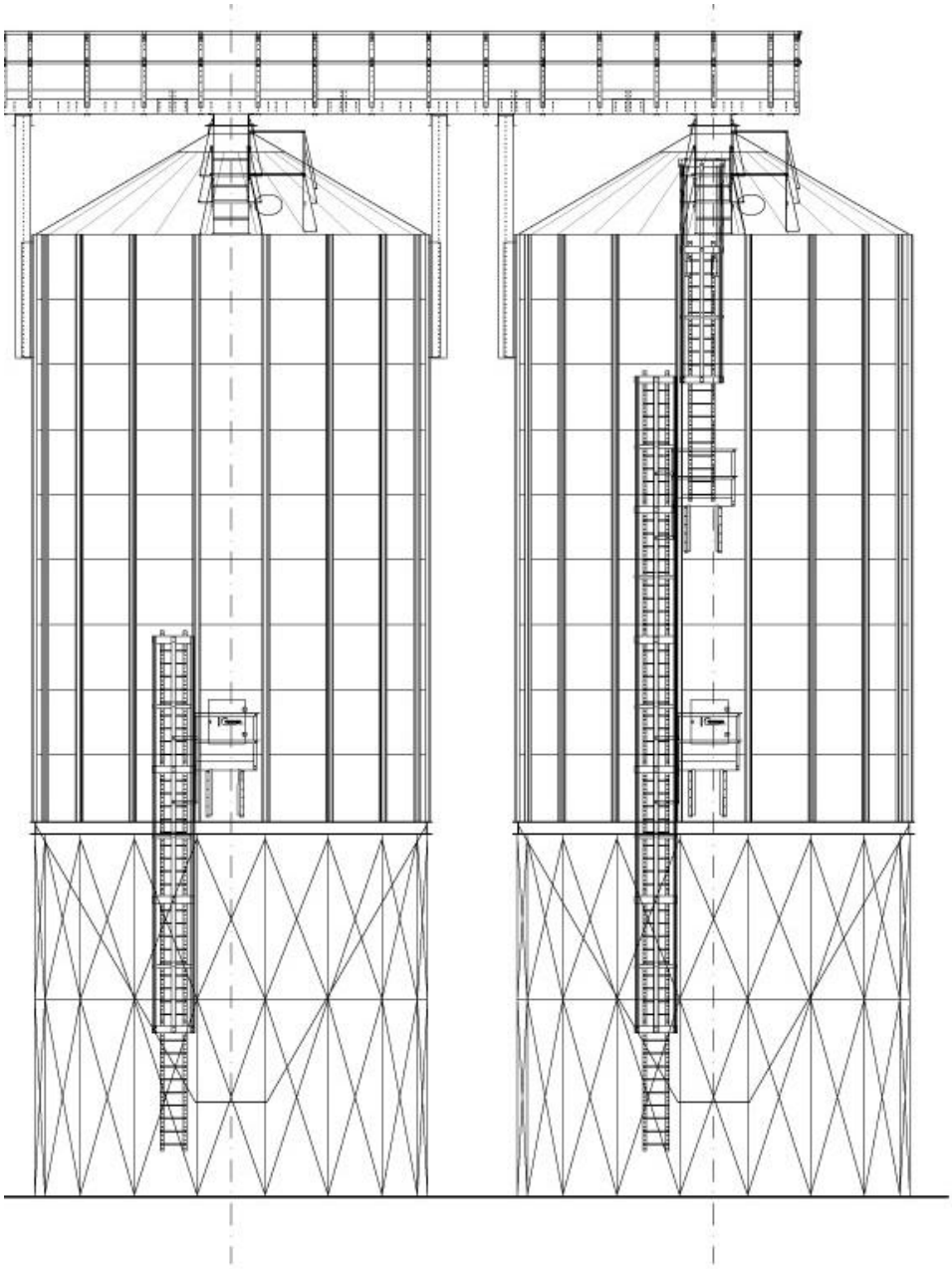
BIG HOPPER SILO

Ø5,35-9 T45 MEPU 6782



Assembly Instructions

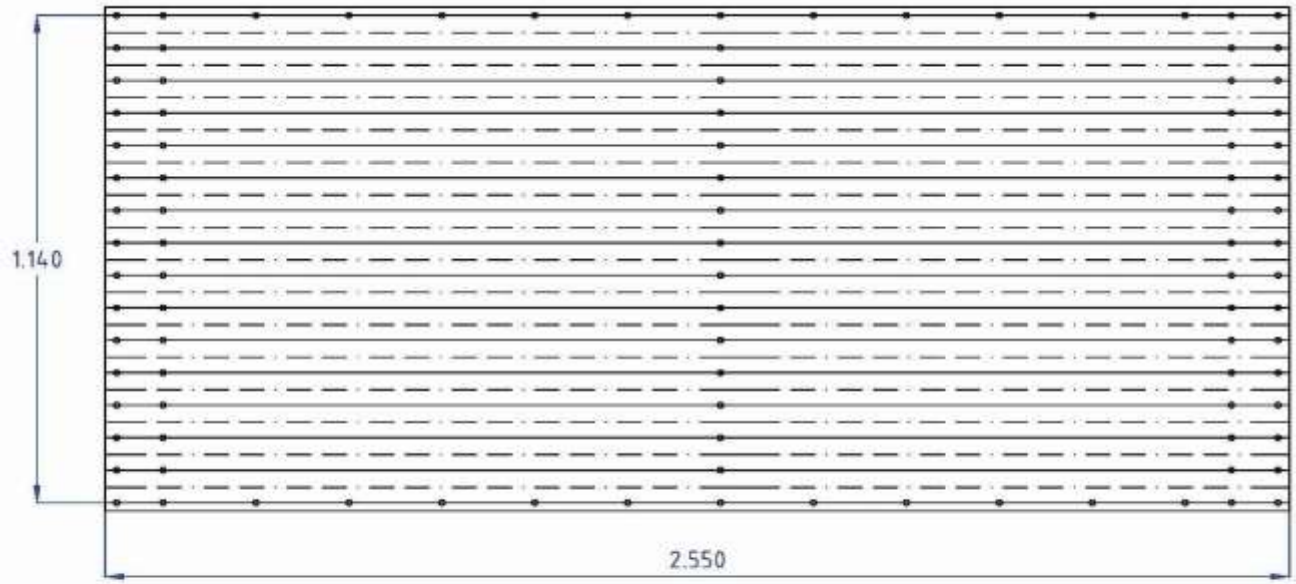
MARK	DESCRIPTION	THICKNESS	QUANTITY
	ROOF		
120497	ROOF SHEET	0,8	16
120534	ROOF SHEET WITH CIRCULAR HOLE	0,8	5
110135	ROOF COLLAR	3	1
120244	ROOF CENTER COLLAR D800mm	5	1
120241	TOP FOR ROOF CENTER COLLAR D800mm	3	1
120261	REINFORCEMENT FOR TOP FOR ROOF CENTER COLLAR D800mm	3	4
111418	FLASHING FOR ROOF COLLAR R1080mm FOR 2 REINFORCEMENTS	0,8	4
120383	REINFORCEMENT CENTER COLLAR "U" 75x30x456mm	2	8
110140A	FLASHING SHEET	0,8	21
110011	SMALL ROOF'S CLIP	2	21
110012A	LARGE ROOF'S CLIP	2	21
120692	ROOF LADDER RUNG L= 418mm	3	9
120691	ROOF LADDER RUNG L= 1100mm	3	5
120715A	RING FOR MANHOLE	2	1
110295	COVER FOR MANHOLE	2	1
120780	"U" HINGE FOR MANHOLE	3	1
120779	"U" FOR HINGE-MANHOLE	3	1
121811	WEATHER STRIP L=1500 mm		1
	BOLT 8 X 30 ISO 4017 GALVANISED C-8.8		320
	BOLT 10 X 25 ISO 4017 GALVANISED C-8.8		110
	NUT M-8 ISO 4161 WITH FLANGE		320
	NUT M-10 ISO 4032 GALVANISED C-8.8		110
	FLAT WASHER M-8 ISO 7093 GALVANISED		135
	FLAT WASHER M-10 DISO 7091 GALVANISED		110
	WEATHERSEAL WASHER M-8 GALVANISED		320
	WEATHERSEAL WASHER M-10 GALVANISED		110
	METRE OF PLASTILINE D 6mm		12
	BODYSHEET		
110000A	BODYSHEET 2 STIFFENERS DOUBLE JOINT	0,8	49
110000A	BODYSHEET 2 STIFFENERS DOUBLE JOINT	1	7
110000A	BODYSHEET 2 STIFFENERS DOUBLE JOINT	1,2	7
122302	BODYSHEET 2 STIFFENERS DOUBLE JOINT WITH LOGO SYMAGA	0,8	1
111091	BODYSHEET (1) WITH MANHOLE 2 STIFFENERS DOUBLE JOINT	1,5	1
	STIFFENERS		
113362	UPPER SHORT STIFFENER 75x988mm	1,5	14
111886	STANDARD STIFFENER 2 BODYSHEETS 75x2280mm	1,5	14
111886	STANDARD STIFFENER 2 BODYSHEETS 75x2280mm	2	28
113363	LOWER STIFFENER 75x2432mm	2,5	14
111882	STIFFENER'S SPLICE 67x456mm	1,5	28
111882	STIFFENER'S SPLICE 67x456mm	2	28
	BOLT 10 X 20 ISO 4017 GALVANISED C-8.8		2400
	BOLT 10 X 25 ISO 4017 GALVANISED C-8.8		2000
	BOLT 10 X 30 ISO 4017 GALVANISED C-8.8		100
	BOLT 10 X 35 ISO 4017 GALVANISED C-8.8		50
	NUT M-10 ISO 4032 GALVANISED C-8.8		4550
	WEATHERSEAL WASHER M-10 GALVANISED		3700
	FLAT WASHER M-10 DISO 7091 GALVANISED		3250
	METRE OF PLASTILINE D 6mm		212
	SILICONE TUBE		2
	COLD GALVANIZING SPRAY 985 ZINC		2
	HOPPER T45 WITH RING		
118766	ANCHOR PLATE TYPE "1" 160x80x15mm D22x30mm	5 y 15 mm	14
117221B	COMPRESSION RING T45	5	7
110776	WEB SPLICE	8	7
110775	FLANGE SPLICE	8	14
117223	SHIM FOR SPLICE	3	7
117224	SHIM 160x55x3mm	3	14

MARK	DESCRIPTION	THICKNESS	QUANTITY
110173	LEG ANGLE	5	14
119755	CLIP FOR SPLICE-RING TYPE 1	0,8	7
111908	CLOSE SHEET-RING T45	5	7
110840	HOPPER CONE T45 D400	3 Y 5 mm	1
110841	HOPPERSHEET T45 D400	2	14
121282	LEG HEB-120 L= 3245mm	5,15 Y 20	14
121283	BRACING "L" 50x50x2840mm		28

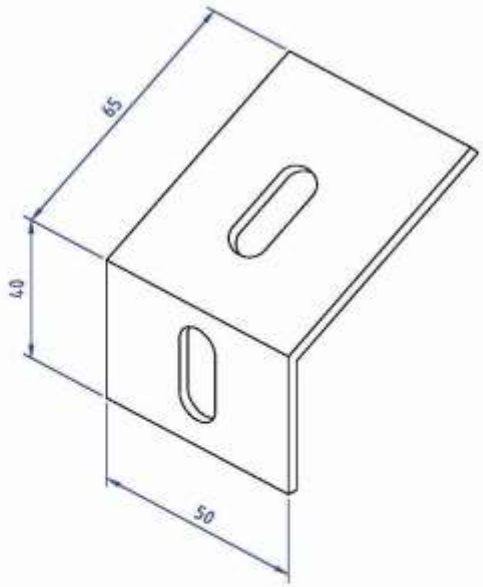
	BOLT 10 X 40 ISO 4017GALVANISED C-8.8		150
	BOLT 10 X 30 ISO 7380 GALVANISED C-8.8		1400
	BOLT 12 X 30 ISO 4017 GALVANISED C-8.8 SB		350
	BOLT 12 X 50 ISO 4017 GALVANISED C-8.8 SB		350
	BOLT 18 X 60 ISO 4017 GALVANISED C-8.8 SB		20
	NUT M-10 ISO 4032 GALVANISED C-8.8		1550
	NUT M-12 ISO 4032 GALVANISED C-8.8 SB		650
	NUT M-18 ISO 4032 GALVANISED C-8.8 SB		20
	FLAT WASHER M-10 DISO 7091 GALVANISED		110
	FLAT WASHER M-12 ISO 7091 GALVANISED		800
	FLAT WASHER M-18 ISO 7091 GALVANISED		20
	WEATHERSEAL WASHER M-10 GALVANISED		1550
	BEVEL WASHER FOR "U" M-12 DIN 434 GALVANISED		150
	BEVEL WASHER FOR "U" M-18 DIN 434 GALVANISED		20
	METRE OF PLASTILINE D 6mm		160
	ROLLO BANDA BUTILICA 10m x 100 mm		0,5
	SILICONE TUBE		9
	COLD GALVANIZING SPRAY 985 ZINC		2
ROOF ACCESSORIES			
	INSULATOR FOR EAVE		21
	INSULATOR FOR WAVES OF ROOF SHEETS		21
HANDRAIL FOR ROOF LADDER			
120691	ROOF LADDER RUNG L= 1100mm	3	3
113915	HANDRAIL BRACKET	3	9
110026	GUSSET FOR HANDRAIL BRACKET	3	12
110129A	BANISTER L= 990mm	1,5	8
110059B	BANISTER L=1028mm	1,5	4
110058A	BANISTER L= 1488mm	1,5	2
	BOLT 10 X 20 ISO 4017 GALVANISED C-8.8		100
	NUT M-10 ISO 4032 GALVANISED C-8.8		100
LADDER TO ROOF			
119608	LADDER'S RAIL L= 1138mm	1,5	26
119714	LADDER'S RAIL L= 1326mm	1,5	6
119610	PLASTIC COVER FOR LADDER'S RAIL		8
119611	LADDER SUPPORT	3	32
119612	LADDER SUPPORT ON EAVE-RING-HOPPER	3	8
119613	UPPER SAFETY BAND	2	1
119614	SAFETY BAND	2	11
119615	TRANSITION SAFETY BAND	2	4
119616	LADDER RUNG L= 460mm	1,5	67
119617	"U" SAFETY L= 1140mm	2	78
119619	ANGLE TO FLOOR	3	5
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	4
121152	CANTILEVERED ANGLE L= 950mm	3	4
121123	LONG VERTICAL RAIL L=1250mm	3	4
119861	LONG VERTICAL RAIL	3	12

MARK	DESCRIPTION	THICKNESS	QUANTITY
121127	HORIZONTAL ANGLE L= 800mm	3	4
121109A	PLATAFORM'S FLOOR 110x800mm	3	2
	BOLT 8 X 20 ISO 4017 GALVANISED C-8.8		360
	BOLT 8 X 60 ISO 4017 GALVANISED C-8.8		160
	BOLT 10 X 20 ISO 4017 GALVANISED C-8.8		120
	BOLT 10 X 40 ISO 4017GALVANISED C-8.8		40
	NUT M-8 ISO 4032 GALVANISED C-8.8		520
	NUT M-10 ISO 4032 GALVANISED C-8.8		160
	WEATHERSEAL WASHER M-10 GALVANISED		80
	FLAT WASHER M-8 ISO 7091 GALVANISED		520
	FLAT WASHER M-10 DISO 7091 GALVANISED		40
	SLEEVE ANCHOR M10x75		2
122207	LINTEL	3	6
122208	DOOR SIDE	3	4
122209	HINGE TIPE A		4
	CLOSING DOOR SPRING		2
	SELF DRILLING BOLT 4,8 X 13 WITHOUT WASHER		20
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			
113112	PERFORATED SHEET 160x1064mm	1,5	6
110480	INSIDE STIFFENER FOR FAN	3	12
113113	ROOF FOR FAN DUCT L= 1064mm	3	3
113114A	LATERAL ANGLE FOR FAN DUCT L= 1145mm	3	6
121075	COVER WITH DEFLECTOR	3	3
	BOLT 8 X 20 DIN 933 BI-CHROMATE C-5.6		240
	NUT M-8 DIN 934 BI-CHROMATE C-5.6		240
	FLAT WASHER M-8 DIN 125 BI-CHROMATE		240
	Mts. POLYETHILENE JOINT 10x3 mm		15
WALL SUPPORT 2U			
117802	WALL SILO ANGLE L= 250mm 103º	3	2
117814	WALL SUPPORT "U" 263x3800mm	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
DOCUMENTATION			
	xxxxx ingles manual 1		1
	xxxxx ingles manual 2		1

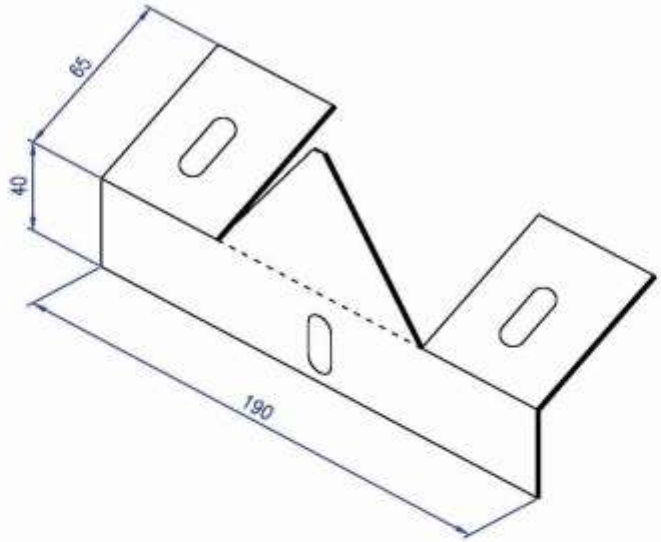
IDENTIFICATION OF MARKS



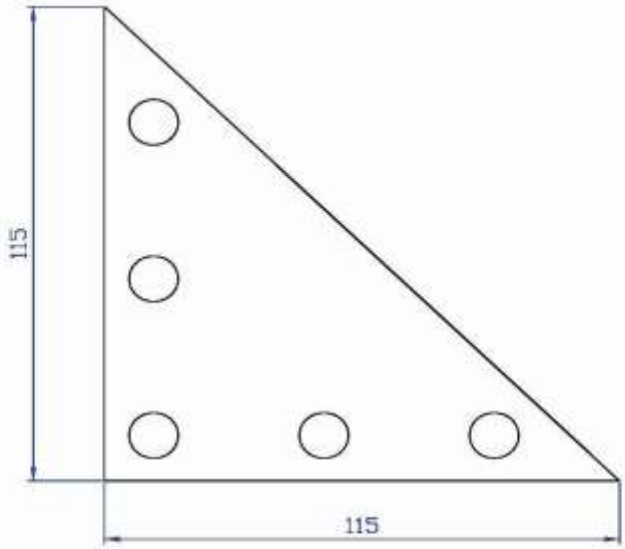
MARCA 110.000A	VIROLA 2 REFUERZOS DOBLE JUNTA
MARK 110.000A	BODYSHEET 2 STIFFENERS DOUBLE JOINT
MARQUE 110.000A	VIROLE 2 MONTANT DOUBLE JOINT



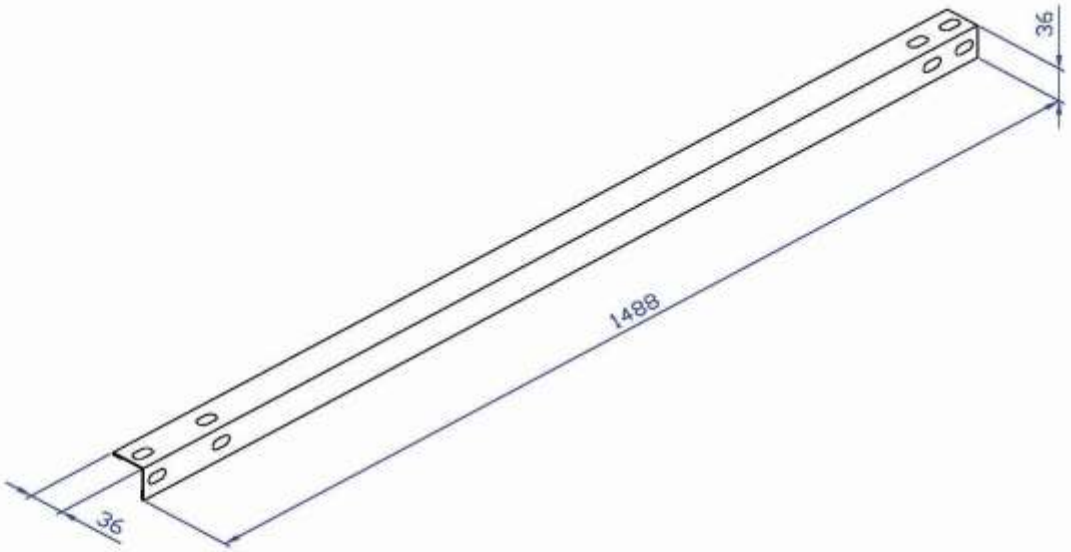
MARCA 110.011	CLIP NORMAL DE TECHO
MARK 110.011	SMALLROOF CLIP
MARQUE 110.011	CLIP PETIT



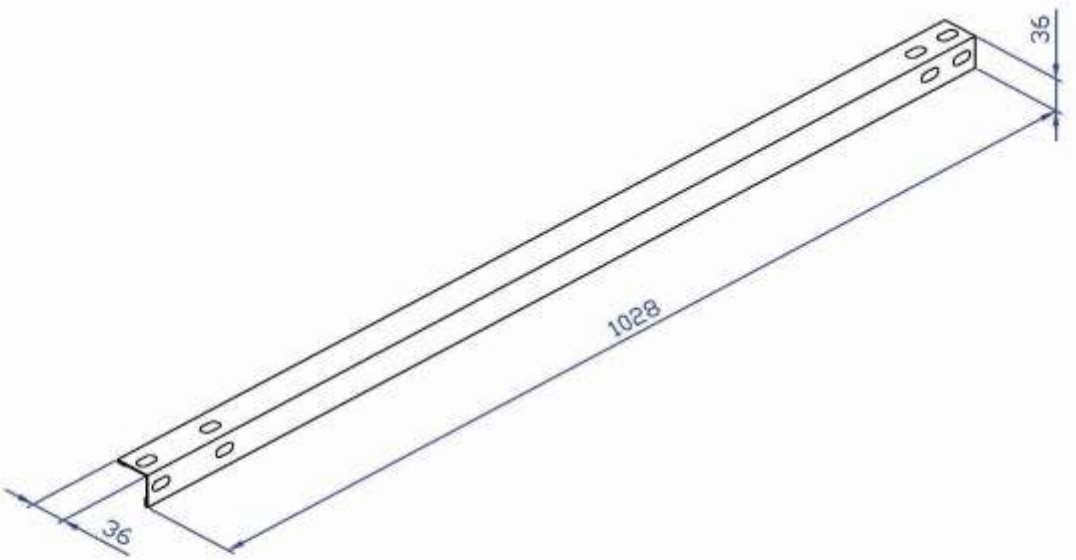
MARCA 110.012A CLIP DOBLE DE TECHO
MARK 110.012A LARGE ROOF CLIP
MARQUE 110.012A CLIP GRAND



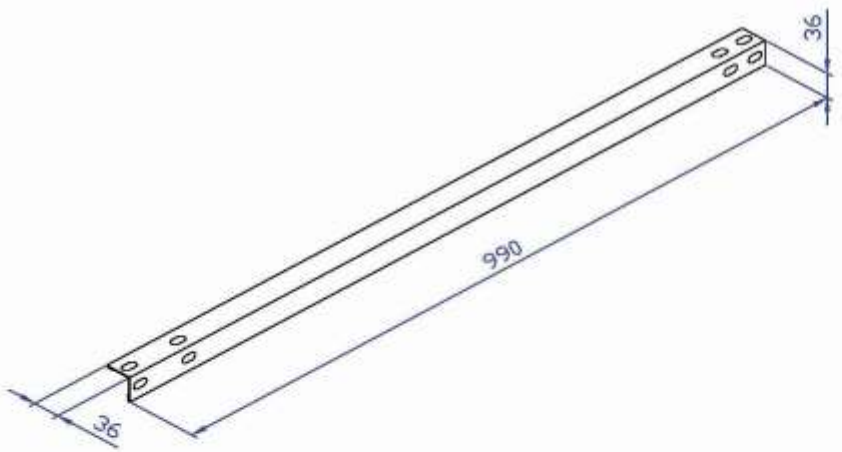
MARCA 110.026 CARTABON EN BARANDILLA TECHO
MARK 110.026 GUSSET
MARQUE 110.026 ECLIPSSE DE RAMBARDE



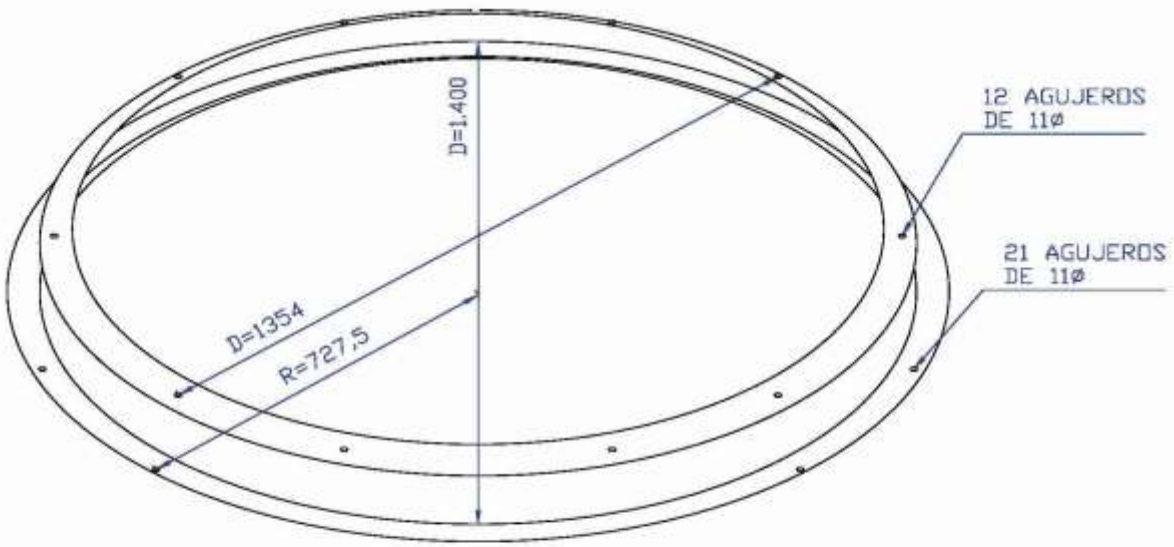
MARCA 110.058A ANGULAR BARANDILLA TECHO
MARK 110.058A HANDRAIL
MARQUE 110.058A ANGLE DE RAMBARDE



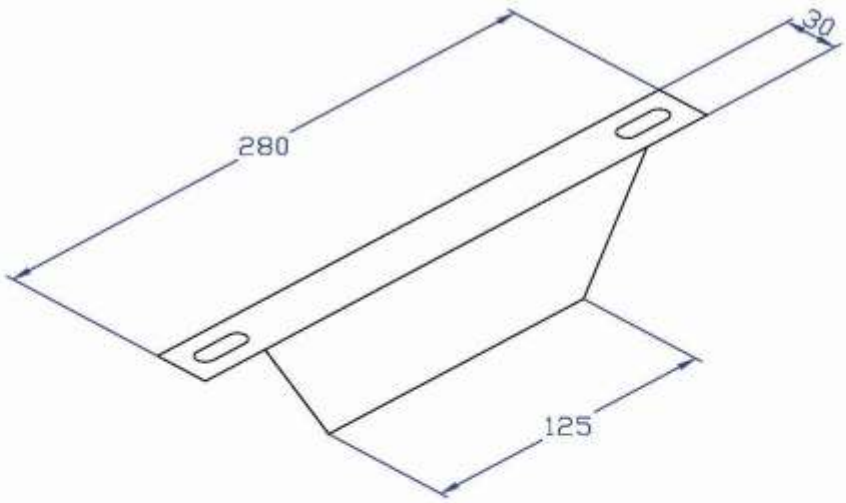
MARCA 110.059B ANGULAR BARANDILLA TECHO
MARK 110.059B HAND RAIL
MARQUE 110.059B ANGLE DE RAMBARDE



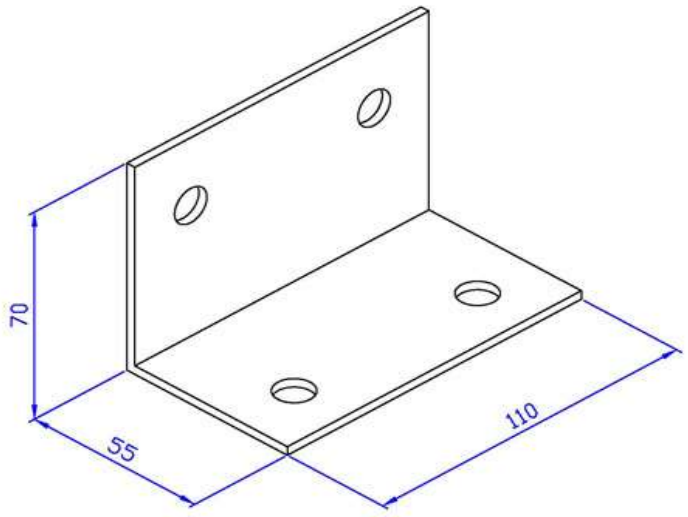
MARCA 110.129A ANGULAR BARANDILLA TECHO
MARK 110.129A HAND RAIL
MARQUE 110.129A ANGLE DE RAMBARDE



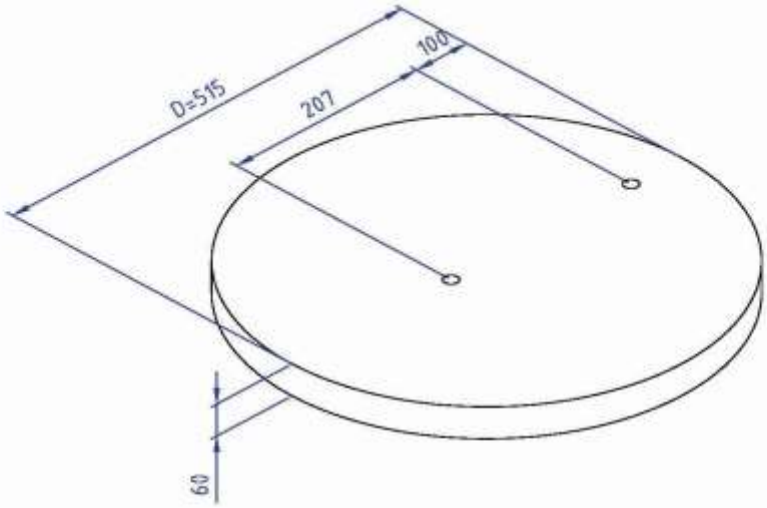
MARCA 110.135 COLLAR DE TECHO SILO 5,35Ø
MARK 110.135 ROOF COLLAR SILO 5,35Ø
MARQUE 110.135 COLLIER DU TOIT SILO 5,35Ø



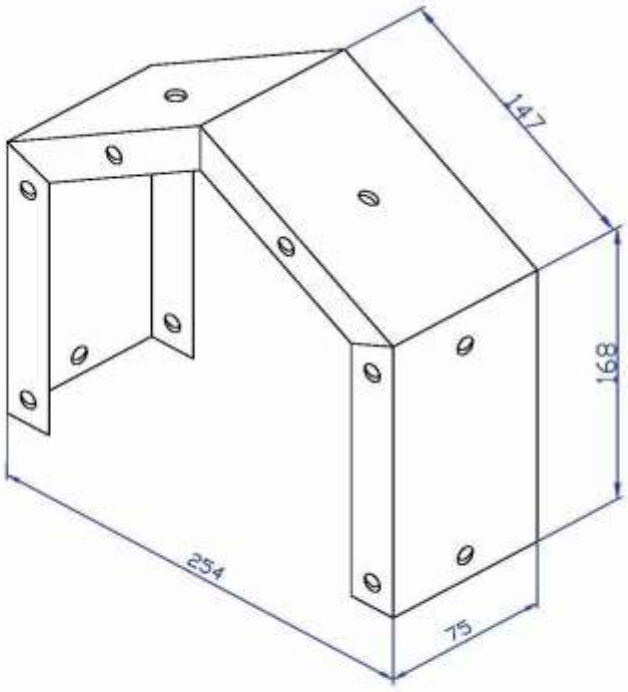
MARCA 110.140A CHAPA CIERRE SILO 5,35Ø
MARK 110.140A ROOF FLASHING SILO 5,35Ø
MARQUE 110.140A TOLE DE CLOTURE SILO 5,35Ø



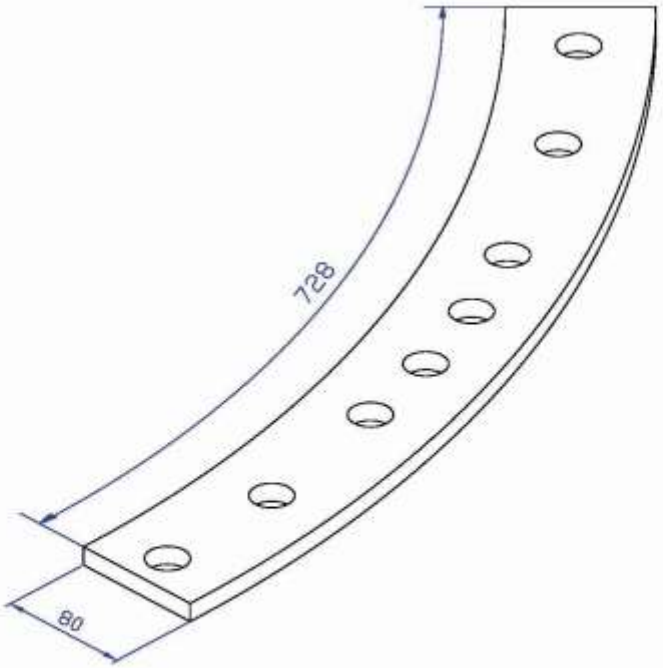
MARCA 110.173 ANGULO PATA
MARK 110.173 COLUMN ANGLE
MARQUE 110.173 ANGLE PIED



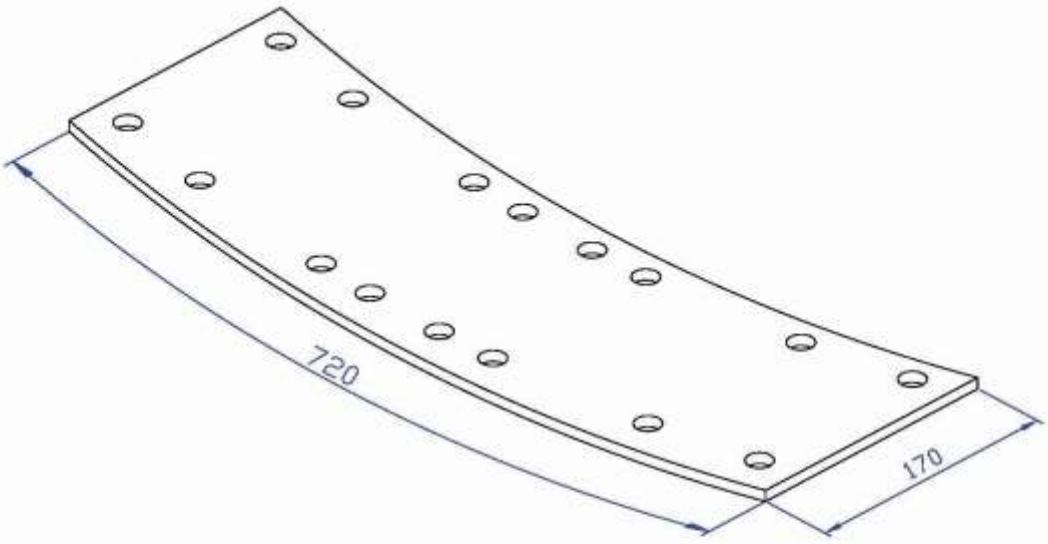
MARCA 110.295 TAPA PUERTA TECHO
MARK 110.295 COVER FOR MANHOLE
MARQUE 110.295 PORTE D'ACCESS



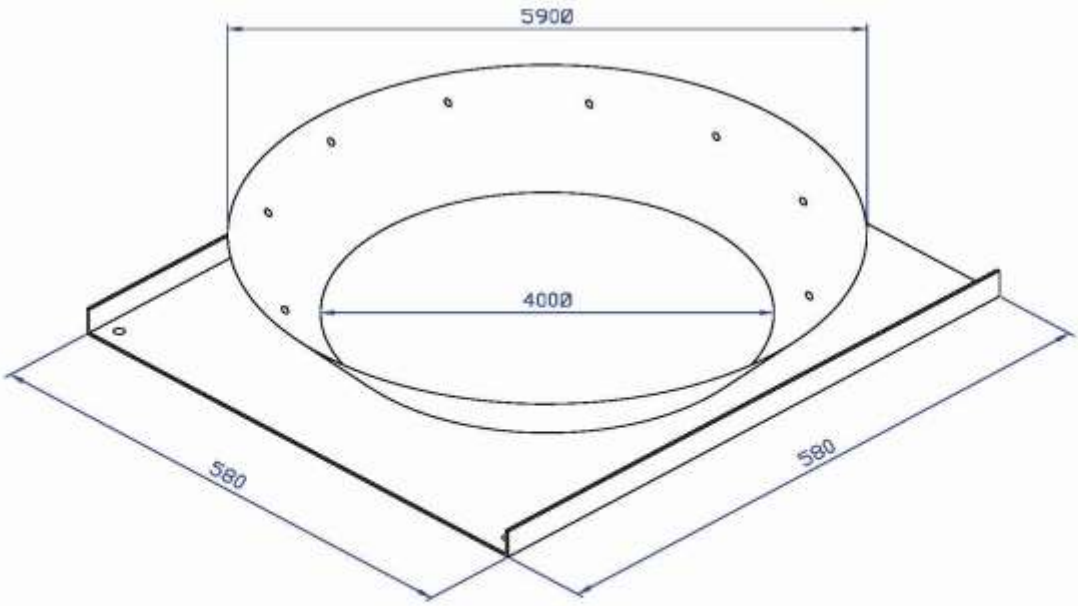
MARCA 110.480 REFUERZO INTERIOR TIPO CASETA
MARK 110.480 INSIDE STIFFENER TYPE HOME
MARQUE 110.480 RENFORT INTERIEUR TIPE MAISON



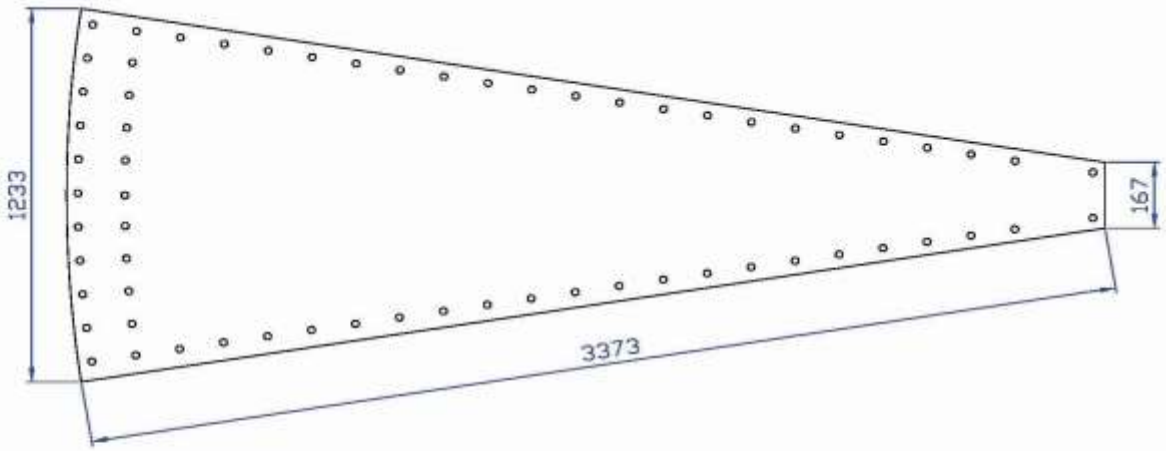
MARCA 110.775 EMPALME ALA
MARK 110.775 FLANGE SPLICE
MARQUE 110.775 RACORDDEMENT DES MEMBRURES



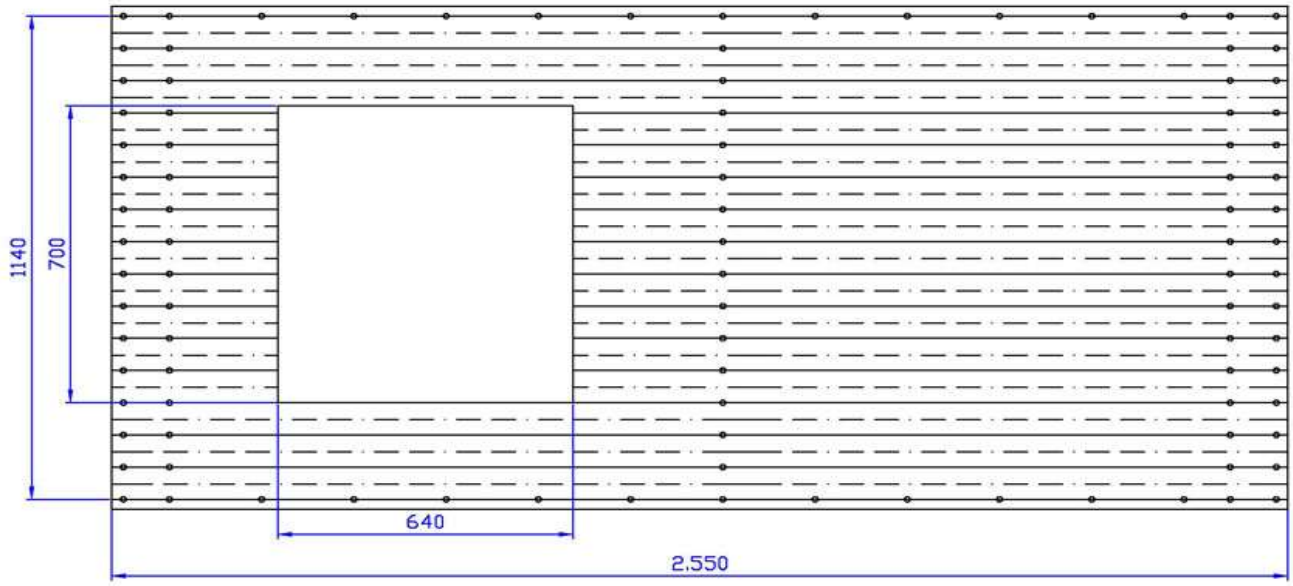
MARCA 110.776 EMPALME ALMA
MARK 110.776 WEB SPLICE
MARQUE 110.776 RACORDEMENT DE L'AME



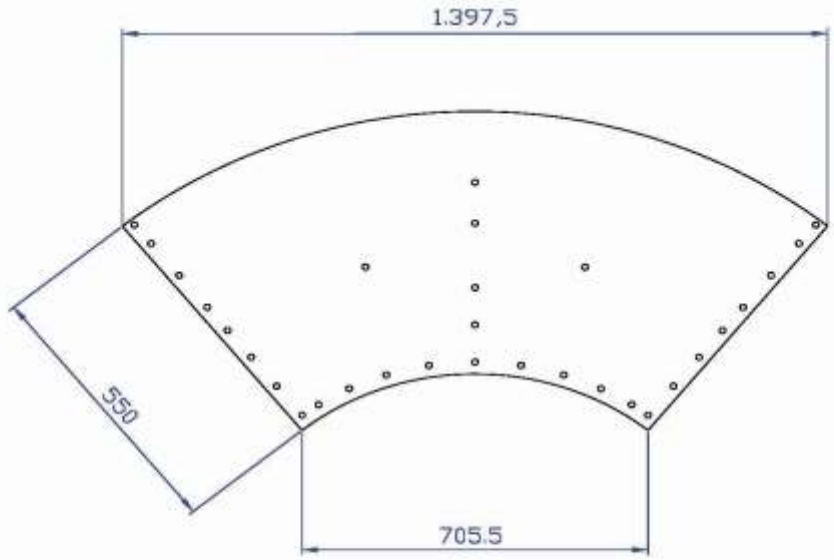
MARCA 110.840 BOCA SALIDA SILO 5,350–T45
MARK 110.840 HOPPER CONE SILO 5,350–T45
MARQUE 110.840 TREMIE DE SORTIE SILO 5,350–T45



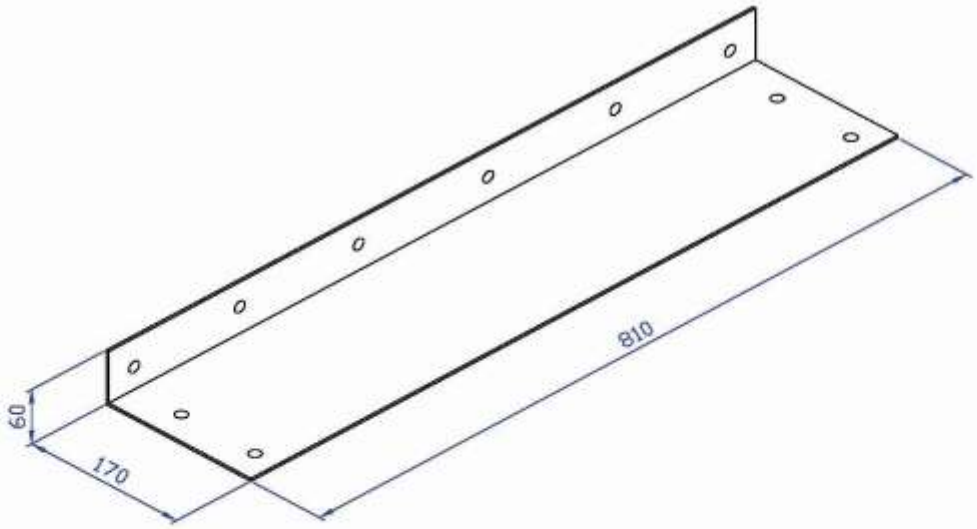
MARCA 110.841 SECTOR INFERIOR TOLVA SILO 5,350–T45
MARK 110.841 LOWER HOPPER SHEET SILO 5,350–T45
MARQUE 110.841 SECTEUR INFERIEUR TREMIE SILO 5,350–T45



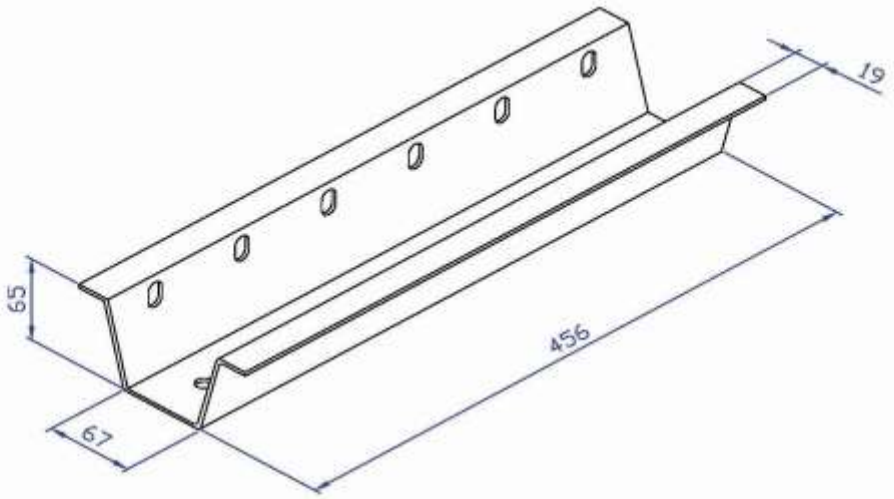
MARCA 111.091 VIROLA CON PUERTA 2 REFUERZOS DOBLE JUNTA
MARK 111.091 ACCESS BODYSHEET 2 STIFFENERS DOUBLE JOINT
MARQUE 111.091 VIROLE AVEC PORTE 2 MONTANT DOUBLE JOINT



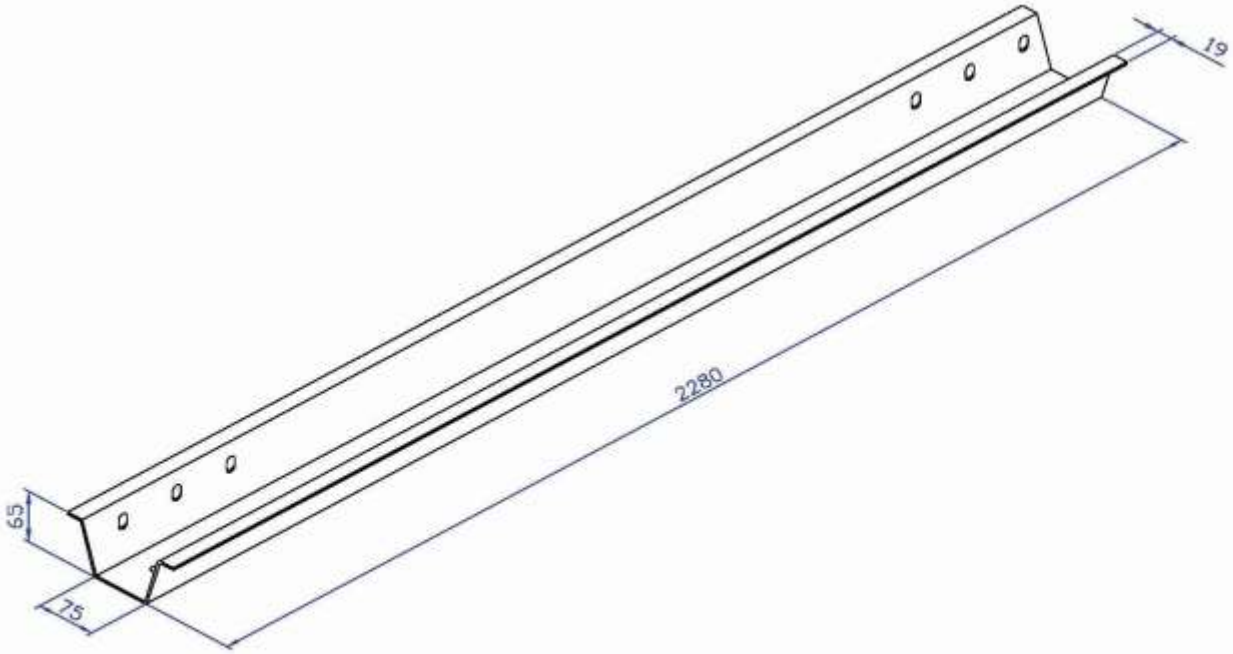
MARCA 111.418 FALDON PARA BOCA DE CARGA
MARK 111.418 FLASHING FOR ROOF CENTER COVER
MARQUE 111.418 BAVECHE POUR BOUCHE CHARGE



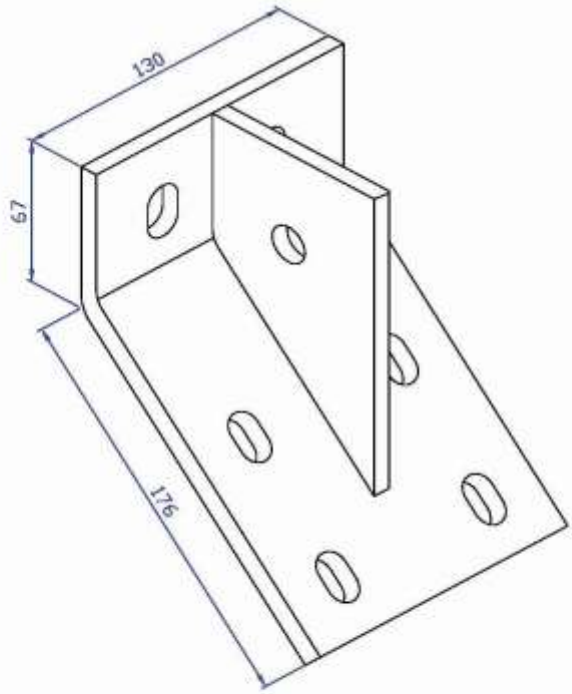
MARCA 111.663 ANGULO AMARRE A SILO
MARK 111.663 VERTICAL ANGLE TO SILO
MARQUE 111.663 VERTICAL ANGLE AU SILO



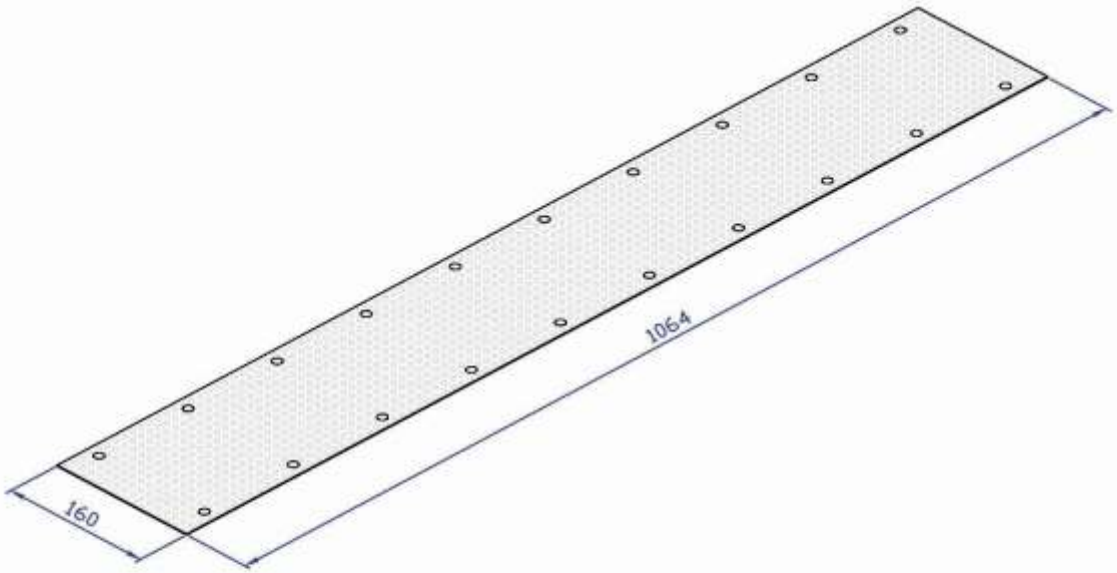
MARCA 111.882 EMPALME REFUERZO
MARK 111.882 SPLICE
MARQUE 111.882 ECLISSE



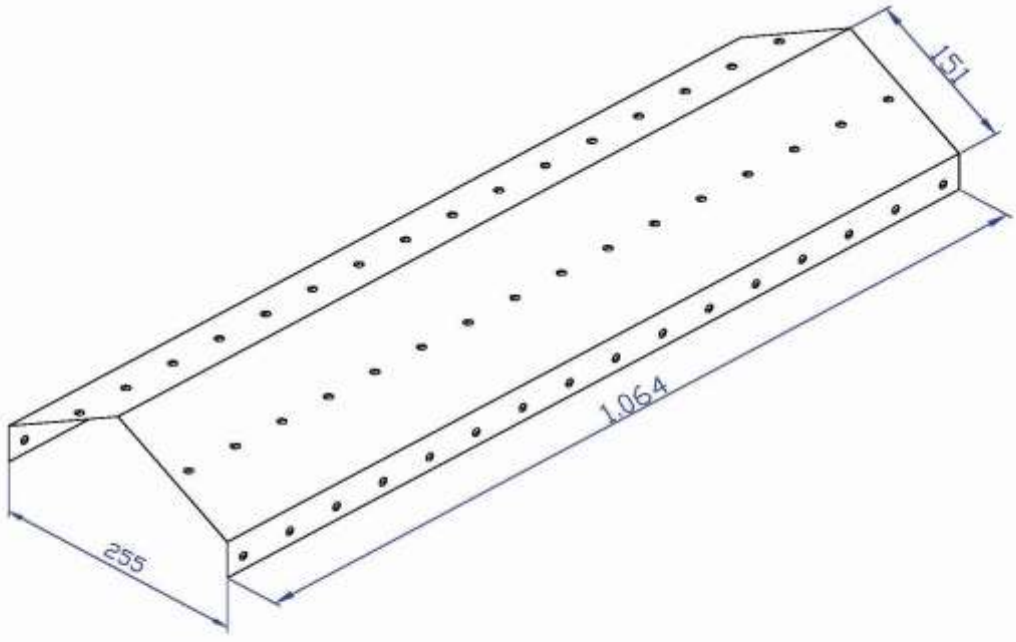
MARCA 111.886 REFUERZO NORMAL
MARK 111.886 STANDARD STIFFENER
MARQUE 111.886 MONTANT STANDARD



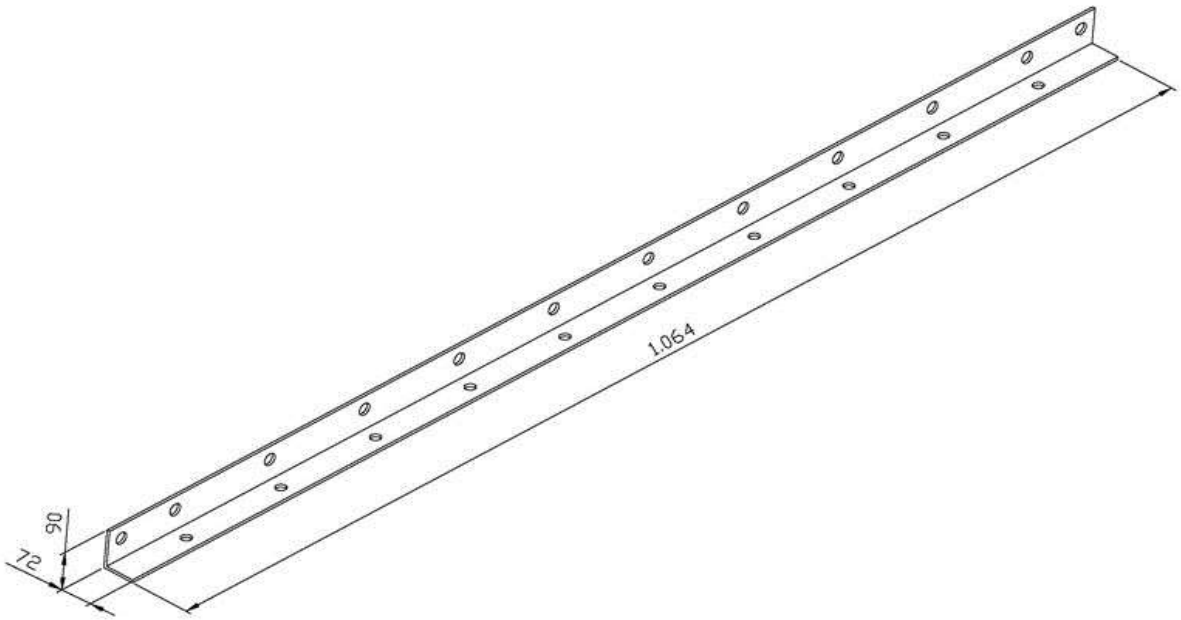
MARCA 111.908 CHAPA CIERRE 5,35–T45
MARK 111.908 FLASHING COVER 5,35–T45
MARQUE 111.908 TÔLE DE CLÔTURE 5,35–T45



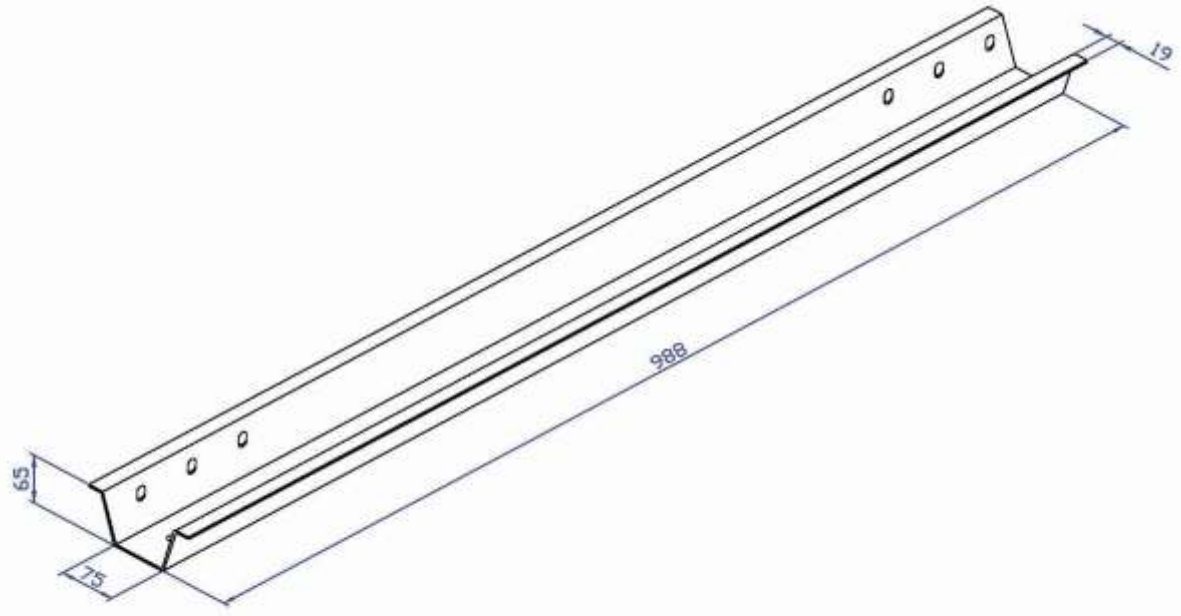
MARCA 113.112 CHAPA PERFORADA PARA CONDUCTO VENTILACION
MARK 113.112 PERFORATED SHEET
MARQUE 113.112 .....



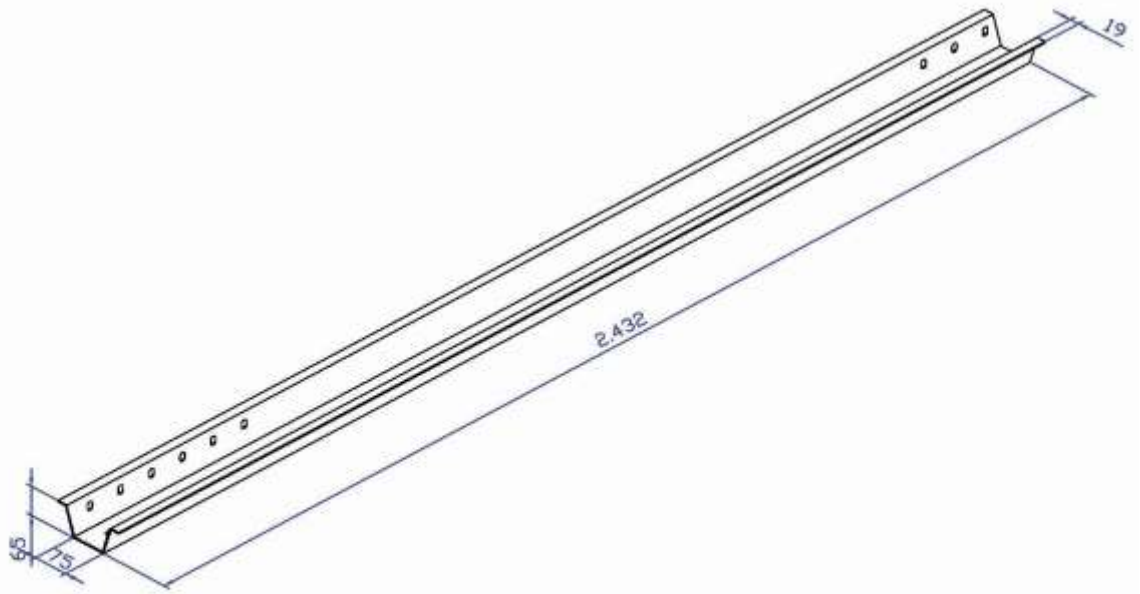
MARCA 113.113 TEJADO CONDUCTO VENTILACION
MARK 113.113 COVER TOP AERATION
MARQUE 113.113 TOIT AERATION



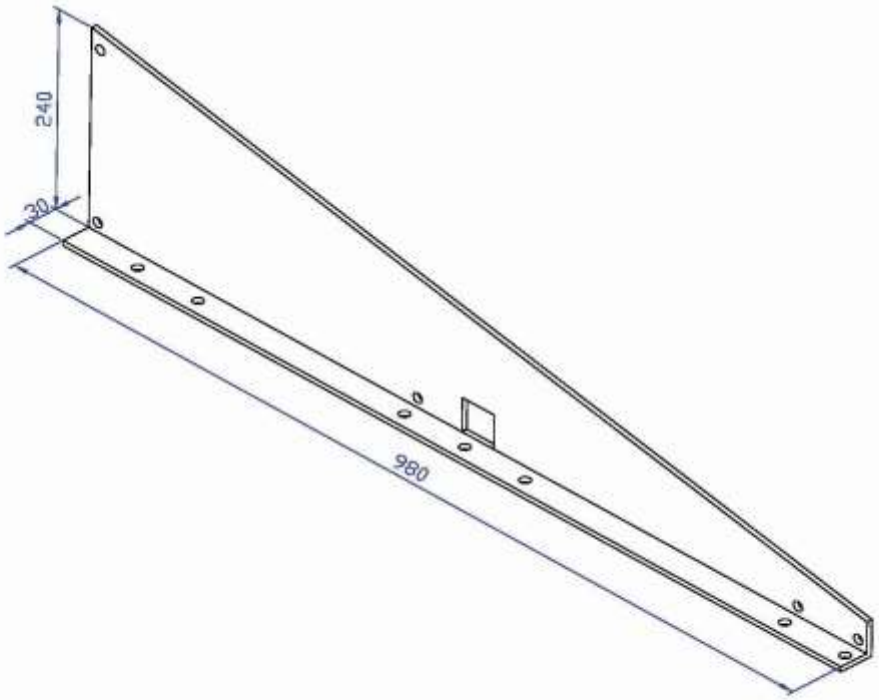
MARCA 113.114 A ANGULO LATERAL CONDUCTO VENTILACION
MARK 113.114 A LATERAL ANGLE
MARQUE 113.114 A LATERAL ANGLE



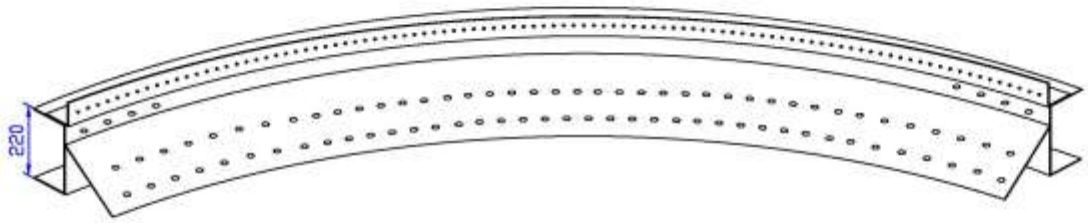
MARCA 113.362 REFUERZO SUPERIOR CORTO
MARK 113.362 SUPERIOR SHORT STIFFENER
MARQUE 113.362 MONTANT PETIT SUPERIEUR



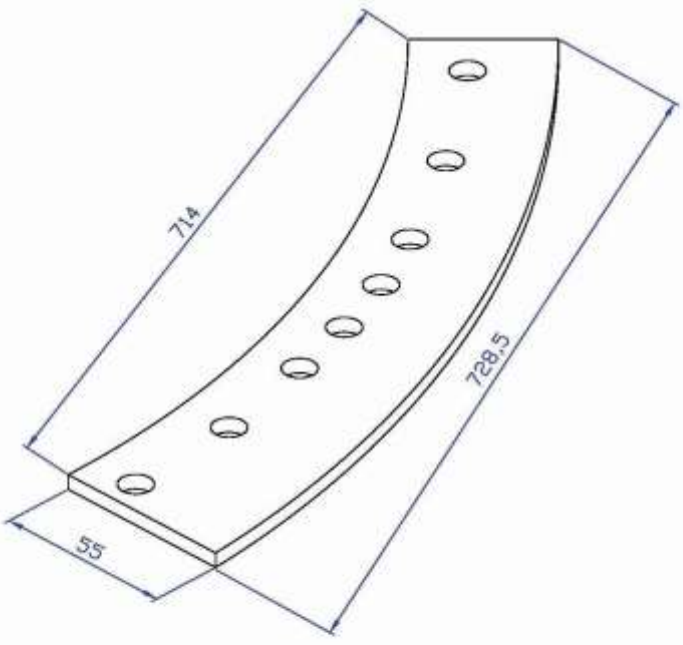
MARCA 113.363 REFUERZO INFERIOR
MARK 113.363 LOWER STIFFENER
MARQUE 113.363 MONTANT INFERIEUR



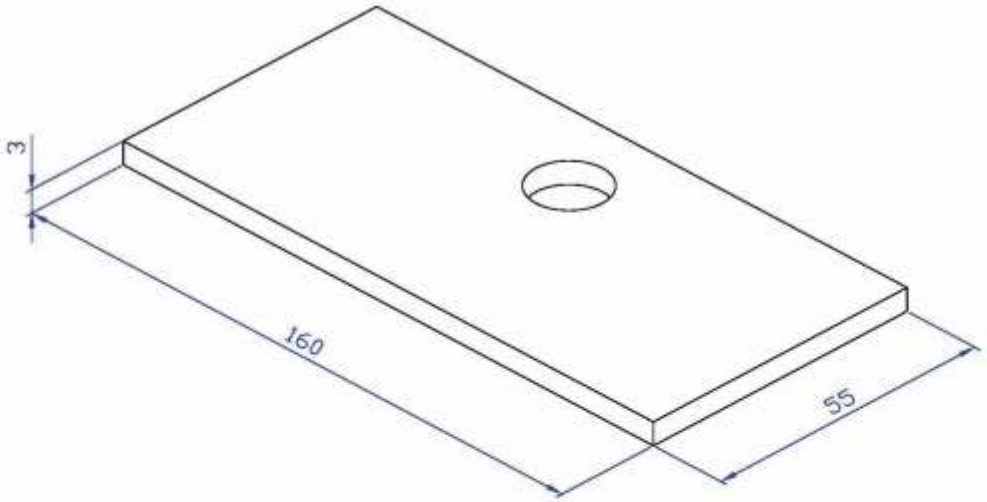
MARCA 113.915 CHAPA BARANDILLA DE TECHO
MARK 113.915 HANDRAIL BRACKET
MARQUE 113.915 POTEAU DE RAMBARDE DU TOIT



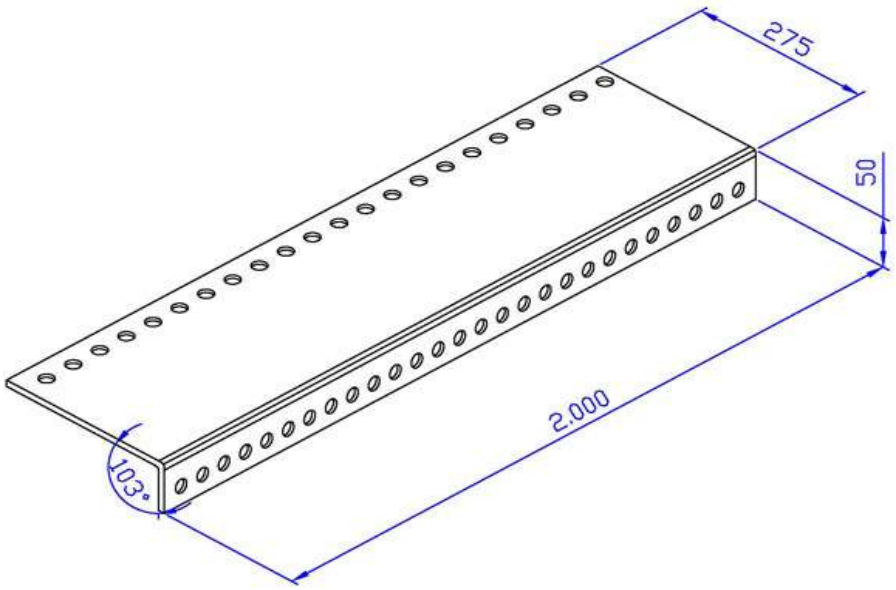
MARCA 117.221B ANILLO DE COMPRESION
MARK 117.221B COMPRESSION RING
MARQUE 117.221B ANNEAU DE COMPRESSION



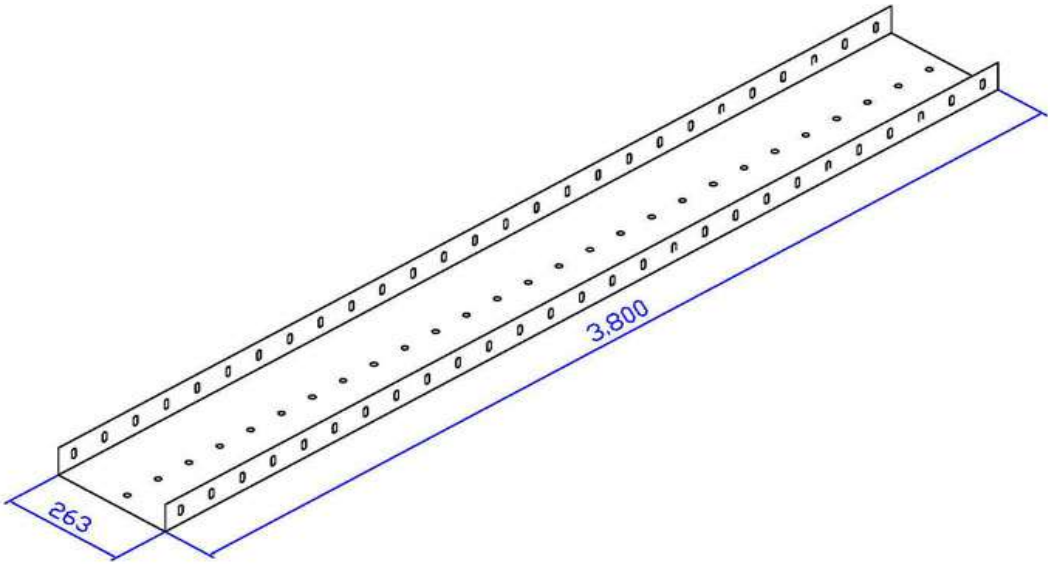
MARCA 117.223 CHAPA CALCE 730x55x3 mm.
MARK 117.223 SHIM 730x55x3 mm.
MARQUE 117.223 TÔLE 730x55x3 mm.



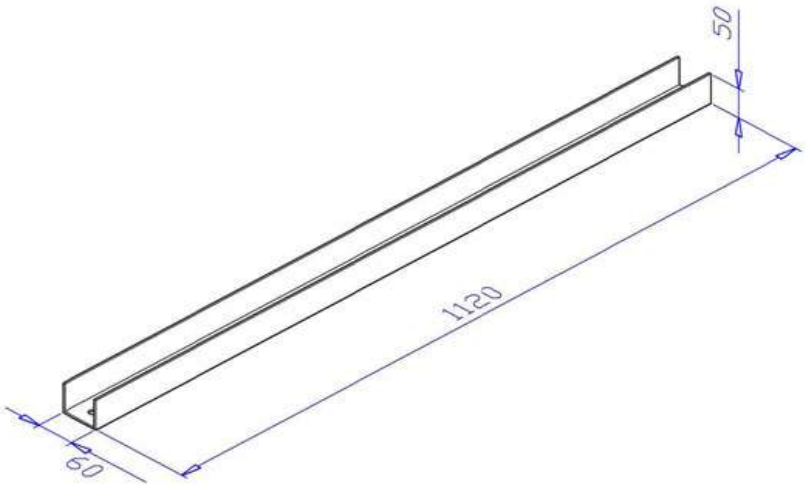
MARCA 117.224 CHAPA 160x55x3 mm.
MARK 117.224 SHIM 160x55x3 mm.
MARQUE 117.224 TÔLE 160x55x3 mm.



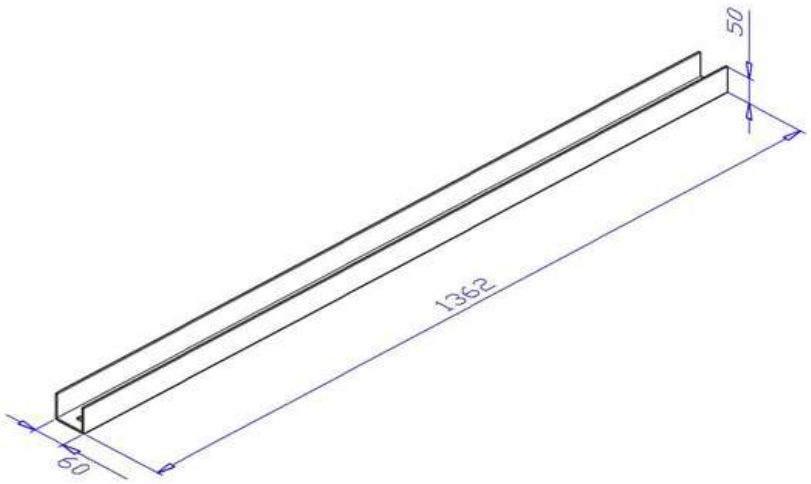
MARCA 117.802 ANGULO AMARRE A SILO ø 5,35
MARK 117.802 WALL SILO ANGLE ø 5,35
MARQUE 117.802 ANGLE ATTACHE AU PAROI ø 5,35



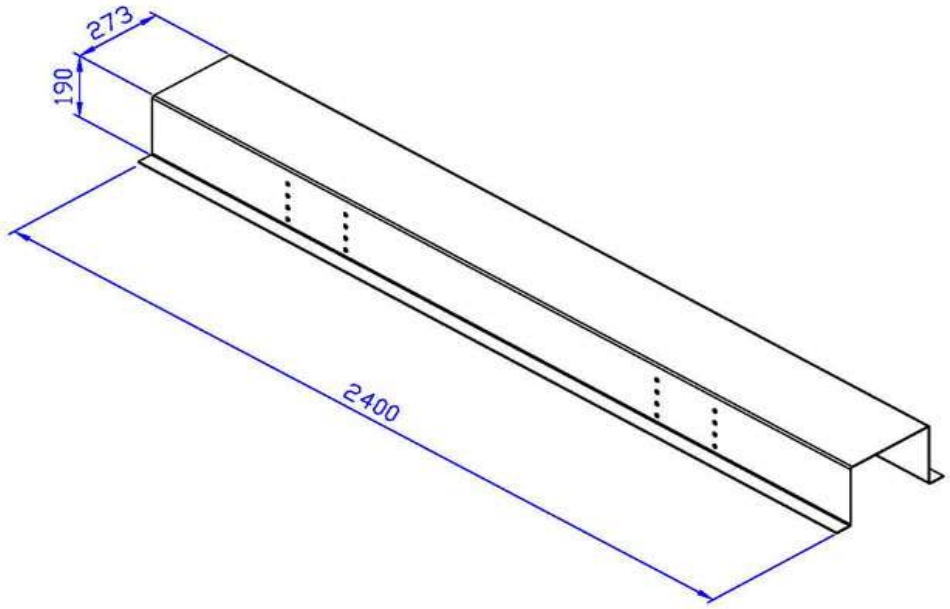
MARCA 117.814	"U" 263x3800 mm
MARK 117.814	"U" 263x3800 mm
MARQUE 117.814	"U" 263x3800 mm



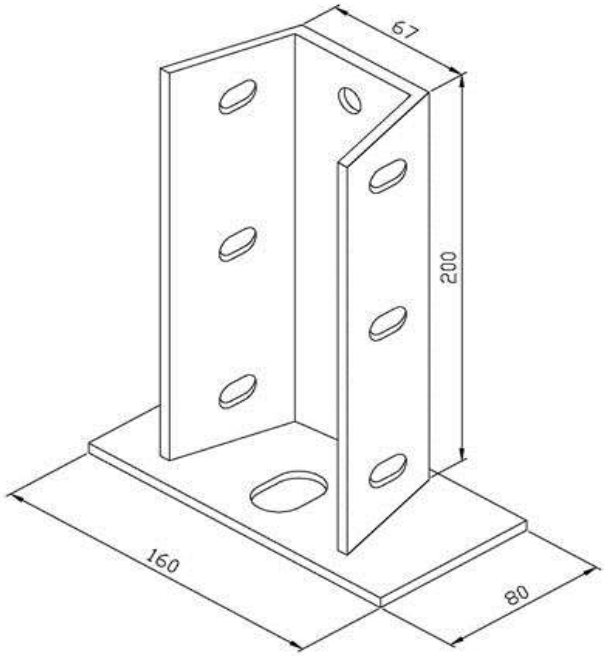
MARCA 117.840	"U" ARRIOSTRAMIENTO 60x50x1.120 mm.
MARK 117.840	"U" BRACING 60x50x1.120 mm.
MARQUE 117.840	"U" CONTREVENTEMENT 60x50x1.120 mm.



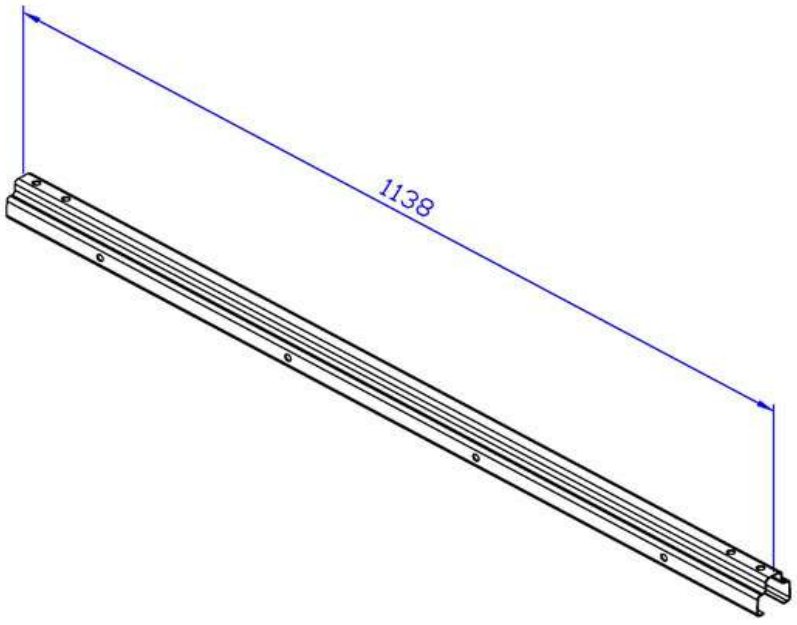
MARCA 117.841	"U" ARRIOSTRAMIENTO 60x50x1.362 mm.
MARK 117.841	"U" BRACING 60x50x1.362 mm.
MARQUE 117.841	"U" CONTREVENTEMENT 60x50x1.362 mm.



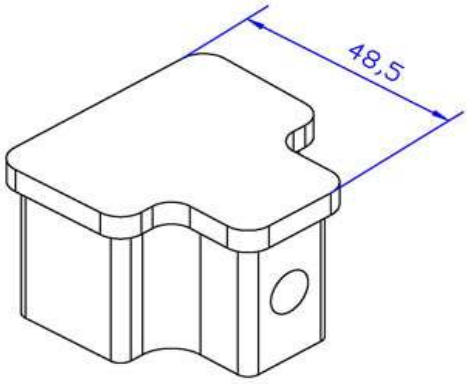
MARCA 117.846	OMEGA 273x190x2400 mm.
MARK 117.846	OMEGA 273x190x2400 mm.
MARQUE 117.846	OMEGA 273x190x2400 mm.



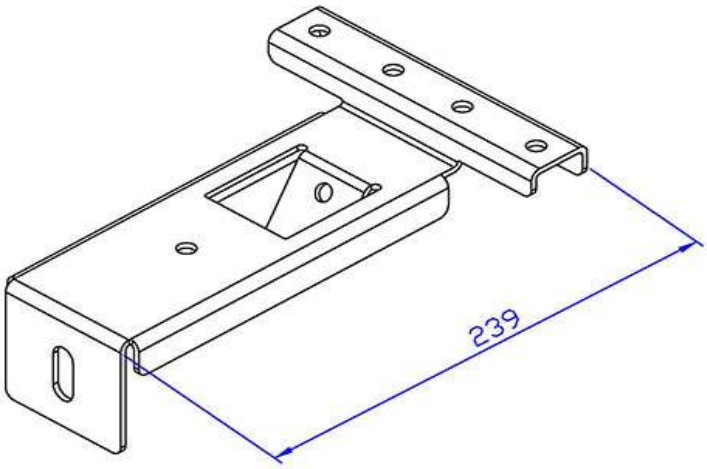
MARCA 118.766	PLACA ANCLAJE TIPO 1
MARK 118.766	ANCHOR PLATE TYPE 1
MARQUE 118.766	PLAQUE D'ANCRAGE TYPE 1



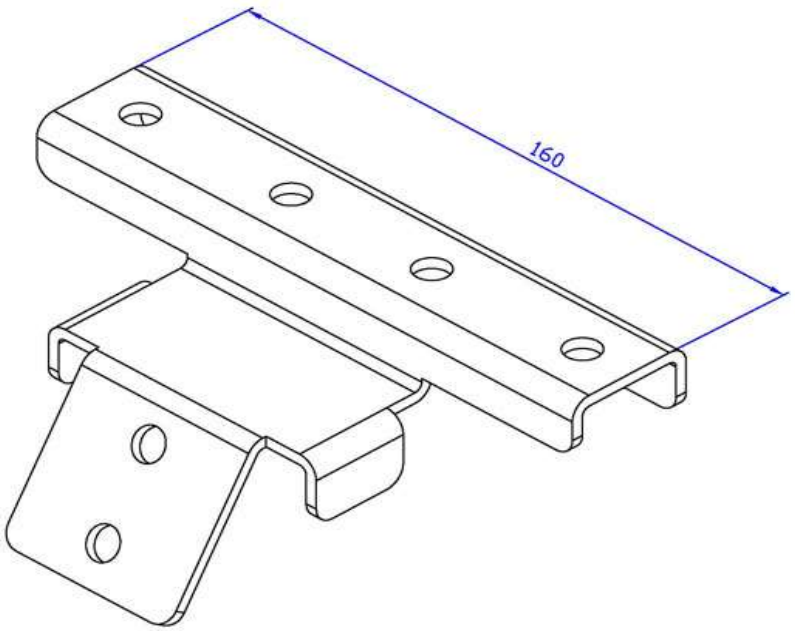
MARCA 119.608	RAIL ESCALERA L=1138 mm
MARK 119.608	LADDER'S RAIL L= 11386mm
MARQUE 119.608	RAIL D'ECHELLE L= 1138mm



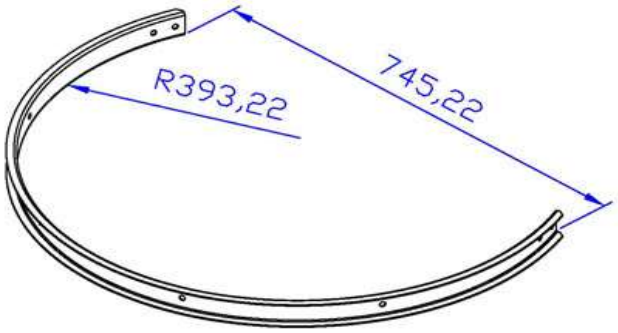
MARCA 119.610	TAPON PLASTICO RAIL ESCALERA
MARK 119.610	PLASTIC COVER FOR LADDER'S RAIL
MARQUE 119.610	COUVERTURE DU PLASTIQUE POUR L'ECHELLE



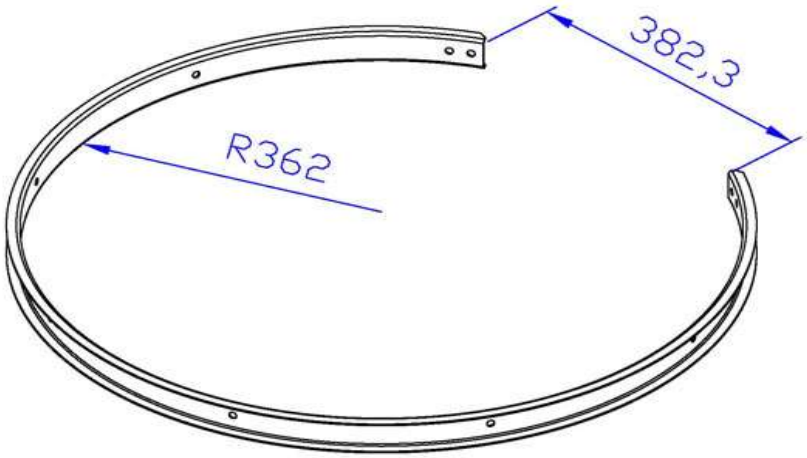
MARCA 119.611	SOPORTE DE RAIL
MARK 119.611	LADDER'S SUPPORT
MARQUE 119.611	SUPPORT D'ECHELLE



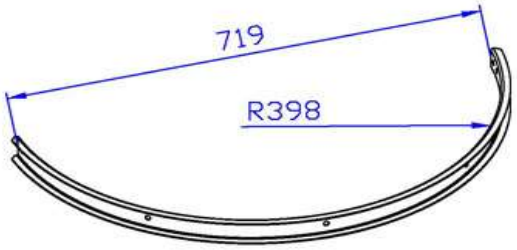
MARCA 119.612 SOPORTE RAIL ESCALERA ZONA ALERO–ANILLO–TOLVA
MARK 119.612 LADDER SUPPORT ON EAVE–RING–HOPPER
MARQUE 119.612 SOUPORT RAIL D'ECHELLE ZONE AUVENT–ANNEOU–TREMIE



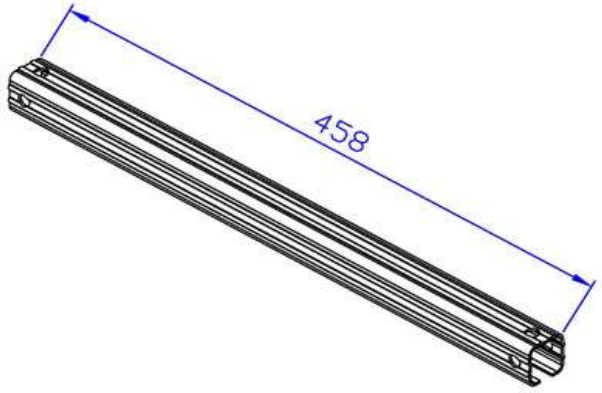
MARCA 119.613 FAJA DEFENSA SUPERIOR
MARK 119.613 UPPER SAFETY BAND
MARQUE 119.613 BANDE DE PROTECTION SUPERIEUR



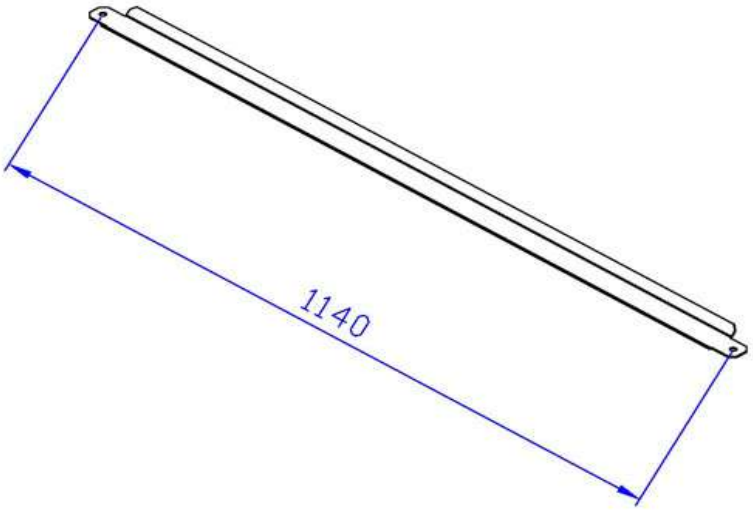
MARCA 119.614 FAJA DE DEFENSA
MARK 119.614 SAFETY BAND
MARQUE 119.614 BANDE DE PROTECTION



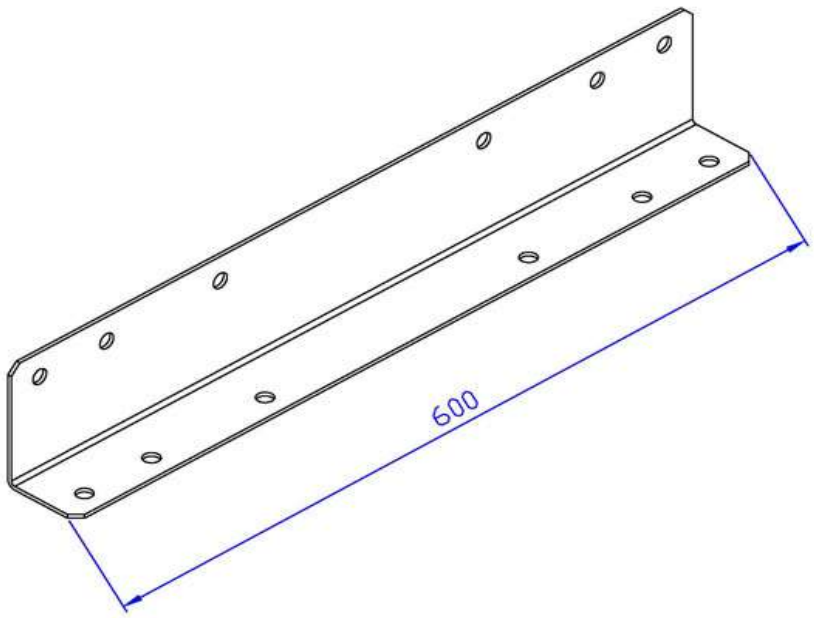
MARCA 119.615 FAJA DEFENSA TRANSICION
MARK 119.615 TRANSITION SAFETY BAND
MARQUE 119.615 BANDE DE PROTECTION POUR TRANSITION



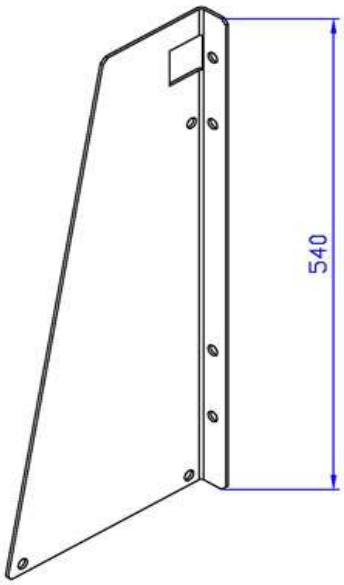
MARCA 119.616 PELDAÑO L= 460mm
MARK 119.616 LADDER RUNG L= 460mm
MARQUE 119.616 MARCHE POUR ECHELLE L= 460mm



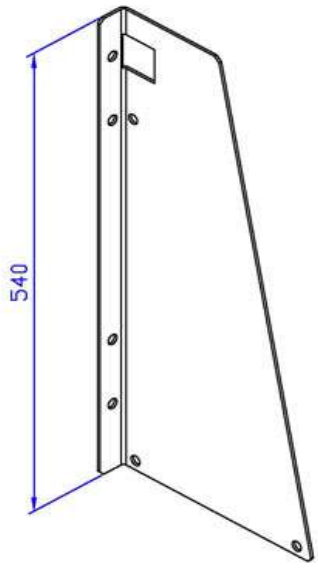
MARCA 119.617 "V" DEFENSA L=1140mm
MARK 119.617 "V" SAFETY L= 1140mm
MARQUE 119.617 "V" PROTECTION L= 1140mm



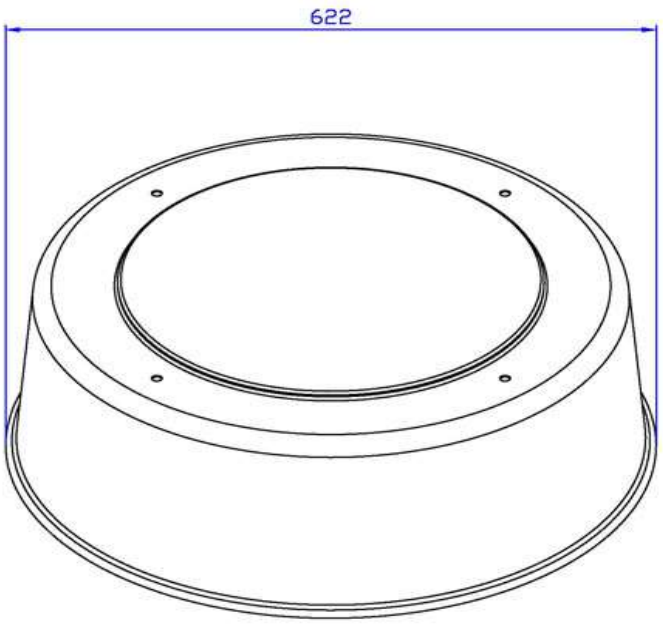
MARCA 119.619 ANGULO SUJECCION ESCALERA A SUELO
MARK 119.619 ANGLE TO FLOOR
MARQUE 119.619 ANGLE AU TERRE



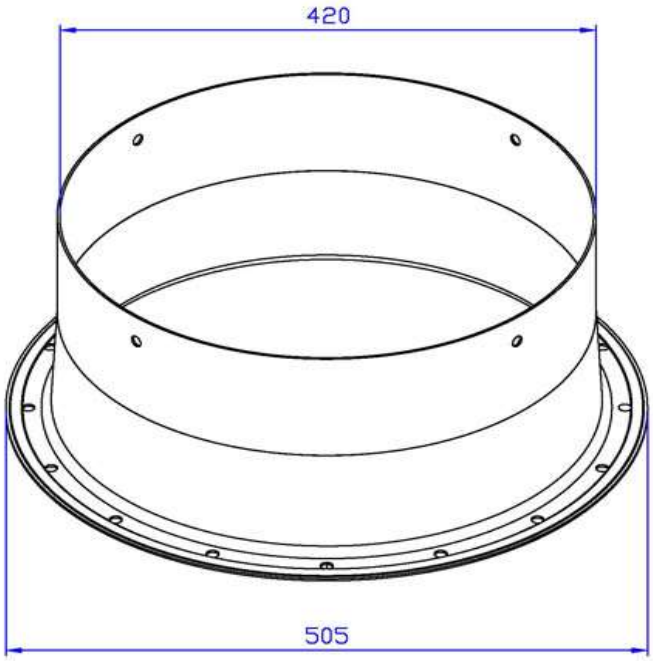
MARCA 119.620 CHAPA BARANDILLA TRANSICION IZQUIERDA
MARK 119.620 HANDRAIL BRACKET LEFT TRANSITION
MARQUE 119.620 POTEAU DE RAMBARDE GAUCHE



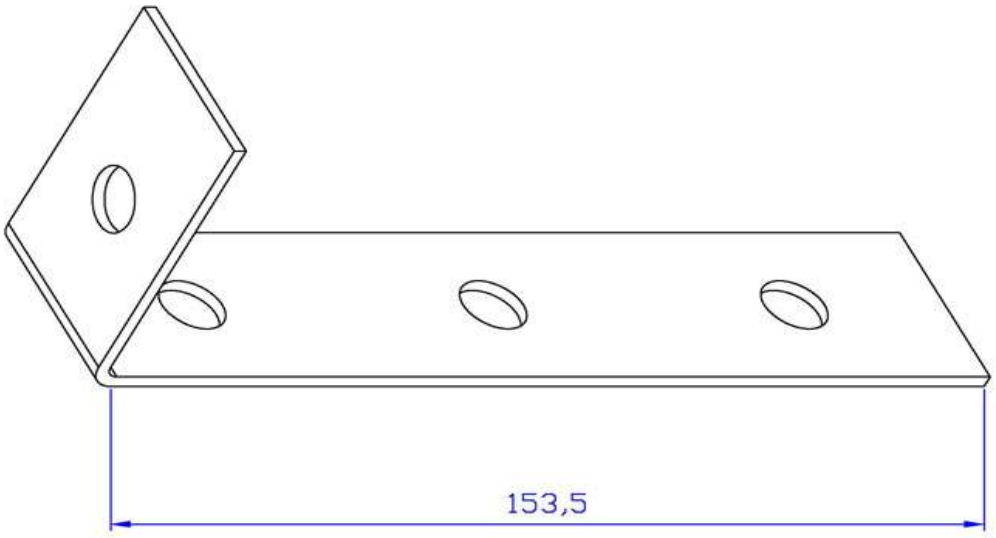
MARCA 119.622 CHAPA BARANDILLA TRANSICION DERECHA
MARK 119.622 HANDRAIL BRACKET RIGHT TRANSITION
MARQUE 119.622 POTEAU DE RAMBARDE DROITE



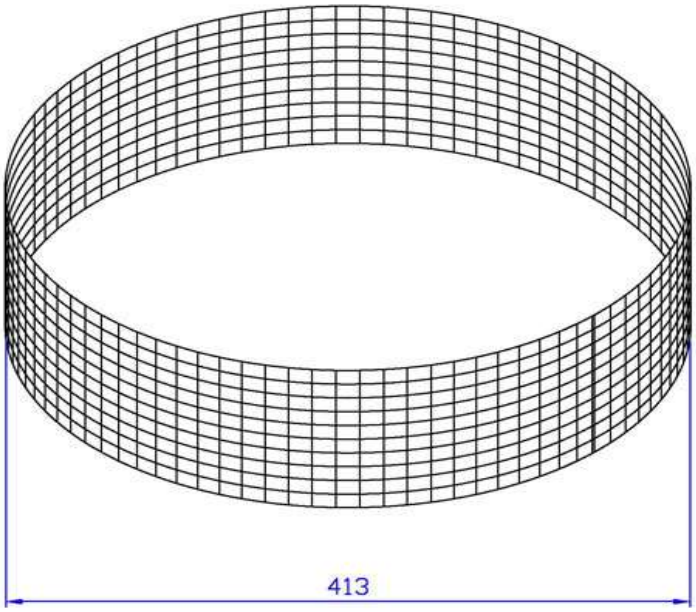
MARCA 119.623 TAPA AIREACIÓN CIRCULAR
MARK 119.623 TOP COVER FOR AERATION
MARQUE 119.623 TOIT DE LA COUVERTURE D'AERATION



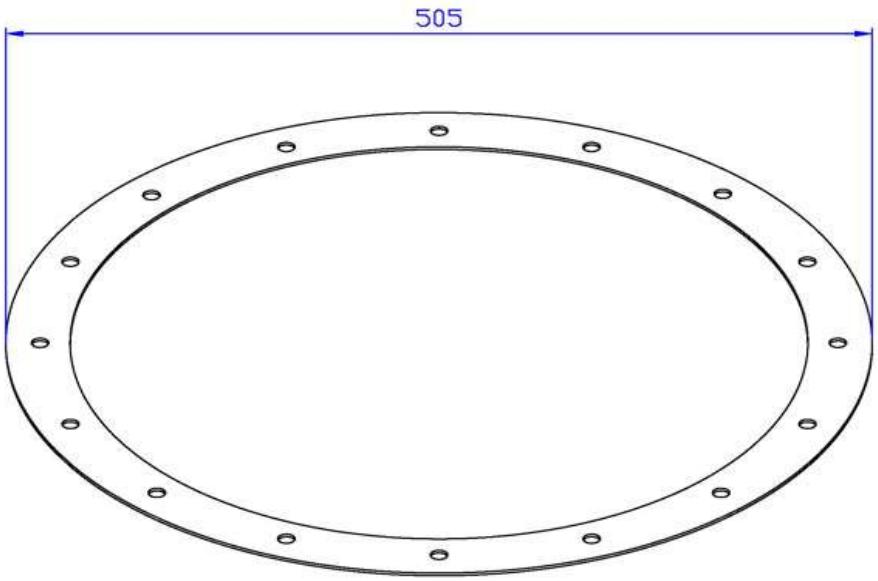
MARCA 119.624 CUERPO AIREACIÓN CIRCULAR
MARK 119.624 TOP COVER FOR AERATION
MARQUE 119.624 TOIT DE LA COUVERTURE D'AERATION



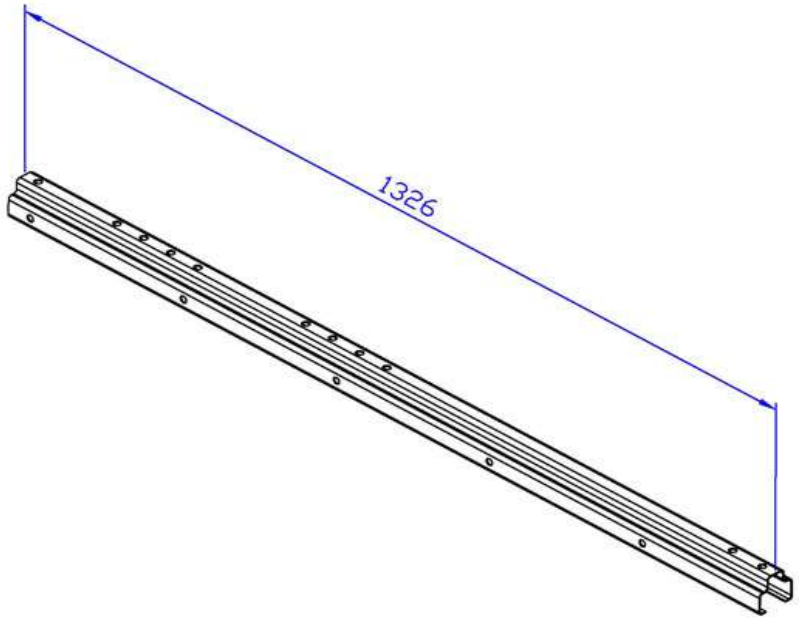
MARCA 119.625 CLIP AIREACIÓN CIRCULAR
MARK 119.625 SUPPORT CLIP
MARQUE 119.625 CLIP SUPPORT



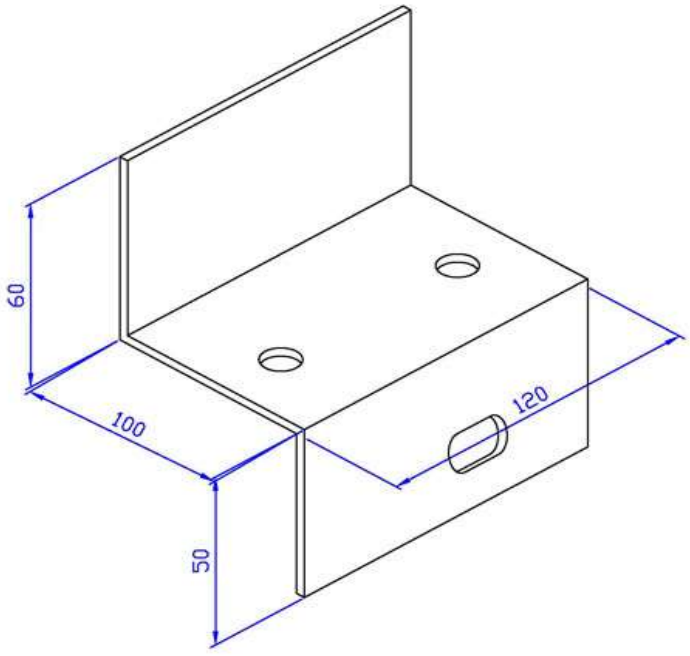
MARCA 119.626 MALLA AIREACIÓN CIRCULAR
MARK 119.626 MESH FOR AERATION
MARQUE 119.626 FILET POUR AERATION



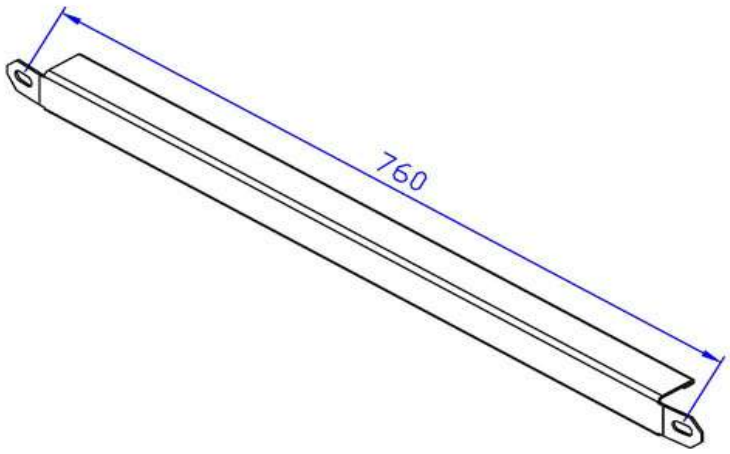
MARCA 119.627 BRIDA AIREACIÓN CIRCULAR
MARK 119.627 FLANGE FOR AERATION
MARQUE 119.627 BRIDE POUR AERATION



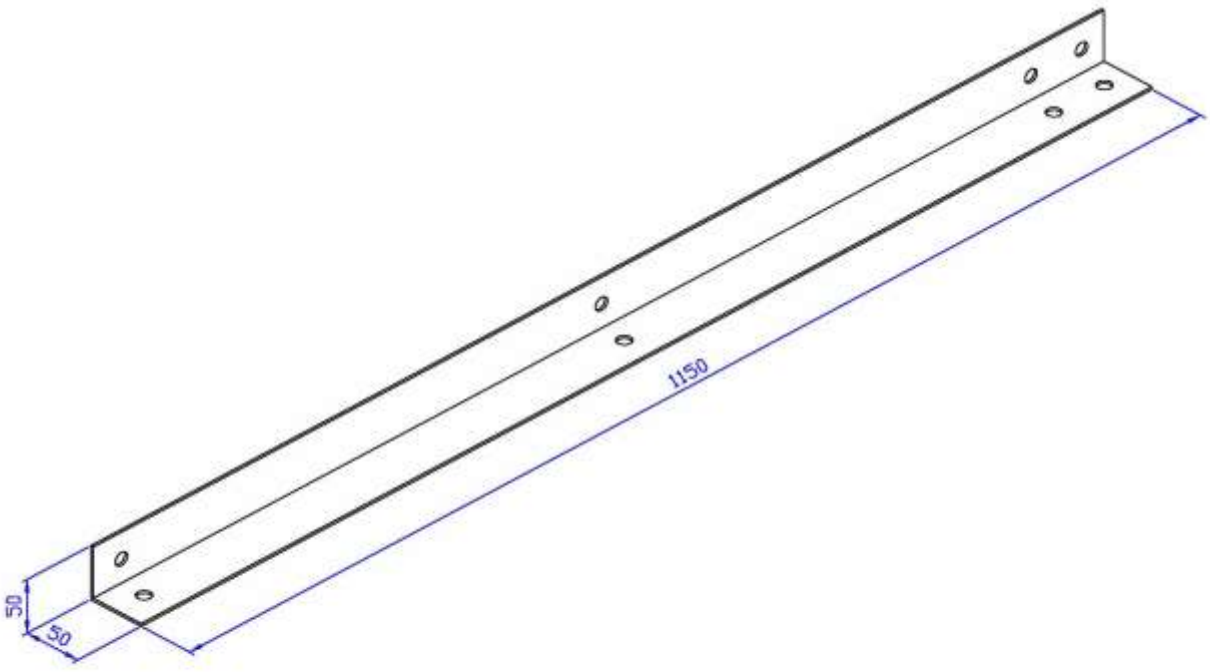
MARCA 119.714	RAIL ESCALERA TERMINAL L=1326 mm
MARK 119.714	LADDER'S TERMINAL RAIL L= 1326mm
MARQUE 119.714	RAIL D'ECHELLE TERMINAL L= 1326mm



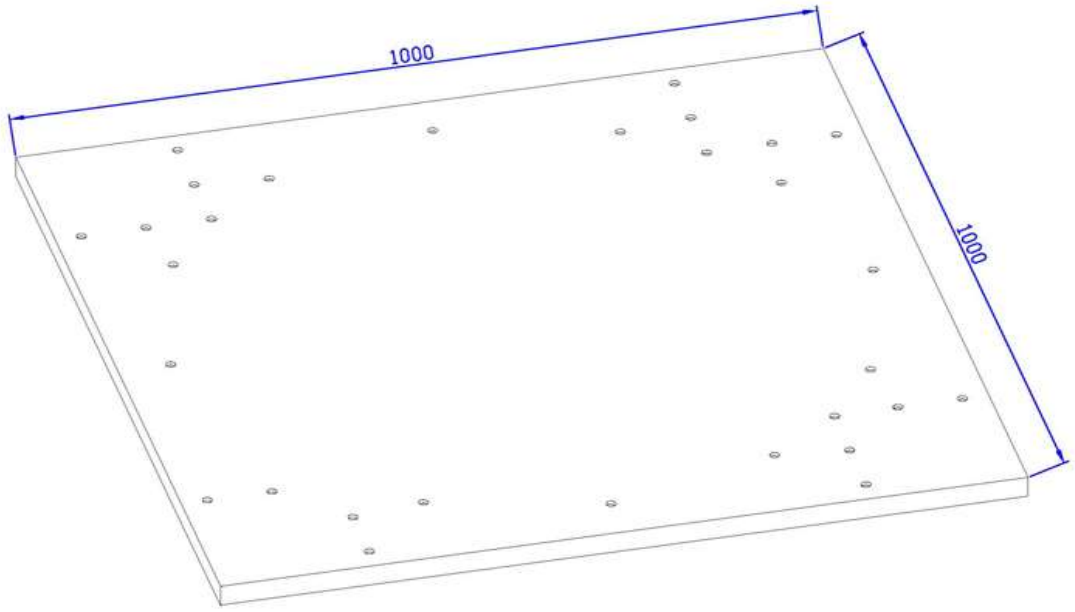
MARCA 119.755	CHAPA CIERRE ZONA EMPALME TIPO 1
MARK 119.755	CLOSE SHEET TYPE 1
MARQUE 119.755	.....



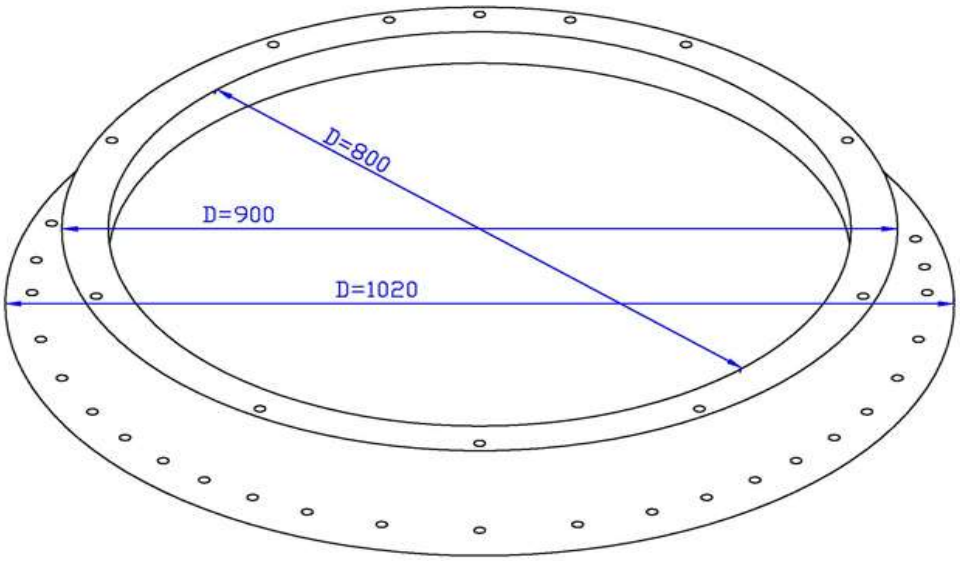
MARCA 119.764	PASAMANOS DE TRANSICIÓN L=760mm
MARK 119.764	HANDRAIL FOR TRANSITION L=760mm
MARQUE 119.764	– L= 760mm



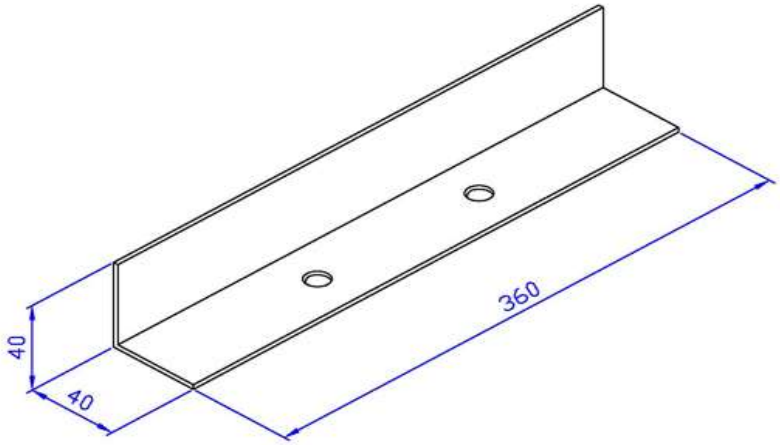
MARCA 119.861	RAIL VERTICAL CORTO
MARK 119.861	VERTICAL SHORT RAIL
MARQUE 119.861	VERTICAL RAIL



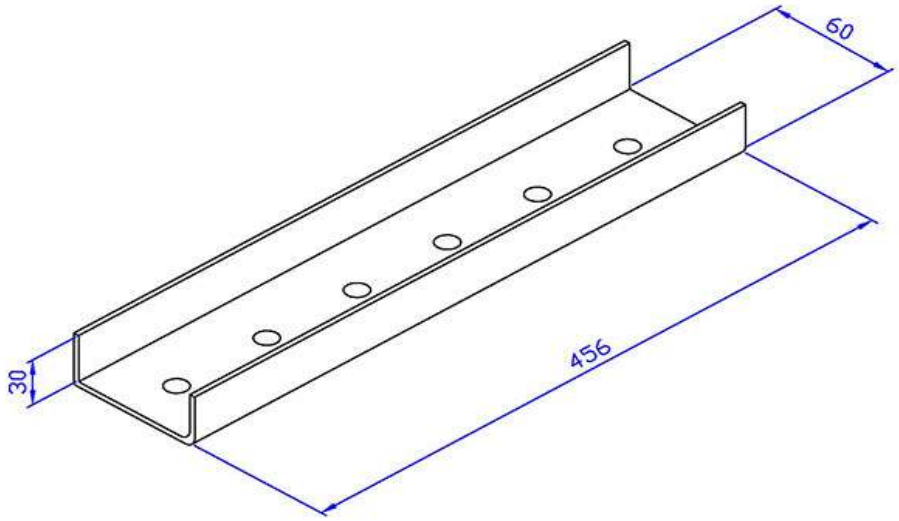
MARCA 120.241 TAPA BOCA DE CARGA
MARK 120.241 TOP FOR ROOF CENTER COLLAR
MARQUE 120.241 COUVERTURE BOUCHE DE CHARGE



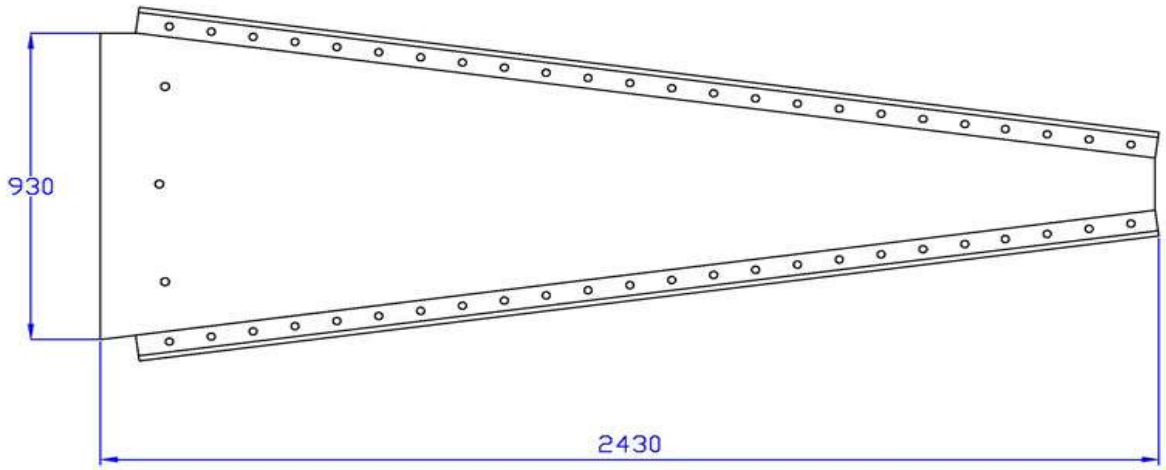
MARCA 120.244 BOCA DE CARGA
MARK 120.244 ROOF CENTER COLLAR
MARQUE 120.244 BOUCHE DE CHARGE



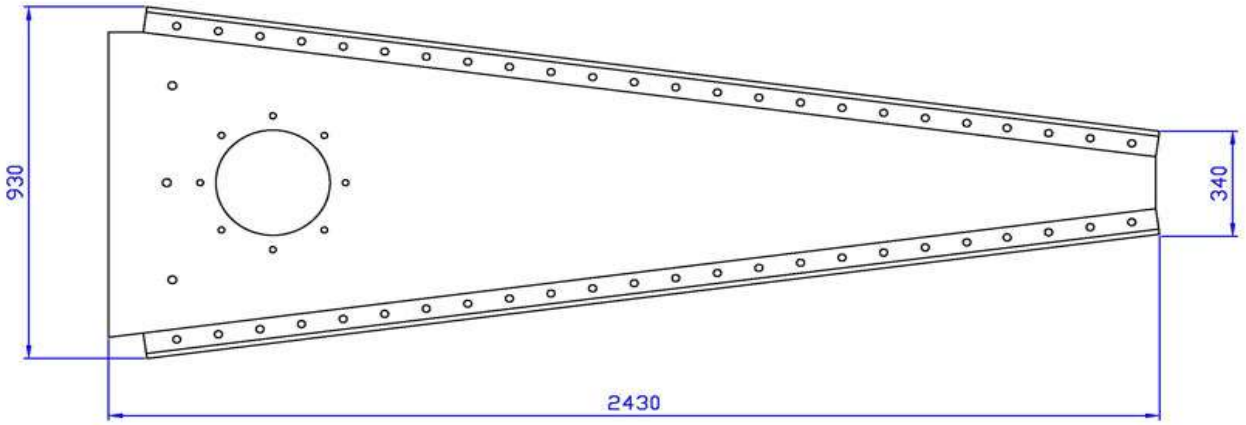
MARCA 120.261 REFUERZO TAPA BOCA DE CARGA
MARK 120.261 REINFORCEMENT FOR TOP FOR ROOF CENTER COLLAR
MARQUE 120.261 RENFORT COUVERTURE BOUCHE DE CHARGE



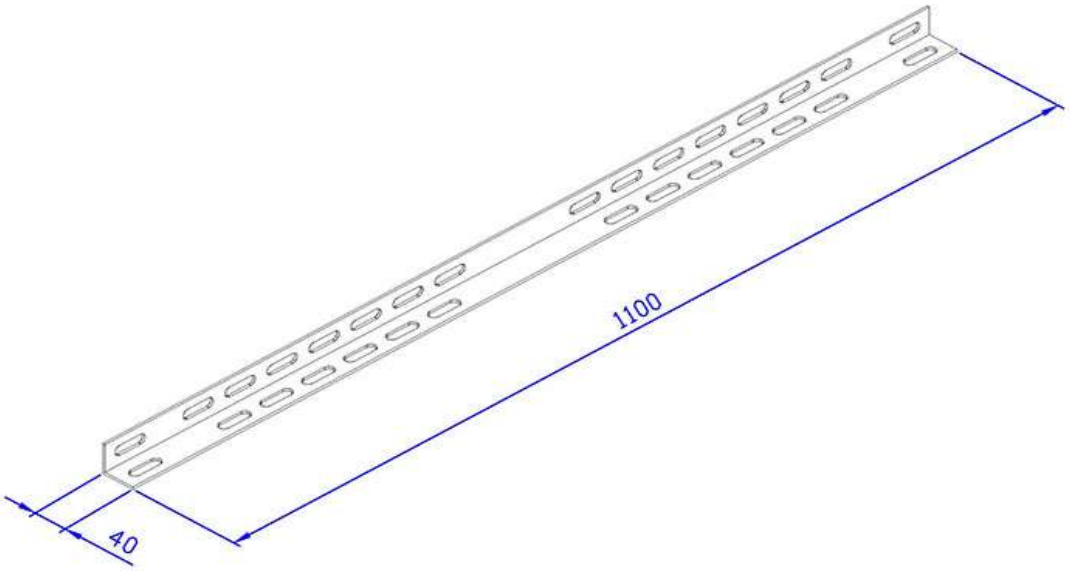
MARCA 120.383 REFUERZO BOCA DE CARGA
MARK 120.383 REINFOR ROOF CENTER COLLAR
MARQUE 120.383 RENFORT BOUCHE CHARGE



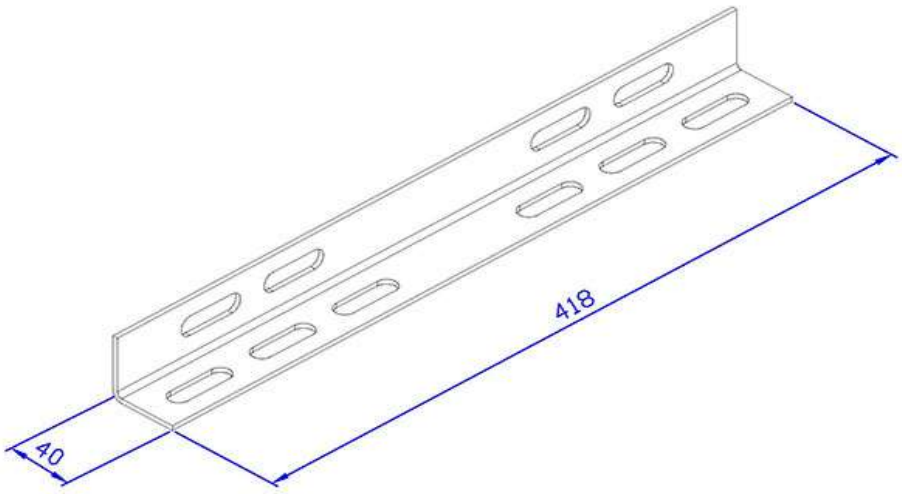
MARCA 120.497 SECTOR TECHO SILO 5,35Ø
MARK 120.497 ROOF SHEET SILO 5,35Ø
MARQUE 120.497 SECTEUR DU TOIT SILO 5,35Ø



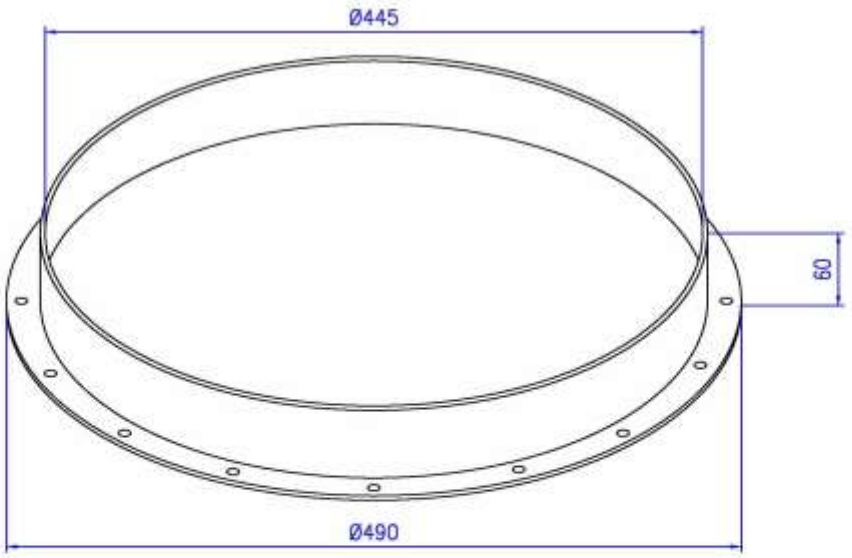
MARCA 120.534 SECTOR DE TECHO CON APERTURA CIRCULAR SILO 5,35Ø
MARK 120.534 ROOF SHEET WITH CIRCULAR OPENING SILO 5,35Ø
MARQUE 120.534 SECTEUR DU TOIT AVEC OUVERTURE CIRCULAIRE SILO 5,35Ø



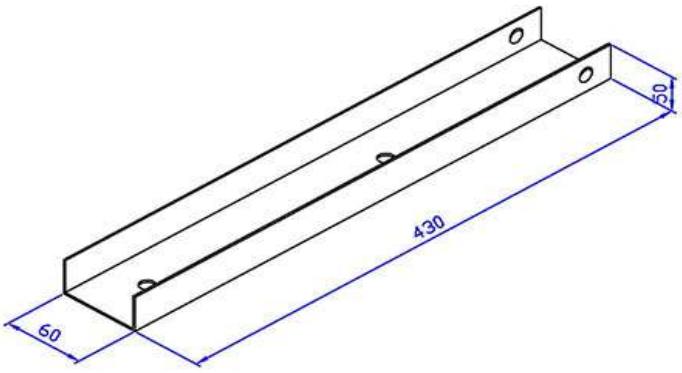
MARCA 120.691 PELDAÑO ESCALERA TECHO L=1100
MARK 120.691 ROOF LADDER RUNG L=1100
MARQUE 120.691 MARCHE DU TOIT L=1100



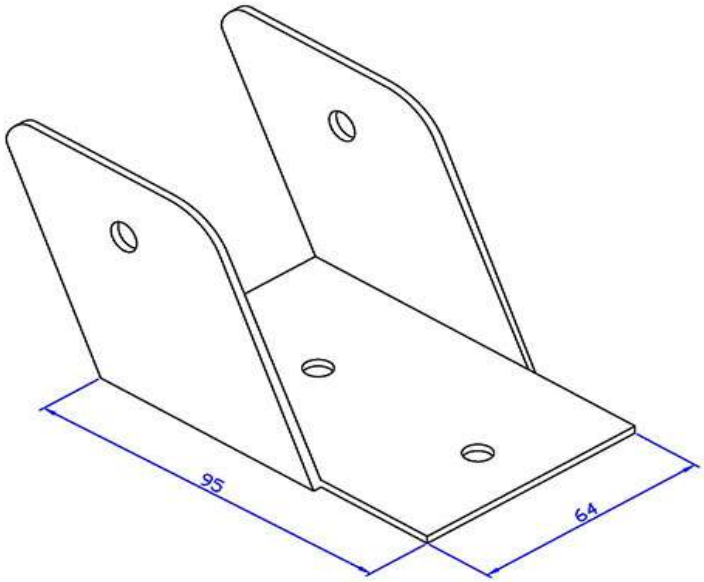
MARCA 120.692 PELDAÑO ESCALERA TECHO L=418
MARK 120.692 ROOF LADDER RUNG L=418
MARQUE 120.692 MARCHE DU TOIT L=418



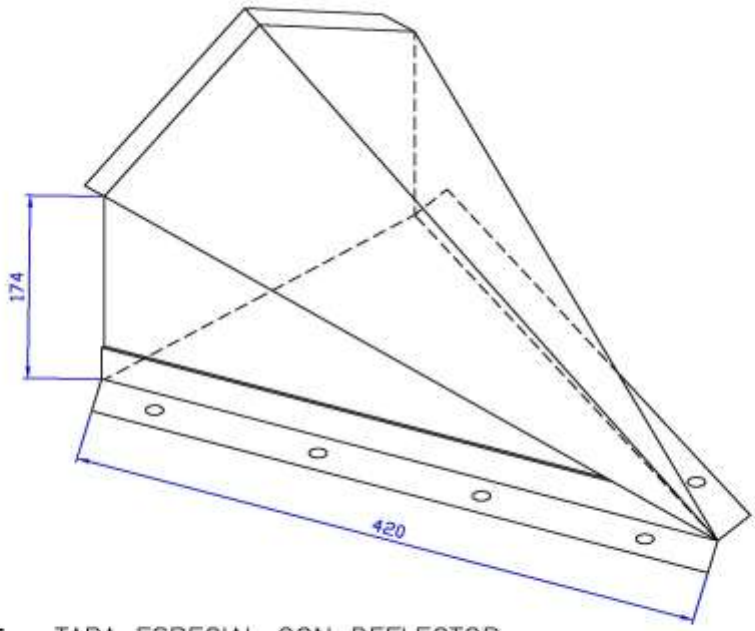
MARCA 120.715	ANILLO PUERTA TECHO
MARK 120.715	RING FOR MANHOLE
MARQUE 120.715	ANNEAU DU PORTE D'ACCESS



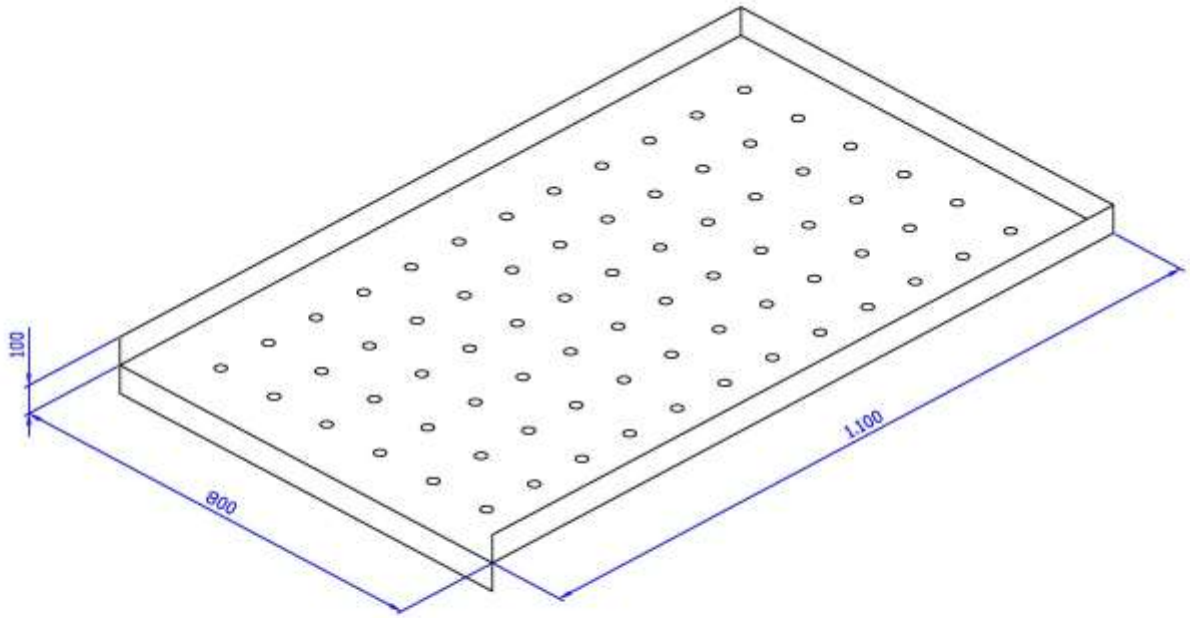
MARCA 120.779	"U" AMARRE BISAGRA
MARK 120.779	"U" FOR HINGE BASE
MARQUE 120.779	"U" ATTACHE POUR CHARNIÈRE



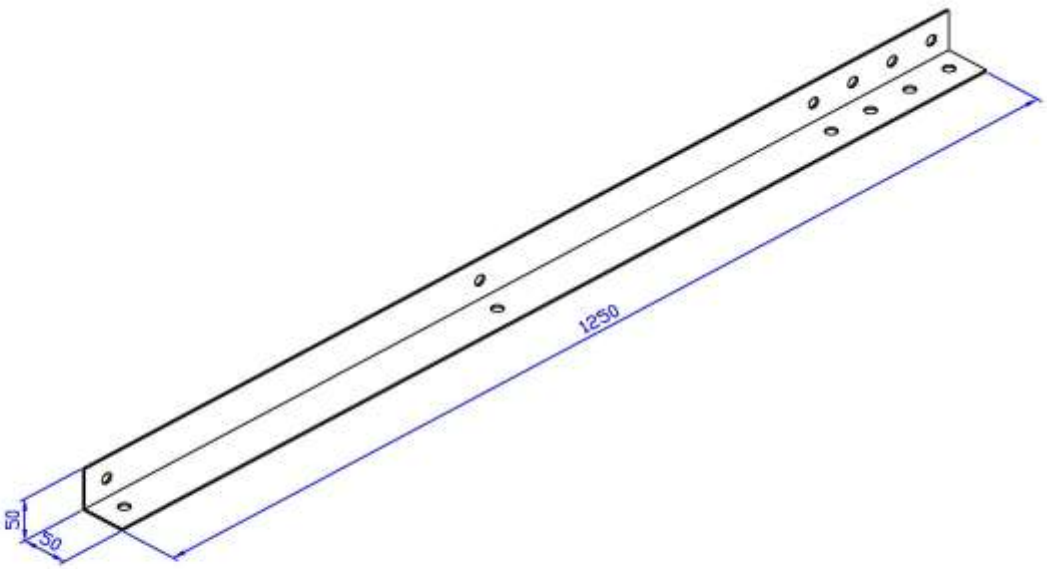
MARCA 120.780	"U" BISAGRA
MARK 120.780	"U" HINGE BASE
MARQUE 120.780	"U" CHARNIERE



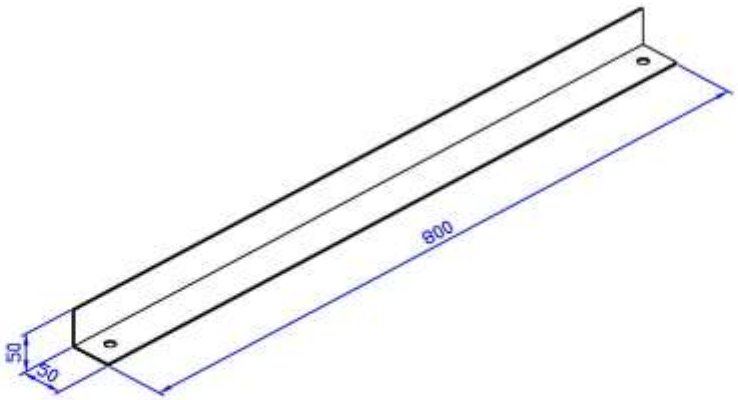
MARCA 121.075	TAPA ESPECIAL CON DEFLECTOR
MARK 121.075	END COVER
MARQUE 121.075	COUVERTURE FINALE



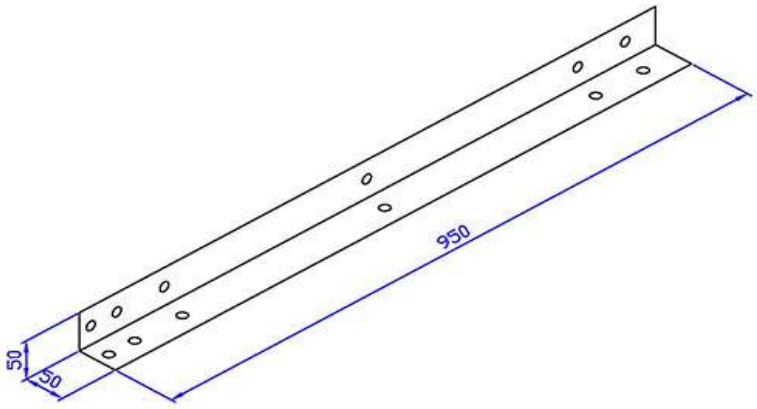
MARCA 121.109A PISO PLATAFORMA DESCASO 1100x800mm
MARK 121.109A FLOOR OF PLATAFORM 1100x800mm
MARQUE 121.109A PLANCHER DE LA PLATEFORME 1100x800mm



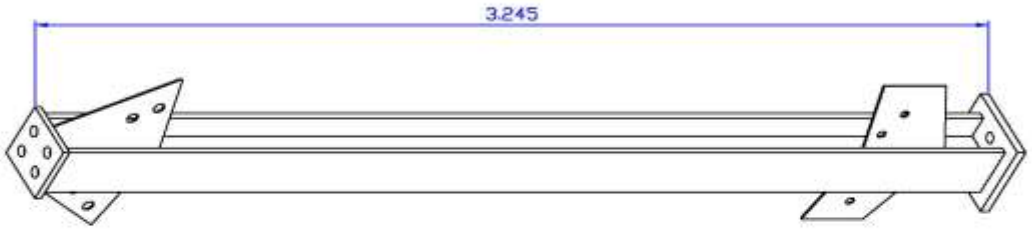
MARCA 121.123 RAIL VERTICAL CORTO L=1250mm
MARK 121.123 VERTICAL SHORT RAIL L=1250mm
MARQUE 121.123 VERTICAL RAIL L=1250mm



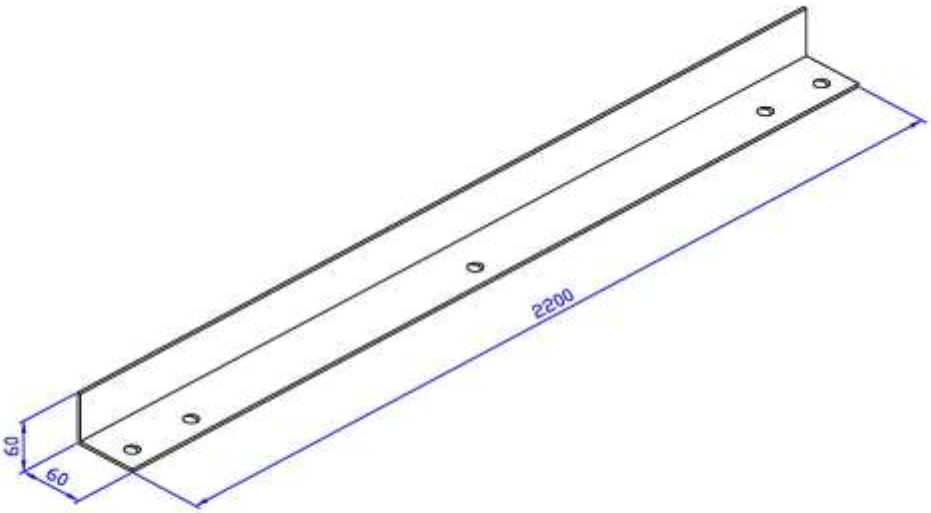
MARCA 121.127 ANGULO HORIZONTAL L=800mm
MARK 121.127 ANGLE L= 800mm
MARQUE 121.127 ANGLE L= 800mm



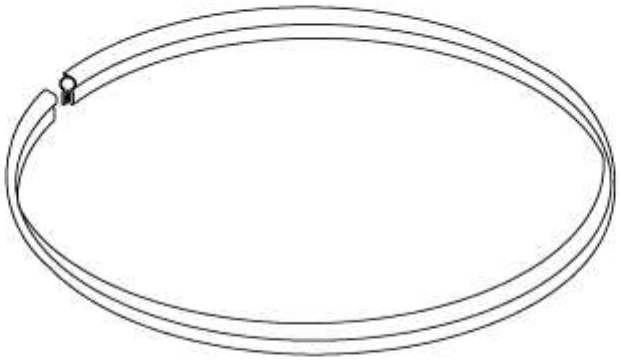
MARCA 121.152 ANGULO VOLADIZO L=950mm
MARK 121.152 CORNER ANGLE L=950mm
MARQUE 121.152 ANGLE HORIZONTAUX L=950mm



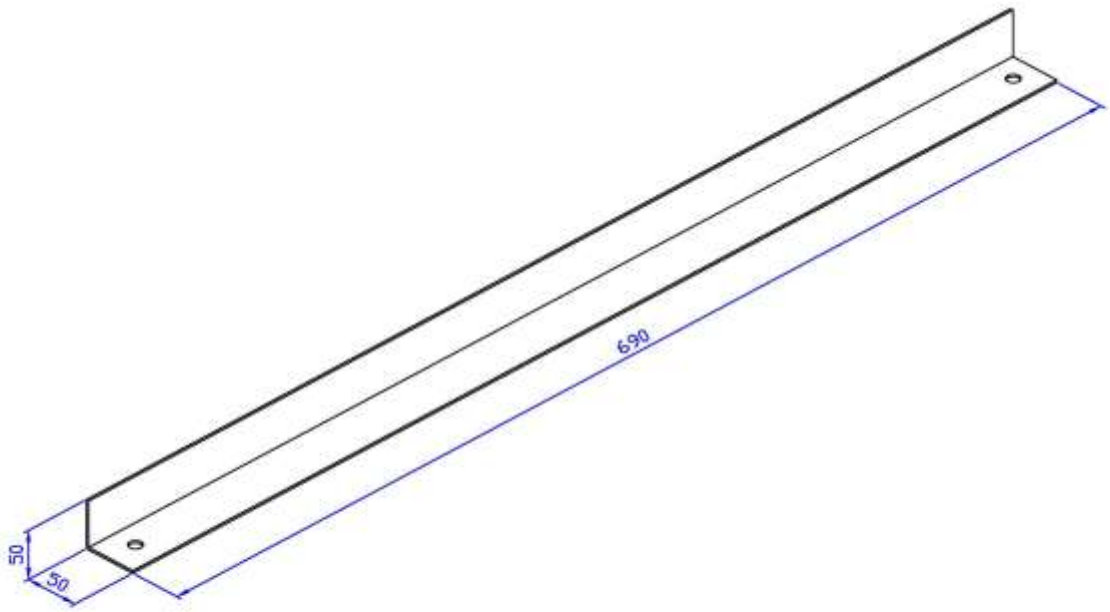
MARCA 121.282	PATA SILO ø 5,35
MARK 121.282	LEG SILO ø 5,35
MARQUE 121.282	PIED SILO ø 5,35



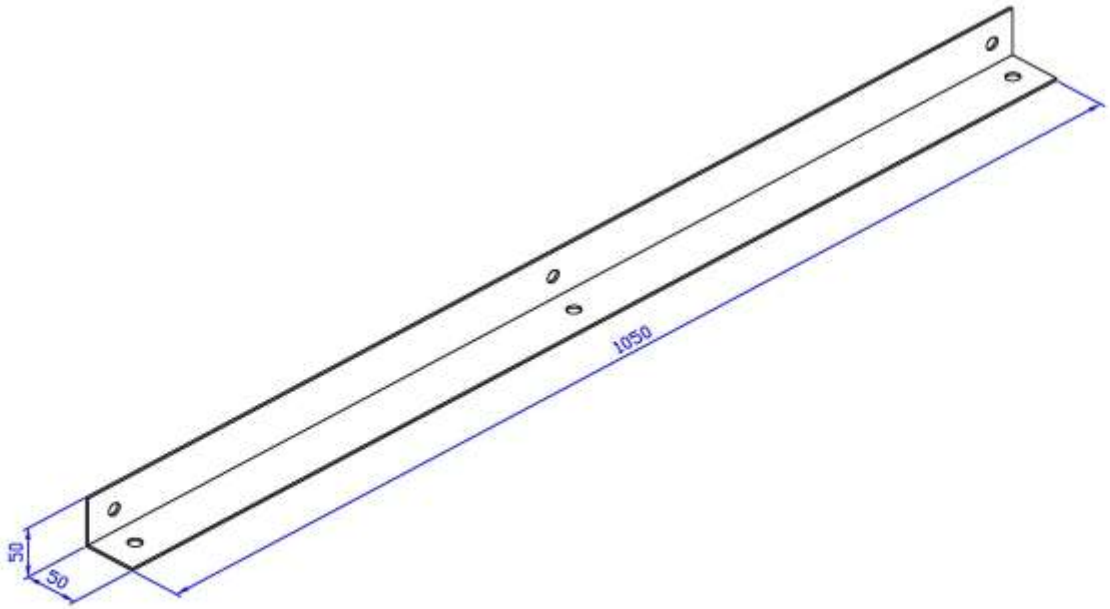
MARCA 121.283	"L" 50x50x5x2840 mm.
MARK 121.283	"L" 50x50x5x2840 mm.
MARQUE 121.283	"L" 50x50x5x2840 mm.



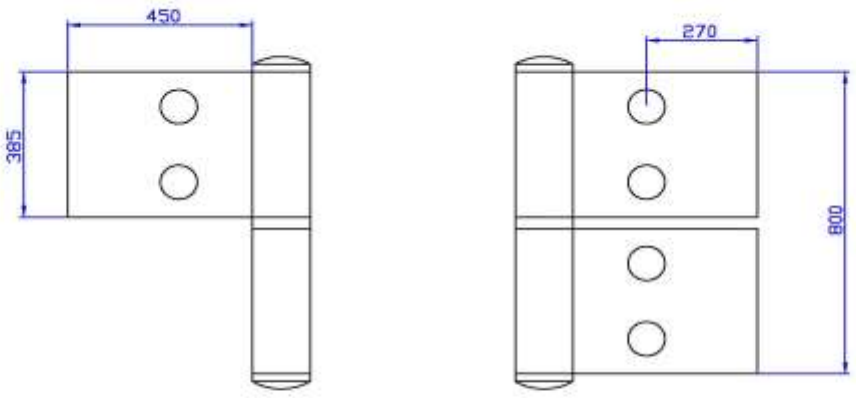
MARCA 121.811 JUNTA DE CONTORNO L=1500mm
MARK 121.811 CONTOUR JOINT L=1500mm
MARQUE 121.811 JOINT DE CONTOUR L=1500mm



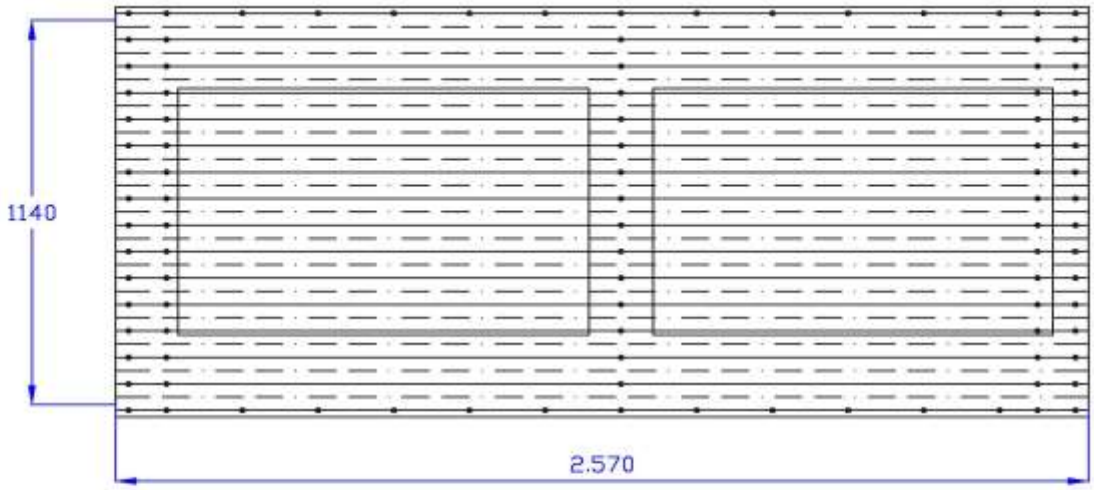
MARCA 122.207 DINTEL PORTILLA
MARK 122.207 LINTEL
MARQUE 122.207 LINTEAU



MARCA 122.208 LATERAL PORTILLA
MARK 122.208 DOOR SIDE
MARQUE 122.208 CÔTÉ POUR PORTE



MARCA 122.209 BISAGRA TIPO A
MARK 122.209 HINGE TYPE A
MARQUE 122.209 CHARNIERE TYPE A



MARCA 122.302	VIROLA 2 REFUERZOS DOBLE JUNTA CON LOGO
MARK 122.302	BODYSHEET 2 STIFFENERS DOUBLE JOINT WITH LOGO
MARQUE 122.302	VIROLE 2 MONTANT DOUBLE JOINT AVEC LOGO

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.

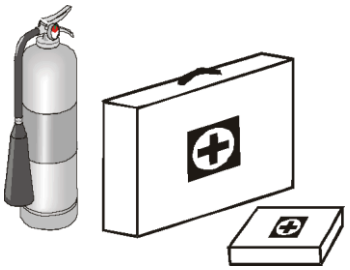
PROTECTION EQUIPMENT

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.

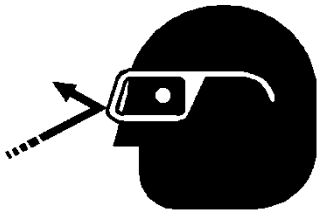
Wear hard hat and steel toe boots to help protect your head and toes from falling debris.

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

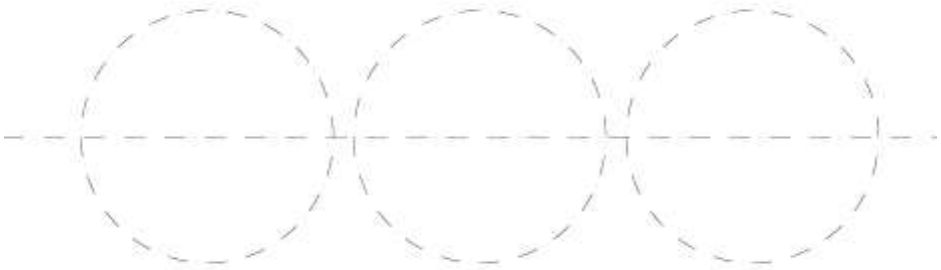
Respirator

Hard hat

PRIOR TO THE ERECTION

Axis tracing:

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



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**

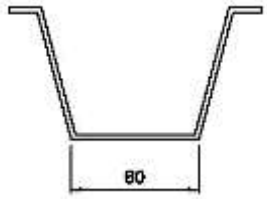
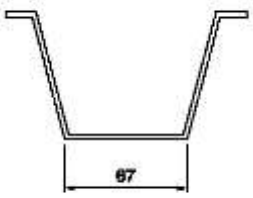
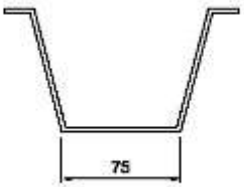
A	Body sheets with **double joint**
B	Body sheets with **triple joint**
C	Body sheets with **quadruple joint**
E	Body sheets with **quintuple joint**
G	Body sheets with **sextuple joint**

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:

	COLOUR	THICKNESS	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**

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

TORQUE VALUE (Cs, N x m)		
THREAD	**QUALITY**	
	8.8	**10.9**
M-8	20	28,8
M-10	39,2	57,6
M-12	68	100
M-14	108	160
M-16	168	248

The indicated grip-torques are exclusively for joints without neoprene washers. In joints with neoprene washers it shall be tightened until the neoprene will be expanded.

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.

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 simultaneous 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

BIG HOPPER SILOS

The fastest and most economical way to erect the grain silos is from the top to the bottom using lifting jacks. It is strongly recommended to use a crane in order to lift the silo when installing the legs.

The suggested assembly procedure is listed 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)

Caulk with sealant the vertical joint. 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.

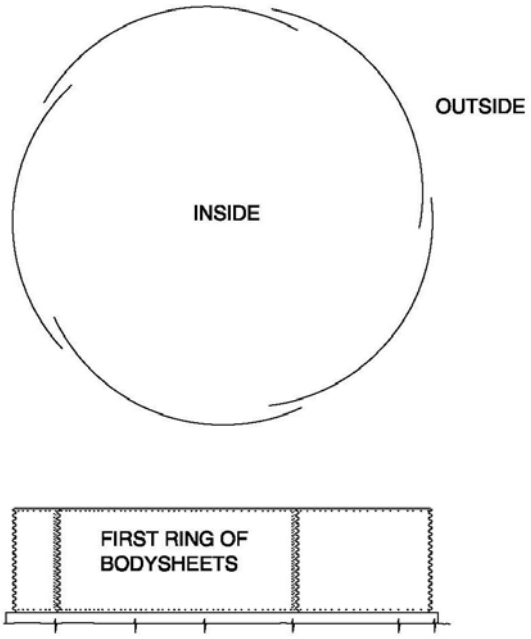


Figure 1

2- 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 begin bolting 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. (See figure 2)

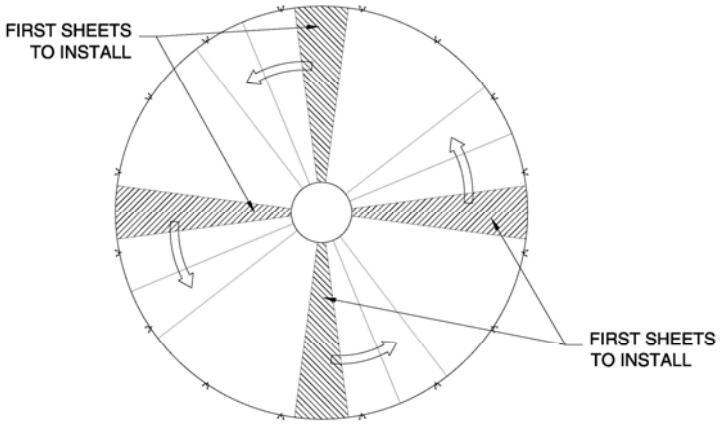


Figure 2

Complete the roof assembly, place the ladder rungs on the sheet right left of the manhole sheet. (See figure 3)

Assemble the manhole according to the detail drawing.

If the roof has any aeration, see the detail drawing to install it.

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.

Right after the assembly of the roof it is advisable to check the sealing of the roof. For this the roof may be watered with a hose to verify all the points where the water could pass through. In case there is any point where the water can go easily through, they have to be resealed.

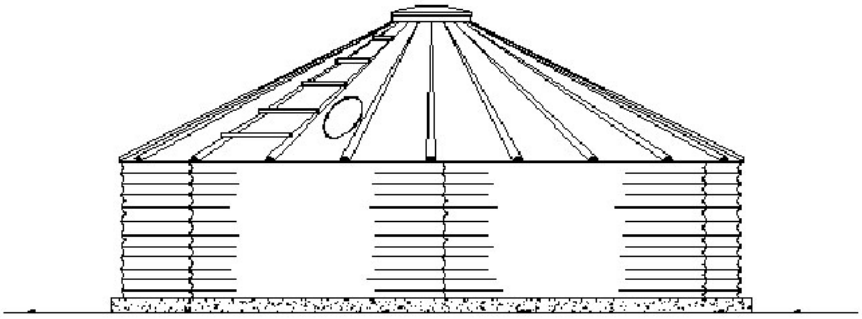


Figure 3

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 4)

Determine the number of required lifting jacks according to the diameter and weight of the silo.

The bolts must be adequate to lift the silo.

The vertical joint of body-sheets must be staggered (as shown in the drawing) to allow all the stiffener holes to be aligned. (See figure 4)

The body-sheets are assembled inside of the previous ring (see drawings).

Caulk with sealant the vertical joint.

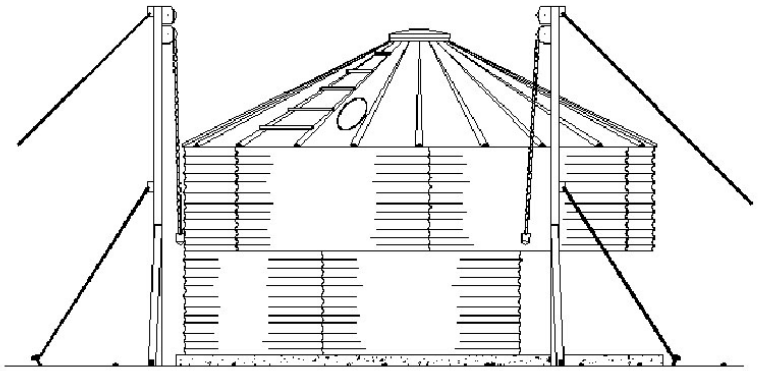


Figure 4

Begin the assembly of stiffeners once one or two body-sheets (depending on the length of stiffeners used) have been installed. Attach the stiffeners to the body-sheets using bolts according to the detail. (See figure 5)

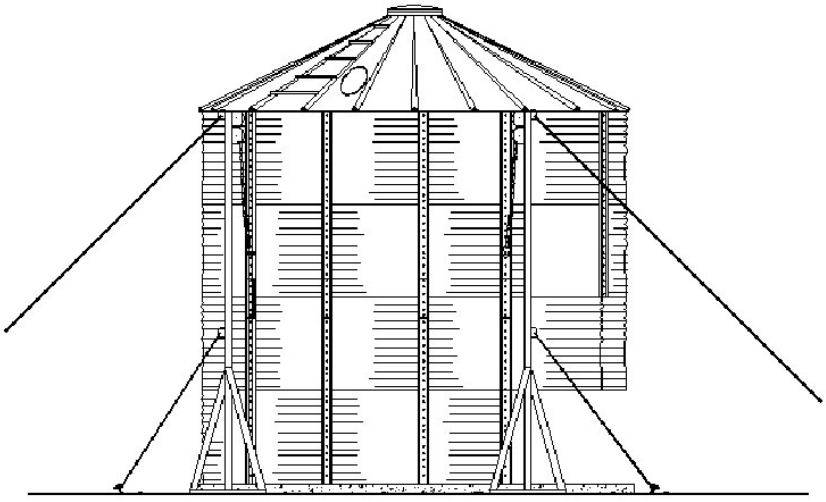


Figure 5

In case 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.

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 its position.

5- After completing the bottom ring, lift silo high enough to be able to assemble the hopper compression ring parts to the silo.

In case a crane is used for the assembly of the legs, cables must be attached to the compression ring (to the splice covers, to be precise) and to the crane hook (put inside the silo through the centre cover). Place it on the legs. (See figure 6) It is recommended to use cables at this point in order to keep the silo straight. The splice covers bolts must be tightened to lift the silo. Afterwards, once the silo is attached to the legs, take out the splice covers in order to assemble the hopper sheets and install the splice covers again once the hopper is assembled.

6- Level the legs and install the bracing angles. Anchor the legs securely to the foundation.

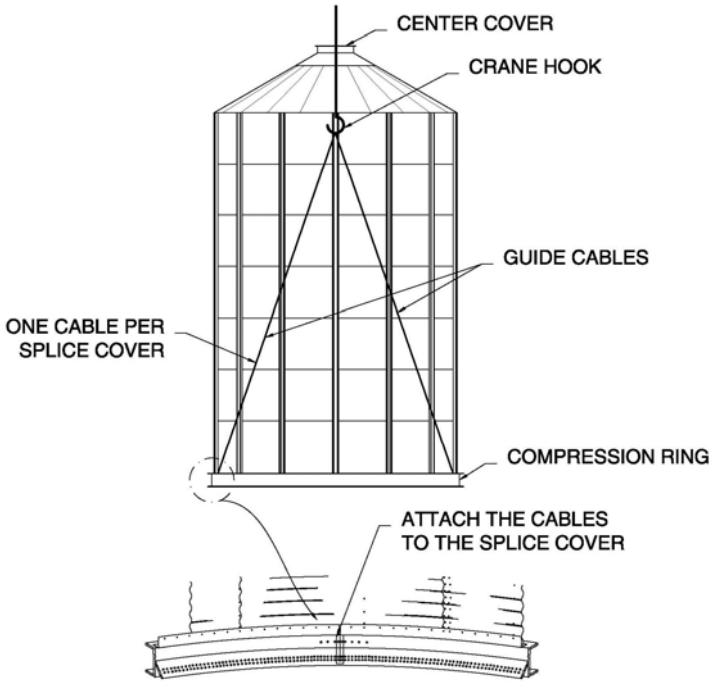


Figure 6

7- Assemble the hopper sheets and install the splice covers.

8- Attach the hopper collar to bottom hopper.

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.

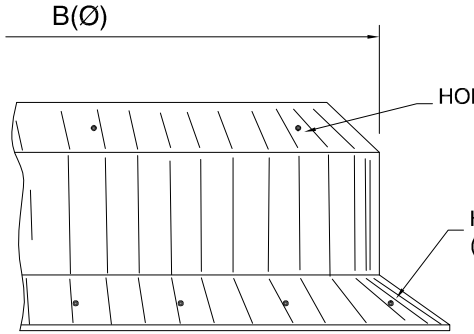
2- WHEN ASSEMBLING, RAISE THE SILO JUST ENOUGH TO ADD ONE BODY-SHEETS RING.

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

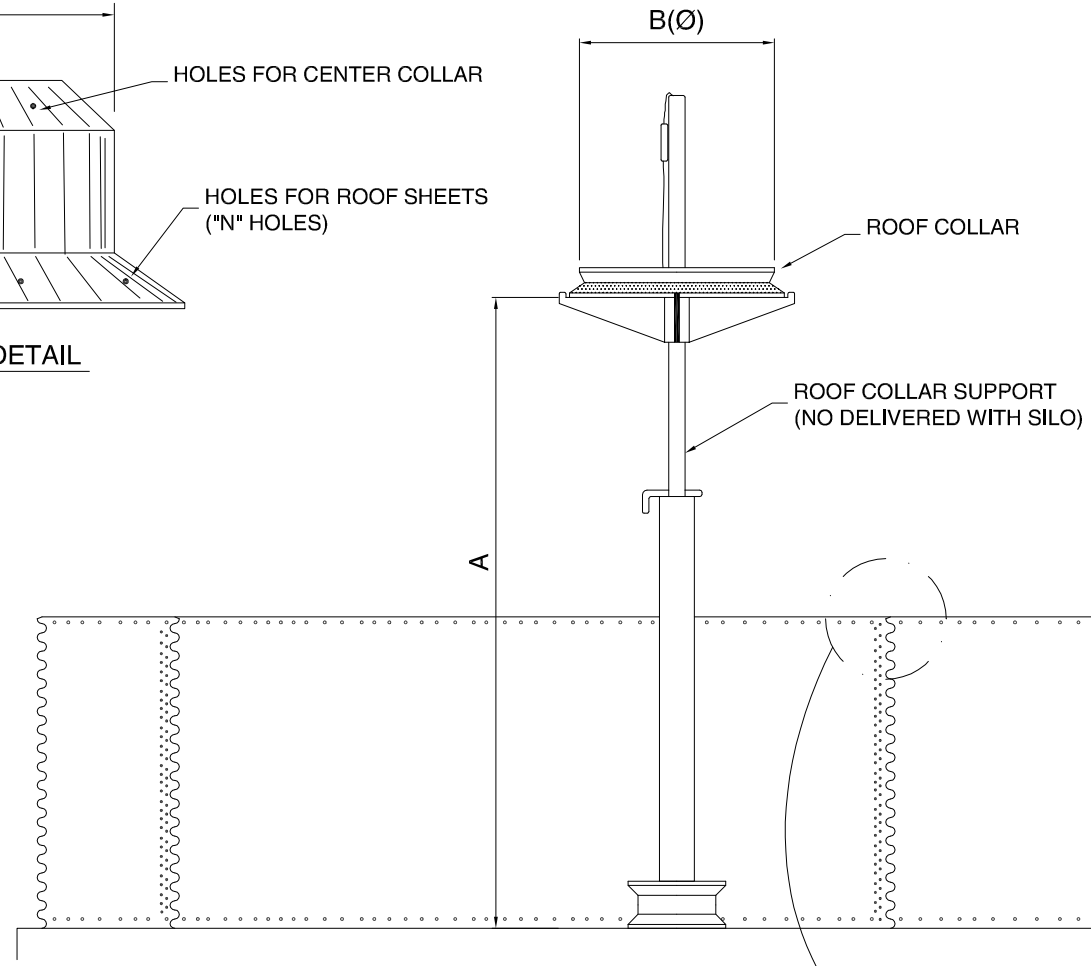
4- WHEN ASSEMBLING A NEW RING LEAVE THE BOLTS LOOSE UNTIL ALL THE BODY-SHEETS ARE ATTACHED.

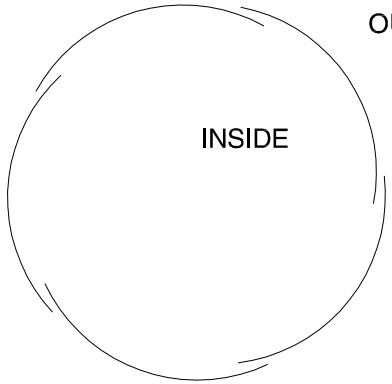
5- LOWER THE SILO AND SECURE IT TO THE FOUNDATION BEFORE LEAVING THE JOBSITE.

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



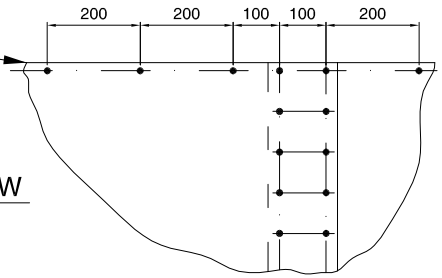
ROOF COLLAR DETAIL





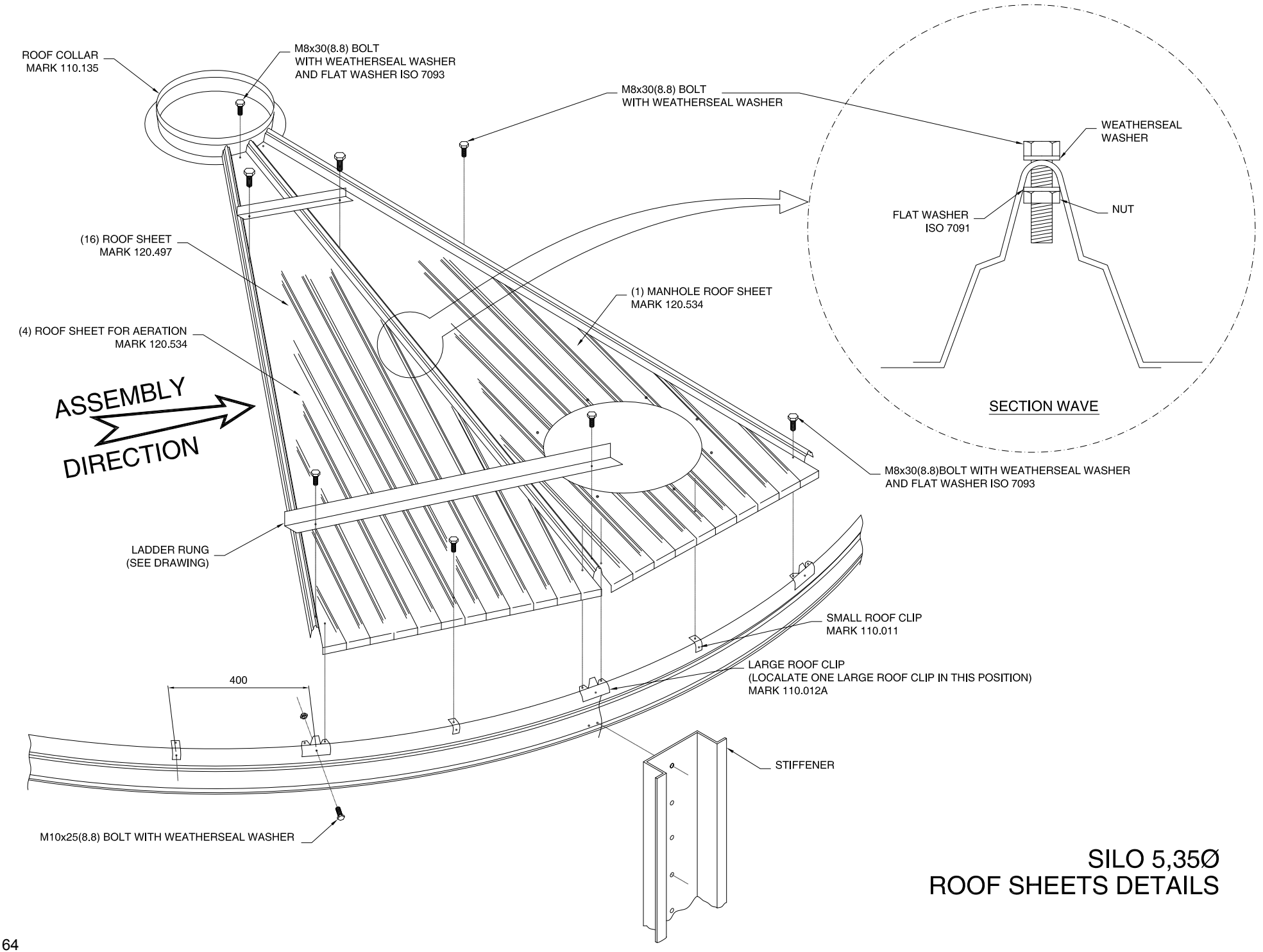
BODY SHEETS INSTALLATION

SILO	(A) mm	(B) mm	N	MARK
4.60	2.070	1.400	18	110.079
5.35	2.290	1.400	21	110.135
6.10	2.510	1.400	24	110.037
6.87	2.730	1.400	27	110.110
7.60	2.950	1.400	30	110.088
8.40	3.170	1.400	33	110.008
9.20	3.390	1.400	36	110.144
9.93	3.460	1.930	39	110.155
10.70	3.680	1.930	42	110.044
11.45	3.900	1.930	45	116.719
12.23	4.120	1.930	48	110.098

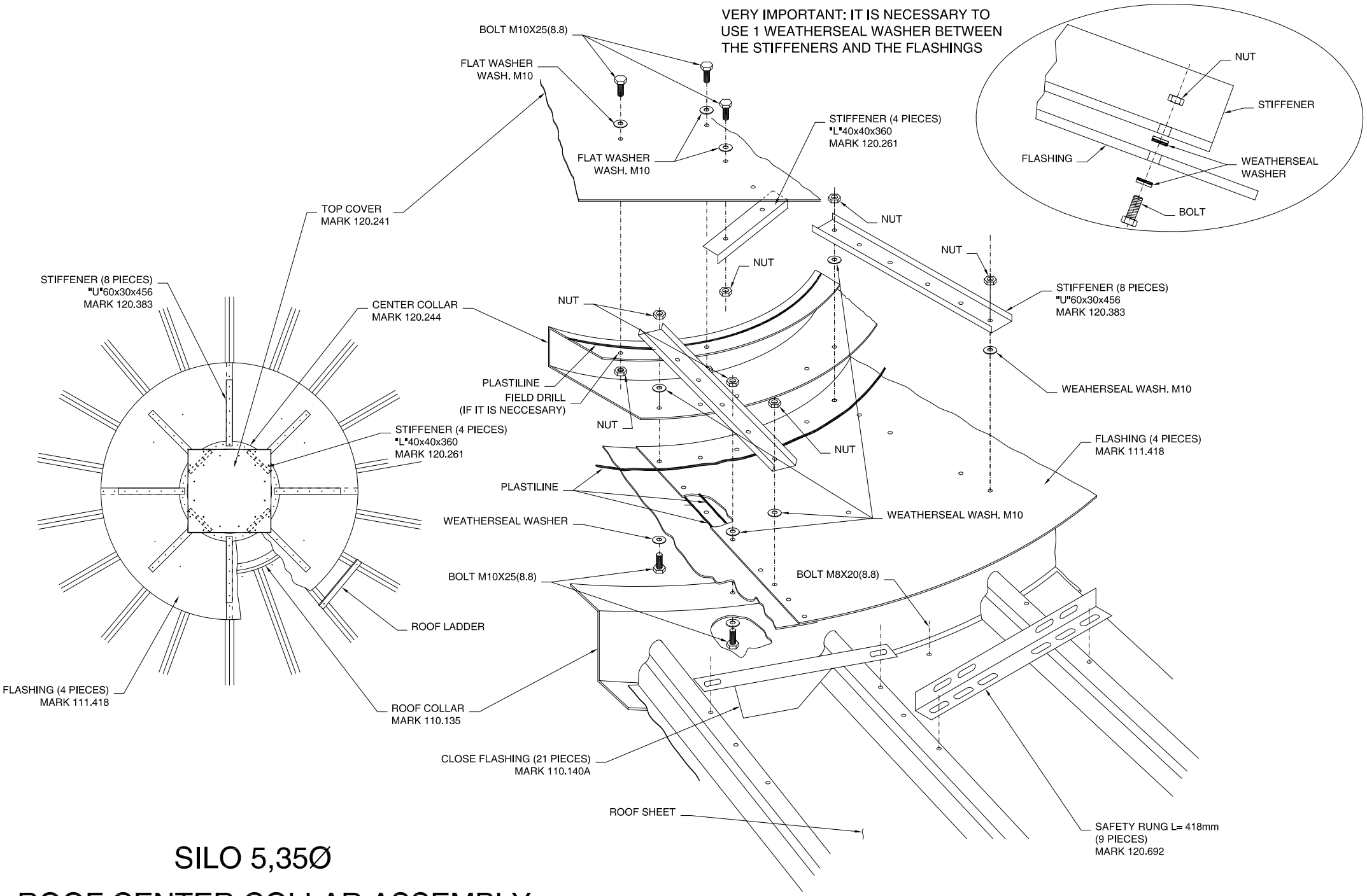


INSIDE VIEW

ROOF ASSEMBLY INSTRUCTIONS



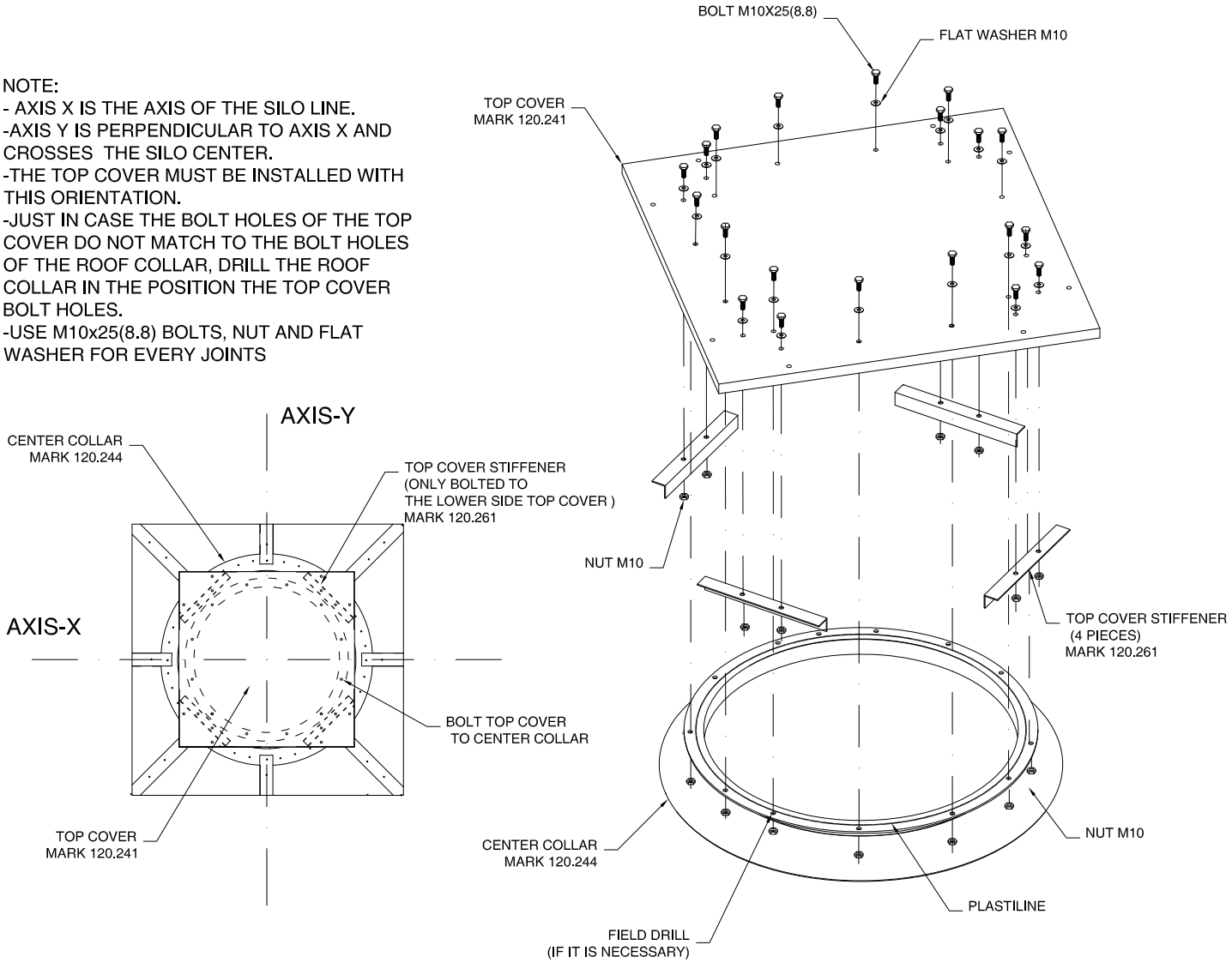
SILO 5,35Ø
ROOF SHEETS DETAILS



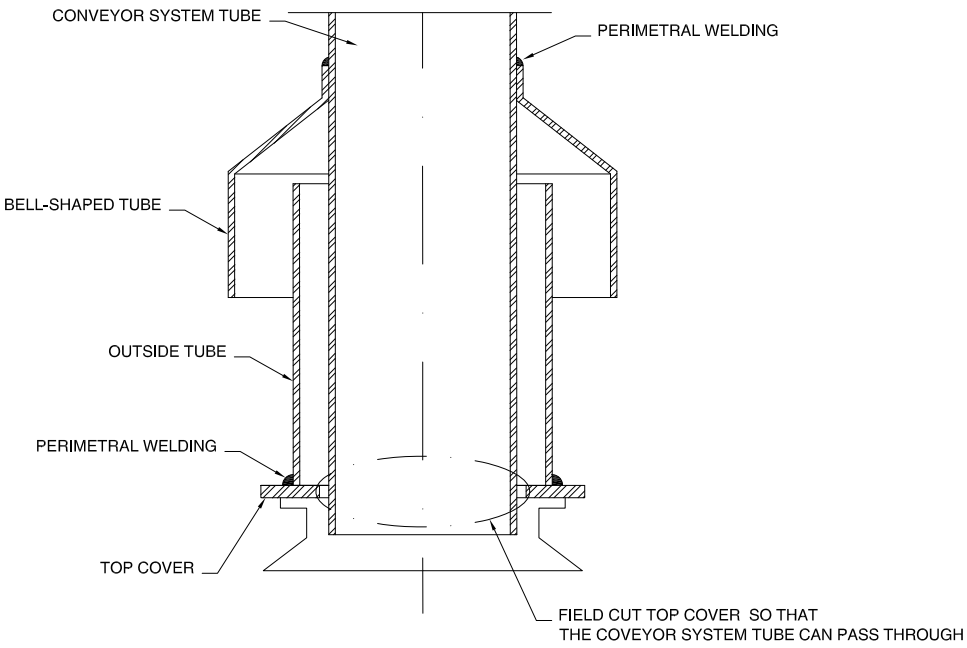
SILO 5,35Ø

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

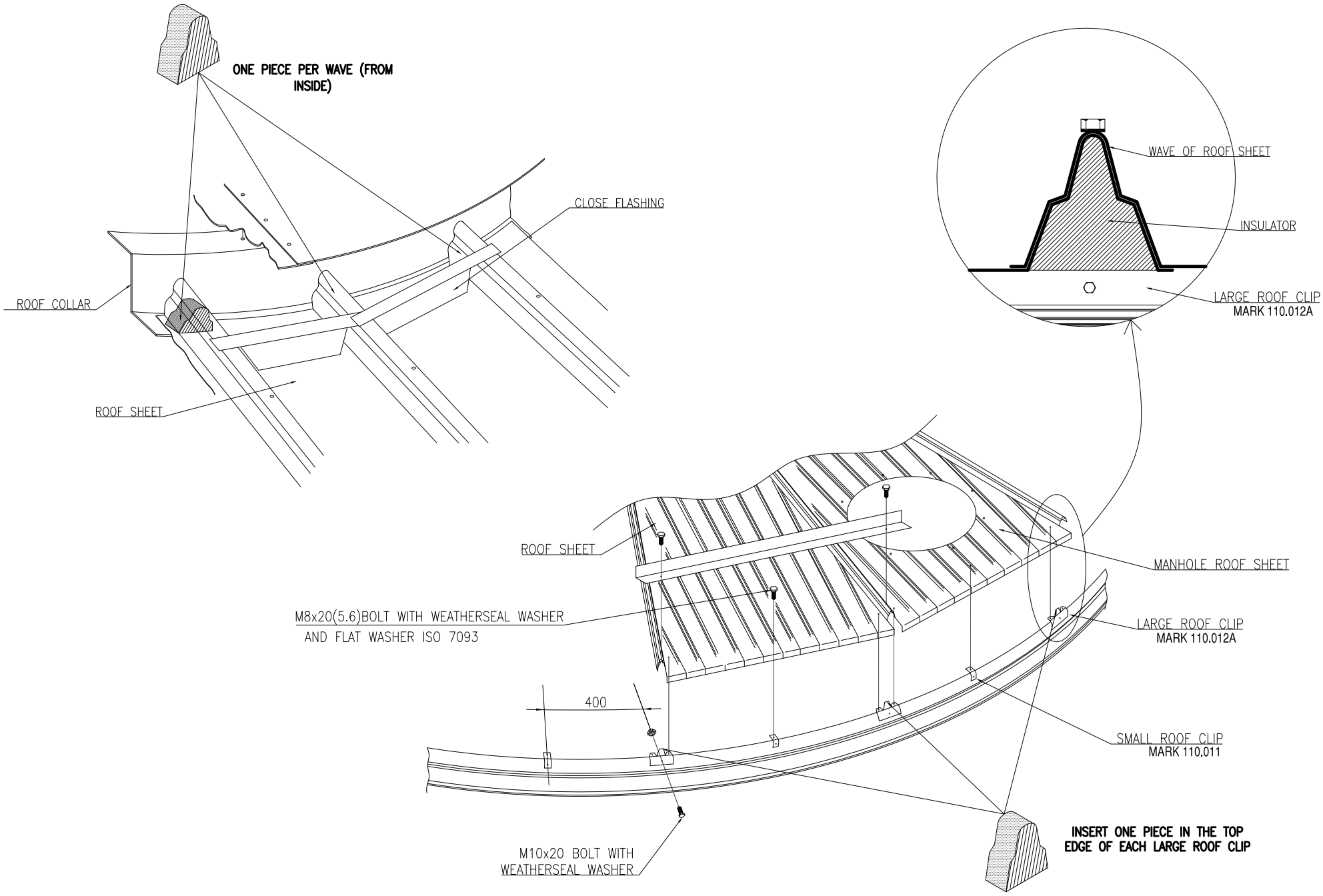


TOP COVER-CENTER COLLAR UNION DETAIL

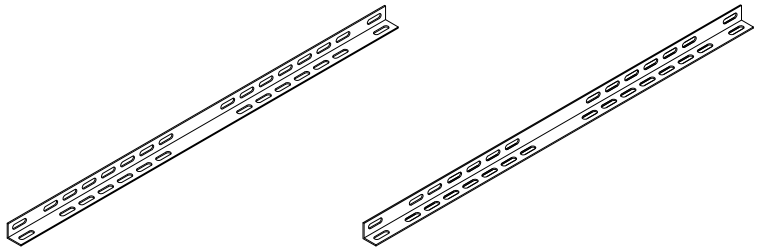


RECOMMENDED CONVEYOR SYSTEM-TOP COVER UNION

ASSEMBLY TOP COVER DETAIL

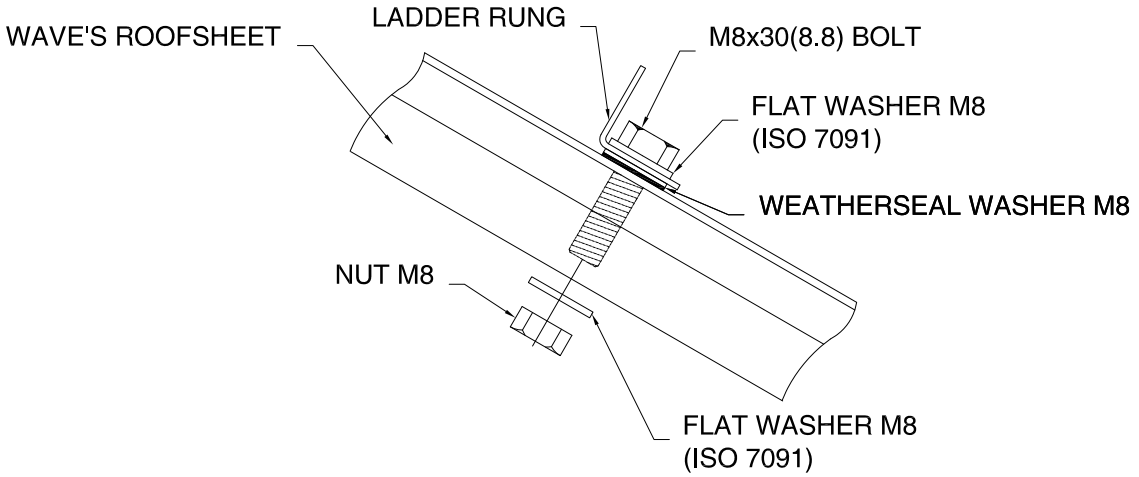


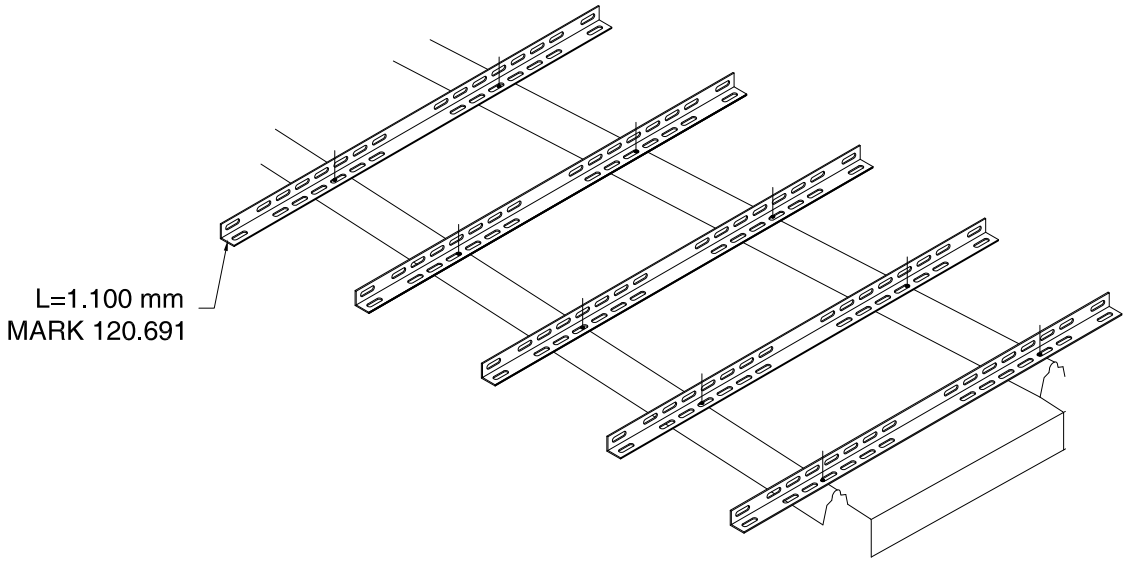
SEALING DETAIL OF ROOF SHEETS WAVES



POSITION "A" POSITION "B"

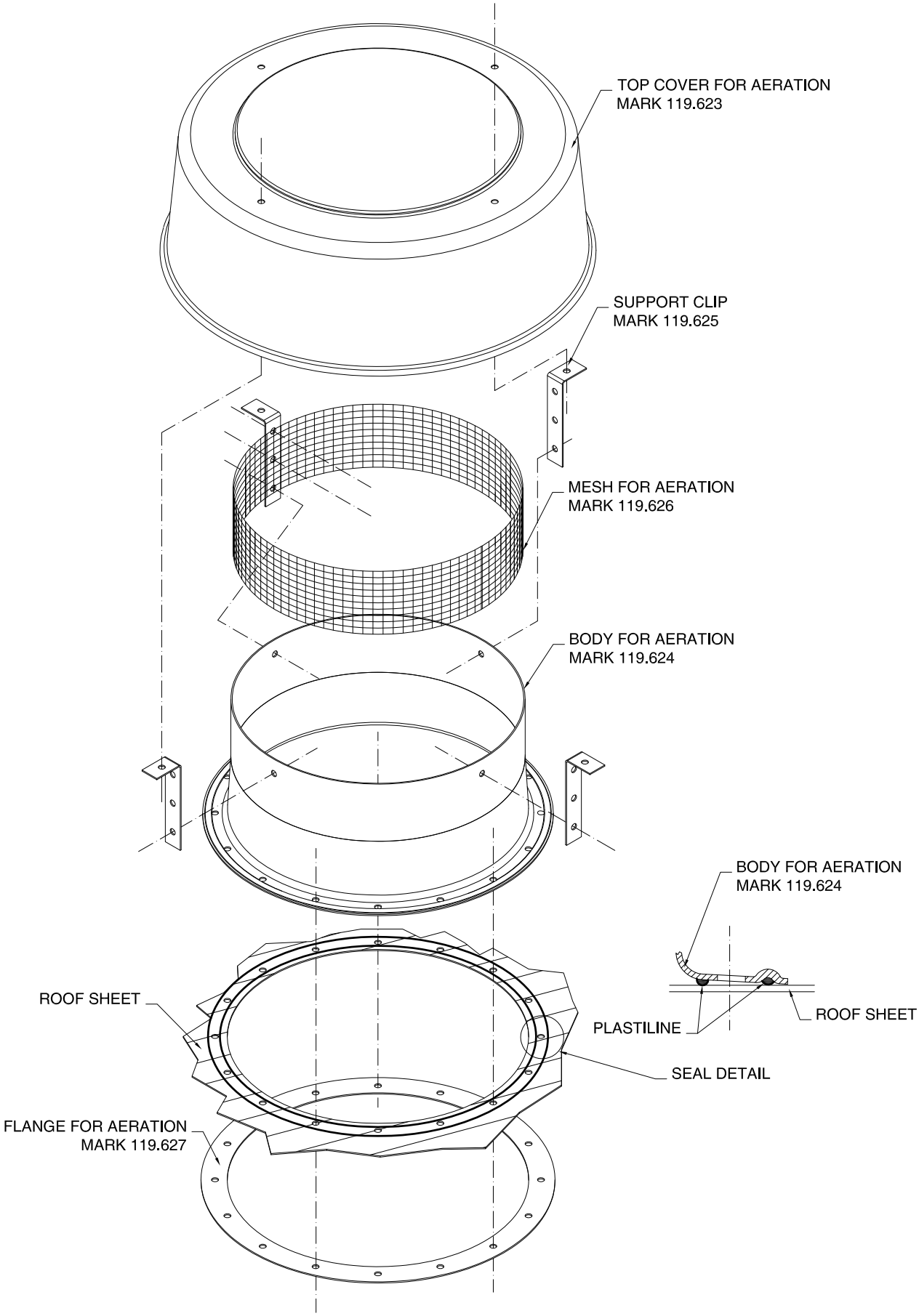
NOTE:
-INSTALL THE RUNGS IN THE POSITION WHERE THE LONG HOLES FIT BETTER WITH THE BOLT HOLE OF ROOF SHEETS.
-TAKE INTO ACCOUNT THE RUNGS ARE SEPARATED 500 mm AMONG THEM



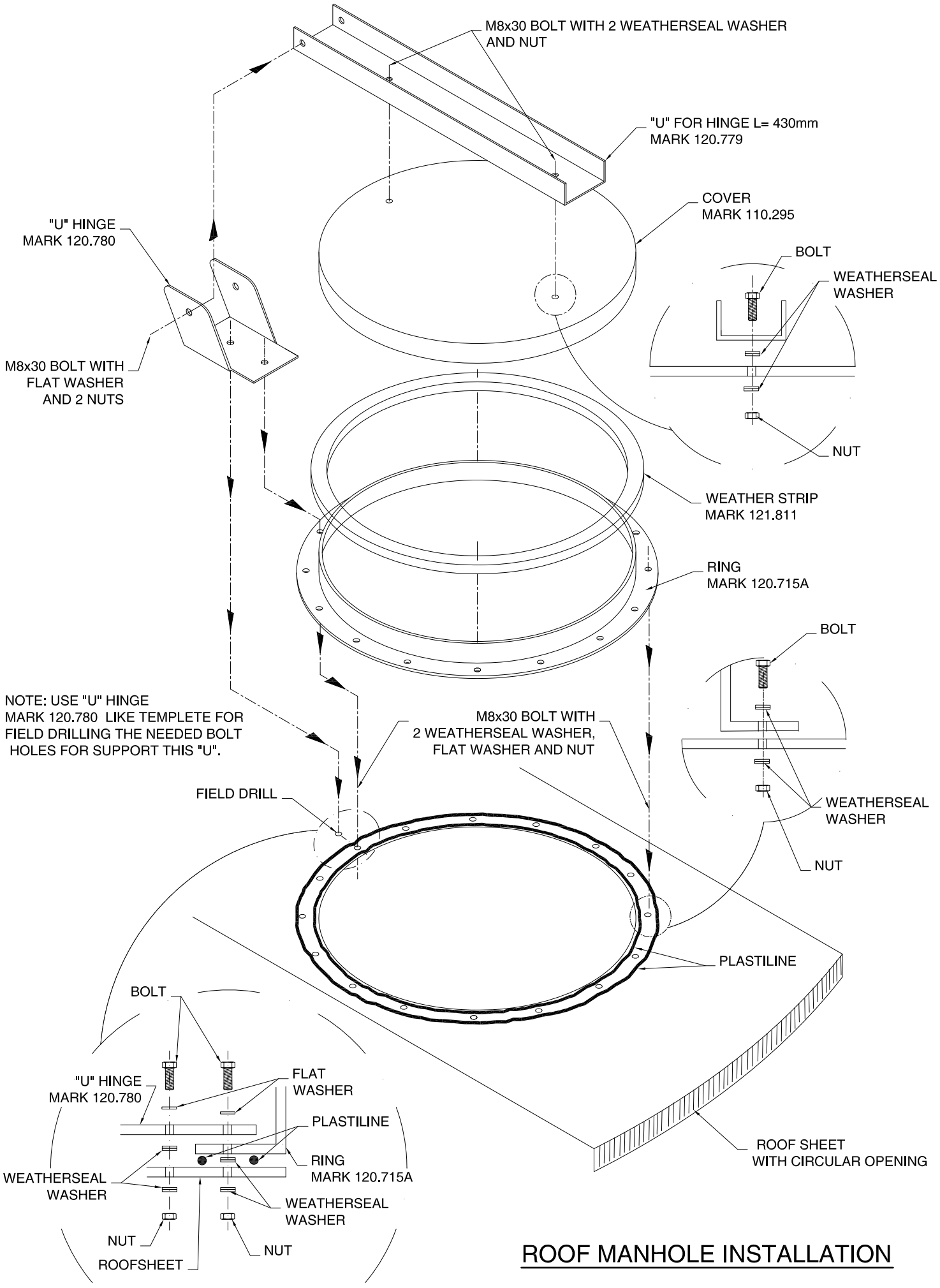


LADDER RUNG ROOF ASSEMBLY SILO 5,35Ø

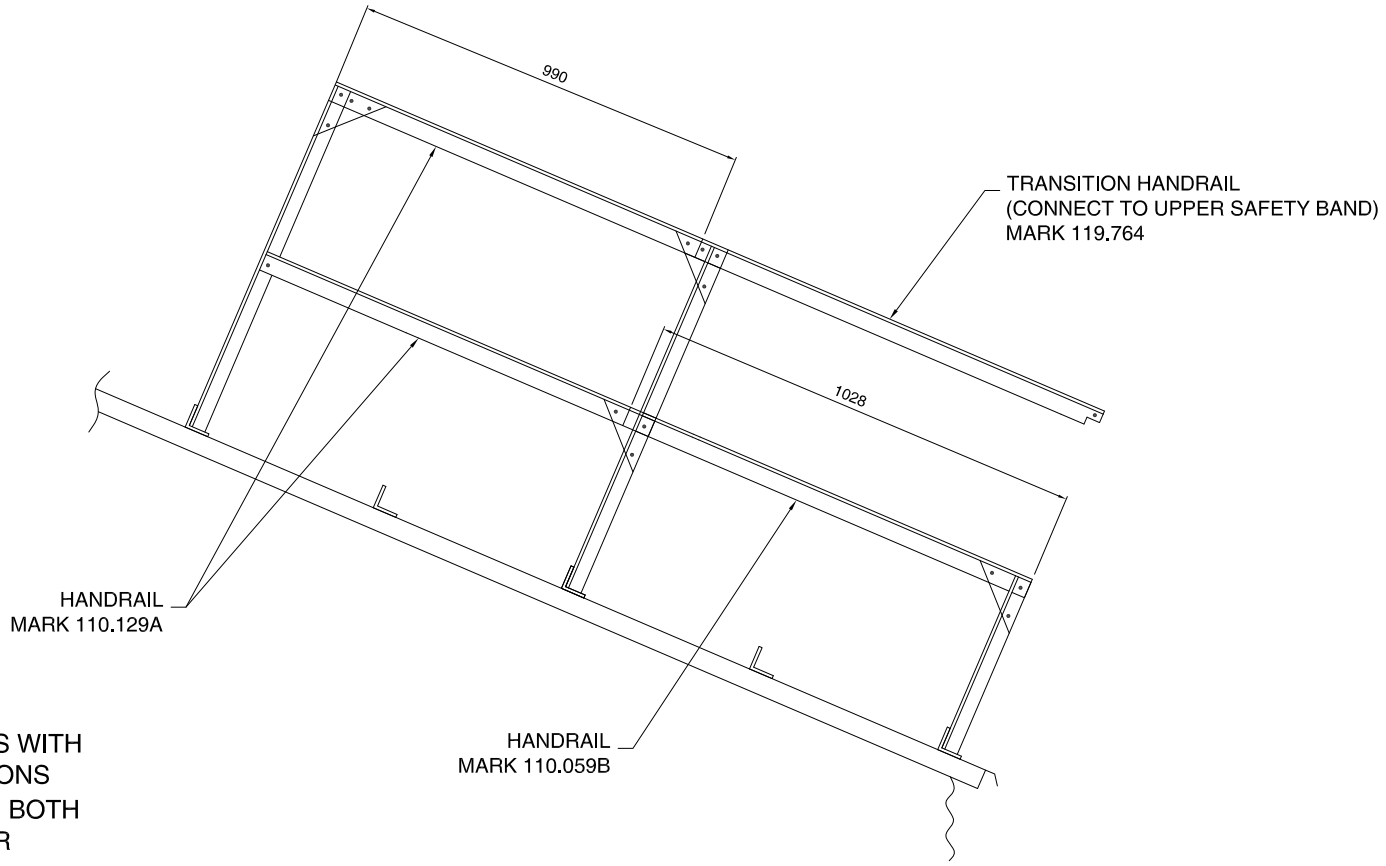
- IT IS VERY IMPORTANT TO SEAL CORRECTLY ALL JOINTS BETWEEN PARTS WITH PLASTILINE
- SILICONE IS ONLY USED TO SEAL THE CONNECTION WITH SILO ROOF SHEET
- USE BOLTS M8x20 (8.8) WITH HEAD OUTSIDE, WEATHERSEAL WASHER OUTSIDE, FLAT WASHER AND NUT INSIDE
- THE DISTRIBUTION OF ROOF AERATION MUST BE UNIFORM AROUND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



INSTALLATION OF ROOF AERATION

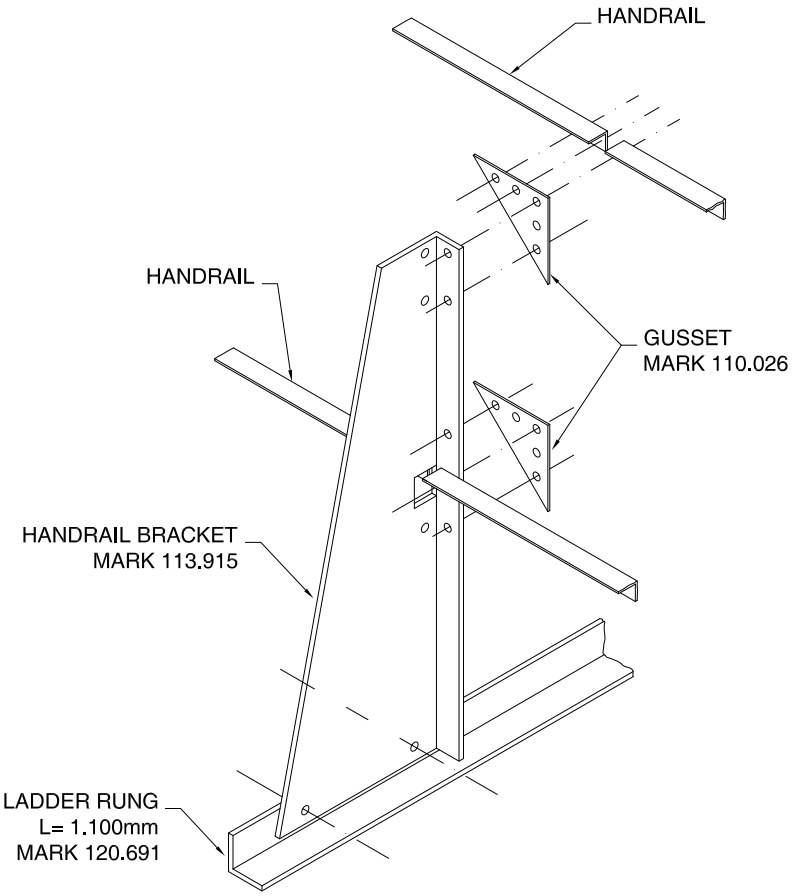


ROOF MANHOLE INSTALLATION

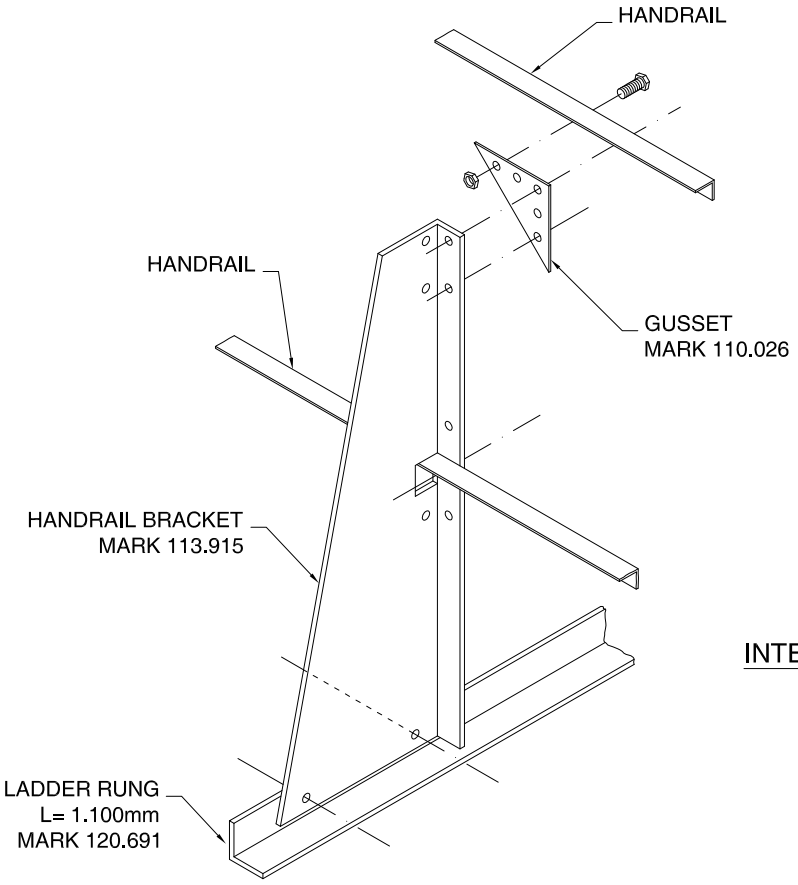


- USE M10x20(8.8) BOLTS WITH NUTS IN ALL CONNECTIONS
- INSTALL HANDRAIL ON BOTH SIDES OF ROOF LADDER

SILO 5,35Ø
ROOF HANDRAIL DETAILS



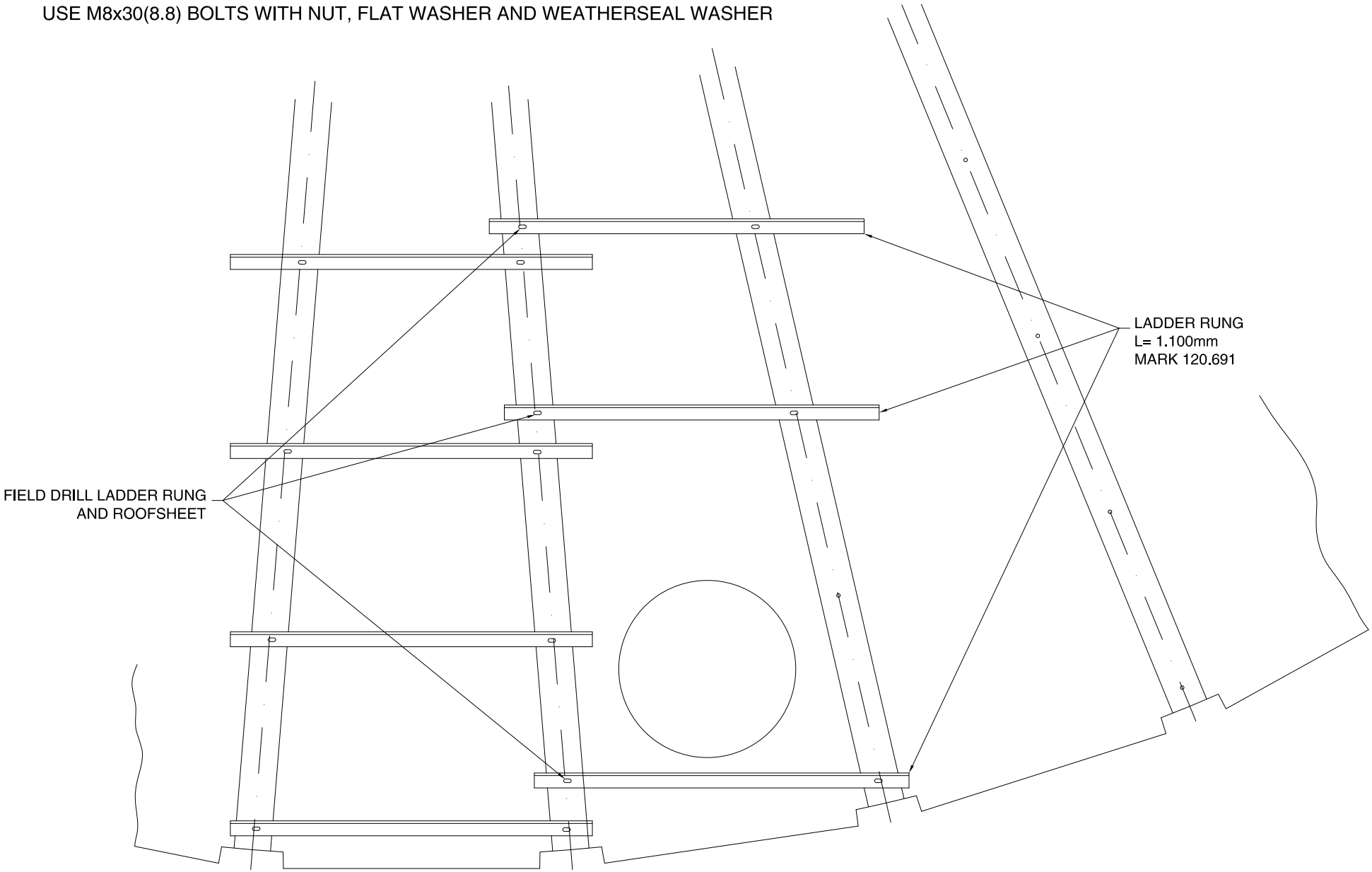
SPLICE DETAIL



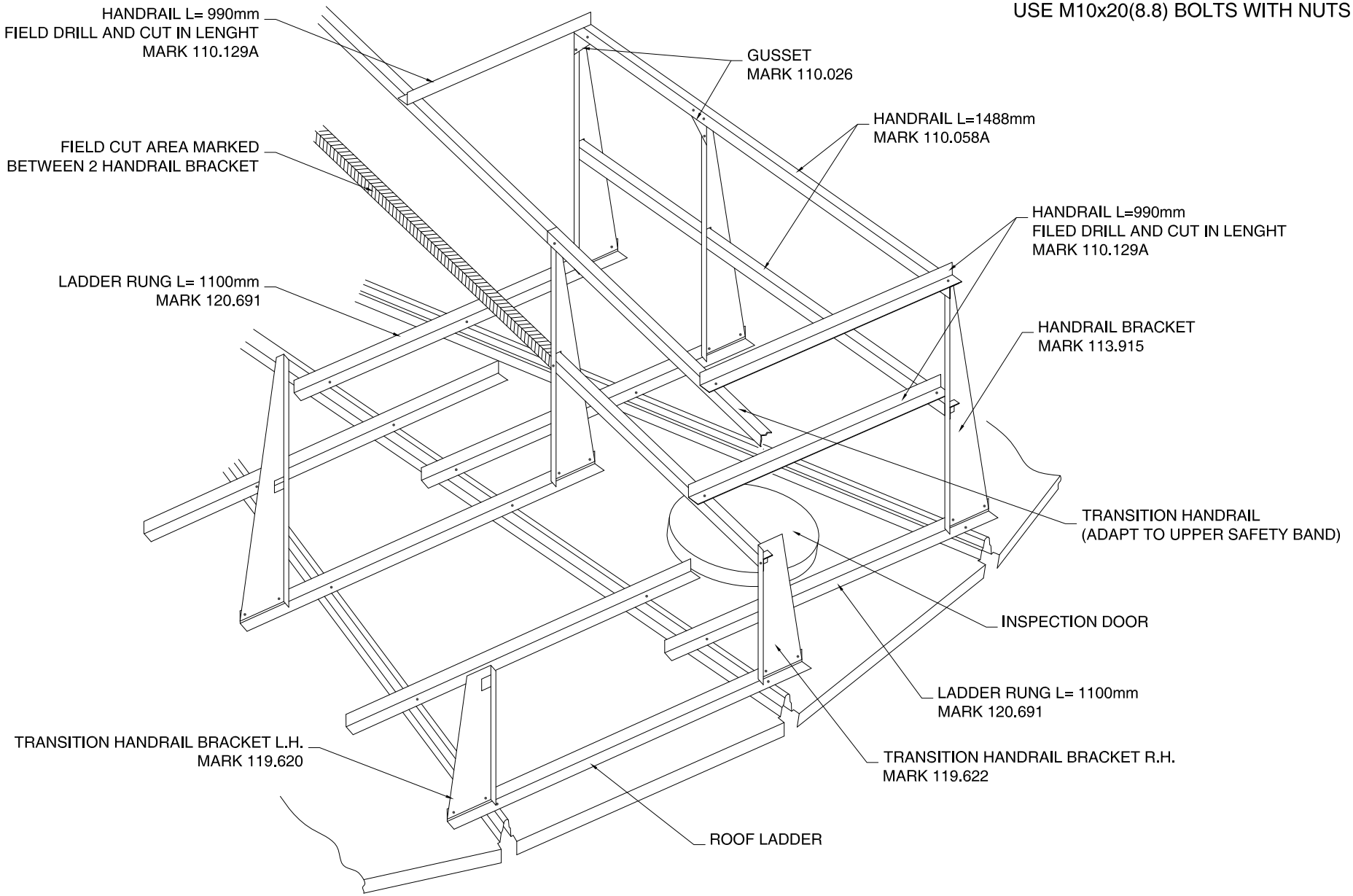
INTERMEDIATE DETAIL

ROOF HANDRAIL DETAILS

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



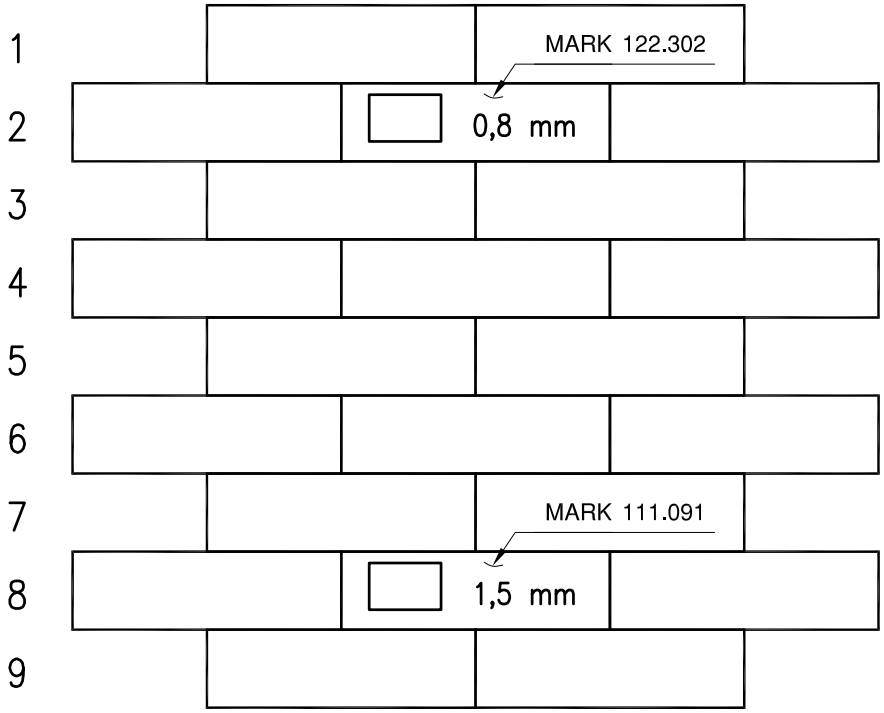
INSTALLATION OF LADDER RUNG FOR PROTECTION ROOF DOOR



PROTECTION OF INSPECTION DOOR

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

SILO 5,35/9 -T45°



BODY SHEETS

QUANT.	THICKNESS (mm)	MARK
7	0,8	110.000A
6	0,8	110.000A
7	0,8	110.000A
7	0,8	110.000A
7	0,8	110.000A
7	0,8	110.000A
7	0,8	110.000A
6	1,0	110.000A
7	1,2	110.000A

BODY SHEET/BODY SHEET SEAM

USE M10x20(8.8) BOLTS WITH HEAD OUTSIDE, WEATHERSEAL WASHER OUTSIDE, FLAT WASHER INSIDE AND NUT INSIDE.

BODY SHEET/STIFFENERS SEAM

USE M10x25(8.8) BOLTS WITH HEAD INSIDE, WEATHERSEAL WASHER INSIDE AND NUT OUTSIDE.

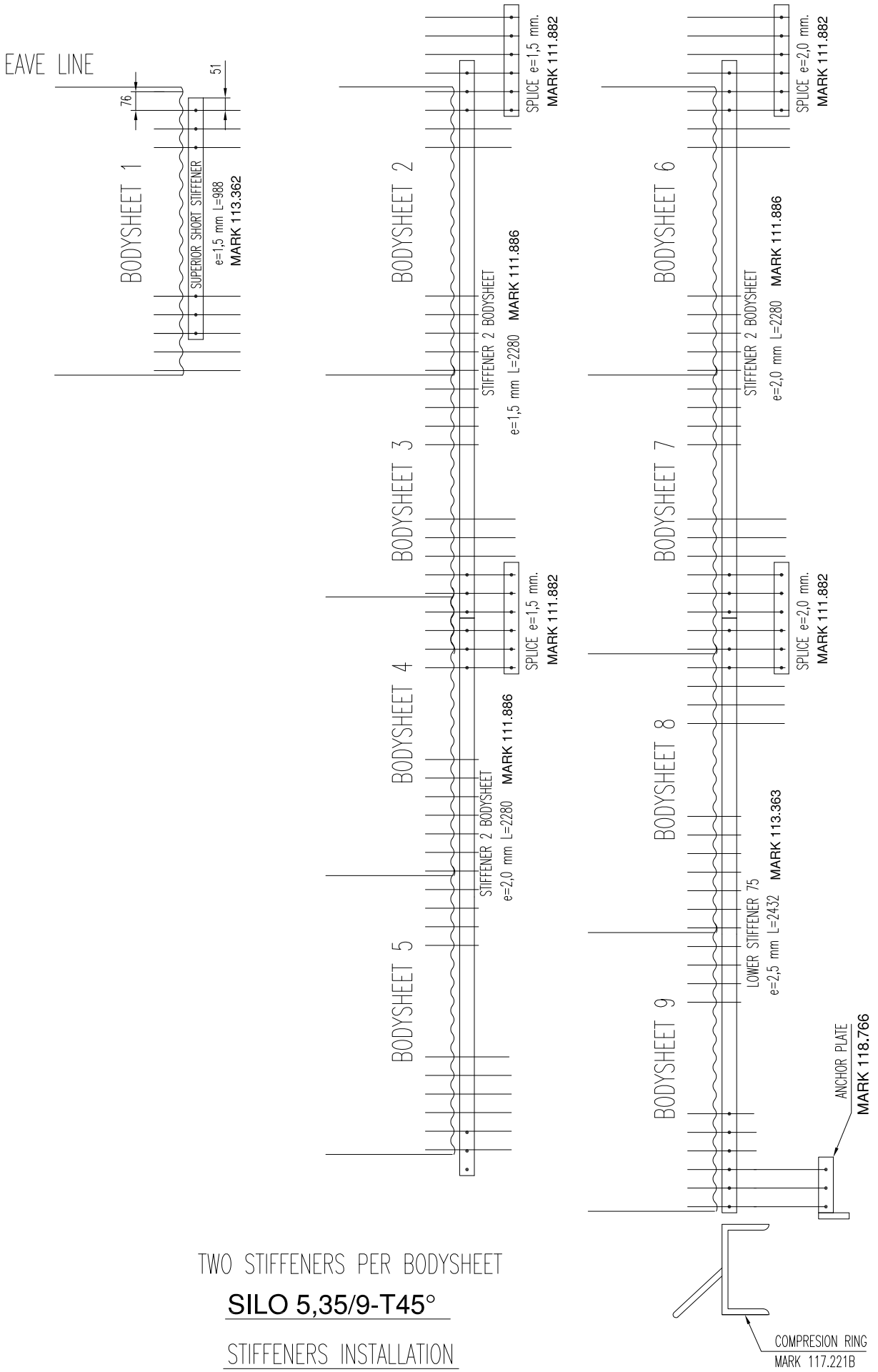
STIFFENER/STIFFENER SPLICE

USE M10x20(8.8) BOLTS WITH NUT AND 2 FLAT WASHERS.

BODY SHEETS COMPOSITION

VERY IMPORTANT:

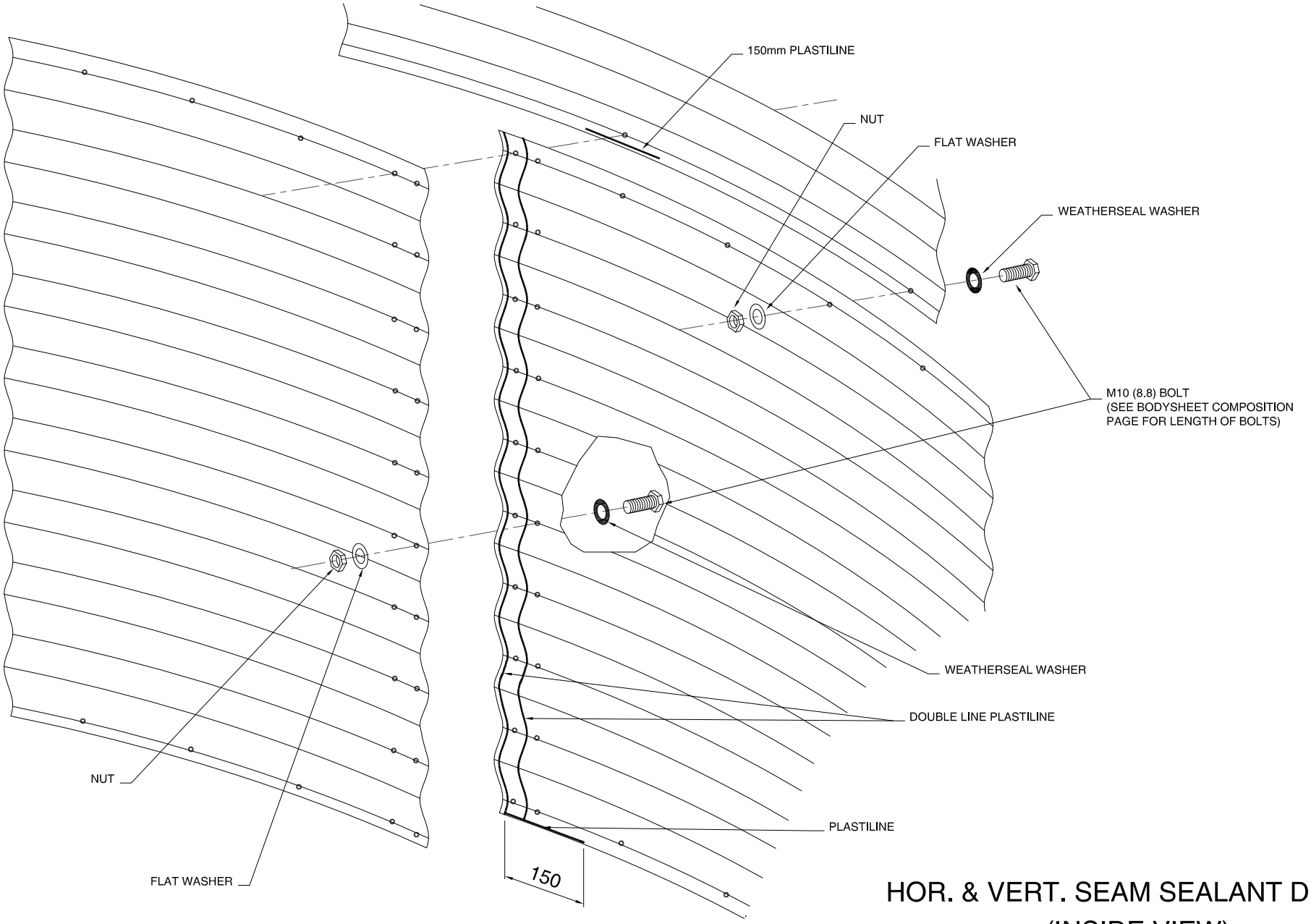
THE FOREMAN IN CHARGED MUST CHECK THAT THERE ARE ENOUGH STIFFFENERS WITH THEIR CORRESPONDING THICKNESS TO INSTALL EVERY SILOS.



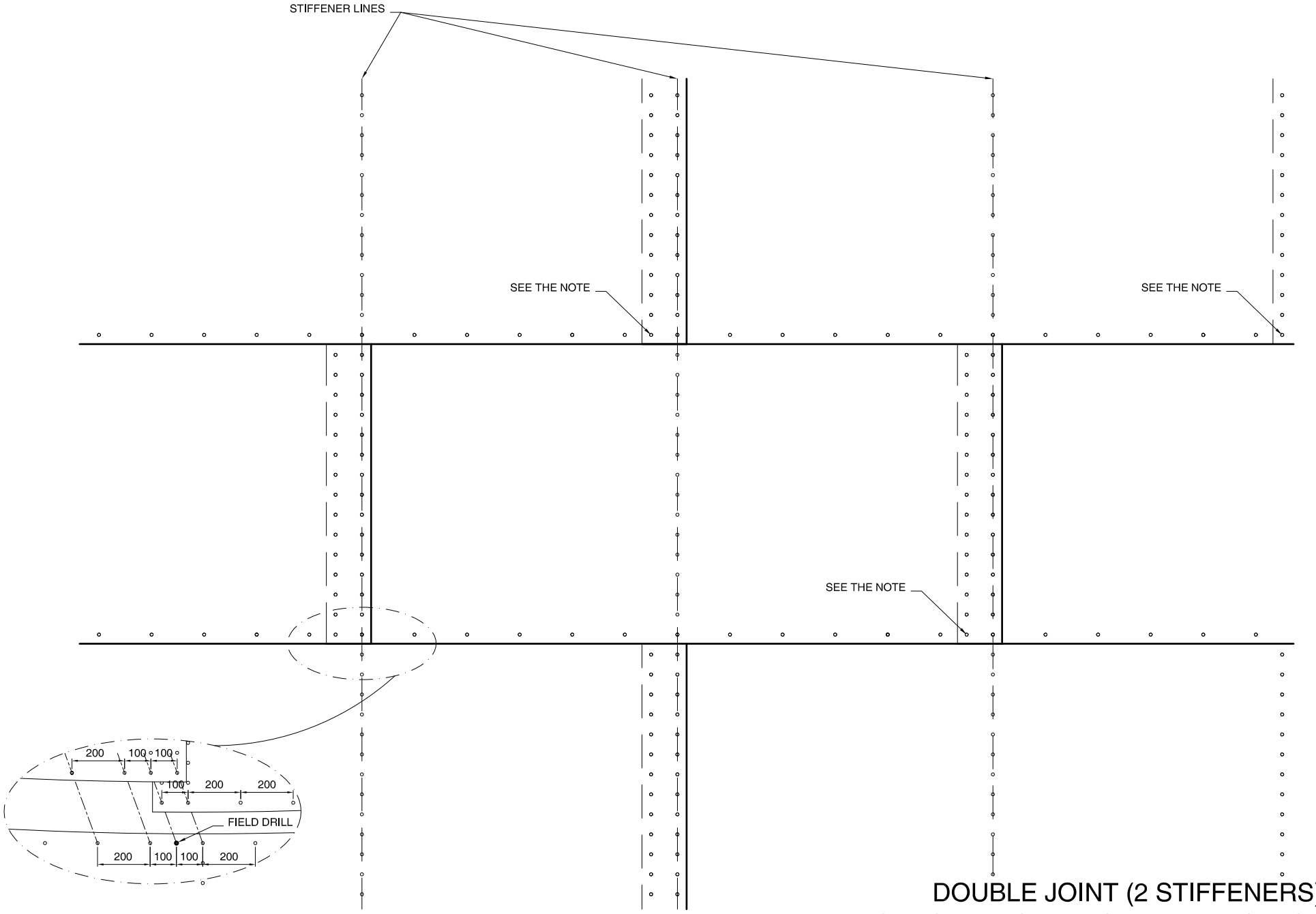
TWO STIFFENERS PER BODYSHEET

SILO 5,35/9-T45°

STIFFENERS INSTALLATION



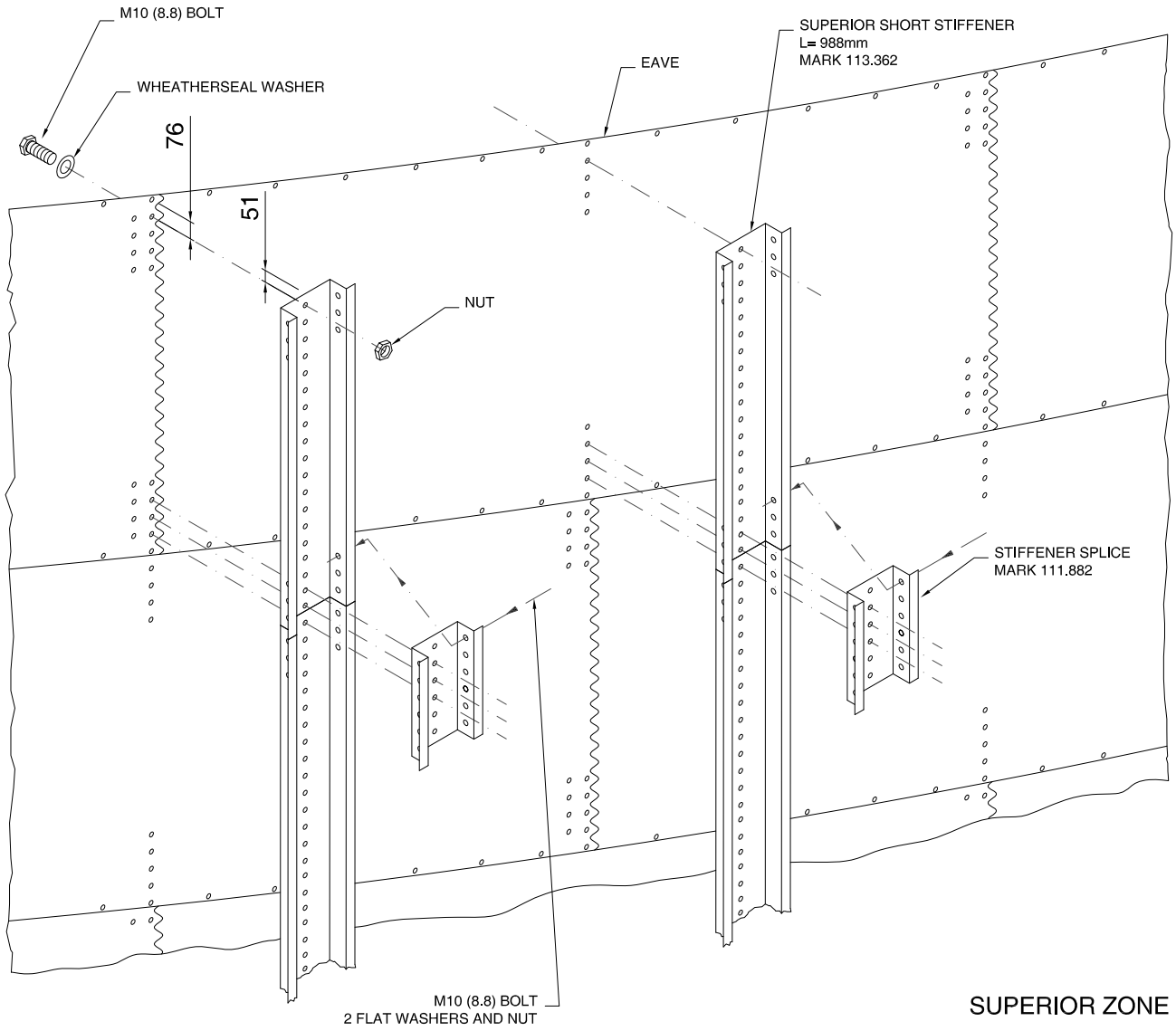
HOR. & VERT. SEAM SEALANT DETAIL (INSIDE VIEW)



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.

* SEE BODYSHEET COMPOSITION PAGE FOR LENGTH OF BOLTS



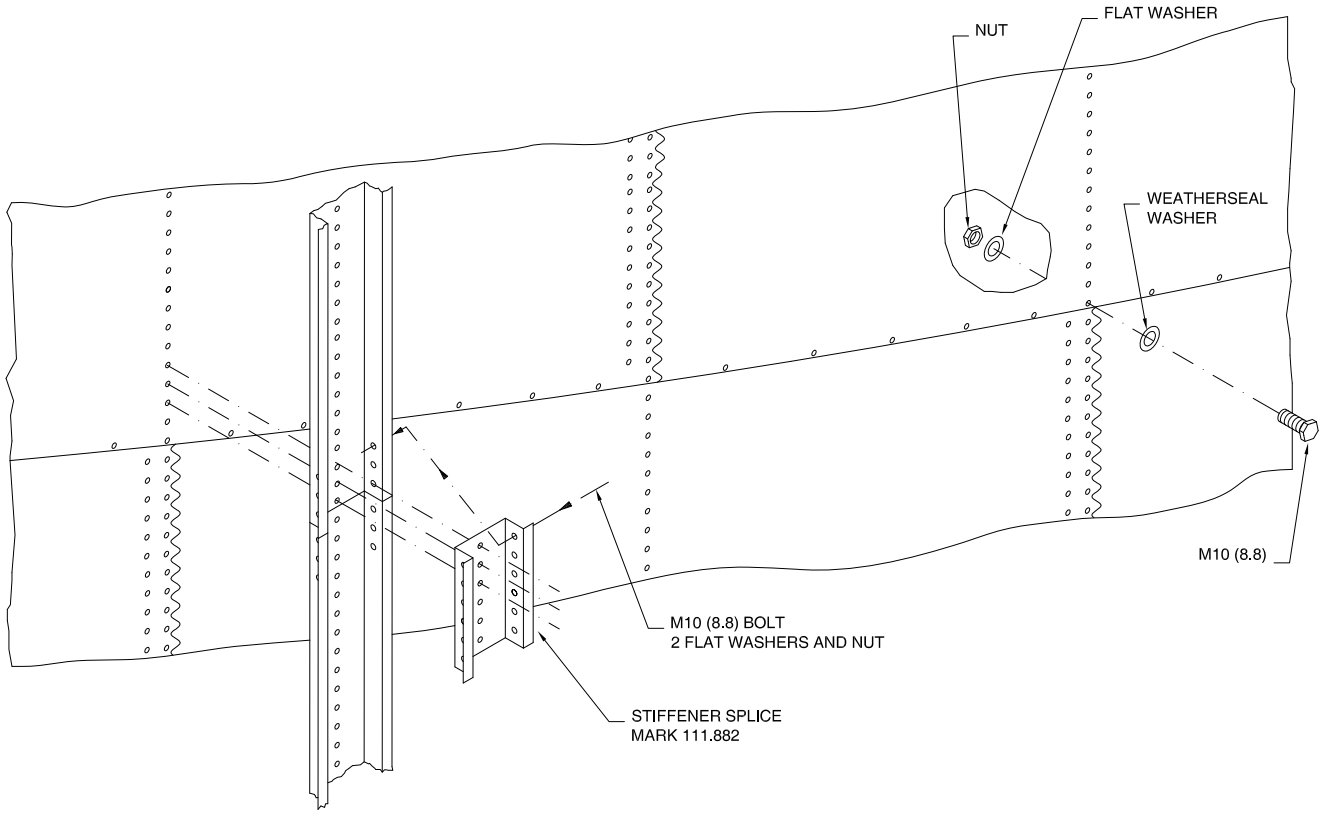
SUPERIOR ZONE

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

BODYSHEETS AND STIFFENERS DETAILS (OUTSIDE VIEW)

* SEE BODYSHEET COMPOSITION PAGE FOR LENGTH OF BOLTS

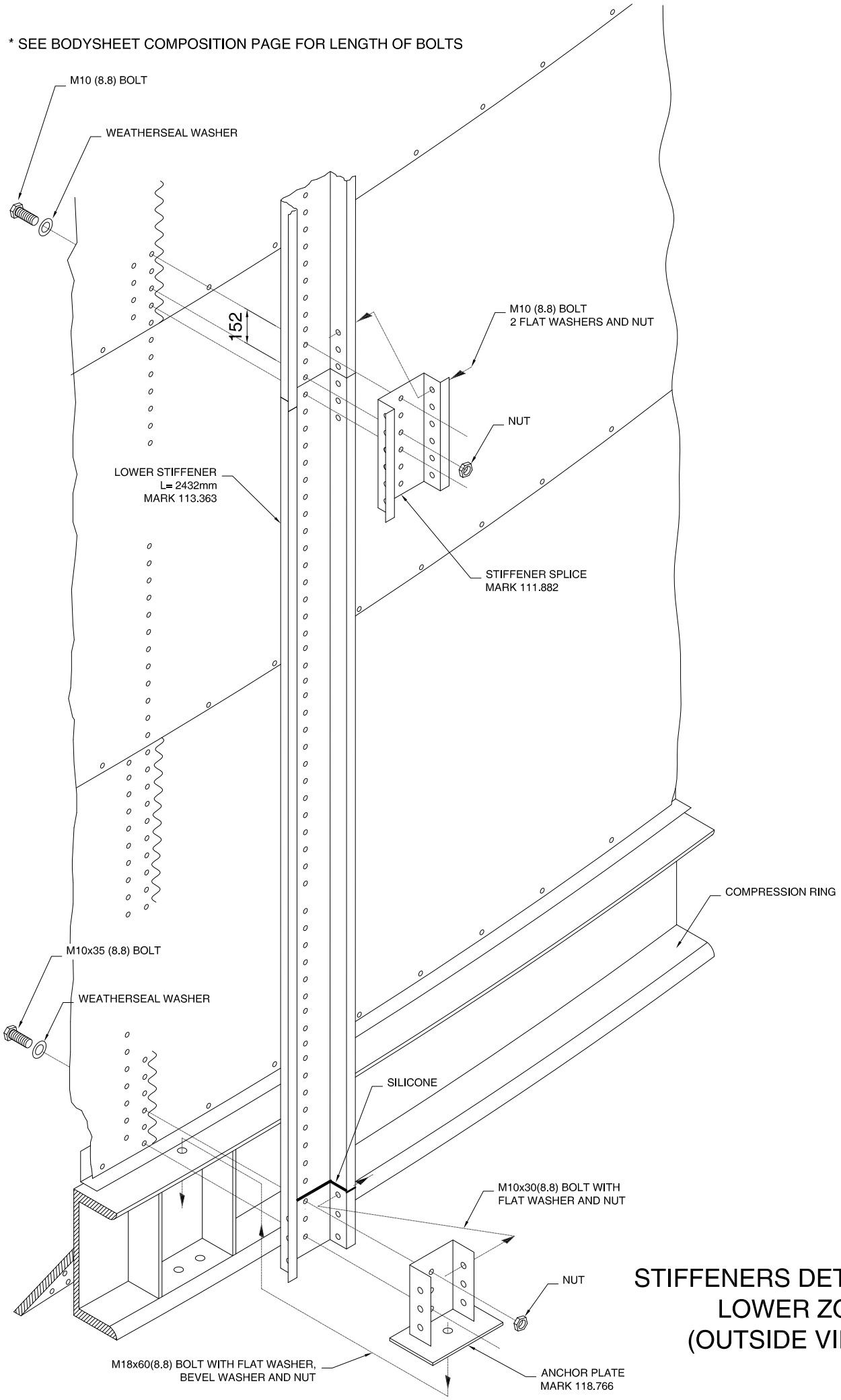
INTERMEDIATE ZONE



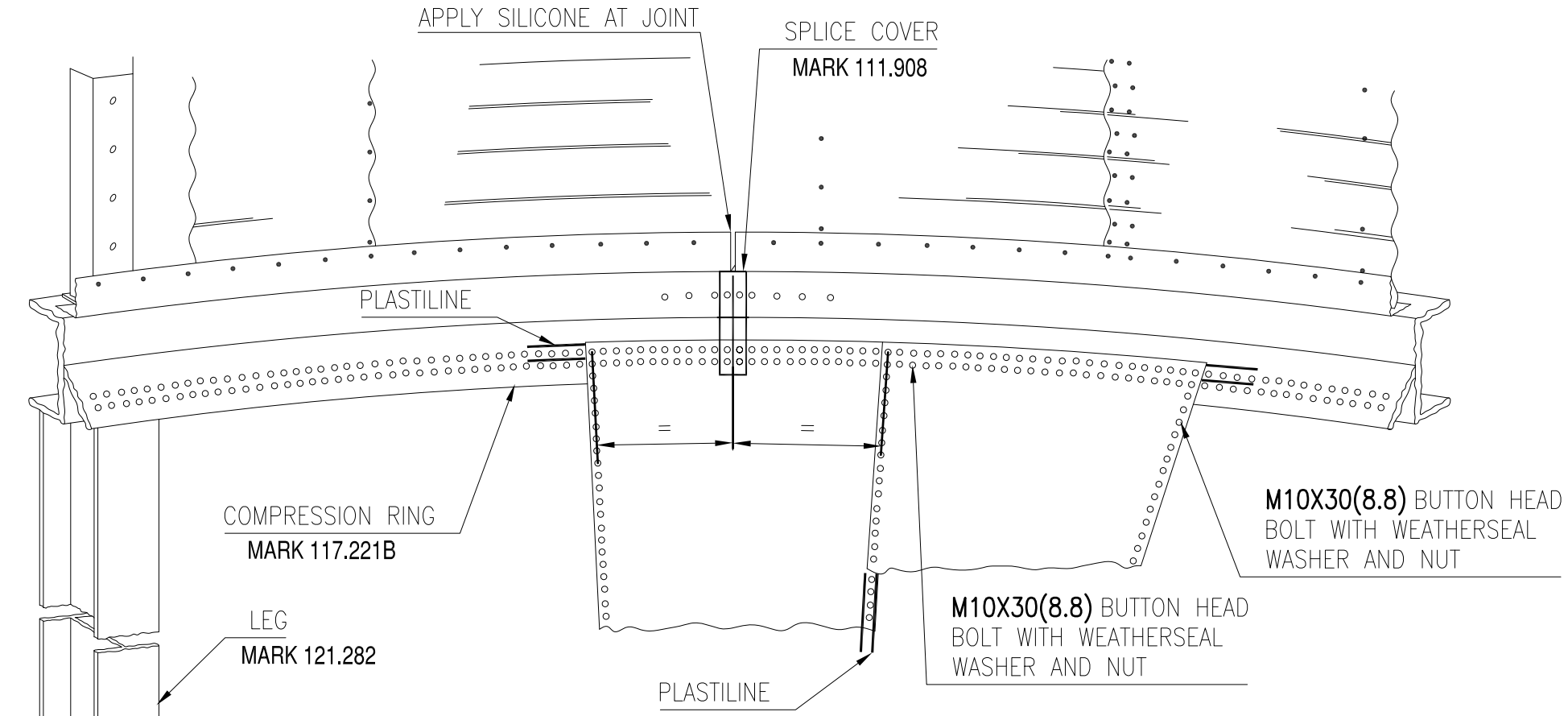
NOTE:
WHEN INSTALL STIFFENERS, IT IS VERY IMPORTAN
NOT TO ALLOW STIFFENERS TO SLIP DOWNWARD WHEN TIGHTENING.
STIFFENERS MUST BE IN CONTACT.

BODYSHEETS AND STIFFENERS DETAILS (OUTSIDE VIEW)

* SEE BODYSHEET COMPOSITION PAGE FOR LENGTH OF BOLTS

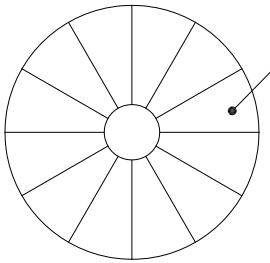


STIFFENERS DETAIL LOWER ZONE (OUTSIDE VIEW)



NOTES:

1.–PLACE PLASTILINE AROUND INSIDE OF SPLICE BEFORE BOLTING TO COMPRESSION RING.
2.–POSITION HOPPER CONE TO ALLOW GATE TO OPEN IN DESIRED DIRECTION.
3.–STAGGER JOINS ON BASE ANGLES, COMPRESSION RINGS AND HOPPER SHEETS AS SHOWN.
4.–AFTER ASSEMBLY IS COMPLETE, THE SILO MUST BE LEVELED. CHECK LEVEL AT EACH LEG. SHIMS OR GROUT MUST BE PLACED UNDER THE BASE PLATE AS NEEDED TO ALLOW THE FULL AREA OF BASE PLATES TO BEAR ON THE FOUNDATION.

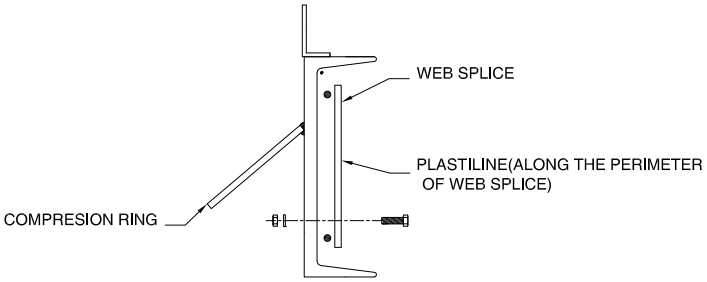


HOPPER SHEET

(12) MARK 110.841
(1) MARK 114.565
(1) MARK 117.289

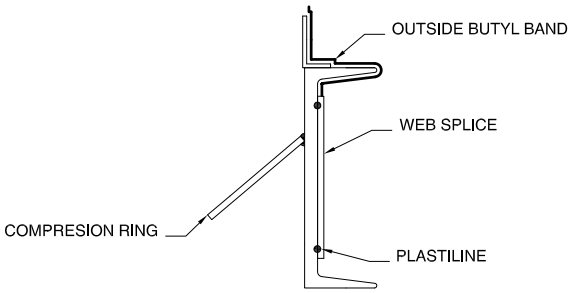
SILO 5,35Ø/ -T 45

HOPPER DETAILS



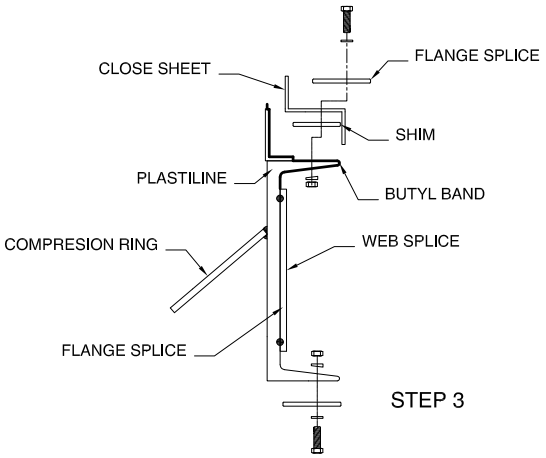
STEP 1

LAY THE RING SECTORS IN A CIRCLE.
PUT WEB SPLICES AND BOLT ONLY THE LOWER BOLTS LINE. SEAL WEB SPLICES WITH PLASTILINE(COVERING THE PLASTILINE WITH THE WEB SPLICE).



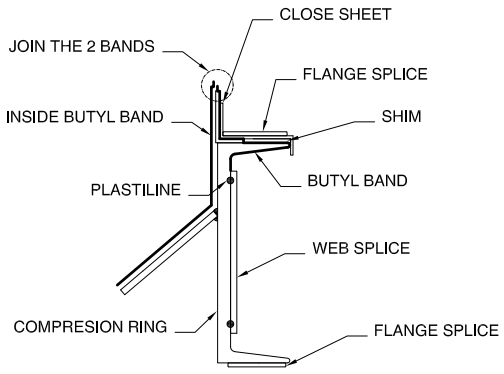
STEP 2

STICK THE OUTSIDE BUTYL BAND FROM THE TOP TO DOWN AND SEAL IT WITH SILICONE.



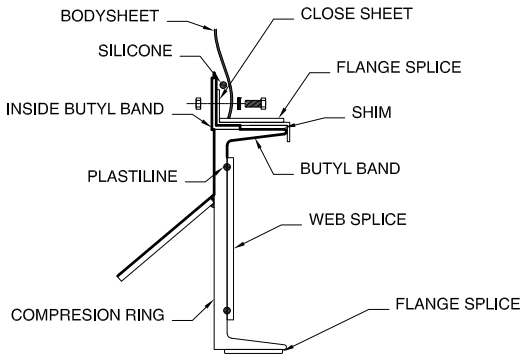
STEP 3

PUT SHIM , CLOSE SHEET AND FLANGE SPLICE, IN THIS SEQUENCE. BOLT THE MENTIONED PIECES TOGETHER(ON 2 CENTRAL BOLT HOLES).



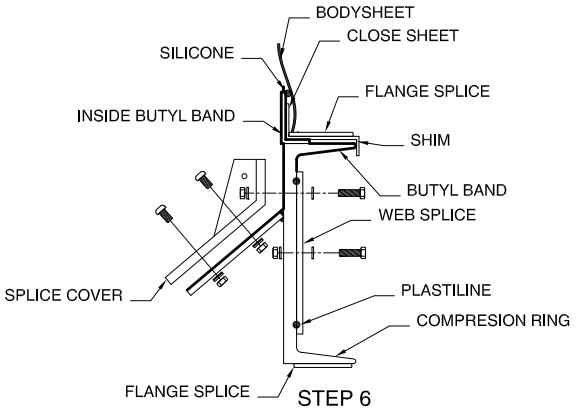
STEP 4

STICK THE INSIDE BUTYL BAND FROM THE TOP TO DOWN JOIN BOTH BANDS.



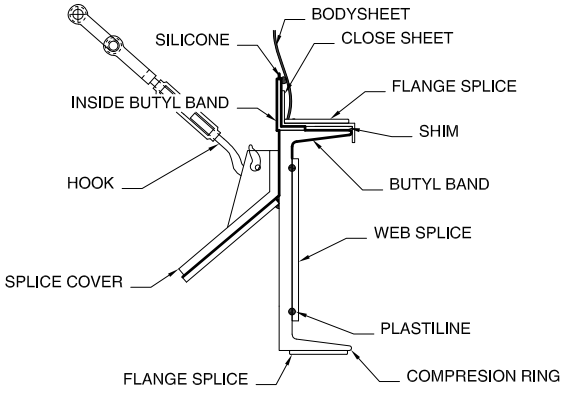
STEP 5

DRILL BODYSHEET AND CLOSE ANGLE FOR PUTTING THE 3 BOLTS INDICATED.



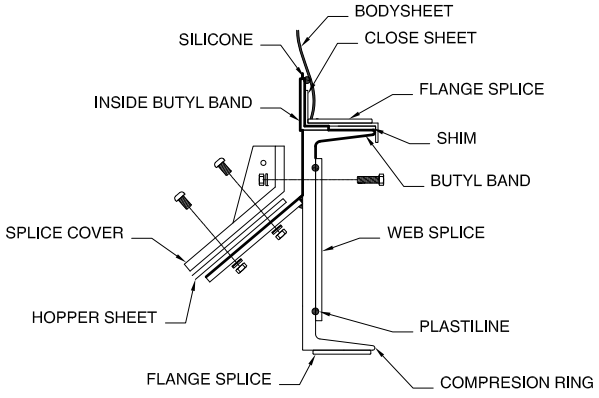
STEP 6

BOLT THE SPLICE COVER AND PUT THE REST OF THE WEB SPLICE'S BOLTS (TAKING ACCOUNT THAT THE UPPER BOLTS LINE MUST BE SEALED SILICONE AROUND THE HOLES AND USE 2 FLAT WASHER AND NUT)



STEP 7

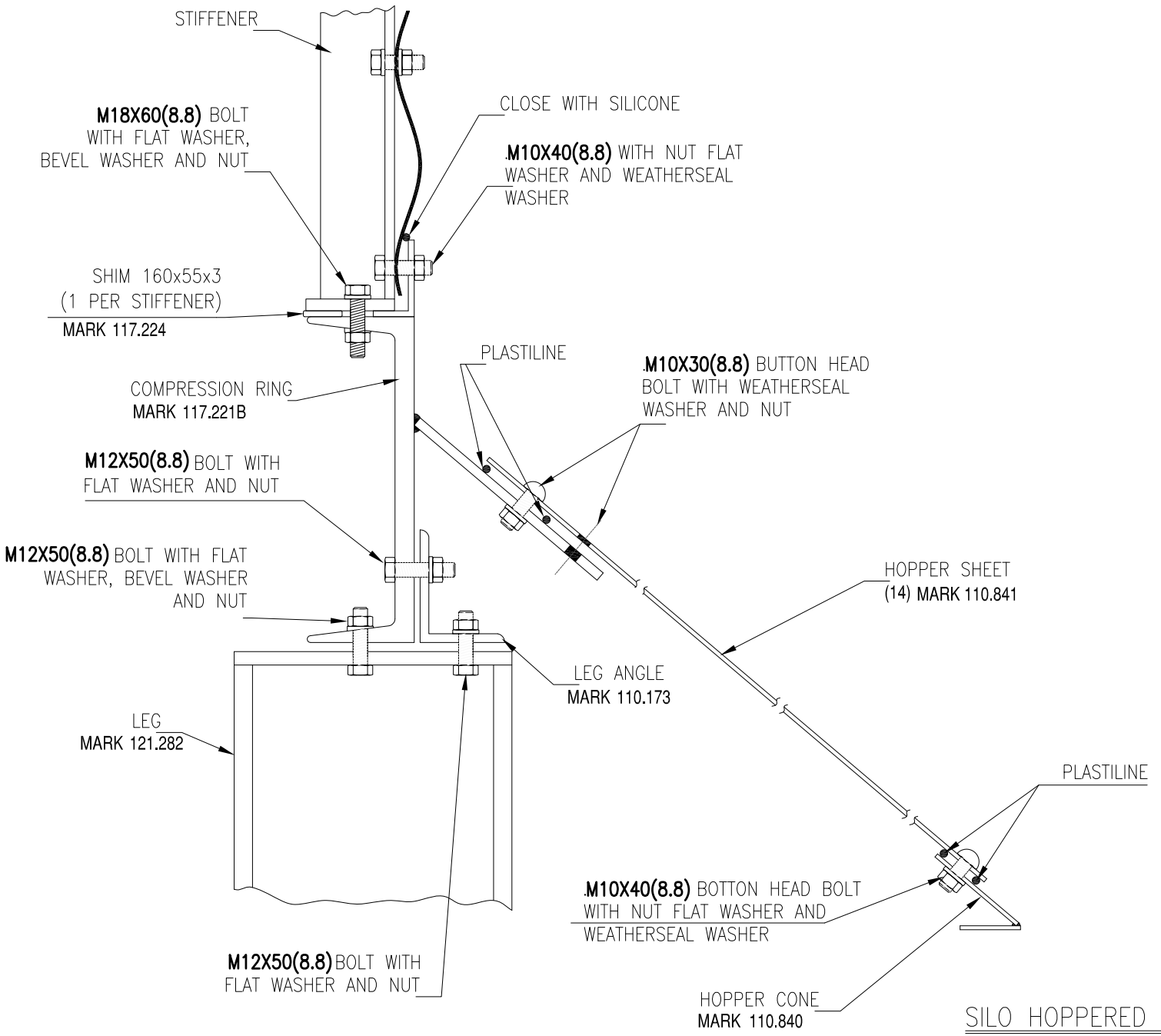
LIFT THE SILO BODY AND COMPRESSION RING BY SPLICE COVERS.
ASSEMBLY THE COMPRESSION RING TO LEGS



STEP 8

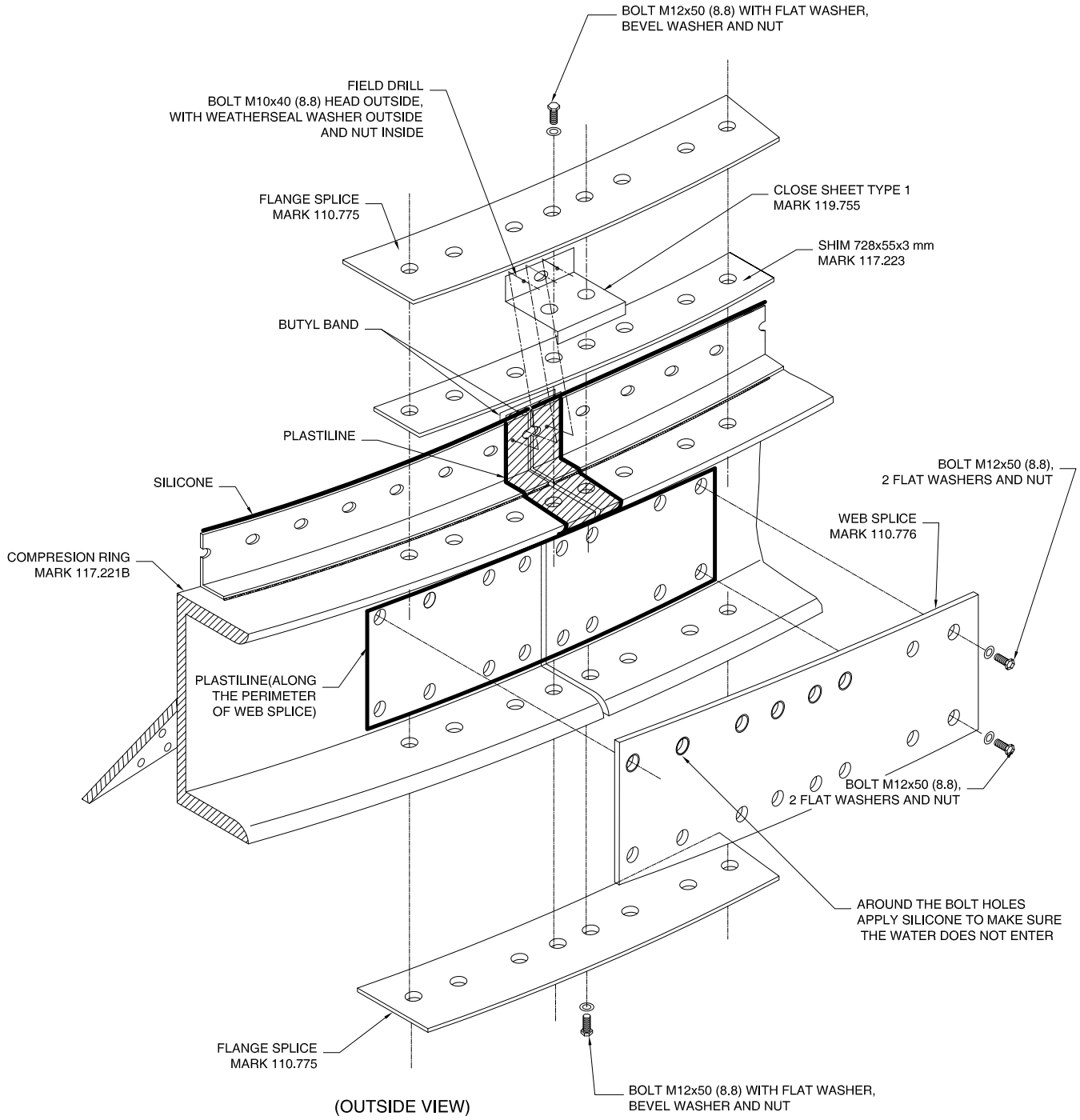
UNSCREW SPLICE COVERS FOR PUT HOPPER SHEETS.
SEAL INSIDE BUTYL BAND WITH SILICONE.
BOLT AGAIN SPLICE COVERS WITH HOPPER SHEETS TO THE COMPRESSION RING.

JOINT COMPRESSION RING PROCESS



SILO HOPPERED 5,35Ø/ –T 45°

HOPPER DETAILS



(OUTSIDE VIEW)

NOTE:

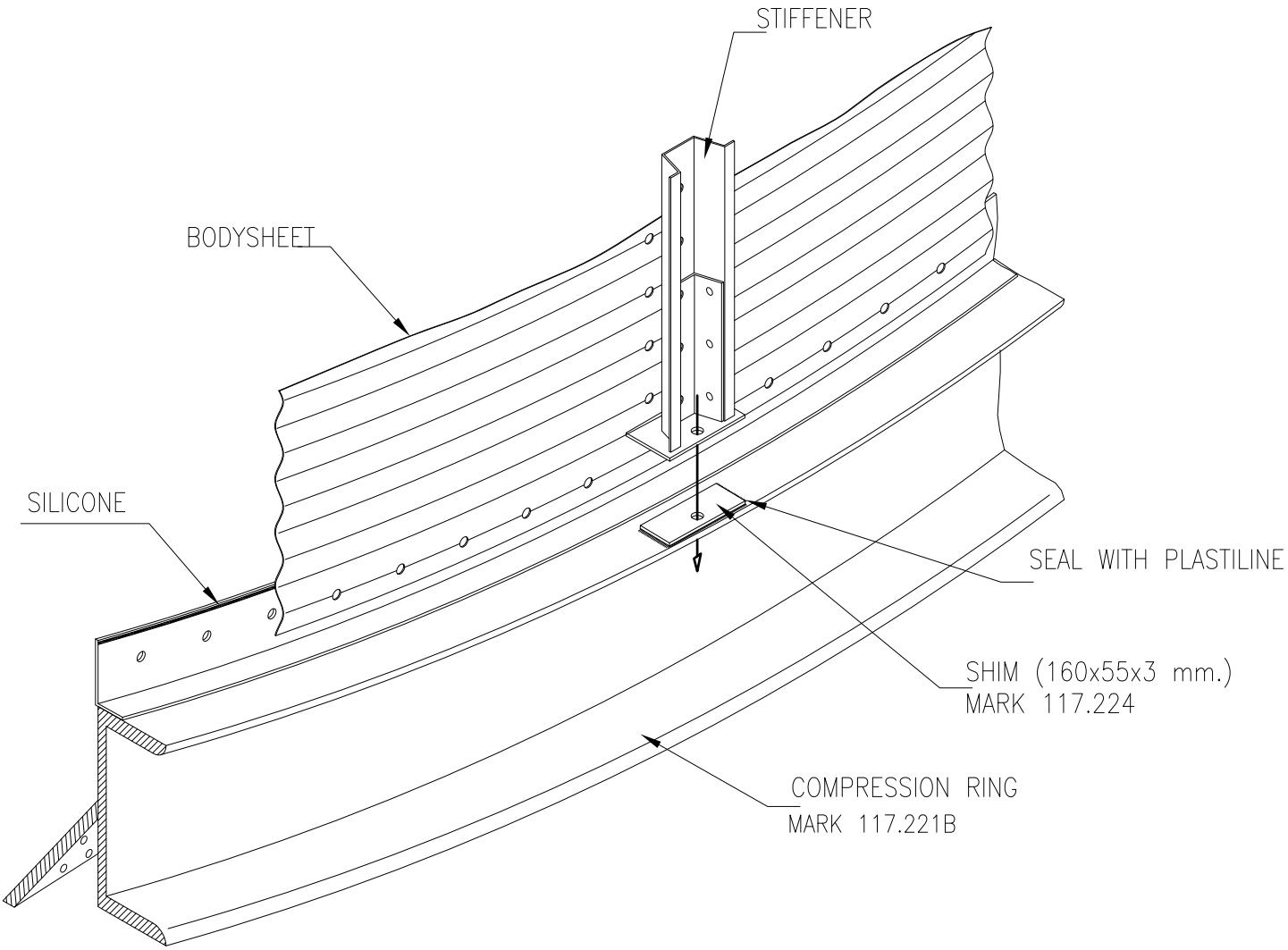
-STICK THE 2 BUTYL BANDS THOROUGHLY, FROM THE TOP TO DOWN.

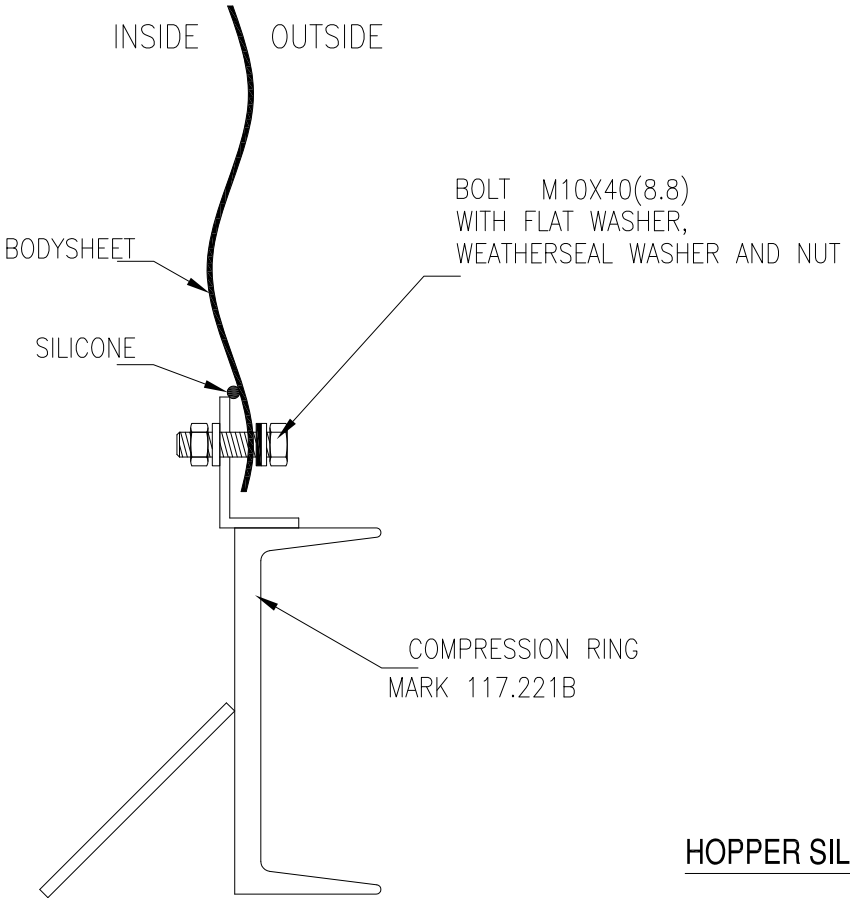
-JOIN BOTH BANDS AT THE POINT INDICATED.

-SEAL WITH PLASTILINE ON THE BAND'S PERIMETER

-APPLY SILICONE IN THE GAP BETWEEN BODYSHEET AND COMPRESSION RING AFTER THE COMPRESSION RING IS TOTALLY ASSEMBLIED AND PUT IN THE LEGS.

HOPPER SILO 5,35 Ø T45°
JOINT DETAILS COMPRESSION RING

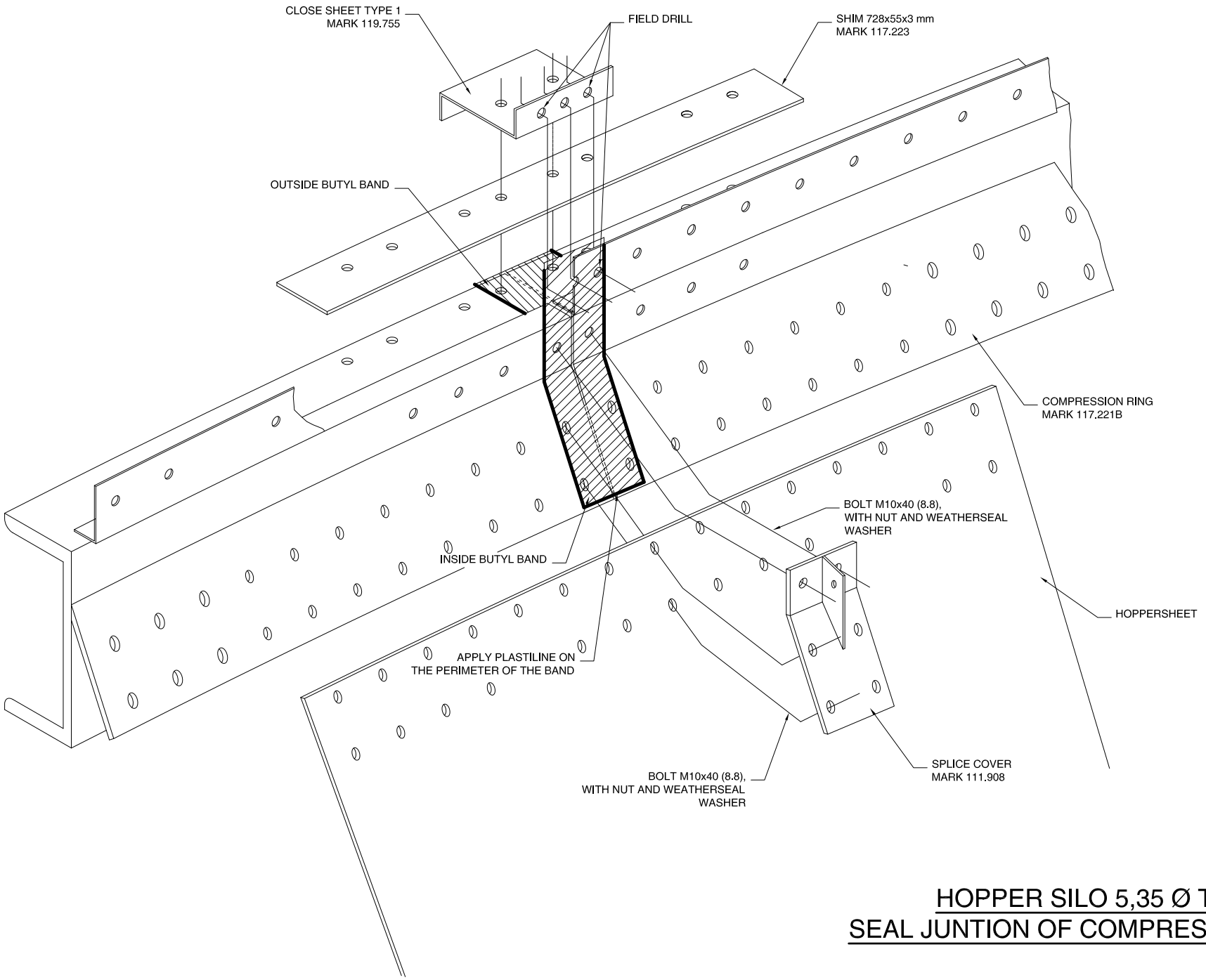




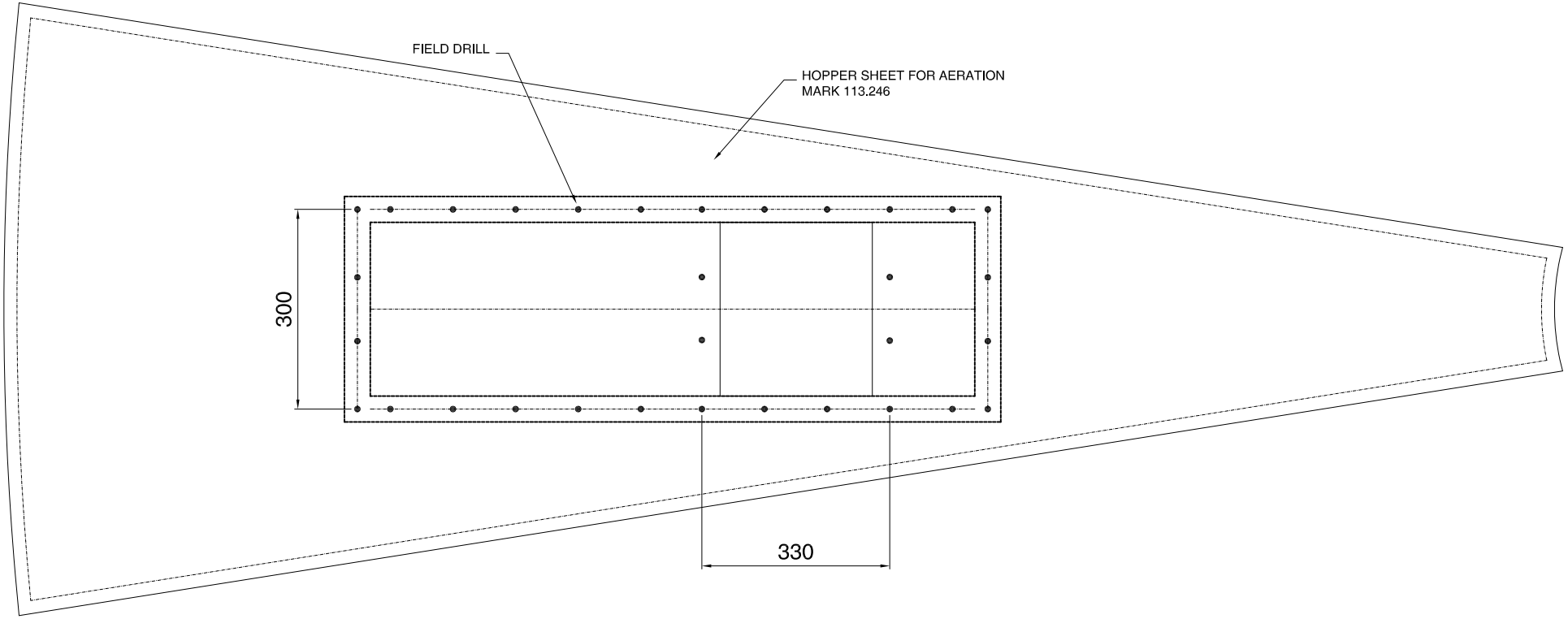
HOPPER SILO 5,35 Ø/ -T - 45°

JOINT DETAILS (LOWER ZONE)

(OUTSIDE VIEW)



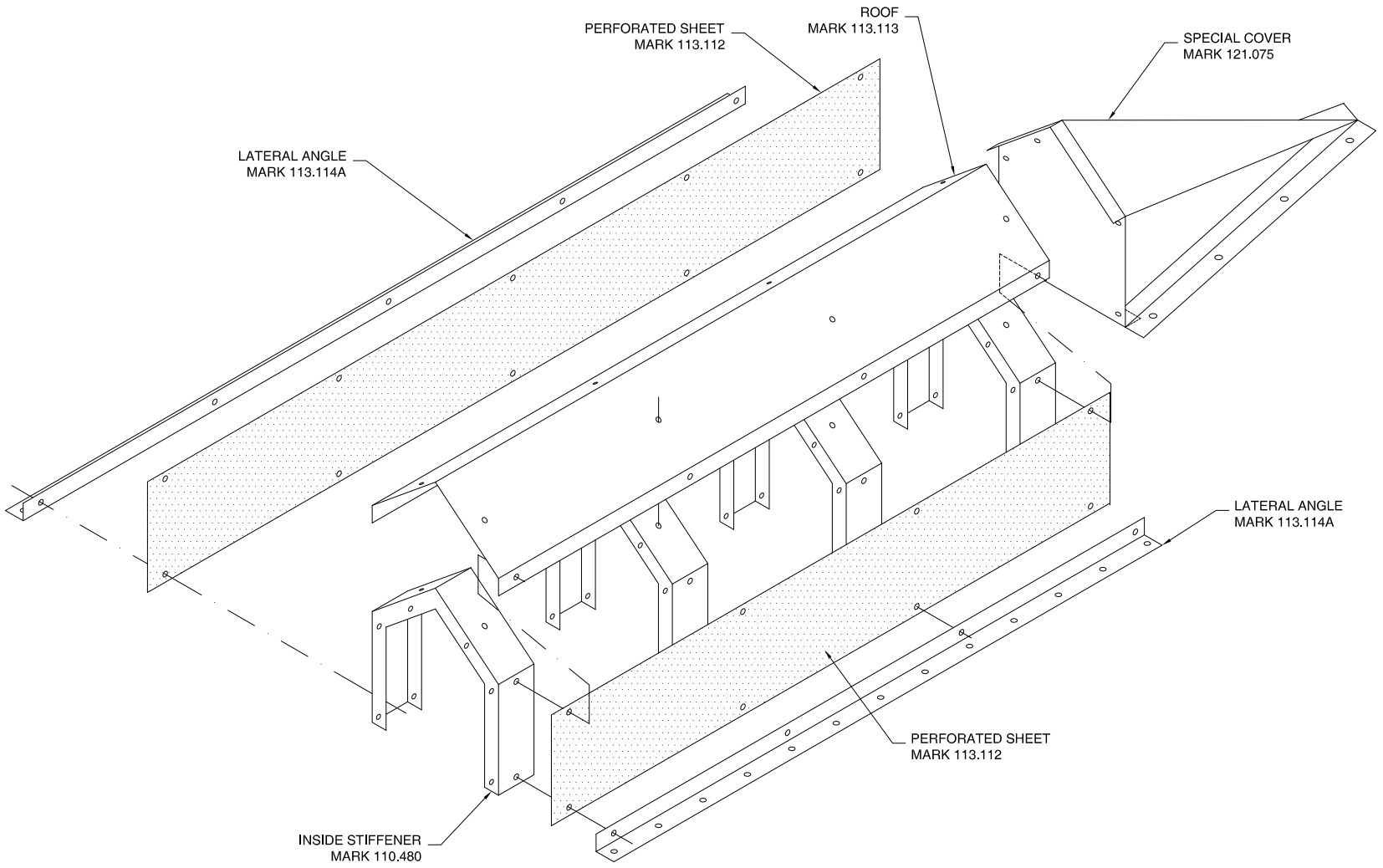
HOPPER SILO 5,35 Ø T45°
SEAL JUNTION OF COMPRESSION RING



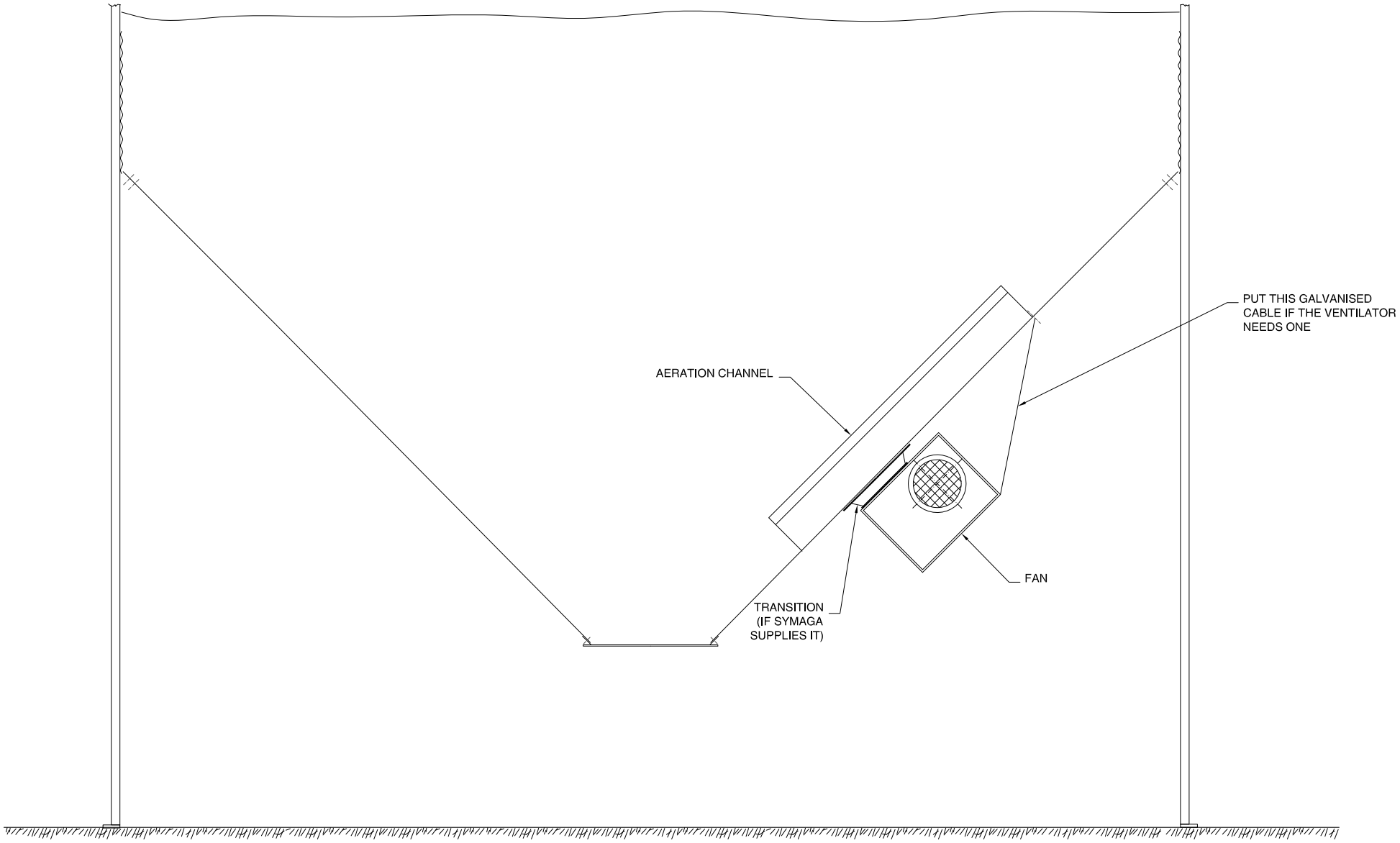
- USE M8x20(8.8) BOLTS WITH FLAT WASHER, WEATHERSEAL WASHER AND NUT.
- PLACE FOAM 10x3 BETWEEN THE CONDUIT AND HOPPERSHEET
- SEE ENCLOSED SHEET FOR ASSEMBLY OF THE CONDUIT
- FIELD DRILL IN THE HOPPER SHEET ALL THE HOLES OF THE AERATION CHANNEL.

HOPPER SHEET FOR AERATION
SILO T45°

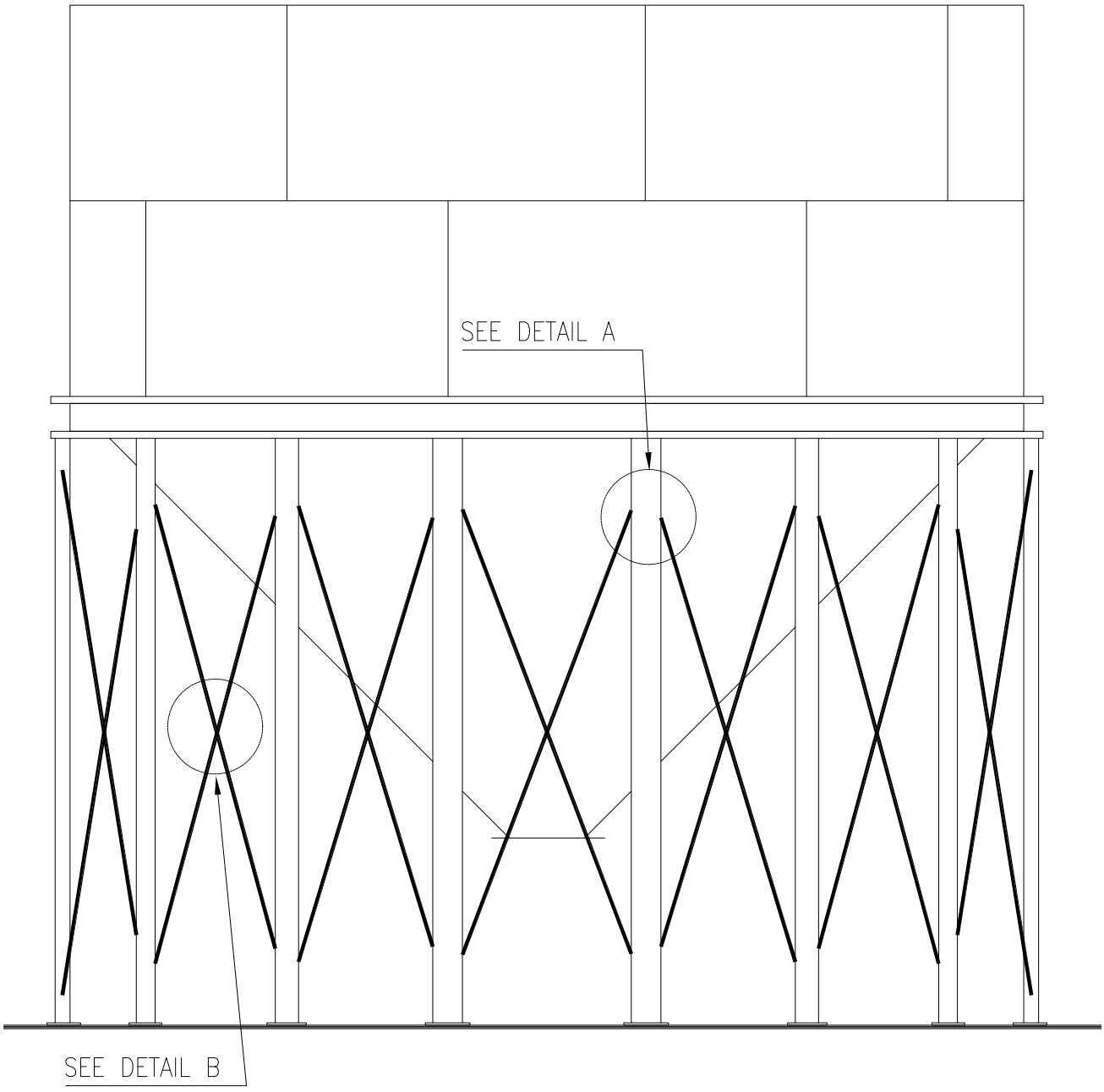
USE M8x20(8.8) BOLTS WITH FLAT WASHER AND NUT

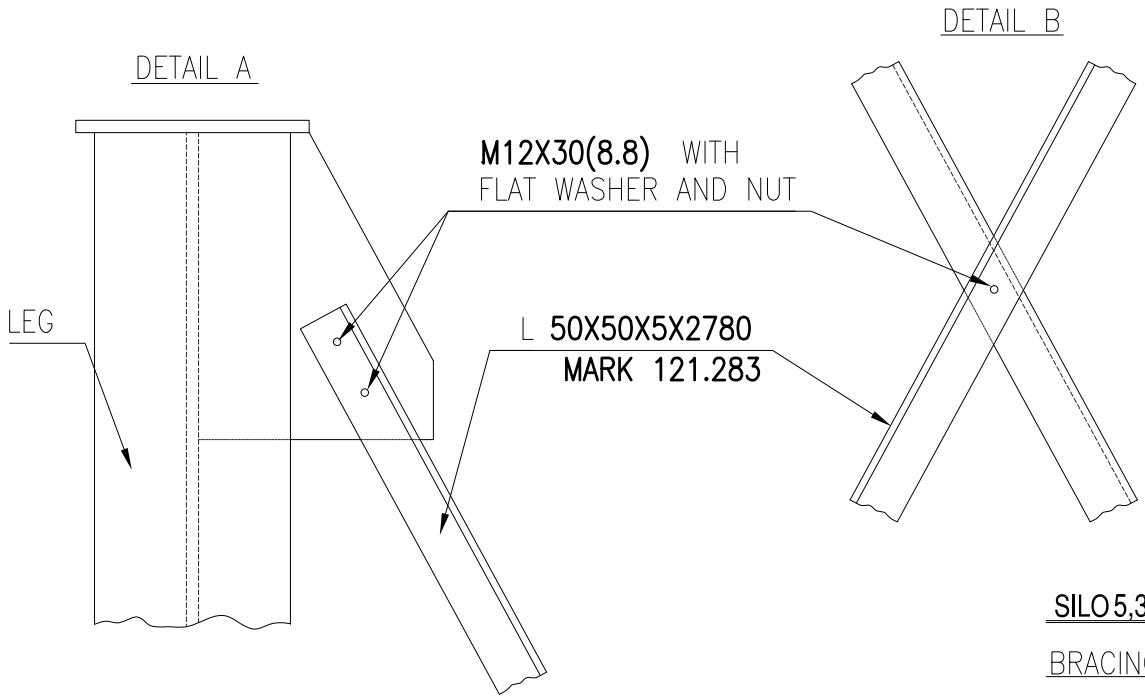


AERATION CHANNEL



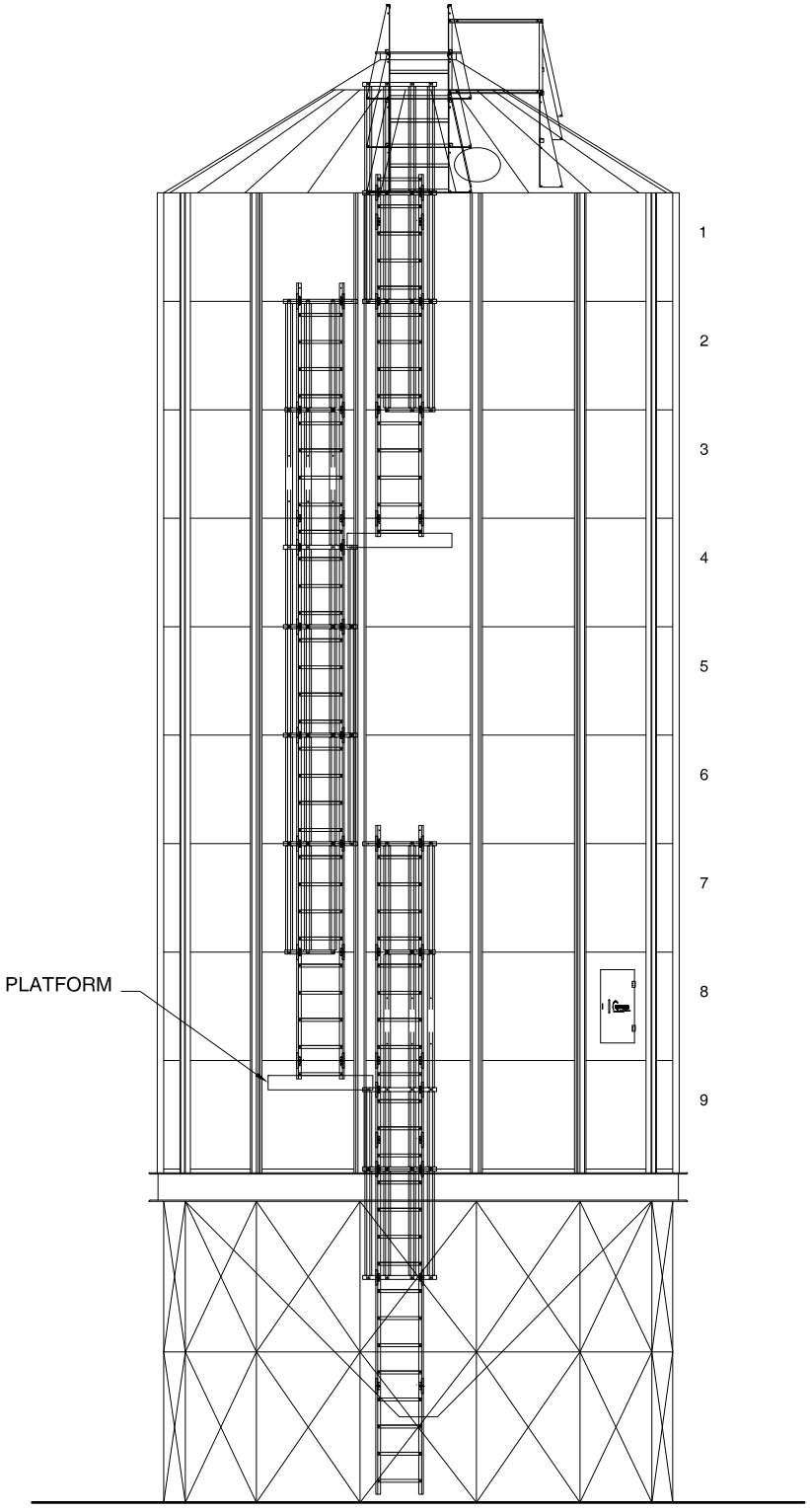
FAN INSTALLATION





SILO 5,35Ø / -T 45°

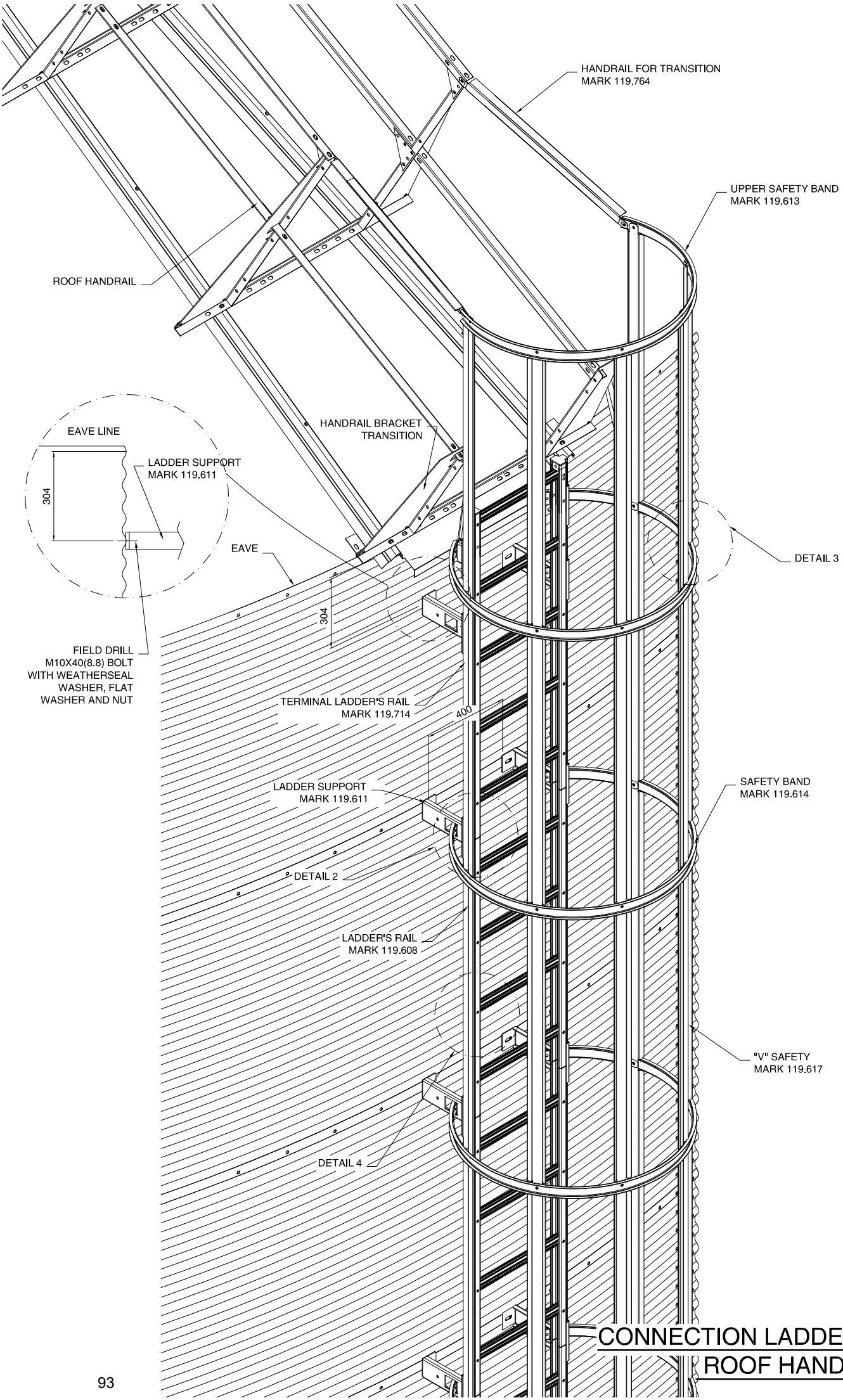
BRACING DETAILS



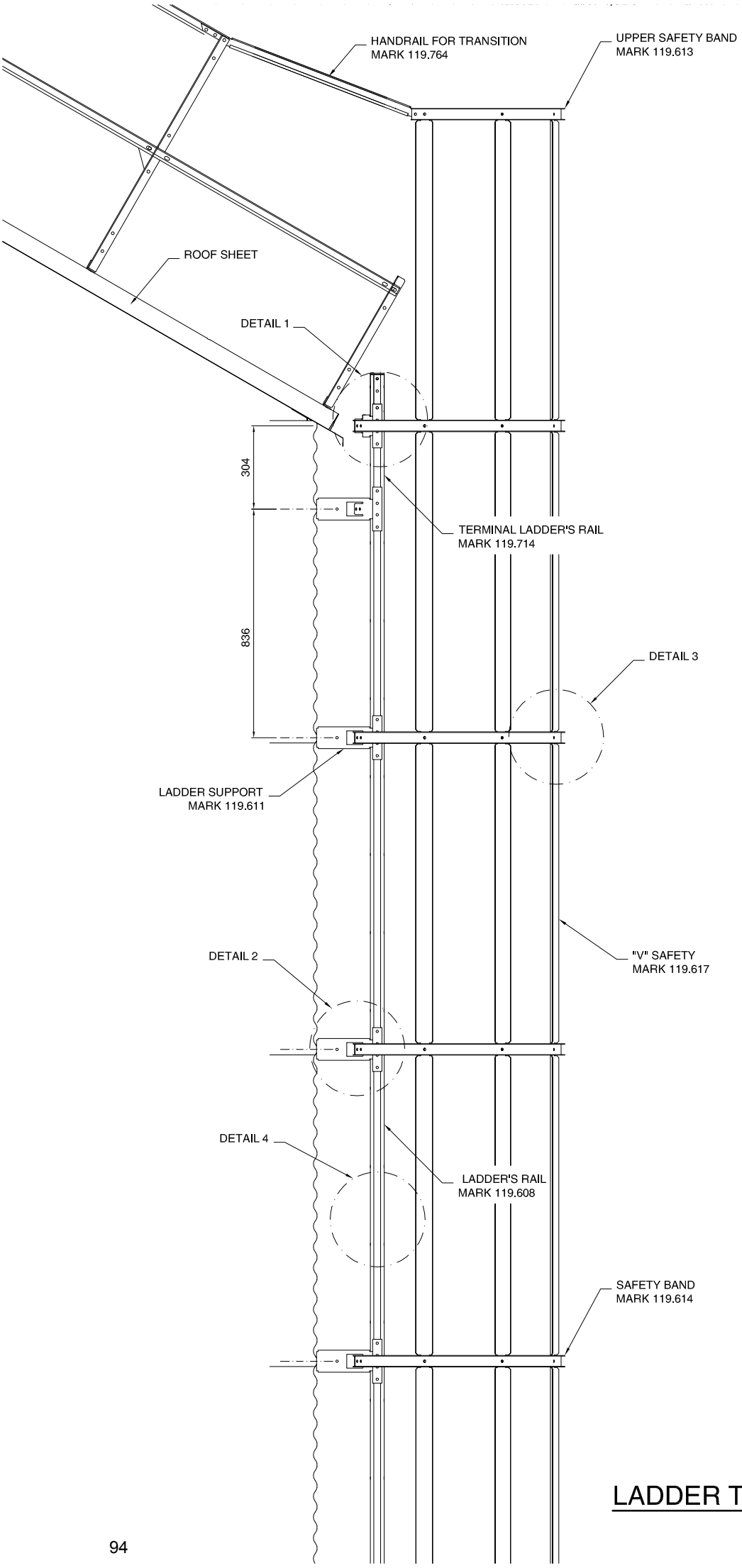
FOR 2 SILO

SILO 9 RINGS

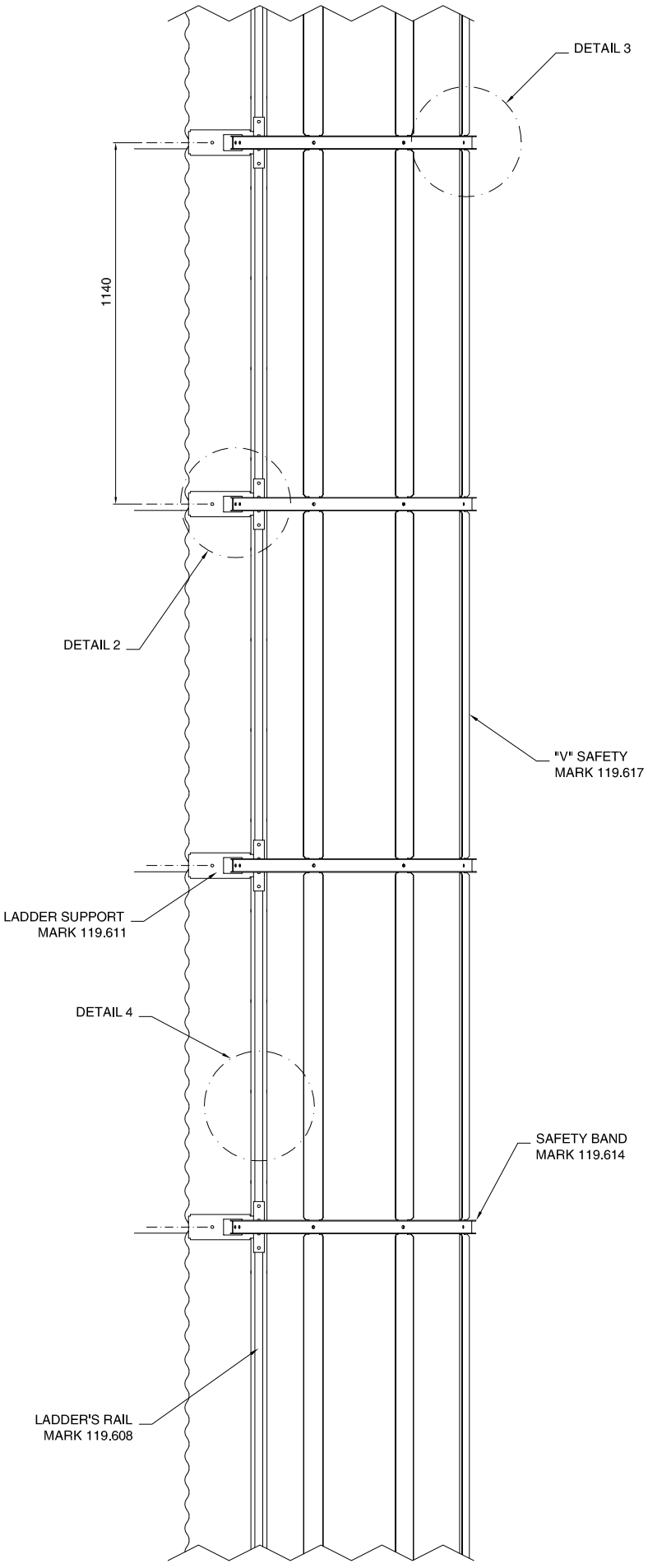
LADDER TO ROOF INSTRUCTIONS



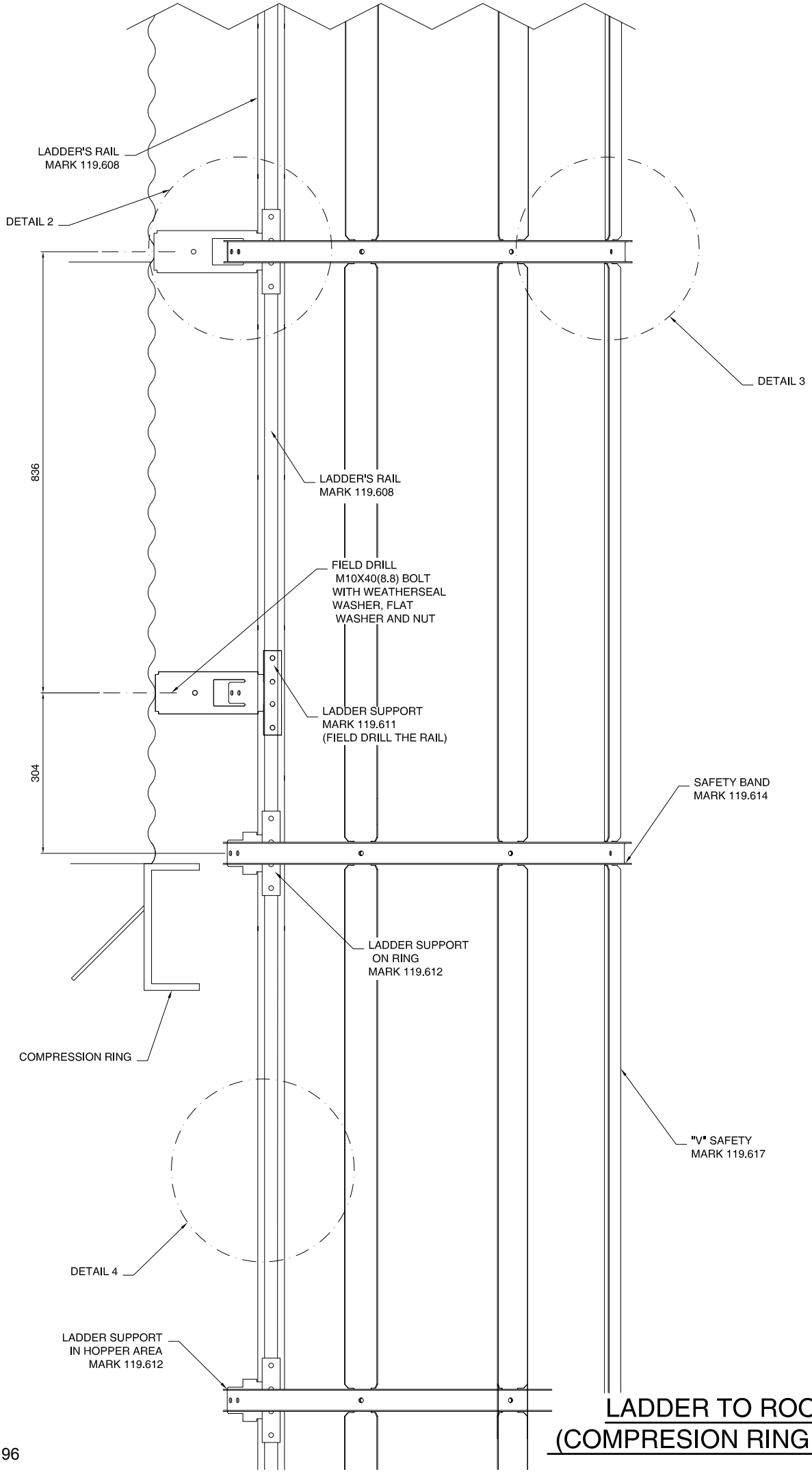
CONNECTION LADDER TO ROOF HANDRAIL



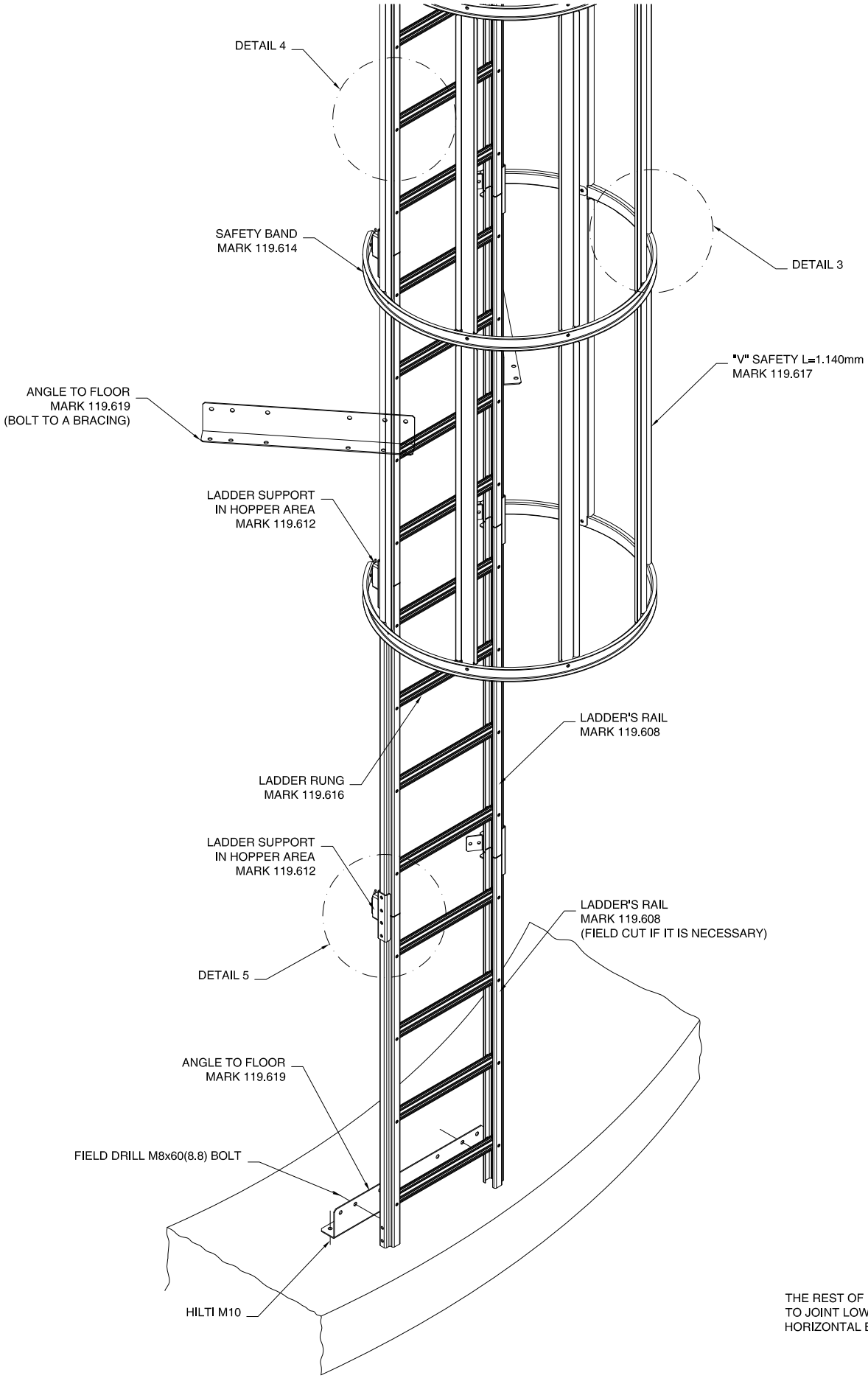
LADDER TO ROOF (UPPER PART)



LADDER TO ROOF
(INTERMEDIATE PART)

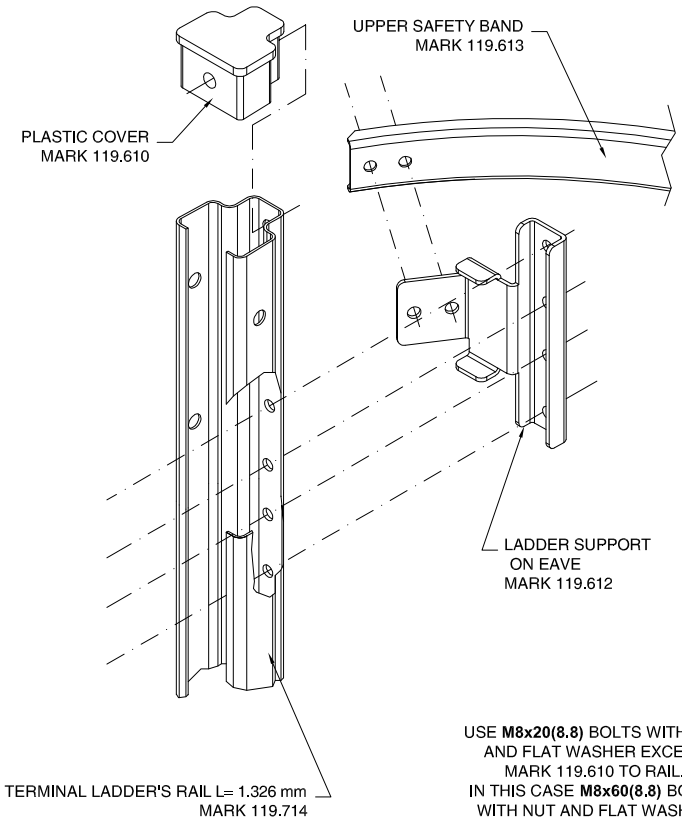


LADDER TO ROOF
(COMPRESION RING PART)

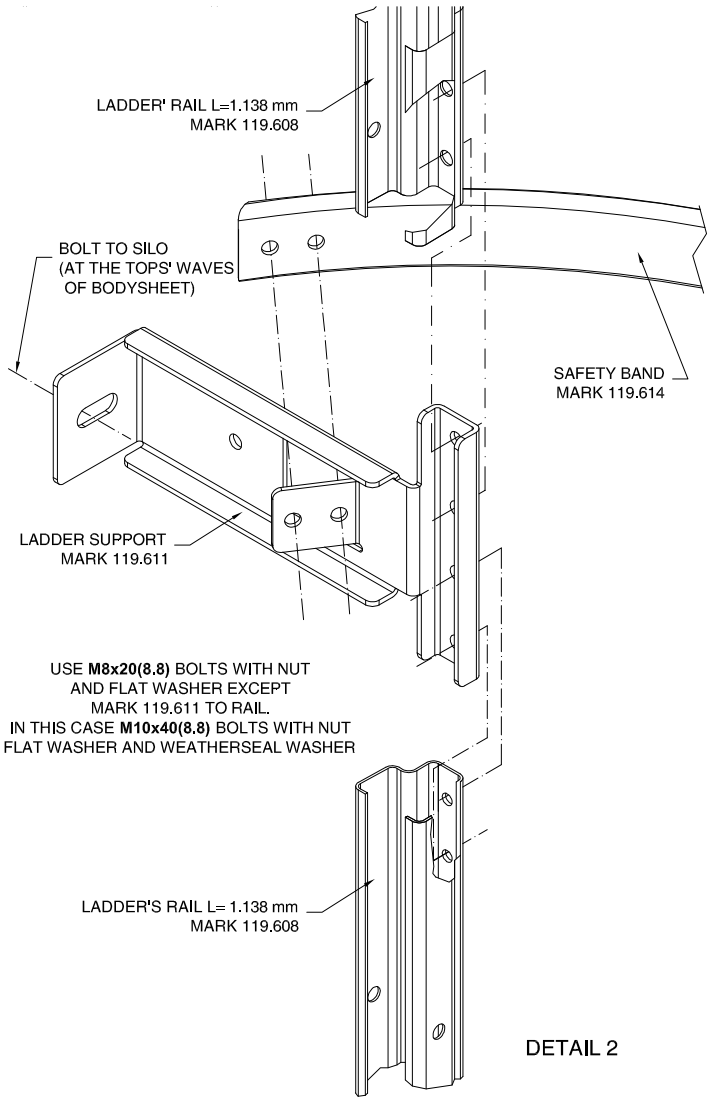


THE REST OF MARKS 119.619 ARE USED TO JOINT LOWER PART OF LADDER TO HORIZONTAL BRACINGS OF HOPPER.

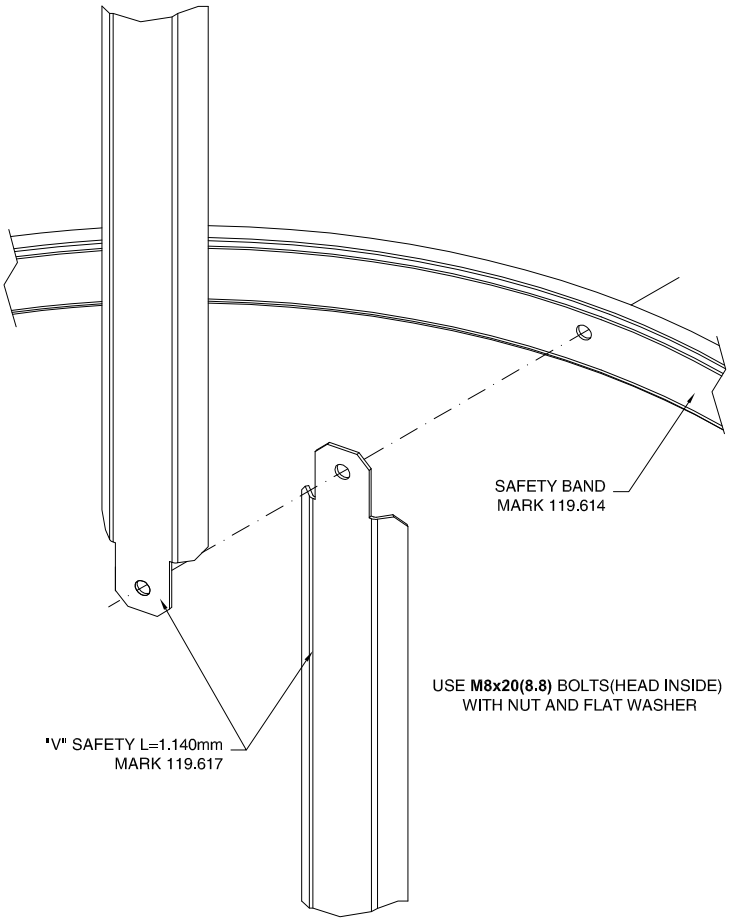
LADDER TO ROOF (LOWER PART)



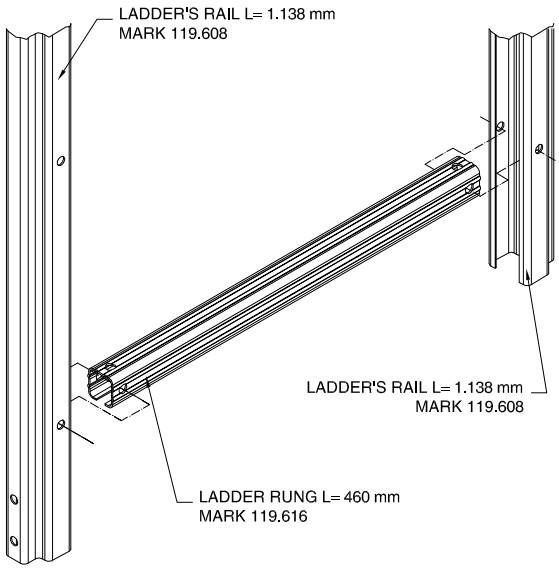
DETAIL 1



DETAIL 2

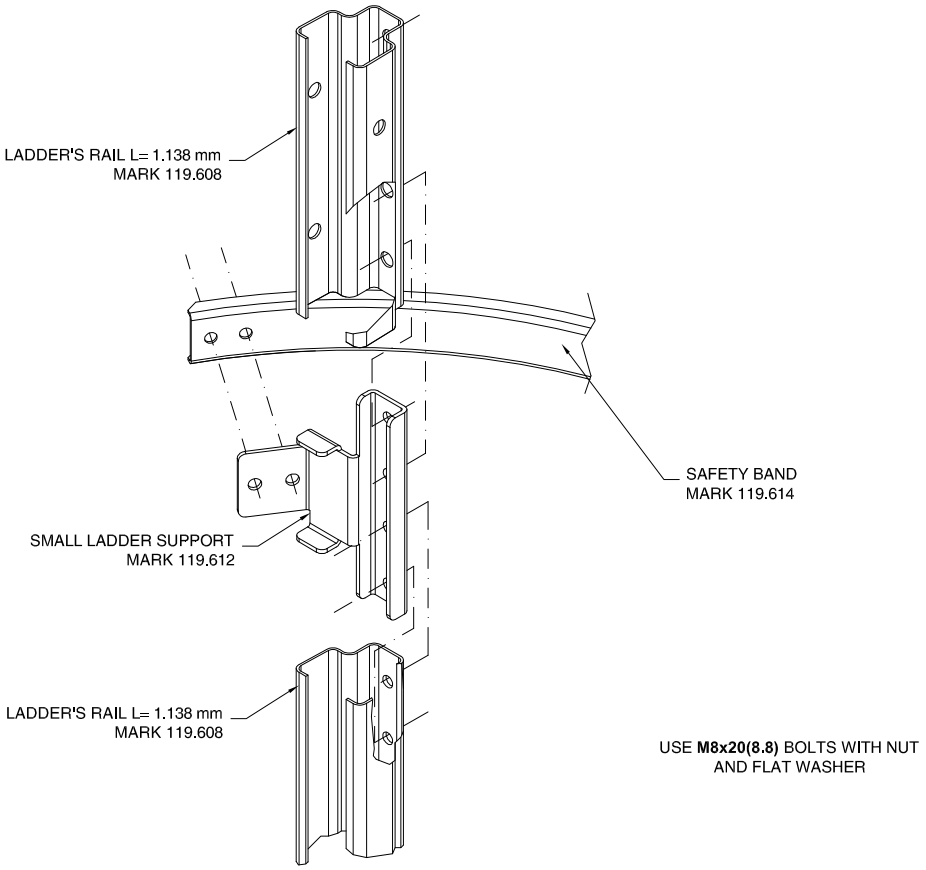


DETAIL 3

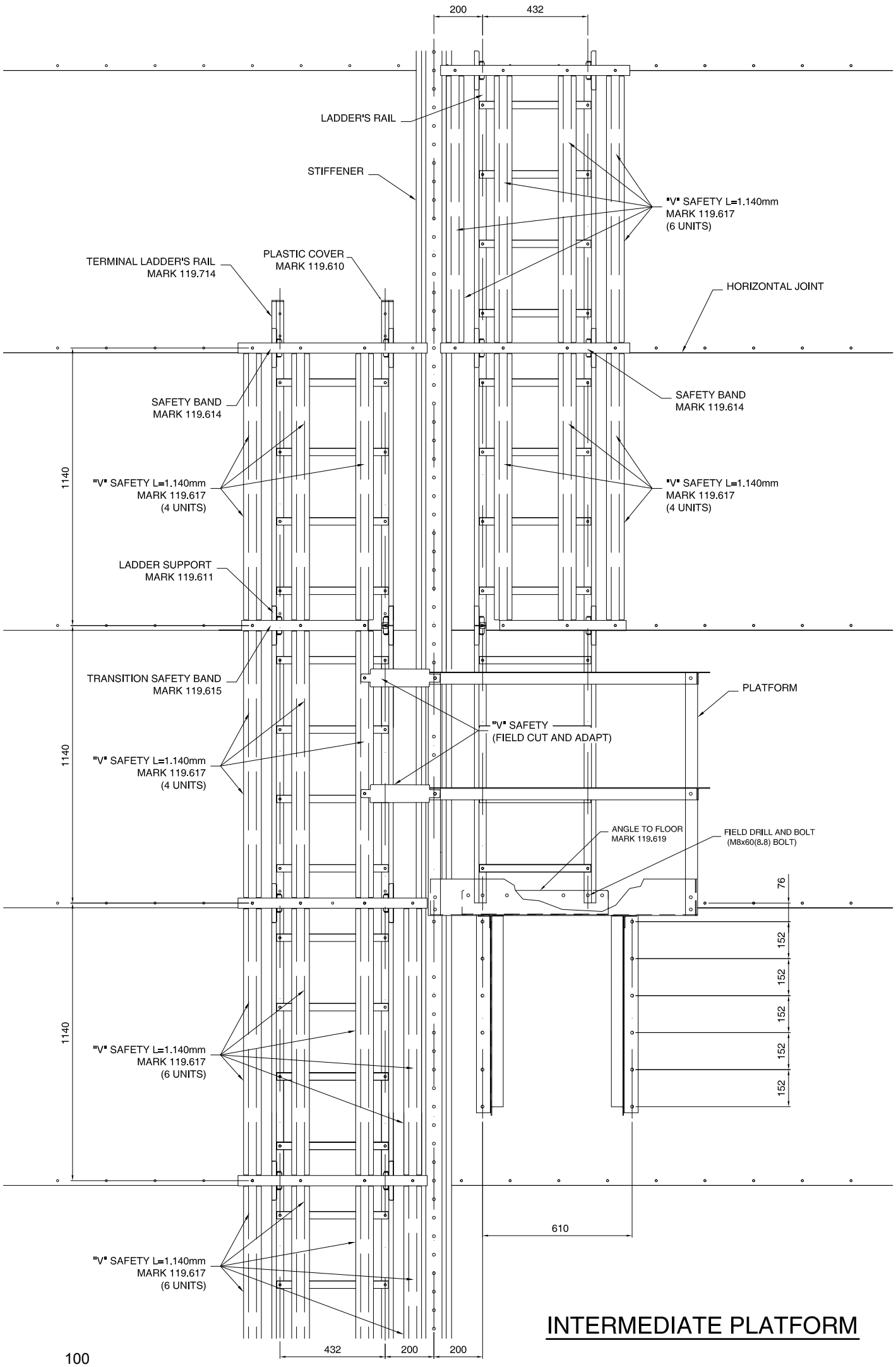


DETAIL 4

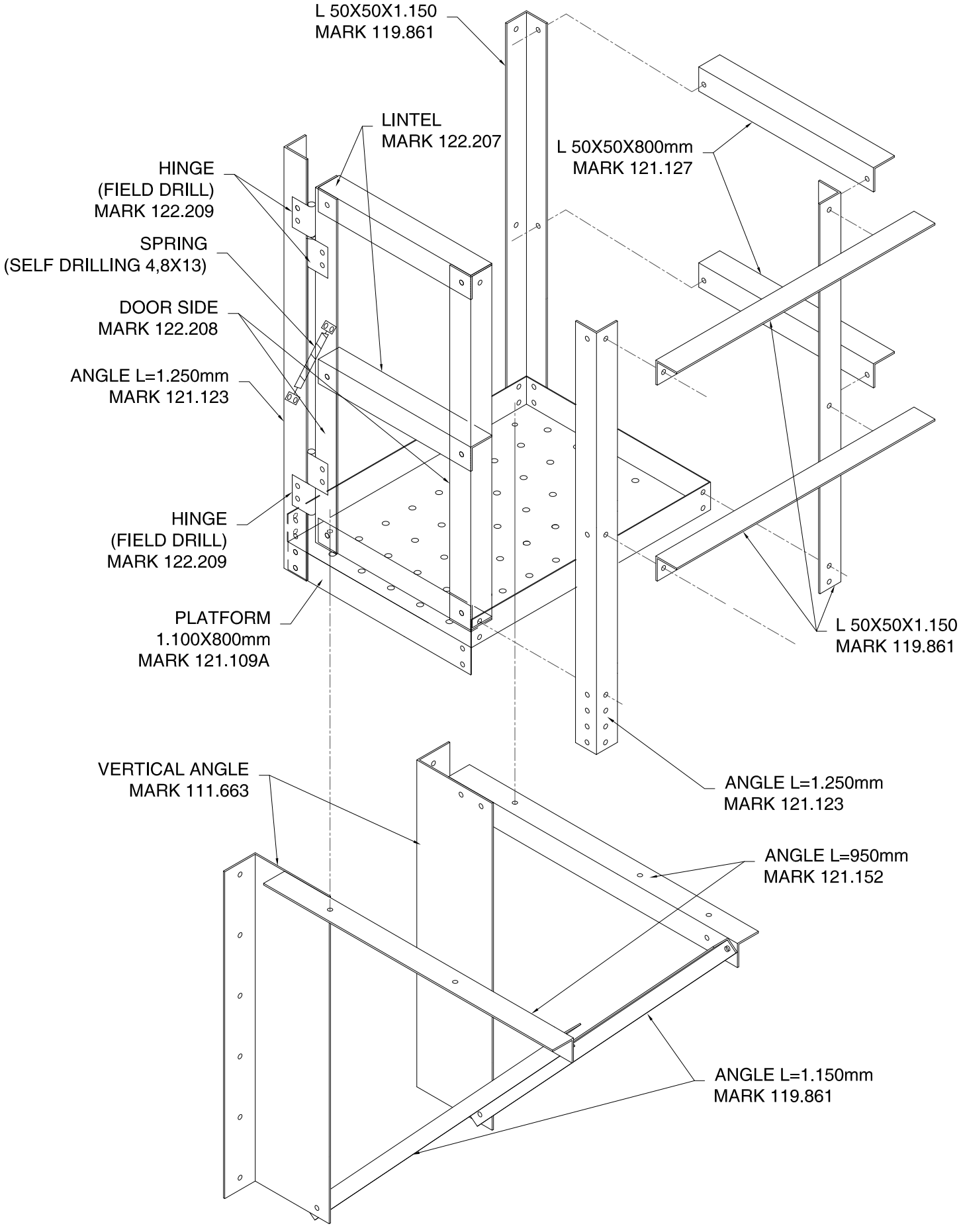
LADDER DETAILS


LADDER'S RAIL L= 1.138 mm
MARK 119.608
SAFETY BAND
MARK 119.614
SMALL LADDER SUPPORT
MARK 119.612
LADDER'S RAIL L= 1.138 mm
MARK 119.608
USE **M8x20(8.8)** BOLTS WITH NUT
AND FLAT WASHER

DETAIL 5



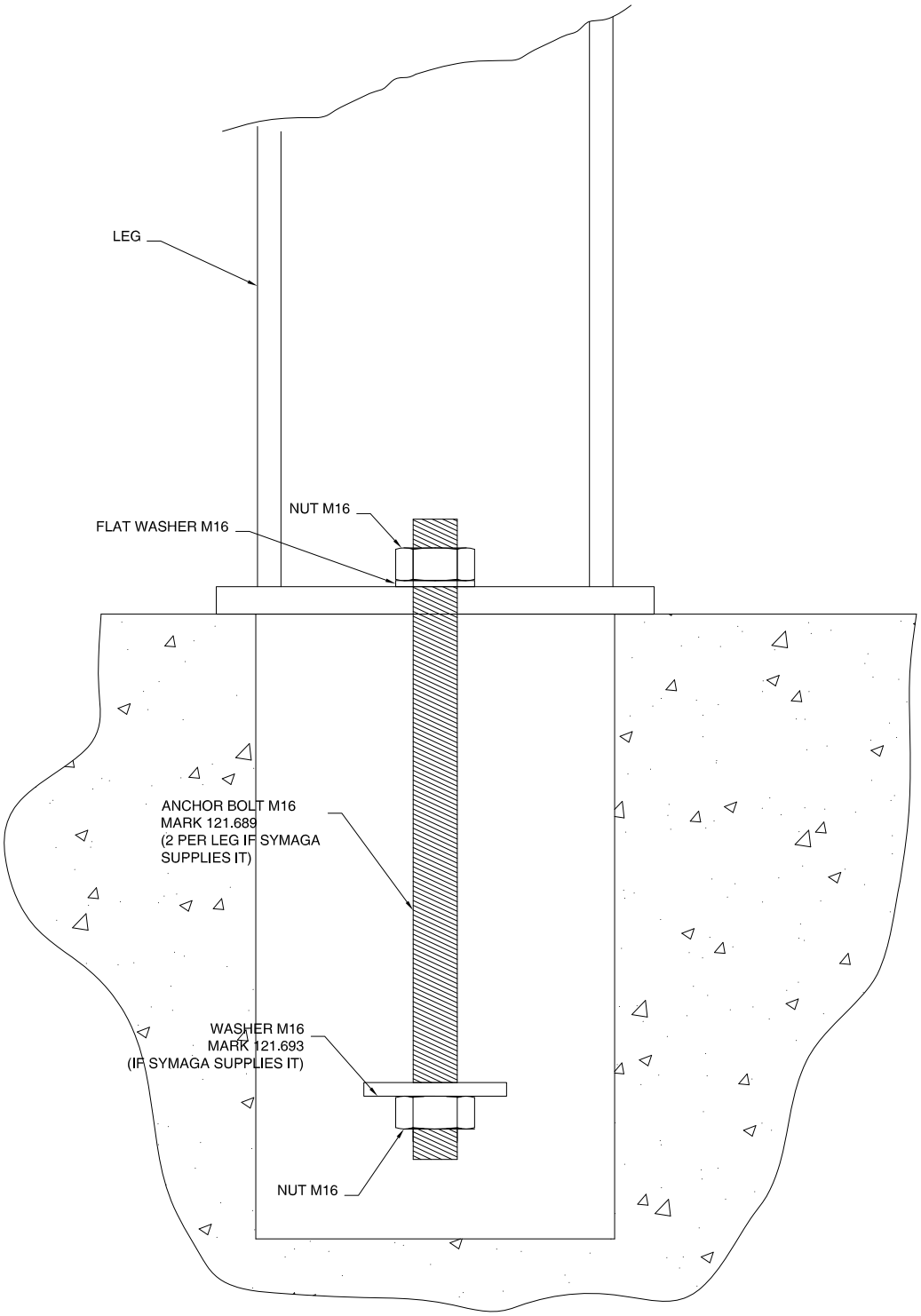
INTERMEDIATE PLATFORM



NOTE:
THE SPRING MUST BE TENSE AFTER BOLTING IT ON THE ANGLES.

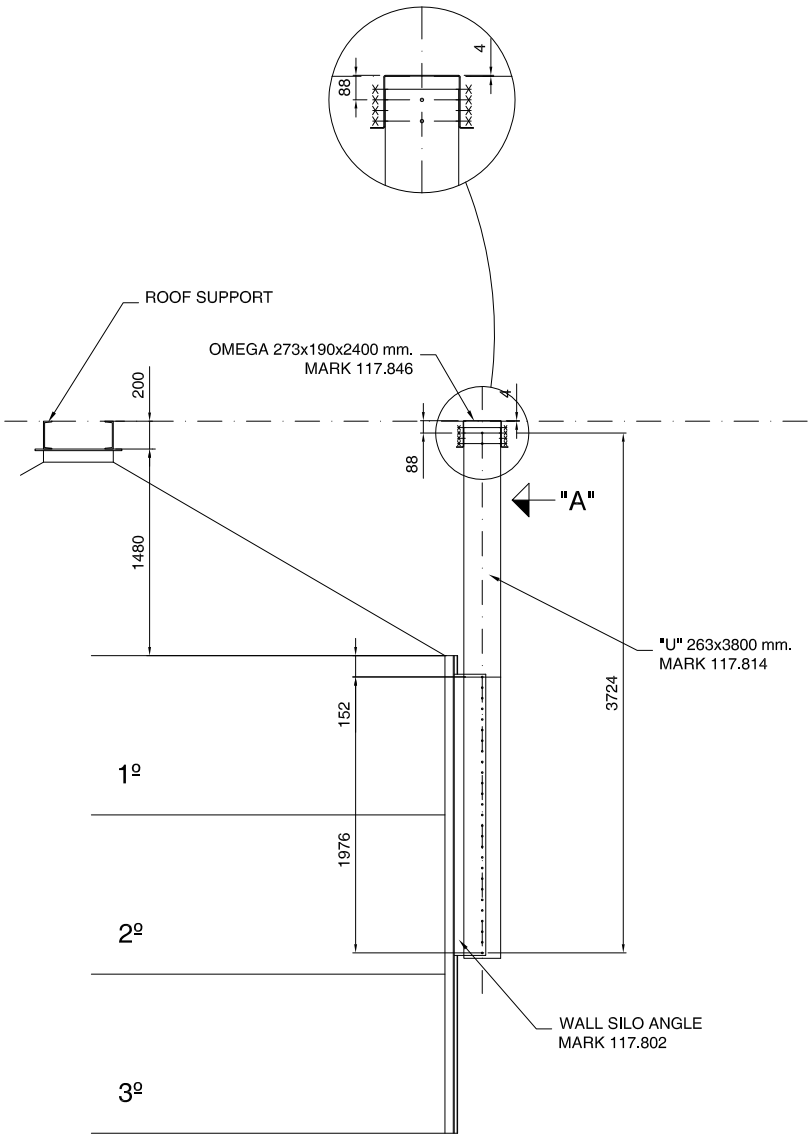
USE M10X20(8.8)BOLTS WITH NUT EXCEPT FOR THE HINGE M8X20(8.8)BOLT

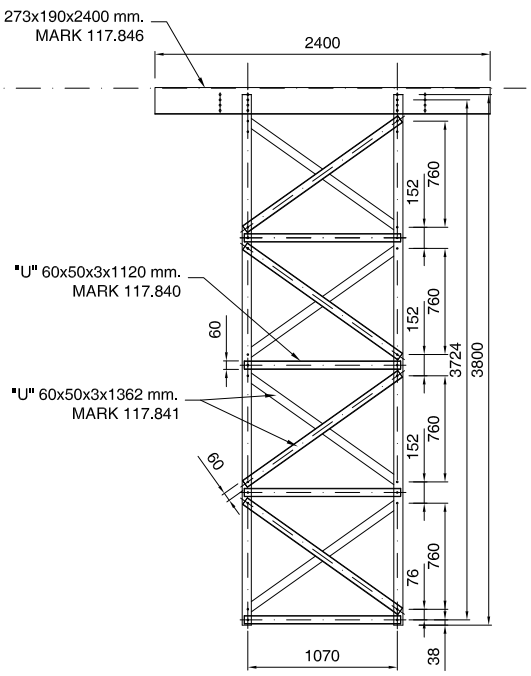
PLATFORM 1.100X800



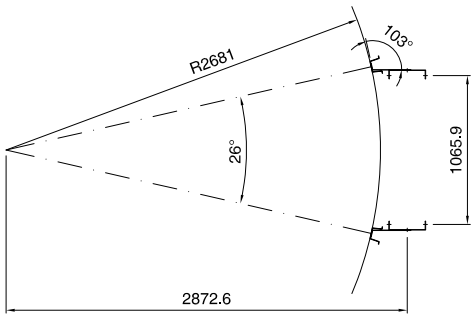
AFTER ERECT THE SILO:
1.-CLEAN THE ANCHOR HOLES.
2.-AFTER SUPPORTING THE TANK ON FOUNDATION FILL ANCHOR HOLES WITH CONCRETE FAST SETTING AND EXPANSIVE ADD.

ANCHORAGE SYSTEM





VIEW FROM "A"



NOTES:

- USE M10x25 (8.8) BOLT WITH WEATHERSEAL WASHER, FLAT WASHER AND NUT FOR JOINING MARK 117.802 TO SILO.
- USE M10x25 (8.8) BOLT WITH FLAT WASHER AND NUT FOR JOINING OTHERS MARKS.

SUPPORT ON SILO WALL

SILO 5,35Ø