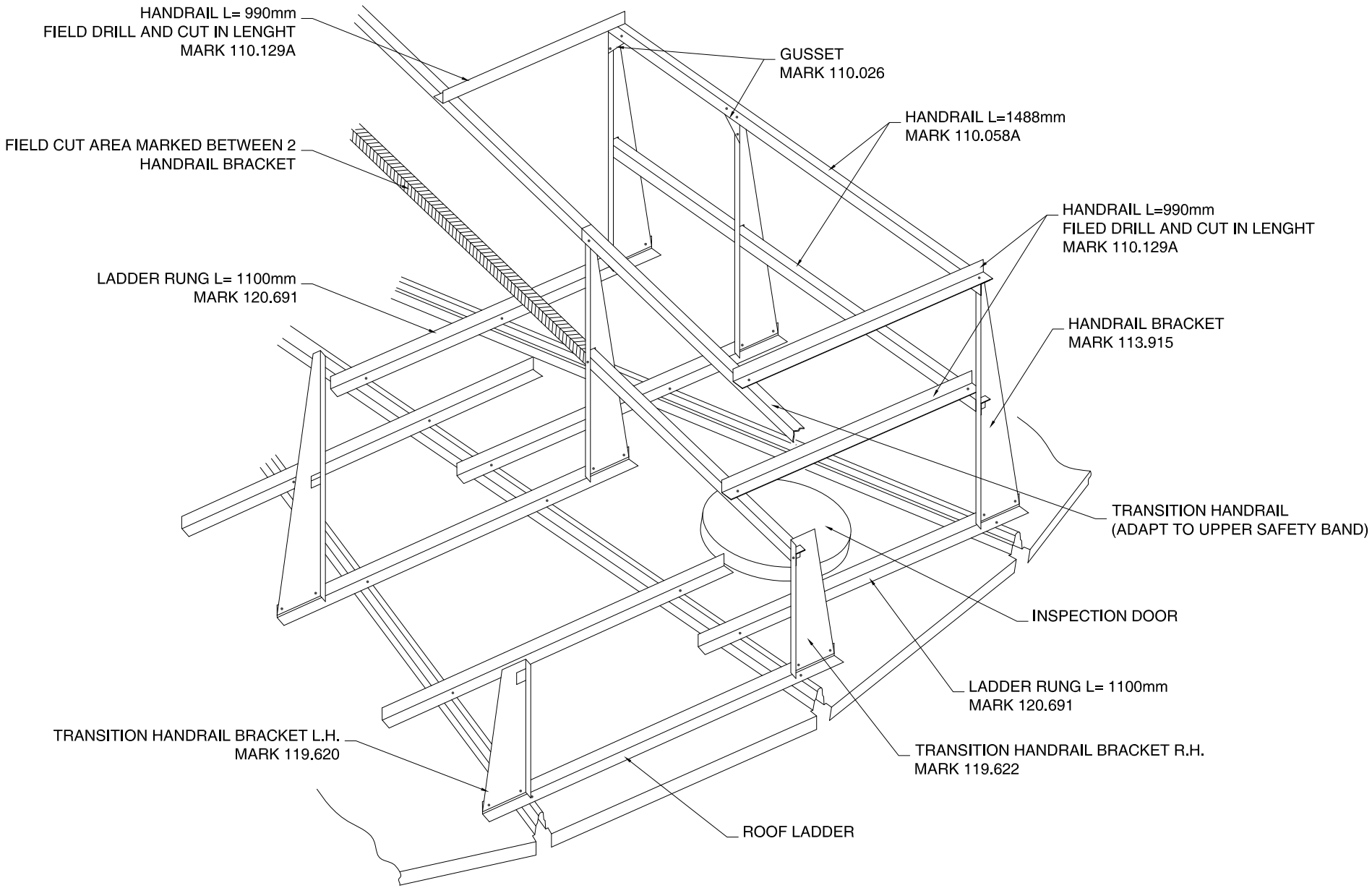
ROOF HANDRAIL DETAILS

USE M8x30(8.8) BOLTS WITH NUT, FLAT WASHER AND WEATHERSEAL WASHER



INSTALLATION OF LADDER RUNGS FOR PROTECTION OF INSPECTION DOOR

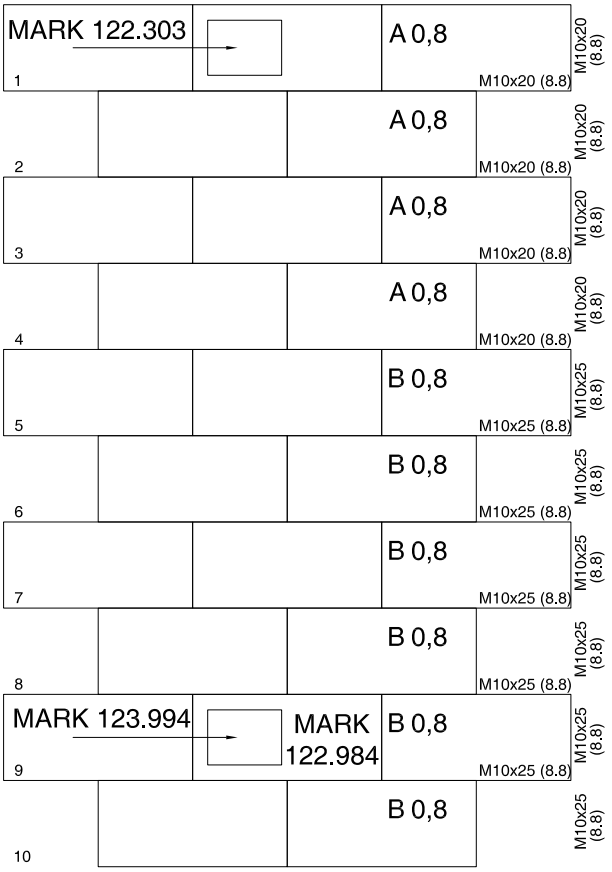
USE M10X20(8.8) BOLTS WITH NUTS



PROTECTION OF INSPECTION DOOR

VERY IMPORTANT:
THE FOREMAN IN CHARGE MUST CHECK THAT THERE ARE ENOUGH BODYSHEETS WITH THEIR CORRESPONDING THICKNESS TO INSTALL EVERY SILO.

SILO 7,6 / 10

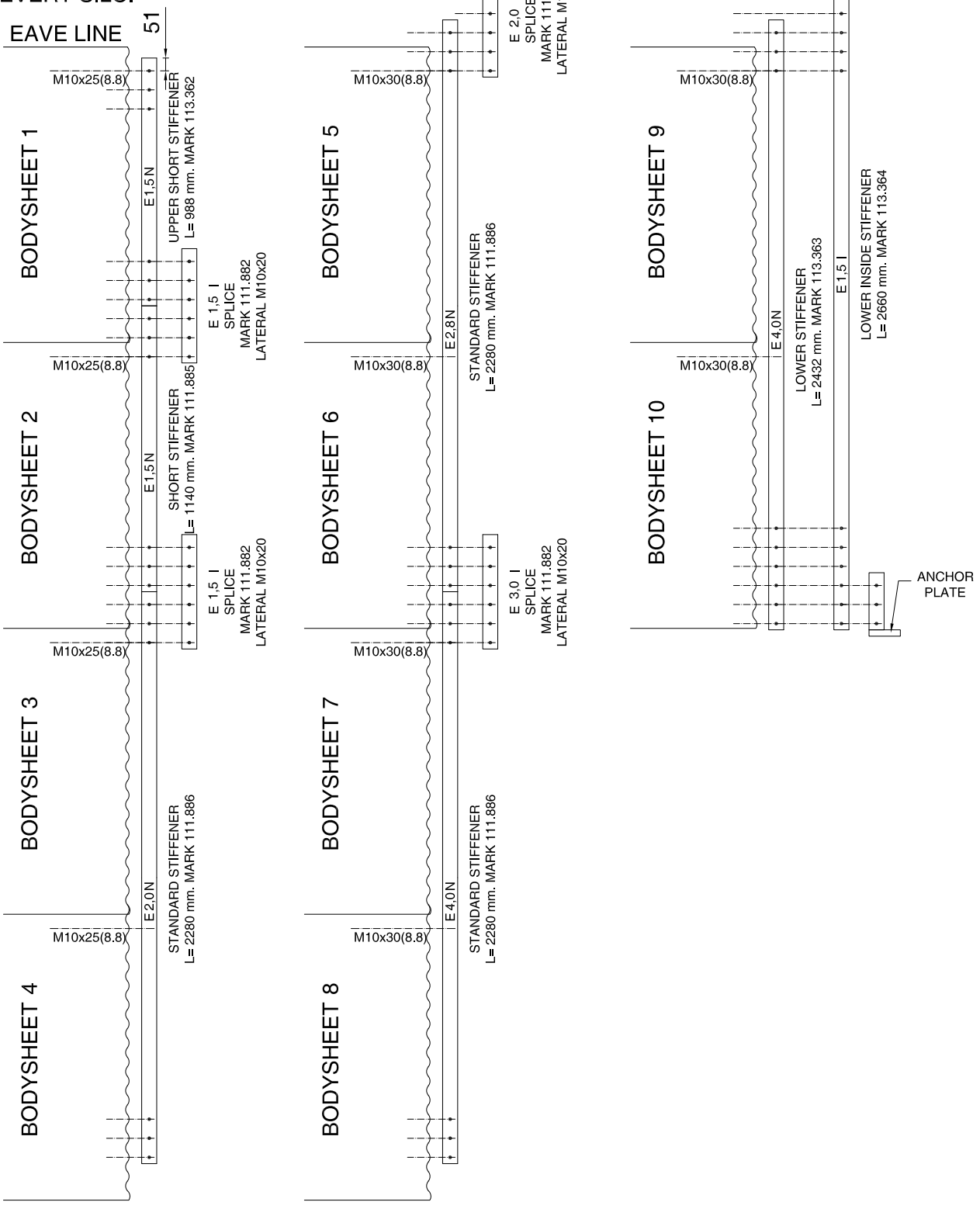


QUANT.	THICKNESS (mm)	MARK
9	0,8	110.000A
10	0,8	110.000A
10	0,8	110.000A
10	0,8	110.000A
10	0,8	122.981
10	0,8	122.981
10	0,8	122.981
10	0,8	122.981
9	0,8	122.981
10	0,8	122.981

*BODY SHEET-BODY SHEET SEAM:
Use bolts with head and weatherseal wash. outside, and flat wash. and nut inside.

BODY SHEET COMPOSITION

VERY IMPORTANT:
THE FOREMAN IN CHARGE MUST CHECK THAT
THERE ARE ENOUGH STIFFFENERS
WITH THEIR CORRESPONDING THICKNESS
TO INSTALL EVERY SILO.



TWO STIFFENER PER BODYSHEET
SILO 7,6 / 10

STIFFENERS INSTALLATION

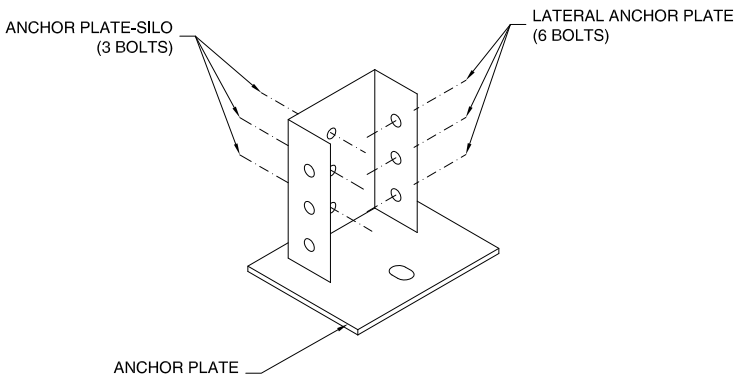
*BODY SHEET-STIFFENER SEAM:

Use bolts with head and weatherseal wash. inside, and nut outside.

*STIFFENER-STIFFENERS SPLICE:

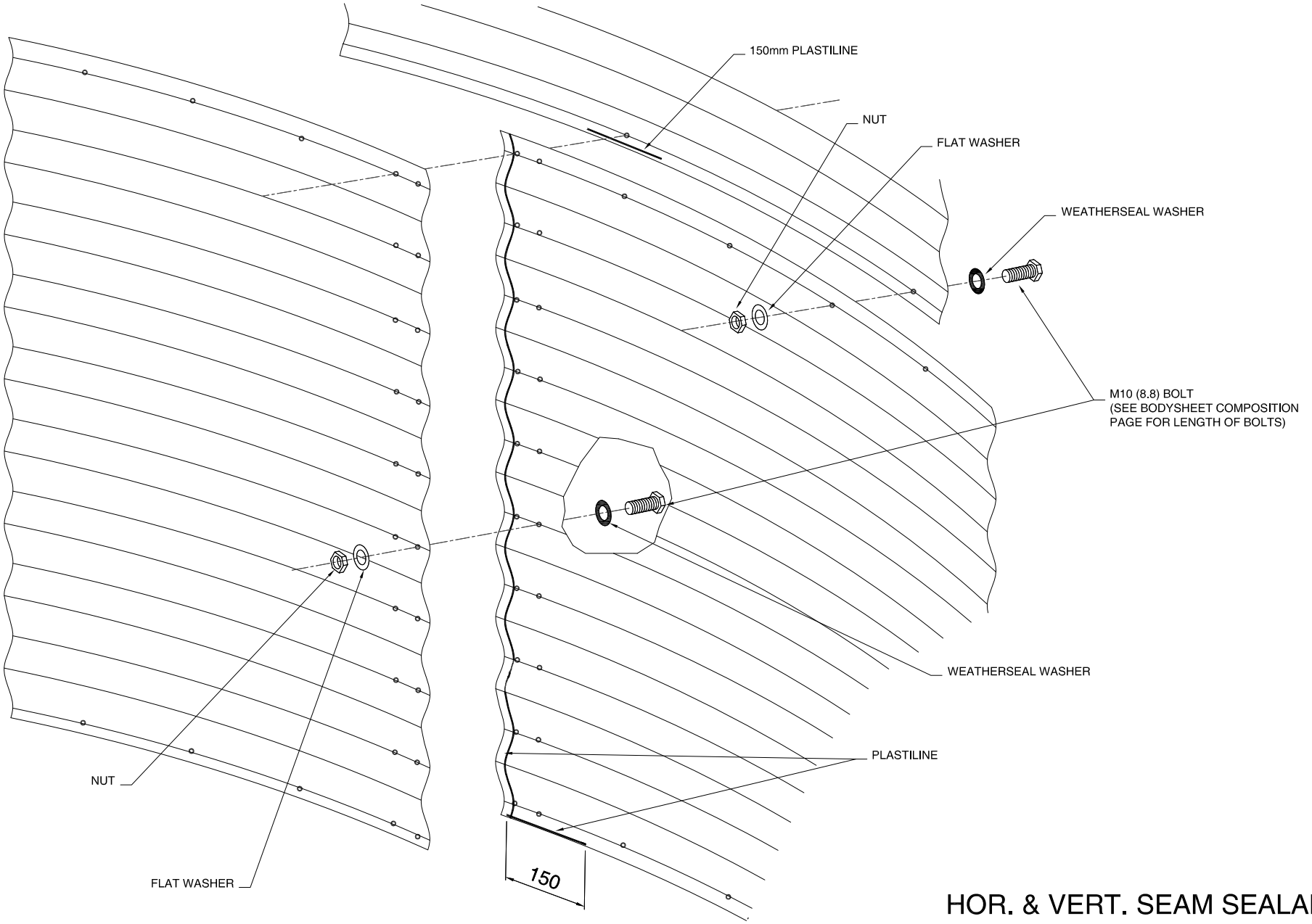
Use bolts with nut and two flat washers.

ANCHOR PLATE	LATERAL ANCHOR PLATE	ANCHOR PLATE-SILO
MARK 119.972	M10x30 (8.8) BOLT	M10x35 (8.8) BOLT
MARK 119.973	M10x35 (8.8) BOLT	M10x40 (8.8) BOLT
MARK 119.974	M10x40 (8.8) BOLT	M10x50 (8.8) BOLT
MARK 119.975	M10x30 (8.8) BOLT	M10x35 (8.8) BOLT
MARK 119.976	M10x35 (8.8) BOLT	M10x40 (8.8) BOLT
MARK 119.977	M10x40 (8.8) BOLT	M10x50 (8.8) BOLT
MARK 119.983	M10x40 (8.8) BOLT	M10x50 (8.8) BOLT
MARK 121.077	M10x40 (8.8) BOLT	M10x50 (8.8) BOLT

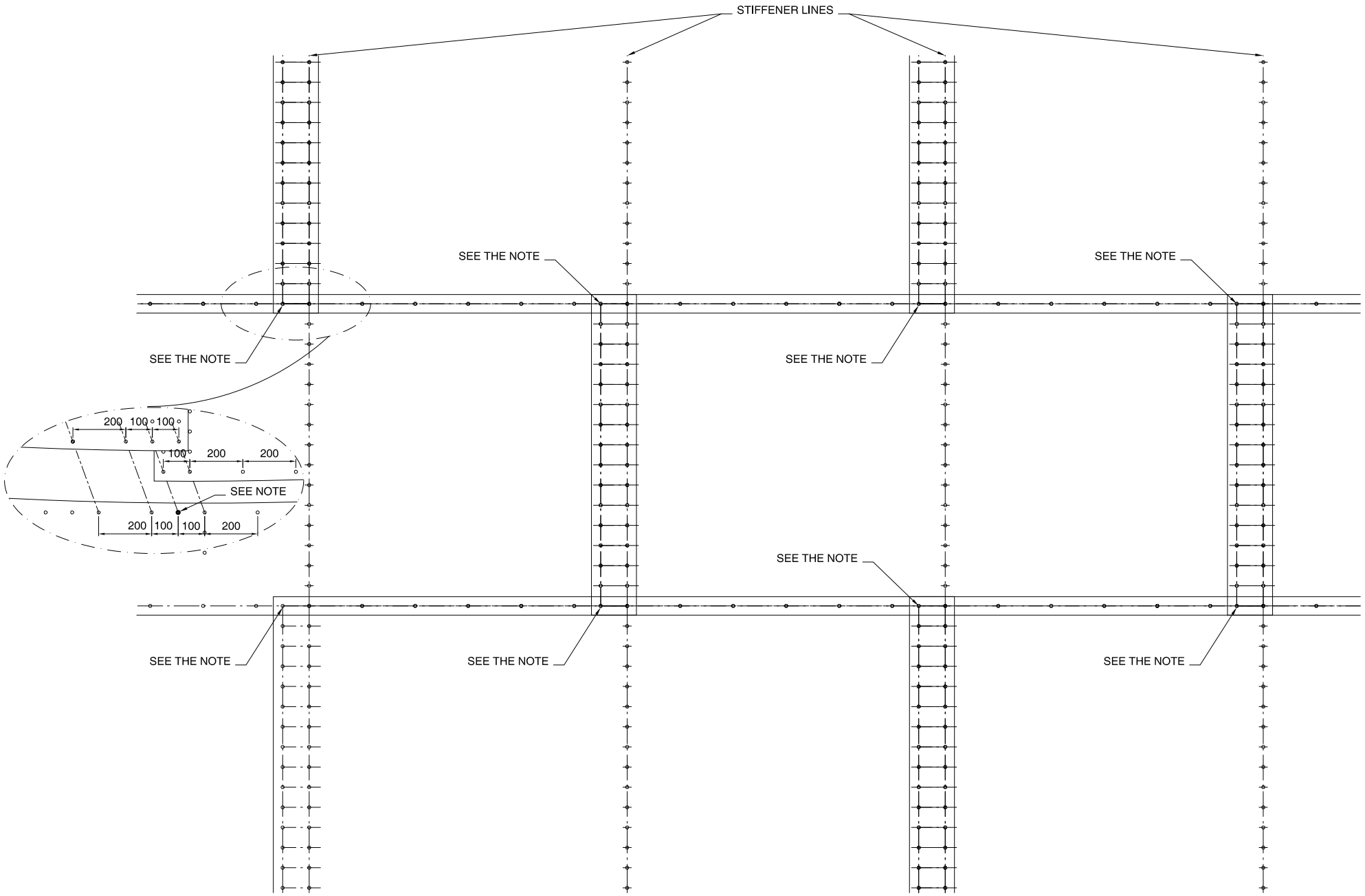


BOLTS FOR ANCHOR PLATE

NOTE:
LOCATE THE PLASTILINE AS CLOSE AS POSSIBLE TO THE HOLES LINE

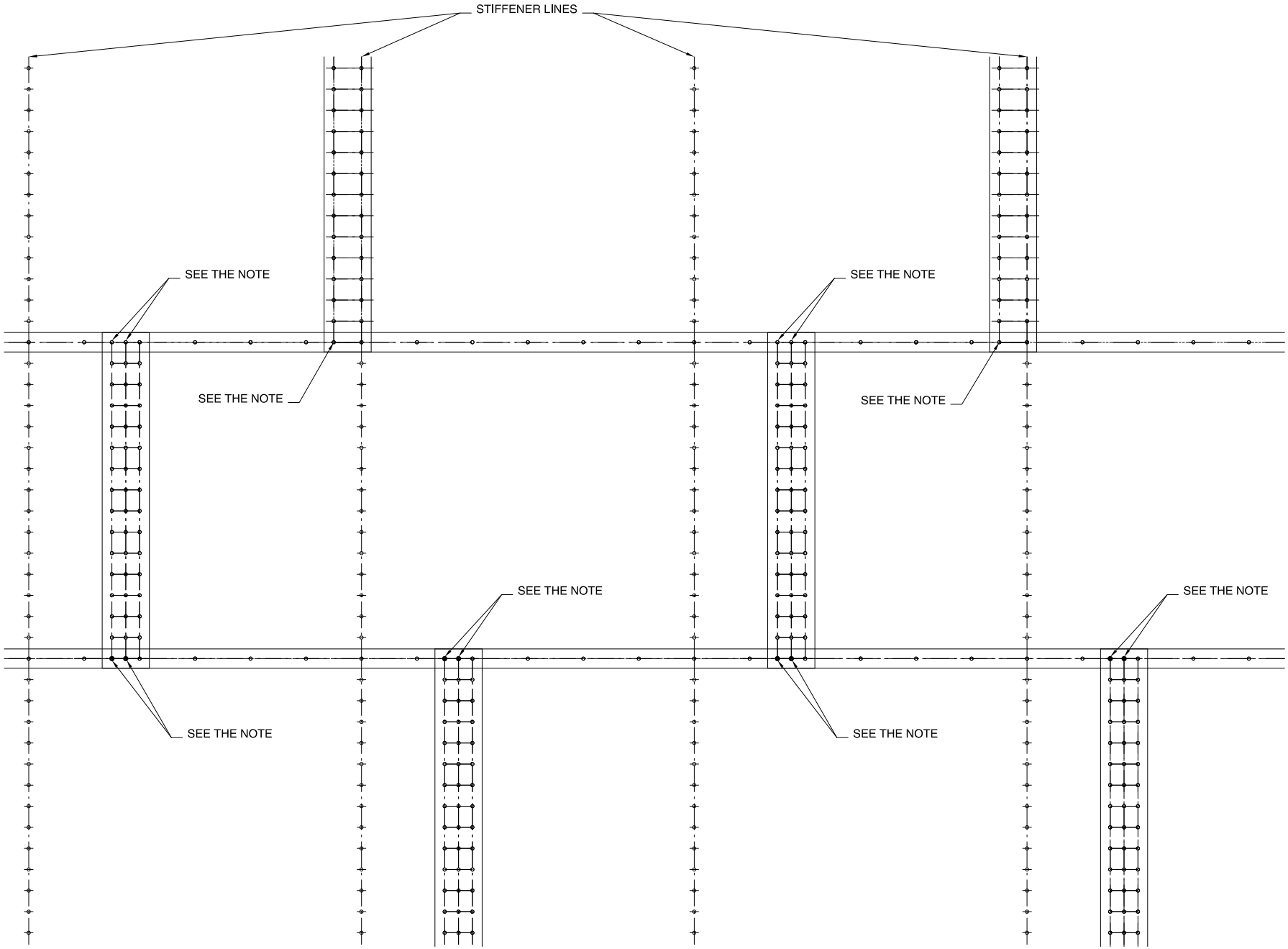


HOR. & VERT. SEAM SEALANT DETAIL
(INSIDE VIEW)



NOTE:
IT IS NOT NECESSARY FIELD DRILL HOLES IN THE BODYSHEETS BECAUSE SILO WAS CALCULATED WITHOUT THE CONTRIBUTION OF THESE ADDITIONAL BOLTS, IT IS ONLY AN ESTHETIC ISSUE.

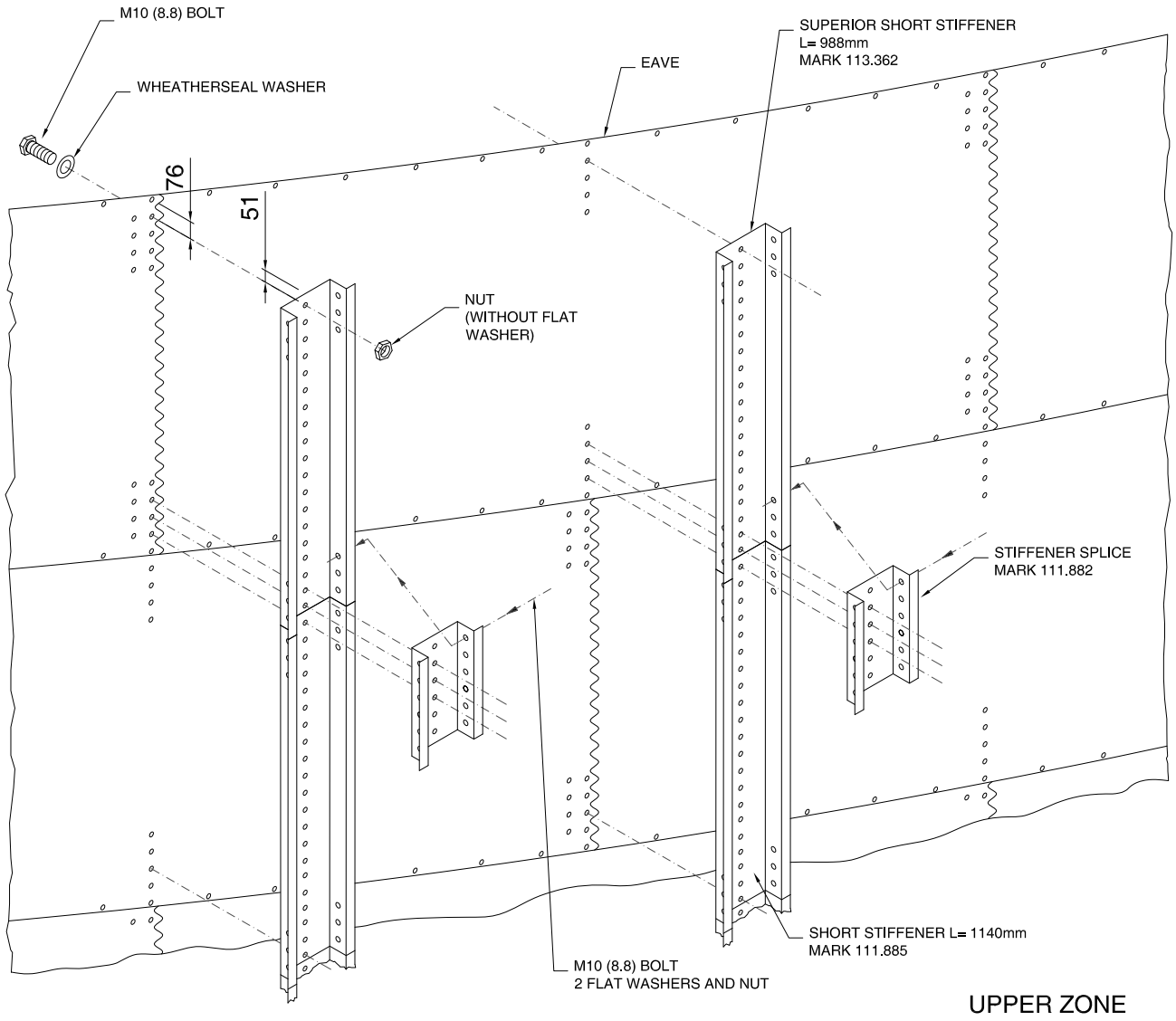
DOUBLE JOINT (2 STIFFENERS) BODYSHEETS AND STIFFENERS INSTALLATION (OUTSIDE VIEW)



NOTE:
IT IS NOT NECESSARY FIELD DRILL HOLES IN THE BODYSHEETS BECAUSE SILO WAS CALCULATED WITHOUT THE CONTRIBUTION OF THESE ADDITIONAL BOLTS, IT IS ONLY AN ESTHETIC ISSUE.

TRIPLE JOINT (2 STIFFENERS) BODYSHEETS AND STIFFENERS INSTALLATION (OUTSIDE VIEW)

* SEE BODYSHEET AND STIFFENERS COMPOSITION PAGE FOR LENGTH OF BOLTS

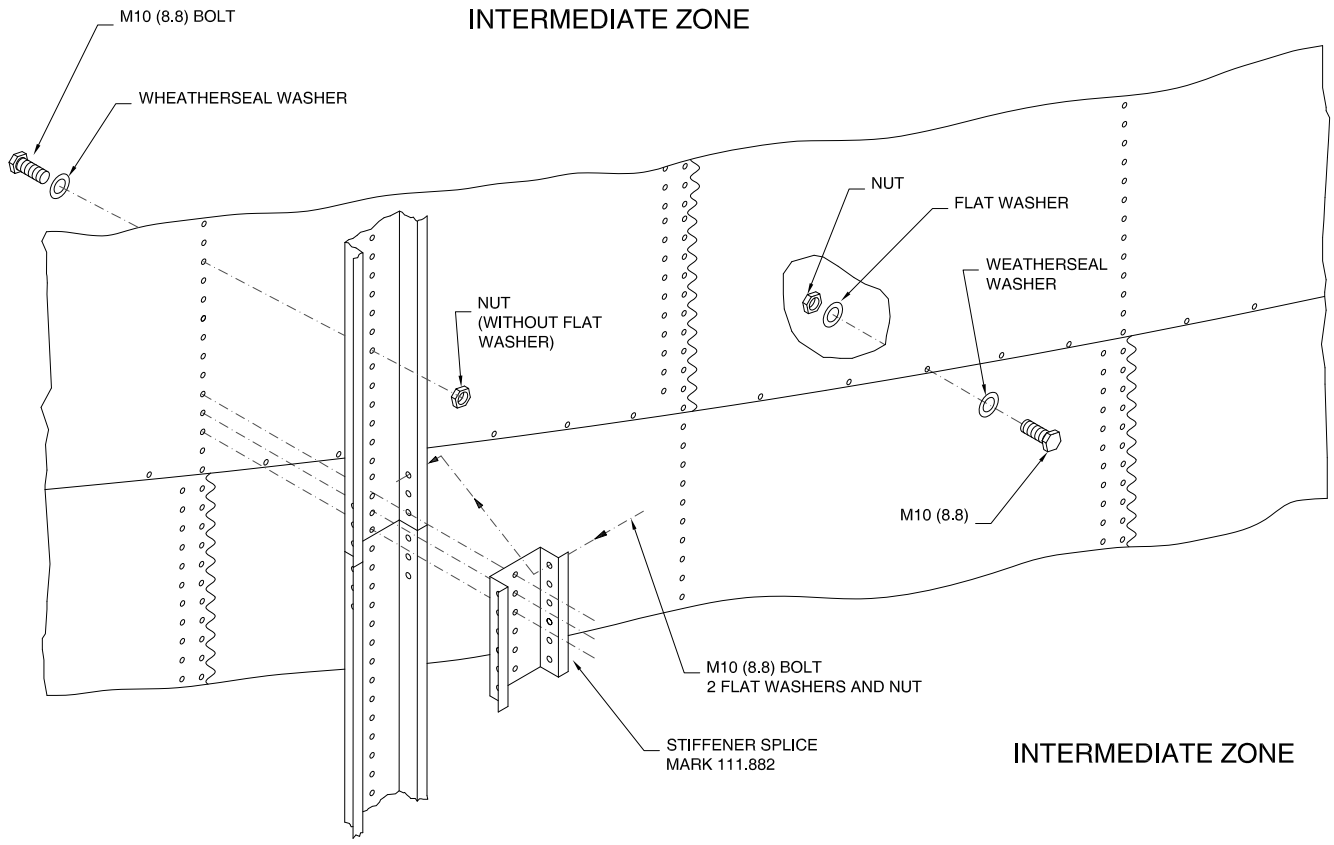


UPPER ZONE

NOTE:
WHEN INSTALL STIFFENERS, IT IS VERY IMPORTANT NOT TO ALLOW STIFFENERS TO SLIP DOWNWARD WHEN TIGHTENING. STIFFENERS MUST BE IN CONTACT.

BODYSHEETS AND STIFFENERS DETAILS (OUTSIDE VIEW)

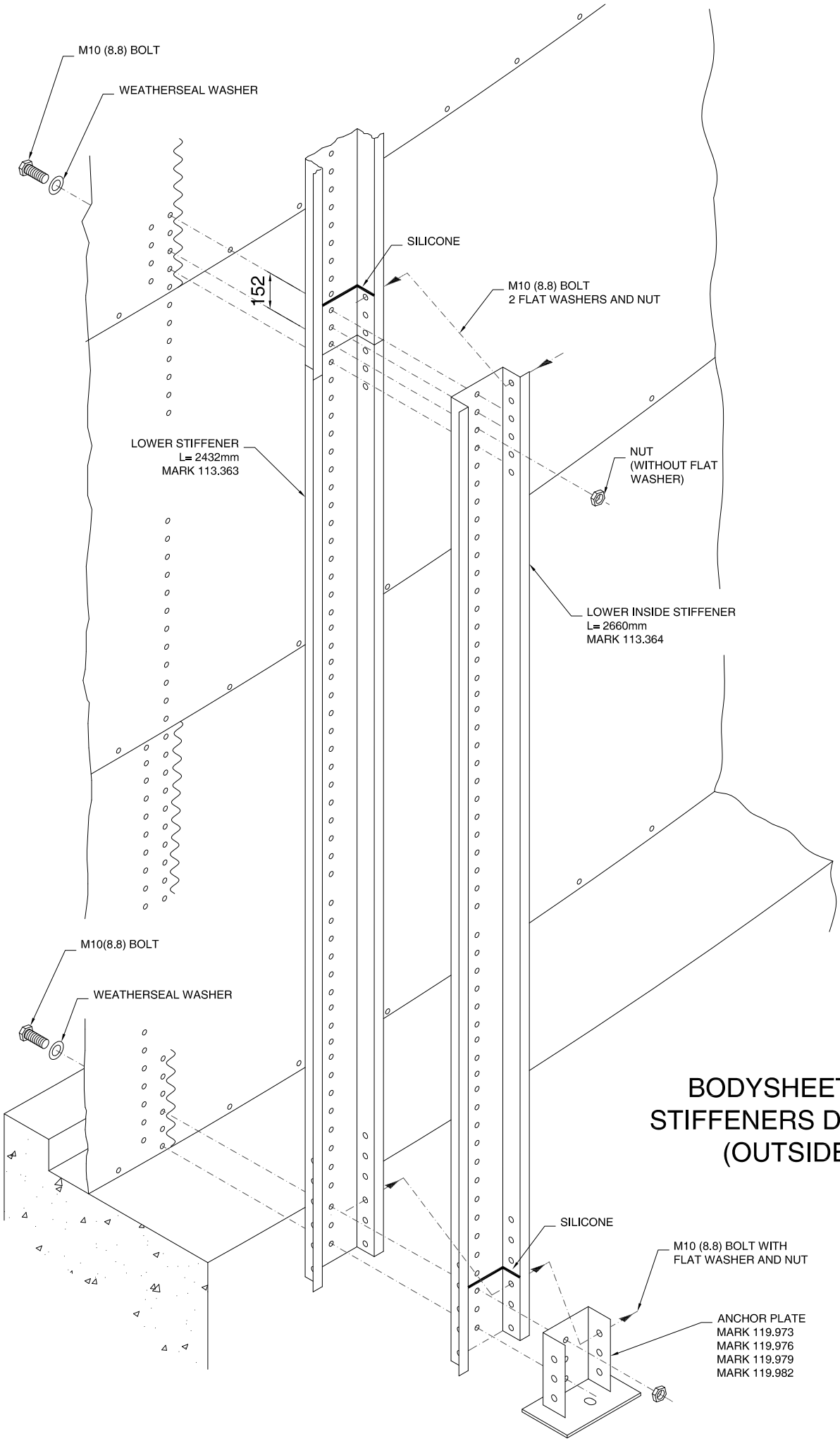
* SEE BODYSHEET AND STIFFENERS COMPOSITION PAGE FOR LENGTH OF BOLTS



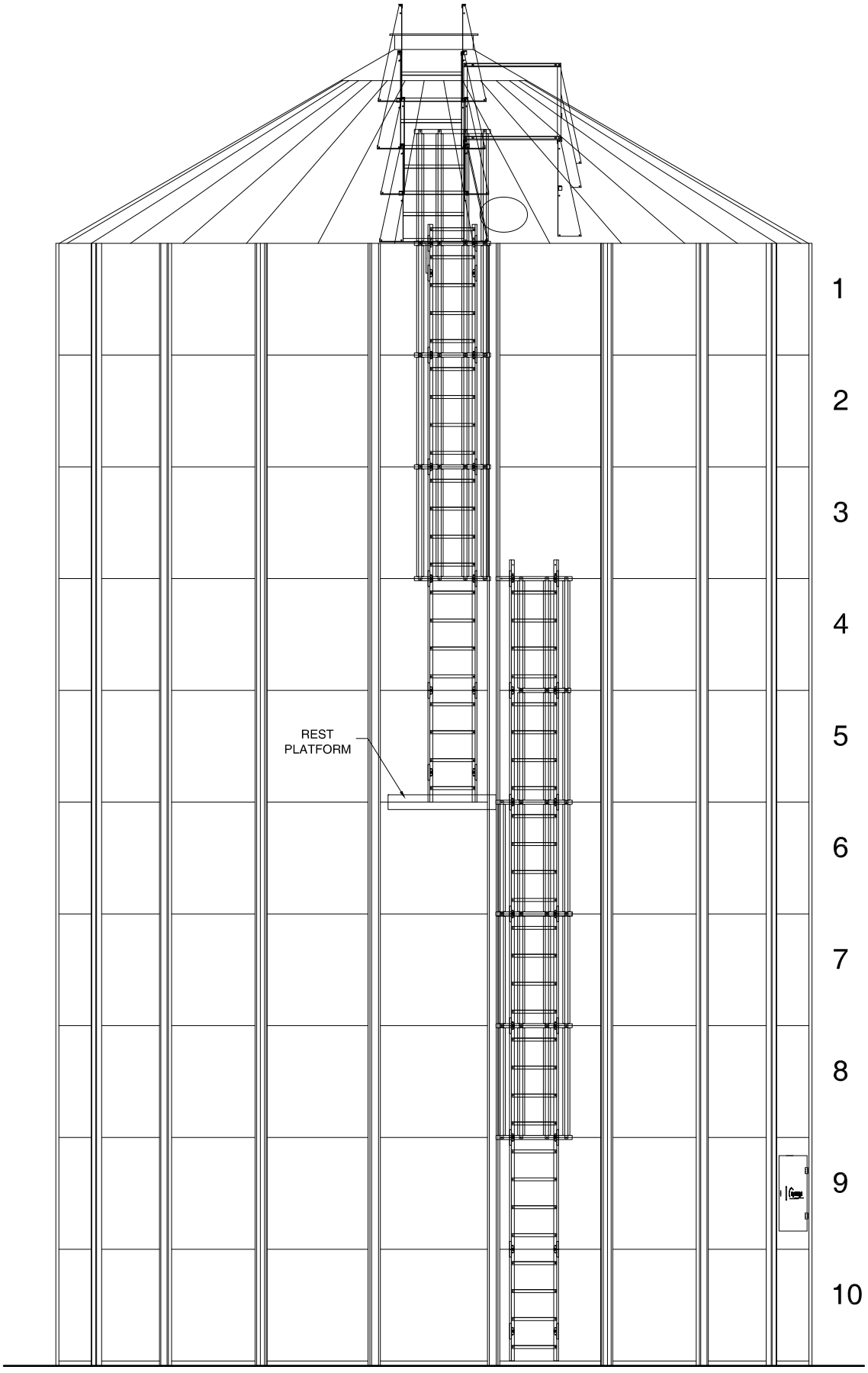
NOTE:
WHEN INSTALL STIFFENERS, IT IS VERY IMPORTANT NOT TO ALLOW STIFFENERS TO SLIP DOWNWARD WHEN TIGHTENING. STIFFENERS MUST BE IN CONTACT.

BODYSHEETS AND STIFFENERS DETAILS (OUTSIDE VIEW)

* SEE BODYSHEET AND STIFFENERS COMPOSITION PAGE FOR LENGTH OF BOLTS

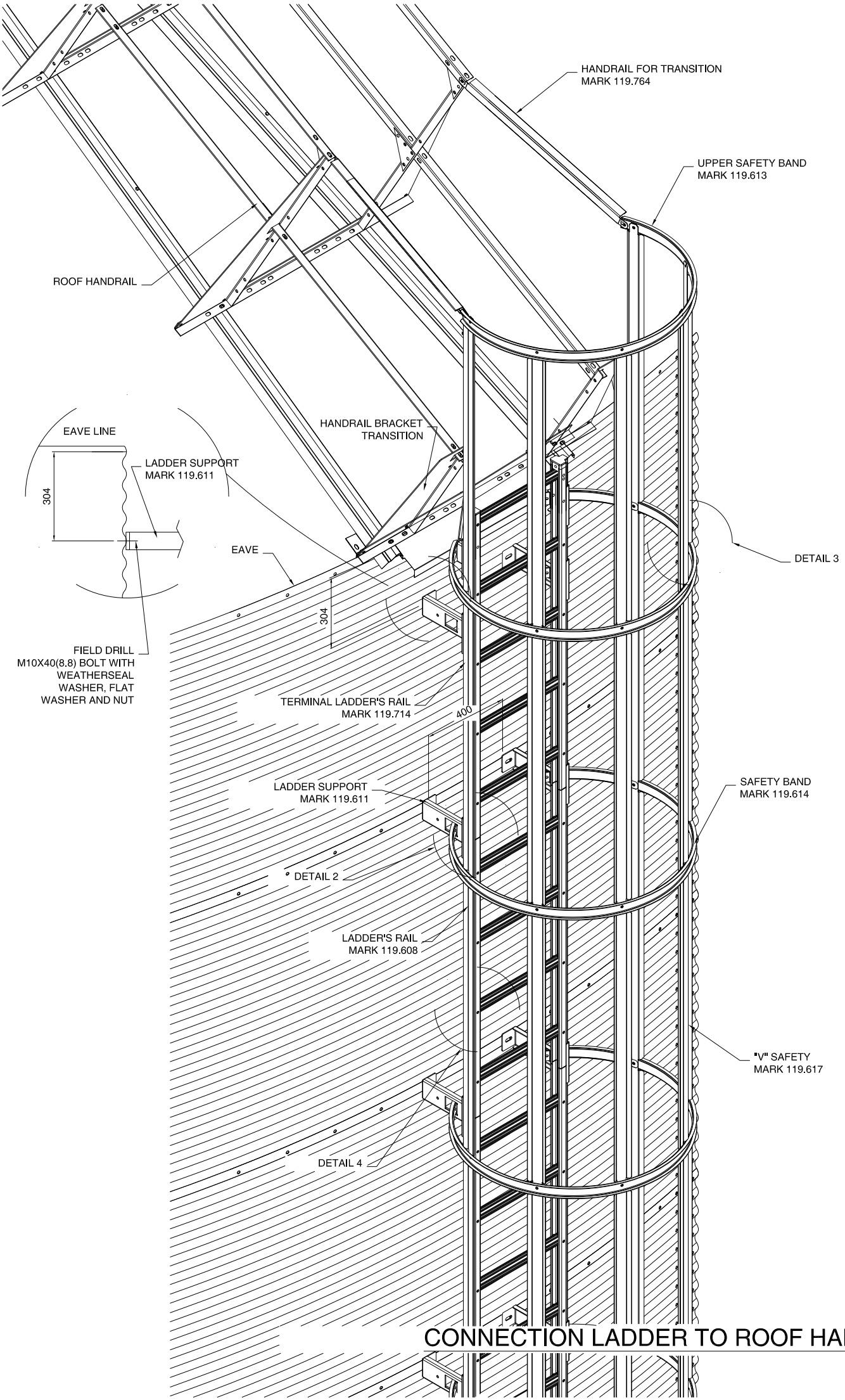


BODYSHEETS AND STIFFENERS DETAILS (OUTSIDE VIEW)

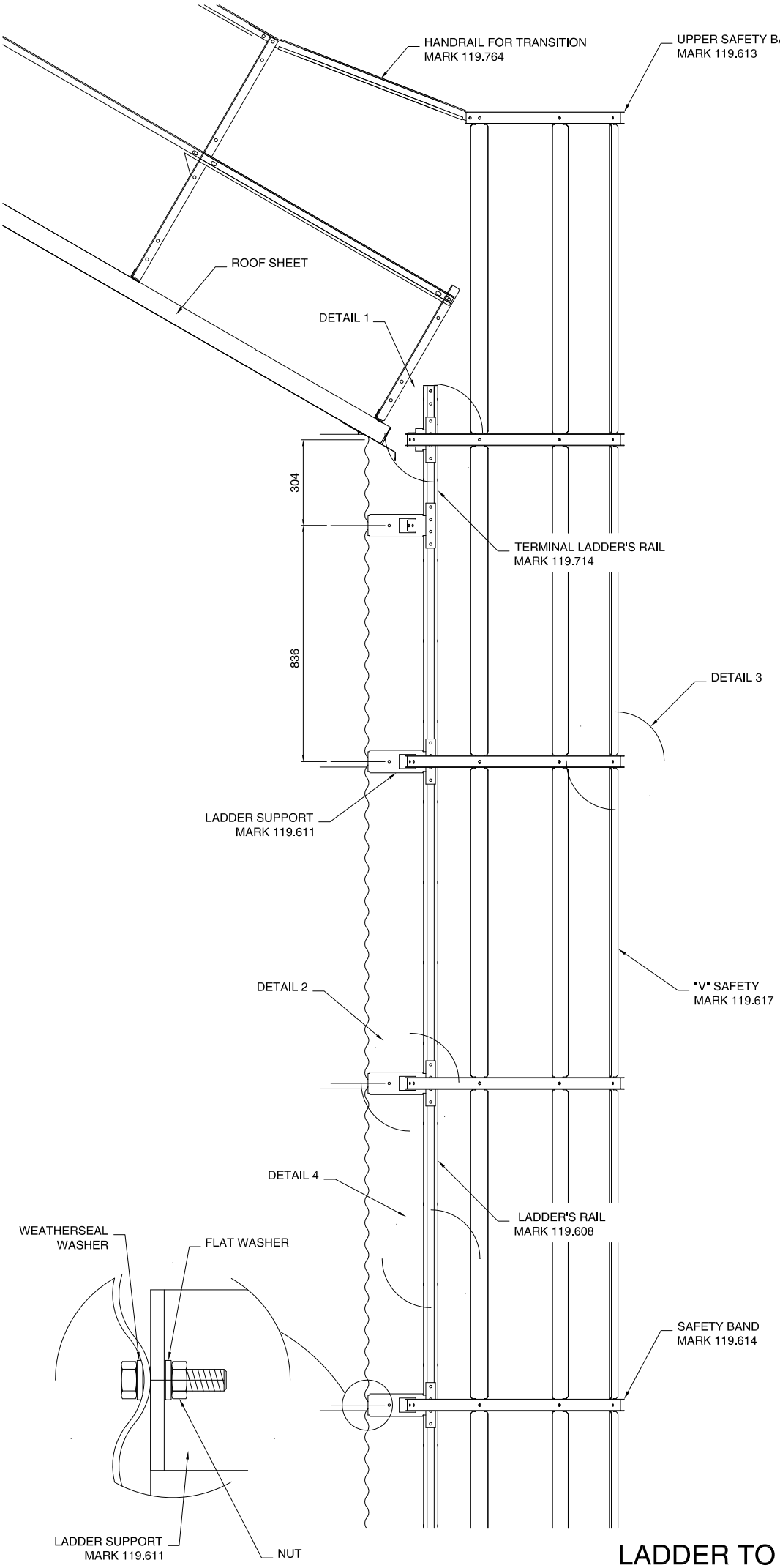


SILO 10 RINGS

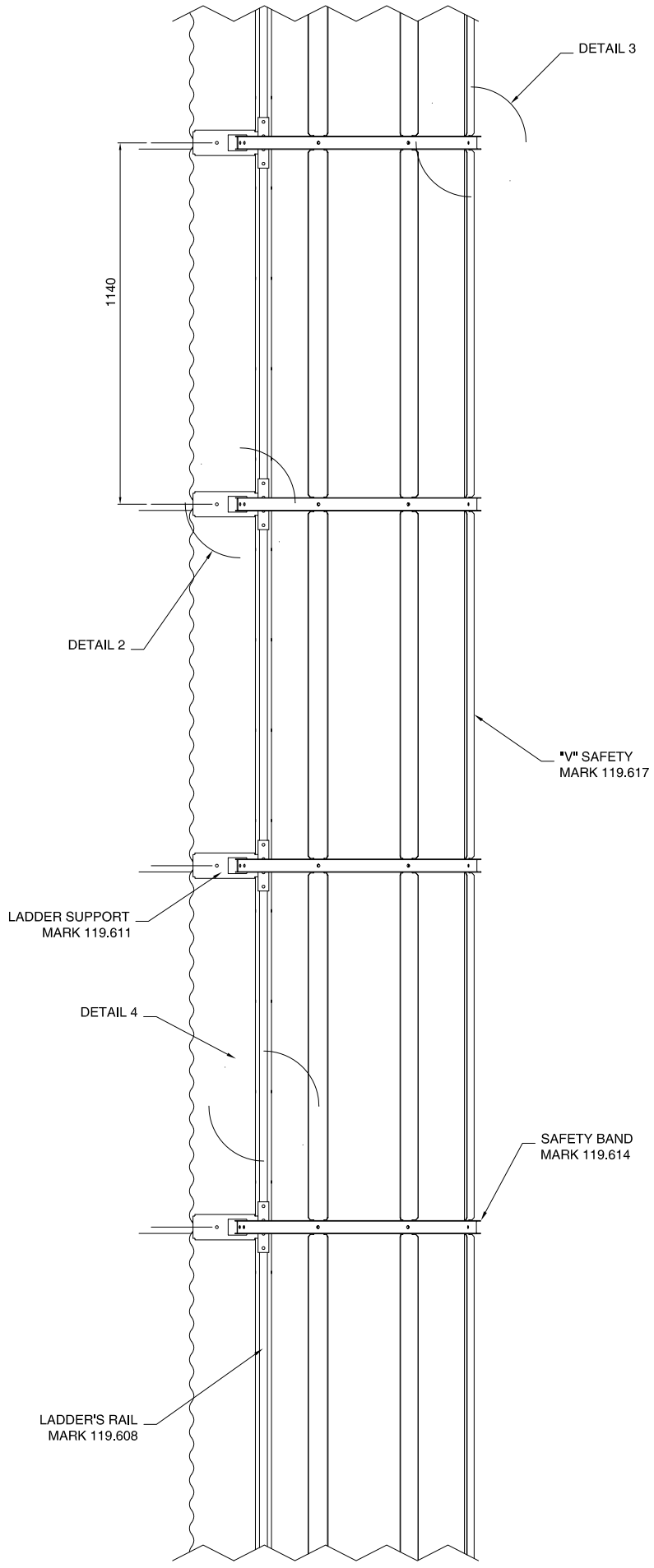
LADDER TO ROOF INSTRUCTIONS



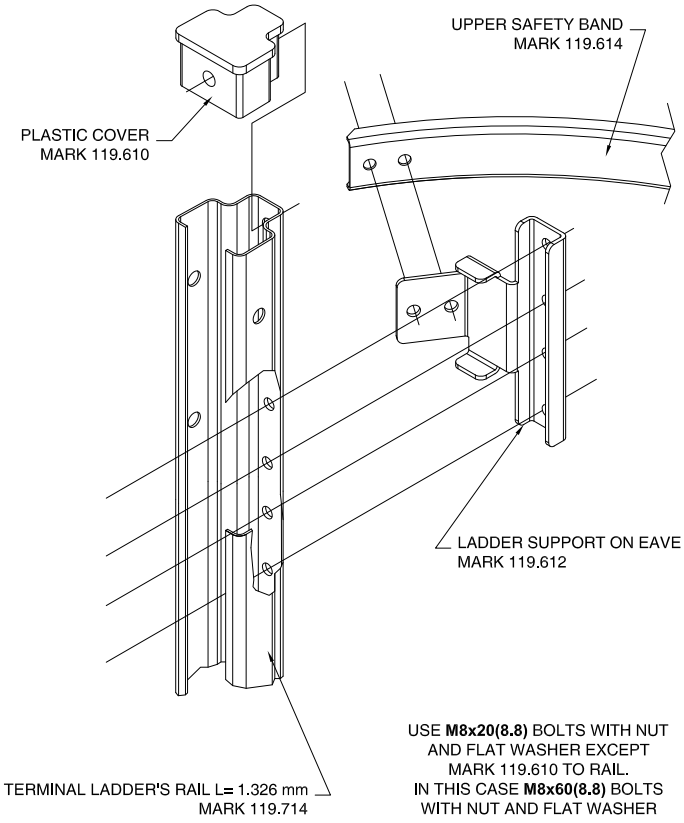
CONNECTION LADDER TO ROOF HANDRAIL



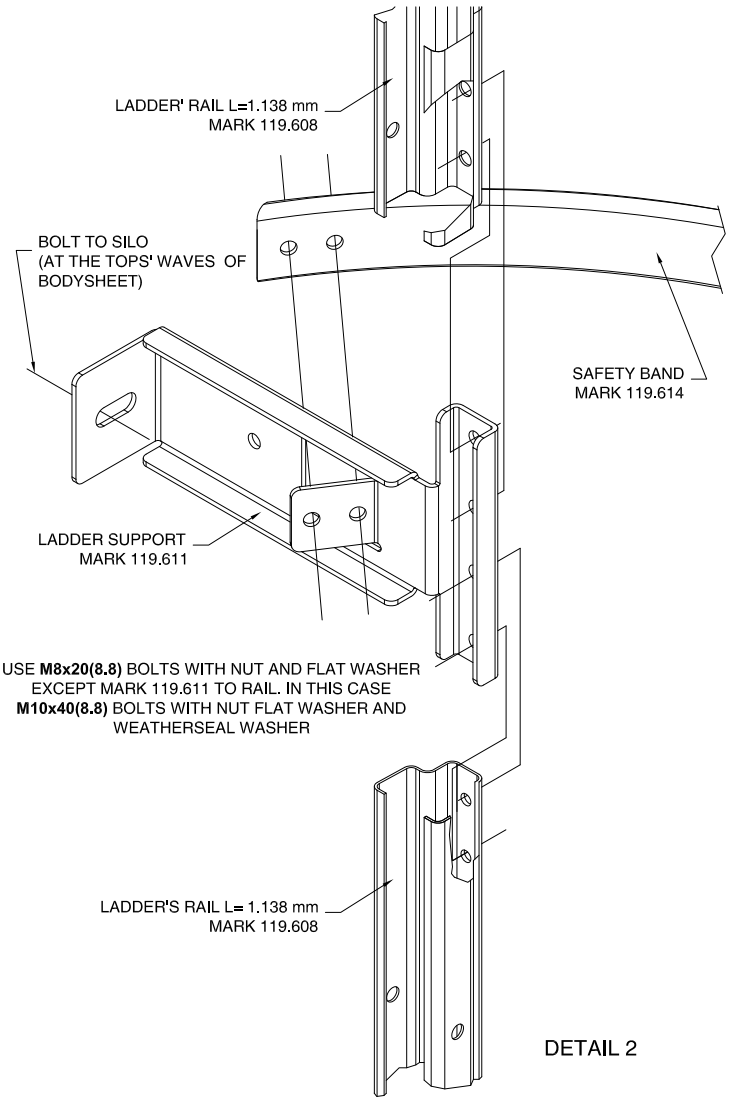
LADDER TO ROOF (UPPER PART)



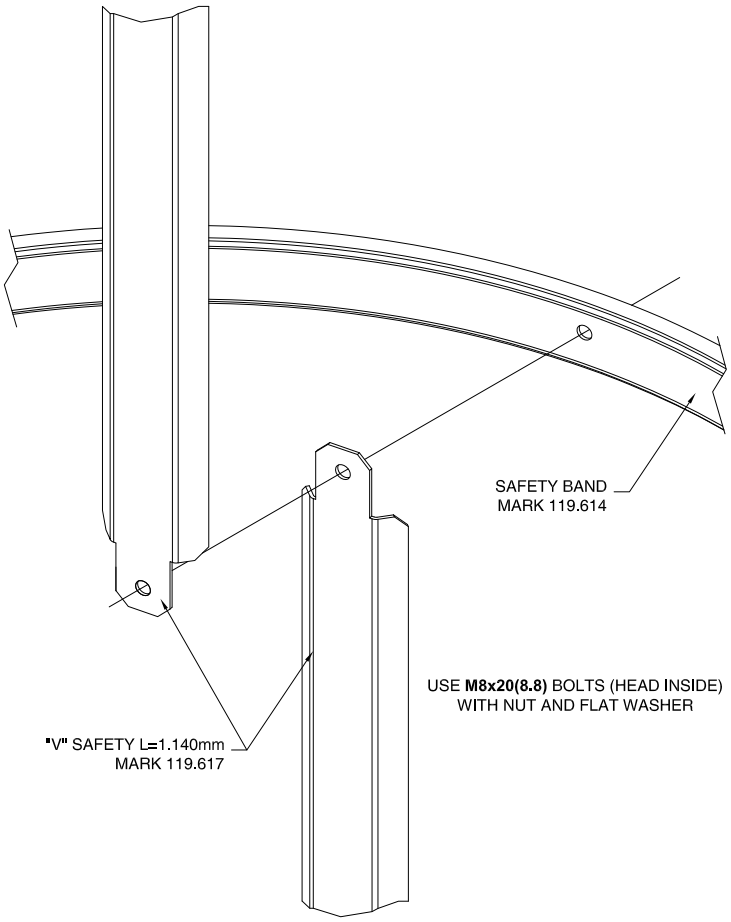
LADDER TO ROOF
(INTERMEDIATE PART)



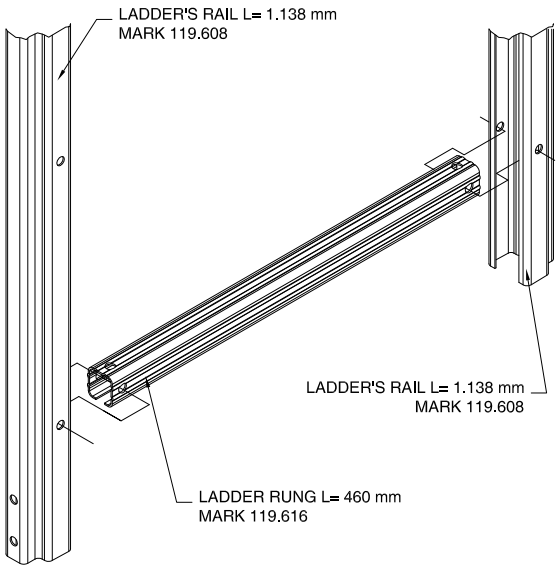
DETAIL 1



DETAIL 2



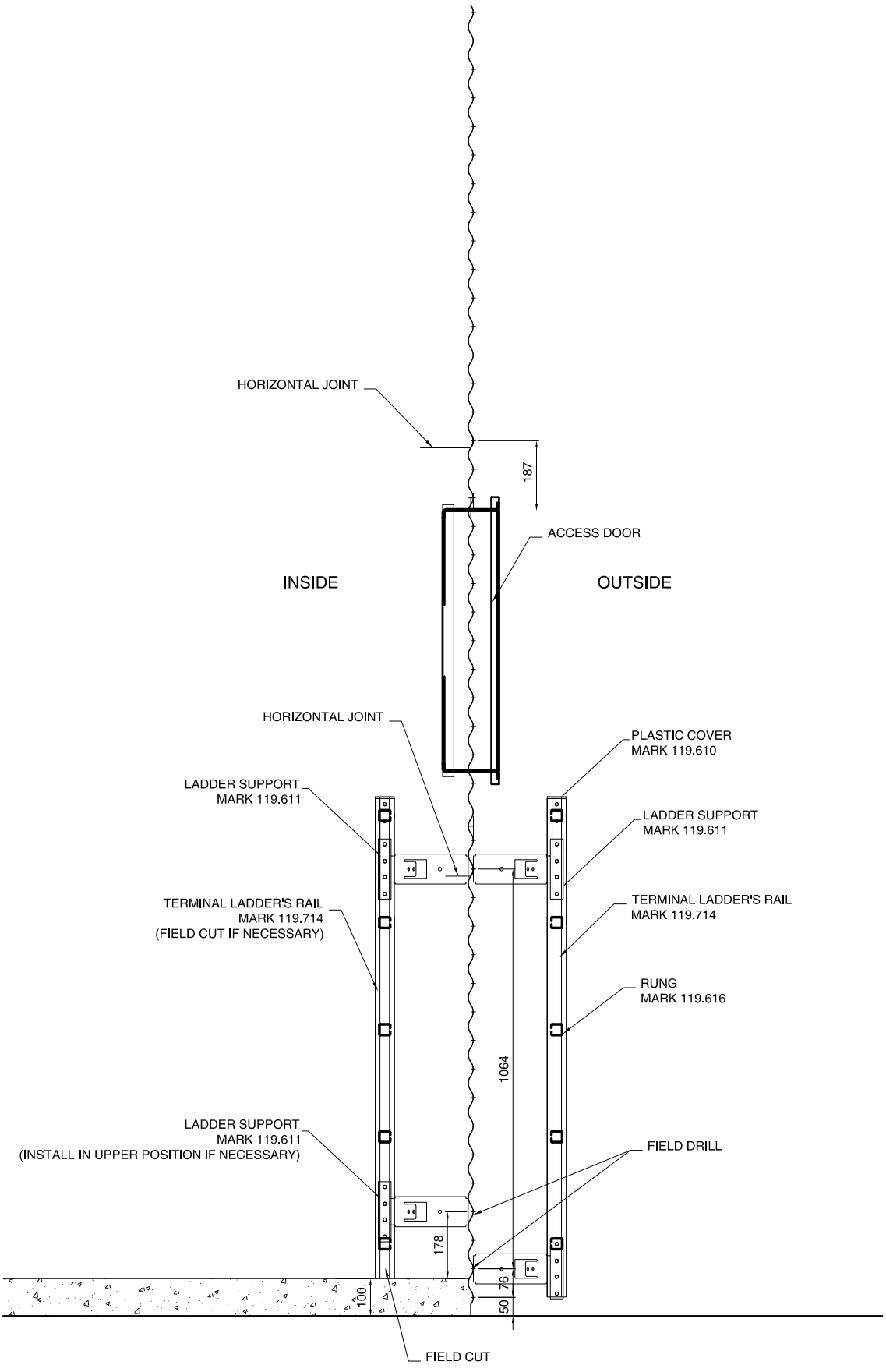
DETAIL 3



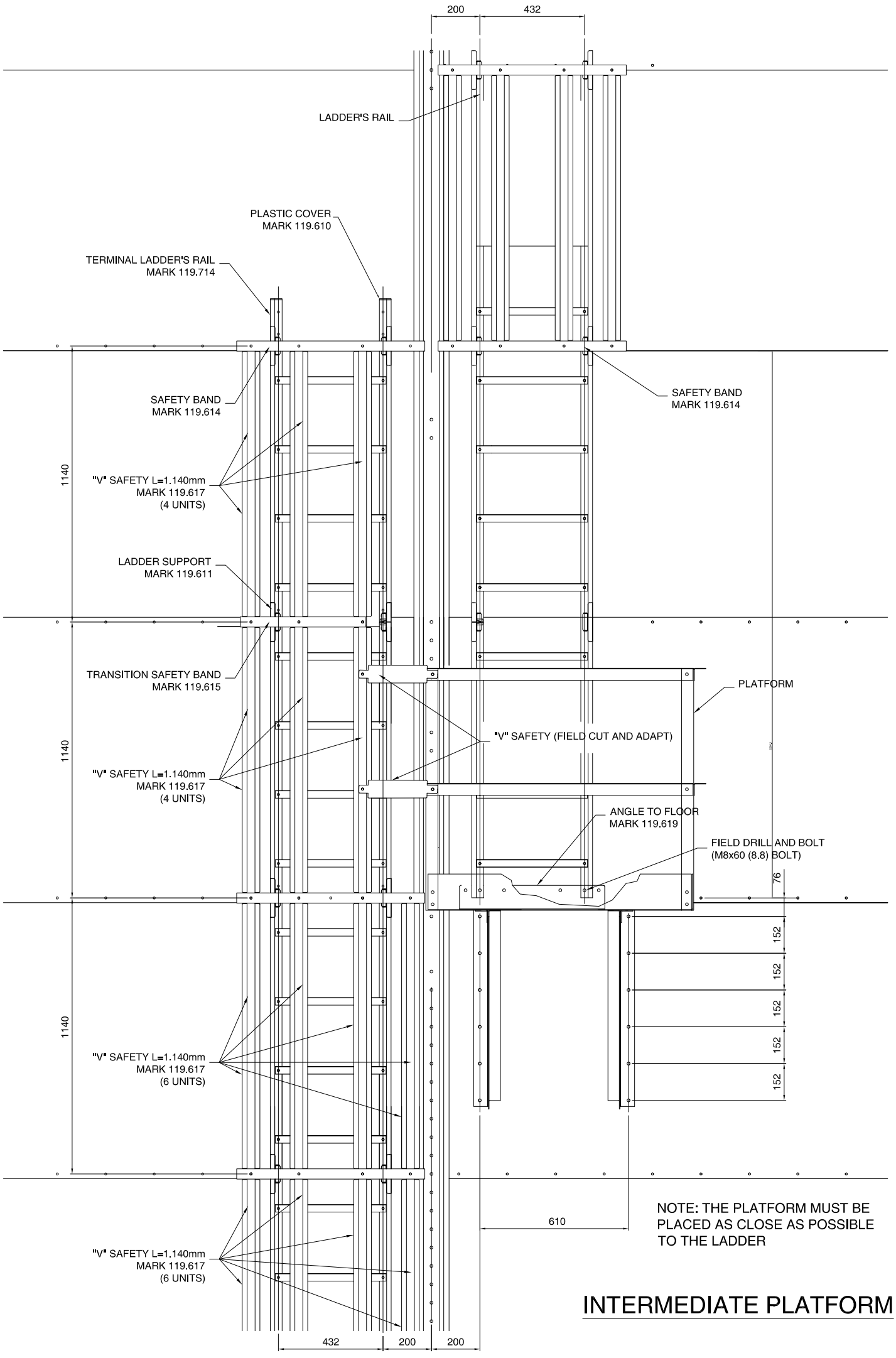
DETAIL 4

LADDER DETAILS

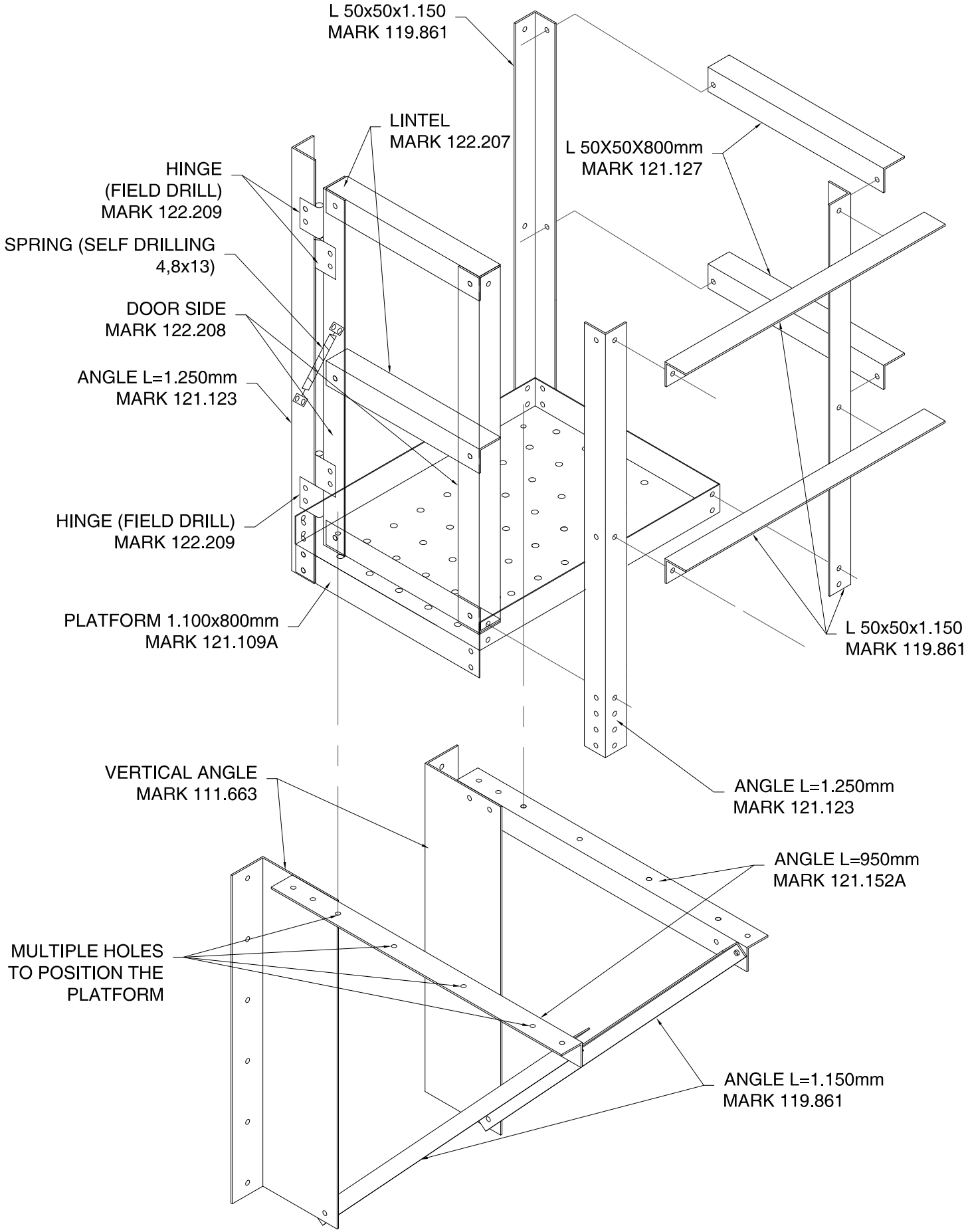
USE **M8x20(8.8)** BOLTS WITH NUT AND FLAT WASHER EXCEPT:
-MARK 119.611 TO RAIL:**M10x40(8.8)** BOLTS WITH NUT FLAT WASHER AND WEATHERSEAL WASHER.
-MARK 119.616 TO RAIL:**M8x60(8.8)** BOLTS WITH NUT AND FLAT WASHER.



LADDER TO ACCESS DOOR

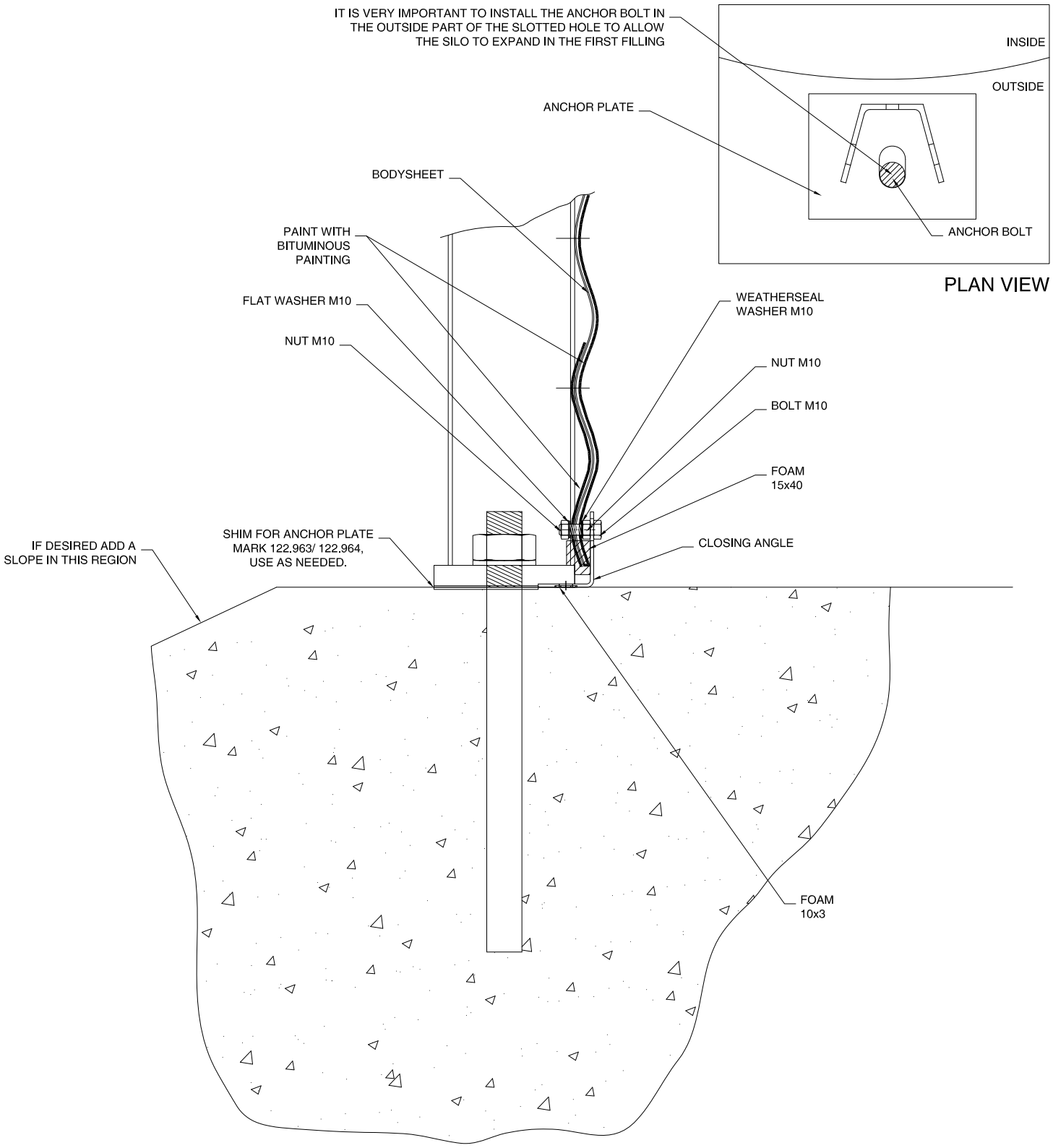


INTERMEDIATE PLATFORM



NOTE:
THE SPRING MUST BE TENSE BEFORE BOLTING IT ON THE ANGLES.
THE WIDTH OF THE ACCESS OPENING SHALL BE AT LEAST 500 mm.
USE M10X20(8.8)BOLTS WITH NUT EXCEPT FOR THE HINGE M8X20(8.8)BOLT

PLATFORM 1.100x800



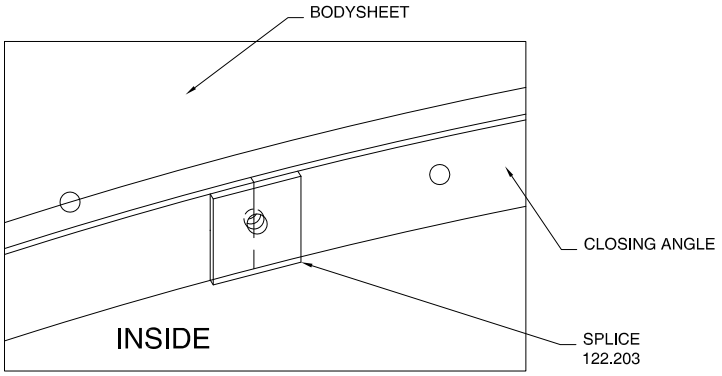
PROCEDURE TO SEAL THE FOUNDATION:

1.-ONCE THE FINAL ANCHOR PLATE POSITIONS ARE KNOWN, USE THE ANCHOR PLATE HOLE TO DRILLTHE HOLES FOR THE CHEMICAL ANCHOR BOLTS.

2.-CLEAN THE CAVITY AROUND THE SILO AND PAINT THE BODYSHEETS WITH A BITUMIOUS PAINTING, INSIDE AND OUTSIDE, AS INDICATED IN THE DRAWING.

3.-BOLT THE CLOSING ANGLE TO THE BODYSHEETS. FILL THE GAP BETWEEN THE CLOSING ANGLE AND THE BODYSHEETS WITH FOAM 15x40. FILL THE GAP BETWEEN THE CLOSING ANGLE AND THE FOUNDATION WITH FOAM 10x3.

4.-IF DESIRED, ADD A SLOPE IN THE FOUNDATION. IMPORTANT: DO NOT ADD MORTAR OUTSIDE OF THE BODYSHEET (SEE DRAWING).

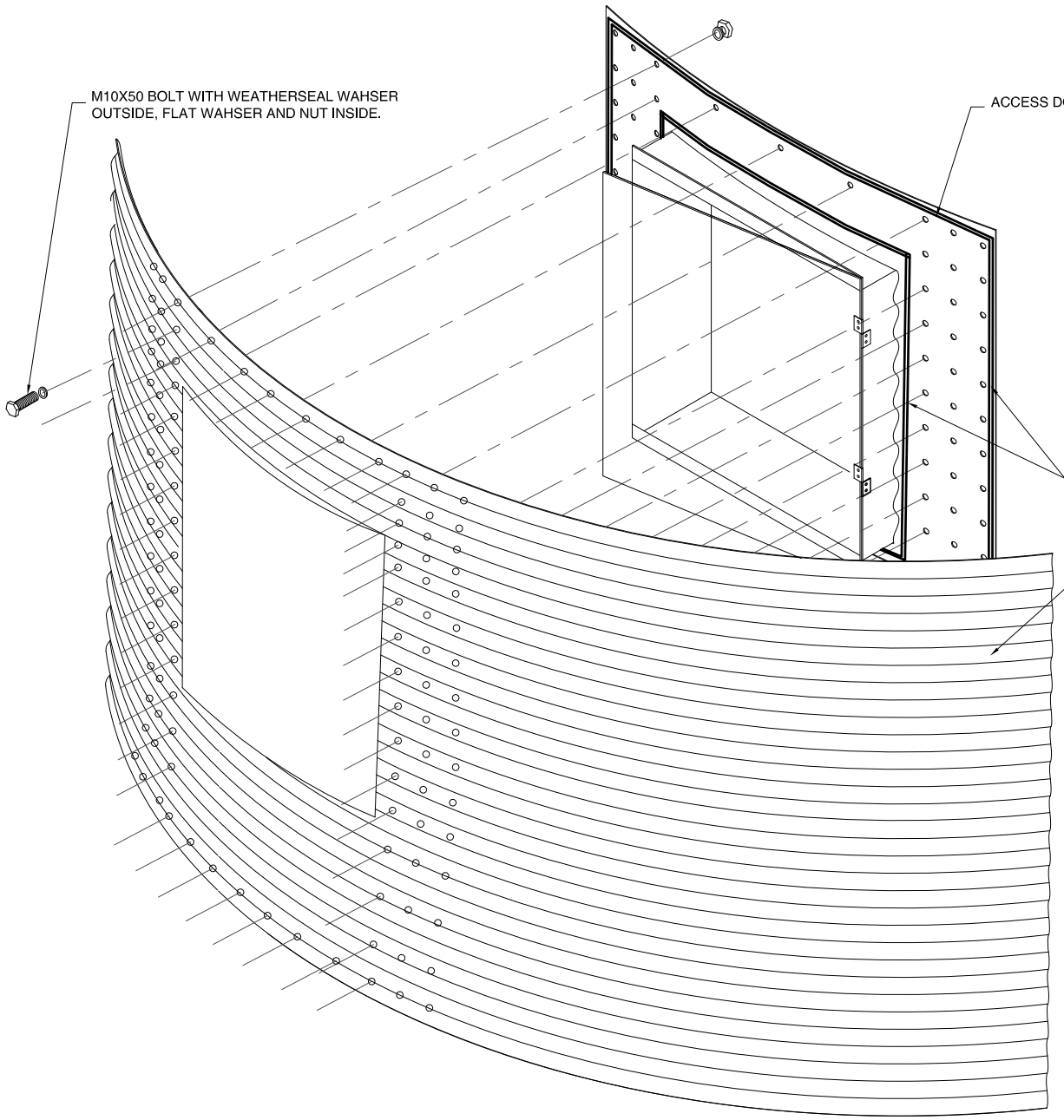


CLOSING ANGLE DETAIL

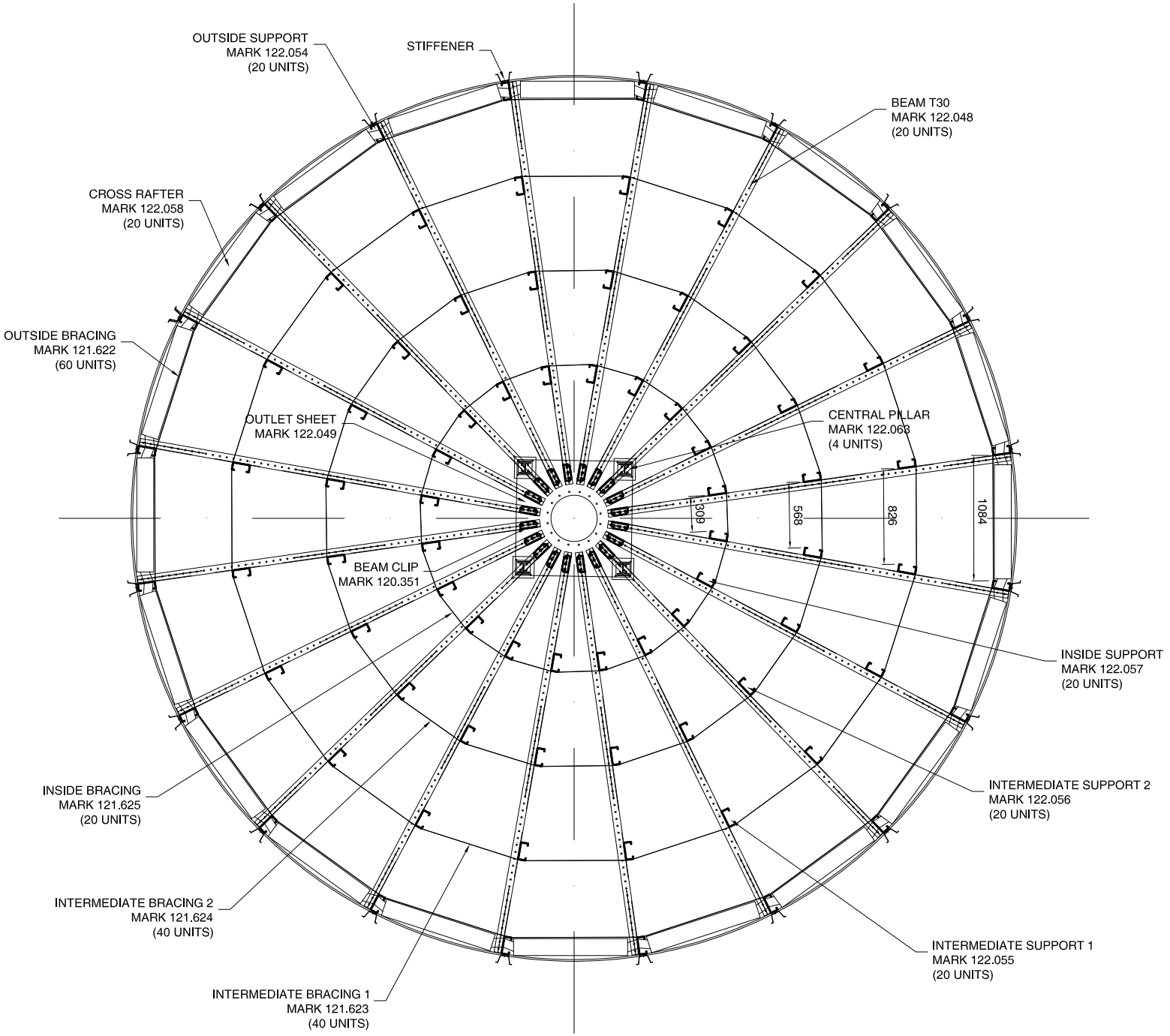
ANCHORAGE SYSTEM

NOTE:
- PUT FOAM BETWEEN THE BODYSHEET AND ACCESS DOOR TO PREVENT WATER ENTERING THE SILO.
- IT IS RECOMMENDED TO INSTALL THE ACCESS DOOR CLOSE TO THE INTERMEDIATE OUTLETS OF THE SWEEP AUGER.
- IF THERE IS OUTSIDE BODYSHEET COVER, FIELD CUT THIS COVER TO ALLOW THE DOOR TO OPEN CORRECTLY.

ACCESS DOOR	MARK
TYPE 1	123.996 / 124.005
TYPE 2	123.995 / 124.004
TYPE 3	123.994
TYPE 4	123.993

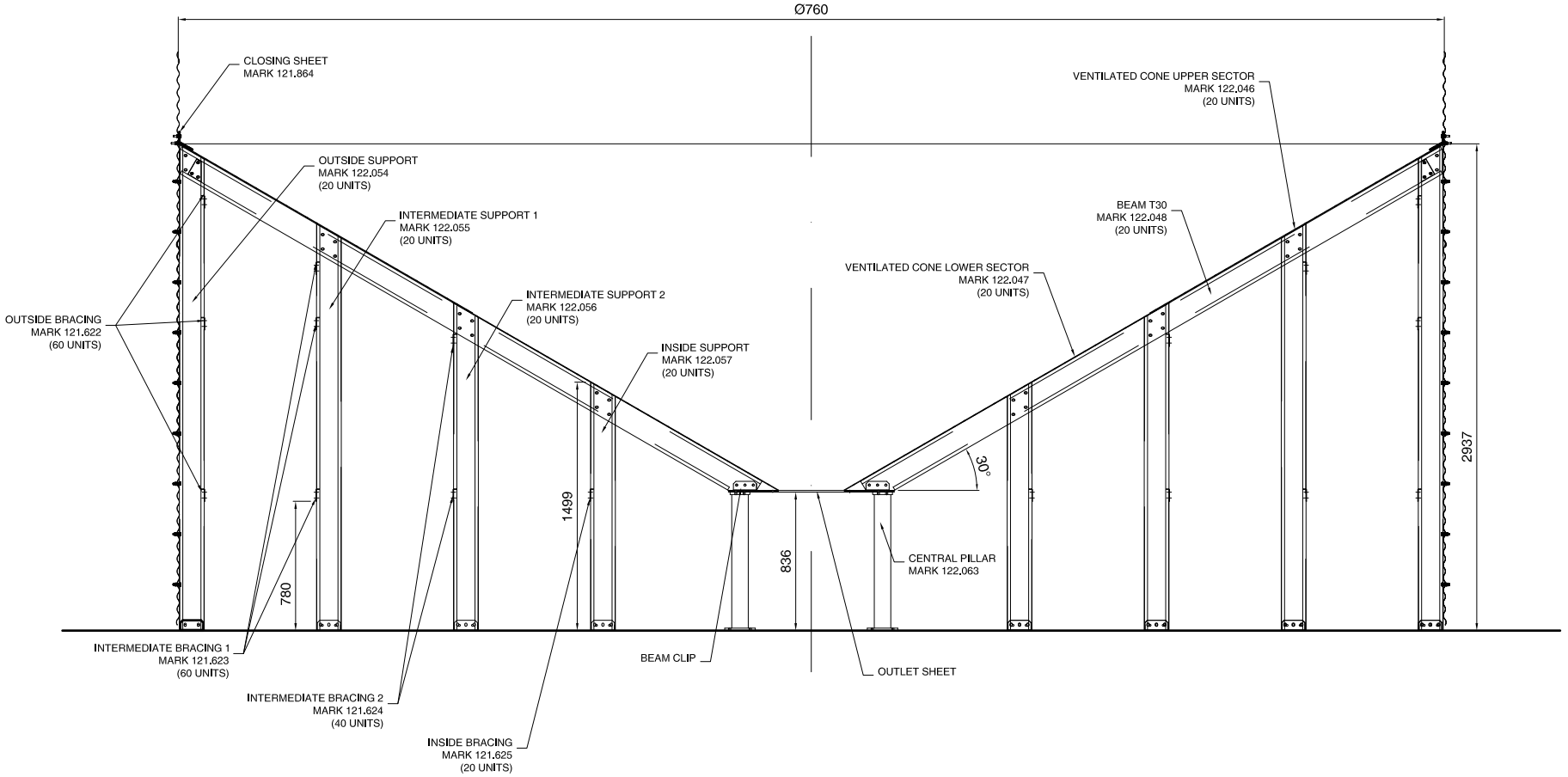


ACCESS DOOR ASSEMBLY

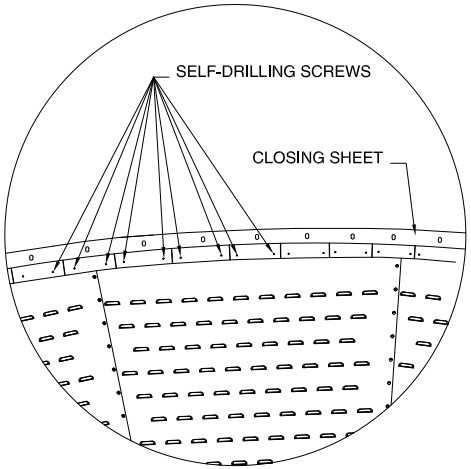


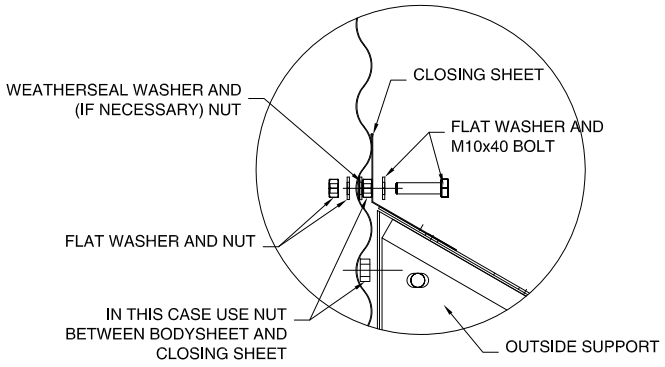
ELEVATED VENTILATED CONE Ø760 T30

NOTE:
USE M12 BOLTS WITH FLAT WAHSER AND NUT IN THE WHOLE STRUCTURE, EXCEPT FOR M10x40 BOLTS INDICATED IN THE DETAILS

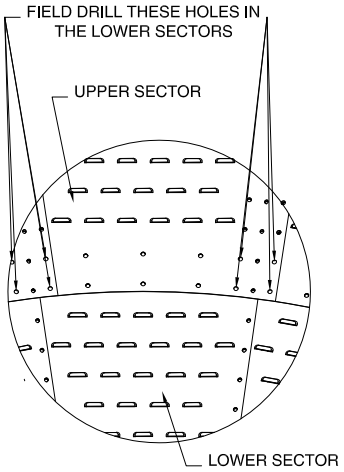


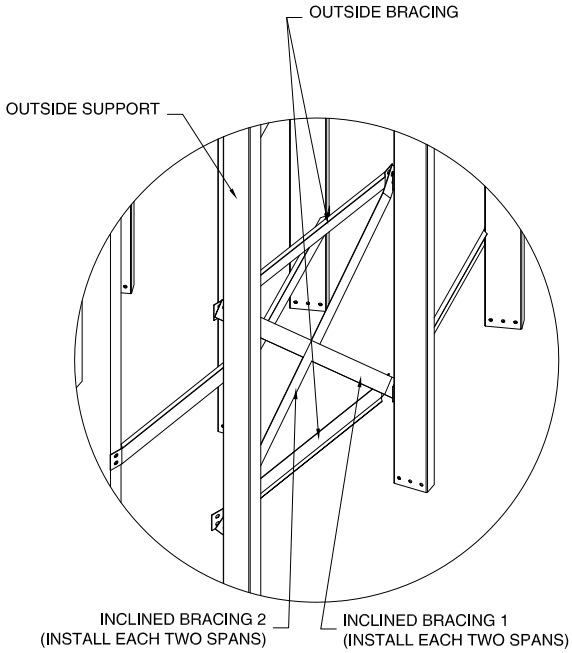
ELEVATED VENTILATED CONE Ø760 T30

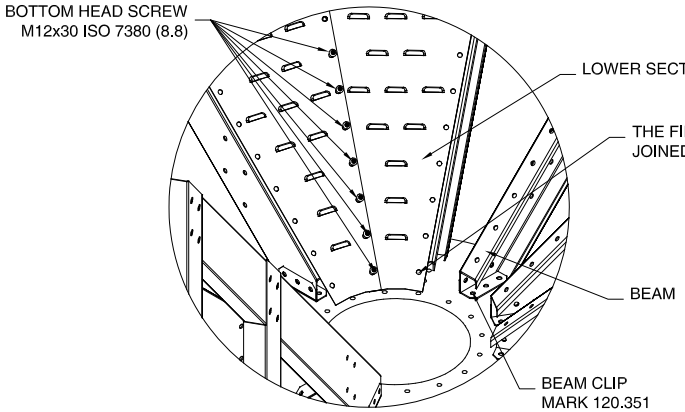


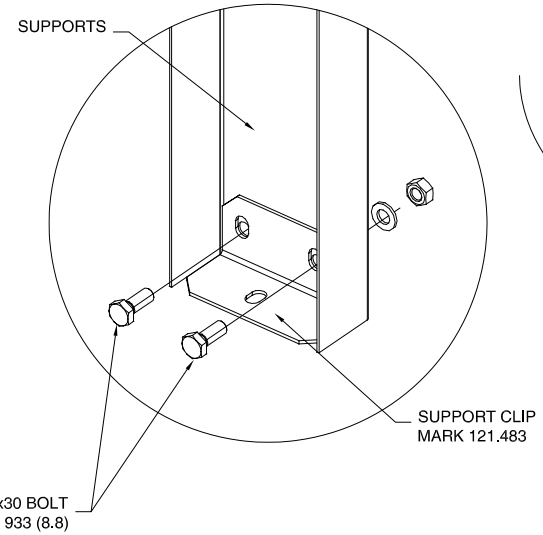


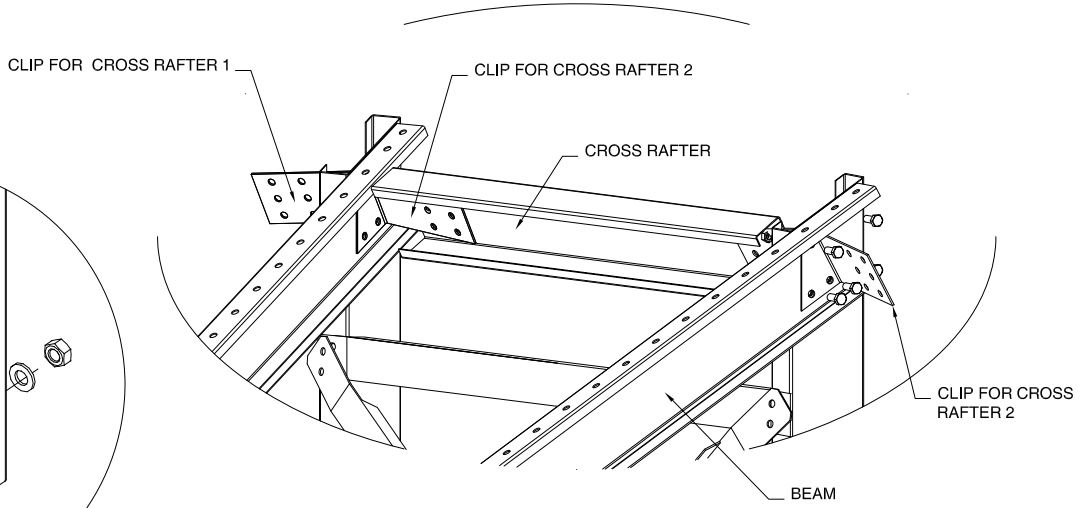
NOTES:
- FIELD DRILL BODYSHEET AND BOLT CLOSING SHEET TO THE WAVE WHICH ALLOWS A BETTER ADAPTATION OF CLOSING SHEET. CLOSING SHEETS MUST OVERLAP 200mm EACH OTHER.
- FIELD DRILL BODYSHEET AND BOLT OUTSIDE SUPPORT. USE M10x40 BOLT WITH THE SAME WASHERS AND NUTS USED FOR THE CLOSING SHEET (AS SHOWN IN THE DETAIL).







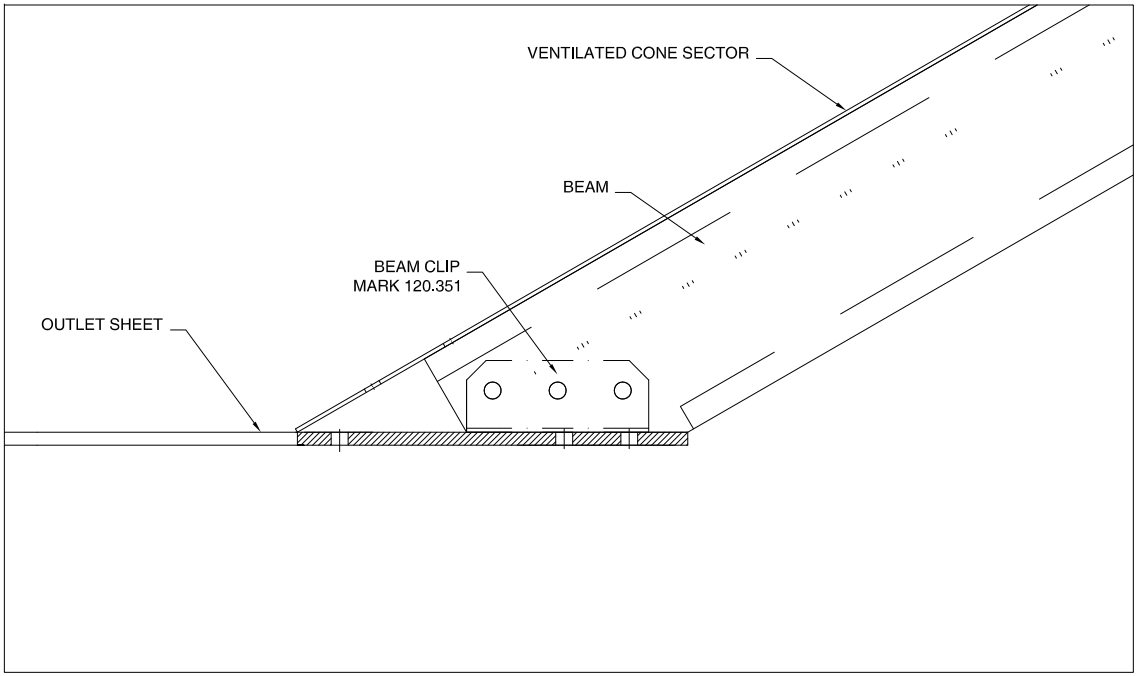




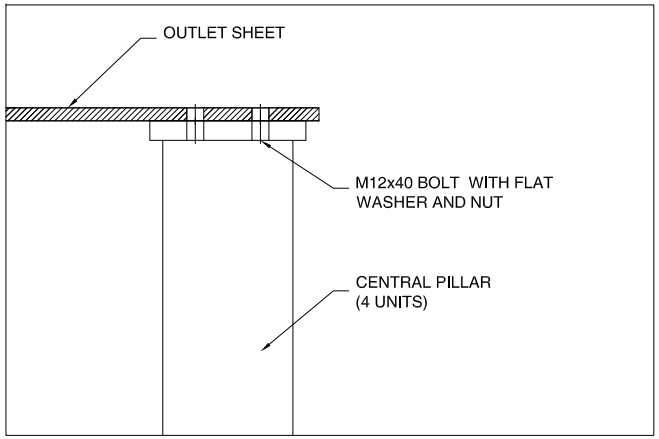
NOTES:
- USE BOTTOM HEAD SCREW M12x30 (8.8) ISO 7380, FLAT WASHER DIN 125 AND NUT IN THE JOINT BETWEEN SECTORS AND BEAMS AND THE JOINT BETWEEN UPPER AND LOWER SECTORS.
- USE METALLIC ANCHORAGE M10x75 TO JOINT CLIPS TO FOUNDATION.

VENTILATED CONE DETAILS

DETAIL JOINT BETWEEN BEAM AND BEAM CLIP



DETAIL JOINT BETWEEN OUTLET SHEET
AND CENTRAL PILLAR



ELEVATED VENTILATED CONE DETAILS