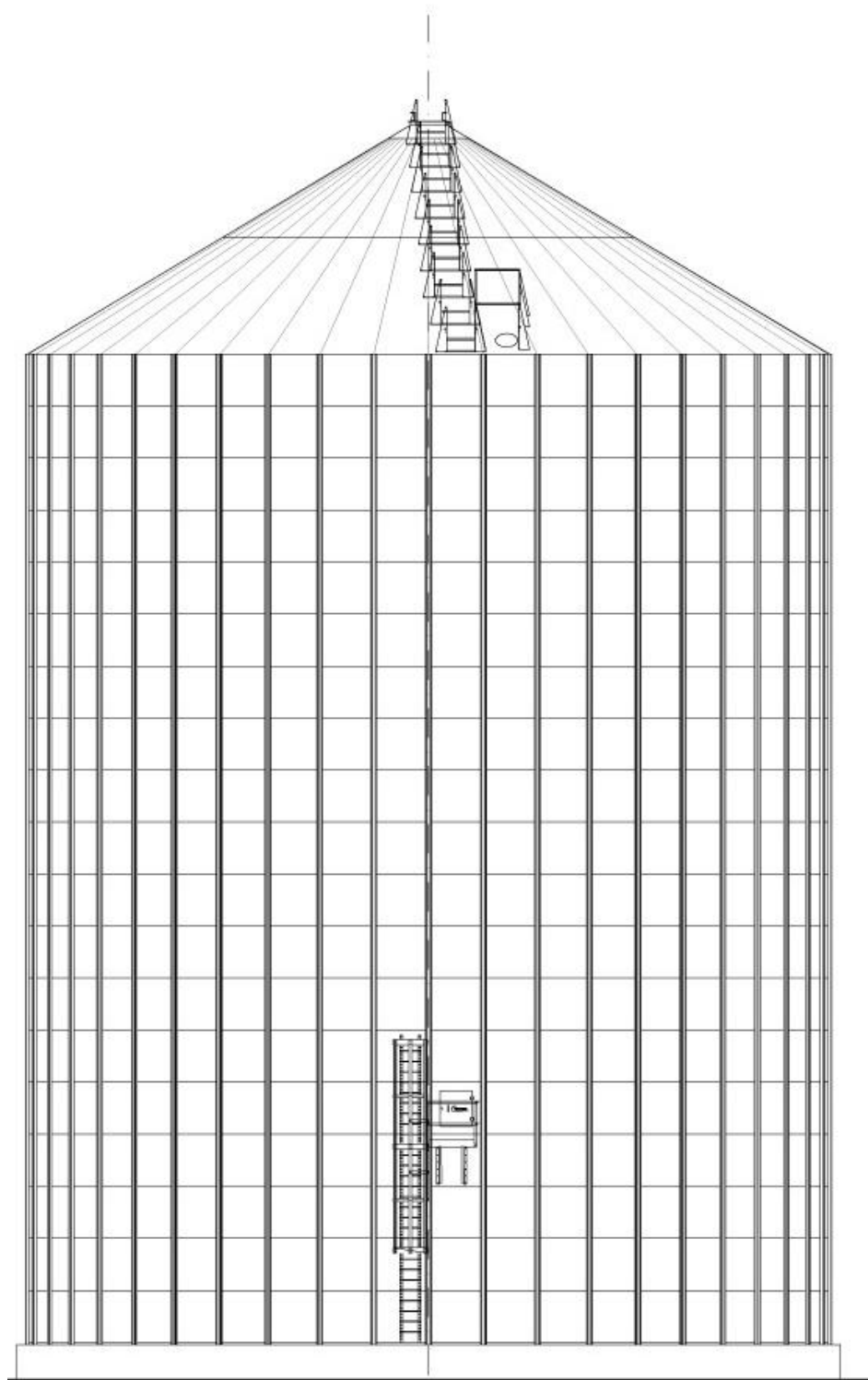


# FLAT BOTTOM SILO

Ø10,70-18 MEPU 6832



## Assembly Instructions



MARK	DESCRIPTION	THICKNESS	QUANTITY
<b>STRUCTURAL ROOF</b>			
120505	ROOF SHEET	0,8	37
120542	ROOF SHEET WITH CIRCULAR HOLE	0,8	5
111146	STRUCTURAL 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
111420	FLASHING FOR ROOF COLLAR R1080mm FOR 4 REINFORCEMENTS	0,8	4
120384	REINFORCEMENT CENTER COLLAR "U" 75x30x760mm	2	12
110046A	FLASHING SHEET	0,8	42
110011	SMALL ROOF'S CLIP	2	126
110012A	LARGE ROOF'S CLIP	2	42
120692	ROOF LADDER RUNG L= 418mm	3	19
120691	ROOF LADDER RUNG L= 1100mm	3	10

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
121684	ROOF RAFTER L= 4851mm	2	14
111130	CROSS RAFTER L= 1275mm	2	14
121685	RAFTER'S BRACKET SUPPORT. RIGHT SIDE	3	14
121686	RAFTER'S BRACKET SUPPORT. LEFT SIDE	3	14
121687	TENSION PLATE L= 2462mm	2	14
119804	BRACE ROD L= 1250mm		4
119745	BRACE ROD L= 2200mm		4
119644	CLIP FOR BRACE ROD	5	16
119676	TUBE FOR BRACE ROD		16
121675A	CLIP FOR CROSS RAFTER. LEFT SIDE	2	28
121674	CLIP FOR CROSS RAFTER. RIGHT SIDE	2	28

	BOLT 8 X 30 ISO 4017 GALVANISED C-8.8		1100
	BOLT 10 X 25 ISO 4017 GALVANISED C-8.8		390
	BOLT 10 X 40 ISO 4017 GALVANISED C-8.8		175
	BOLT 12 X 40 ISO 4017 GALVANISED C-8.8 SB		110
	NUT M-8 ISO 4161 WITH FLANGE		1110
	NUT M-10 ISO 4032 GALVANISED C-8.8		565
	NUT M-12 ISO 4032 GALVANISED C-8.8 SB		110
	NUT M-16 ISO 4032 GALVANISED C-8.8 SB		40
	FLAT WASHER M-8 ISO 7093 GALVANISED		350
	FLAT WASHER M-10 ISO 7091 GALVANISED		565
	FLAT WASHER M-12 ISO 7091 GALVANISED		160
	FLAT WASHER M-16 ISO 7091 GALVANISED		40
	WEATHERSEAL WASHER M-8 GALVANISED		1100
	WEATHERSEAL WASHER M-10 GALVANISED		320
	METRE OF PLASTILINE D 6mm		18

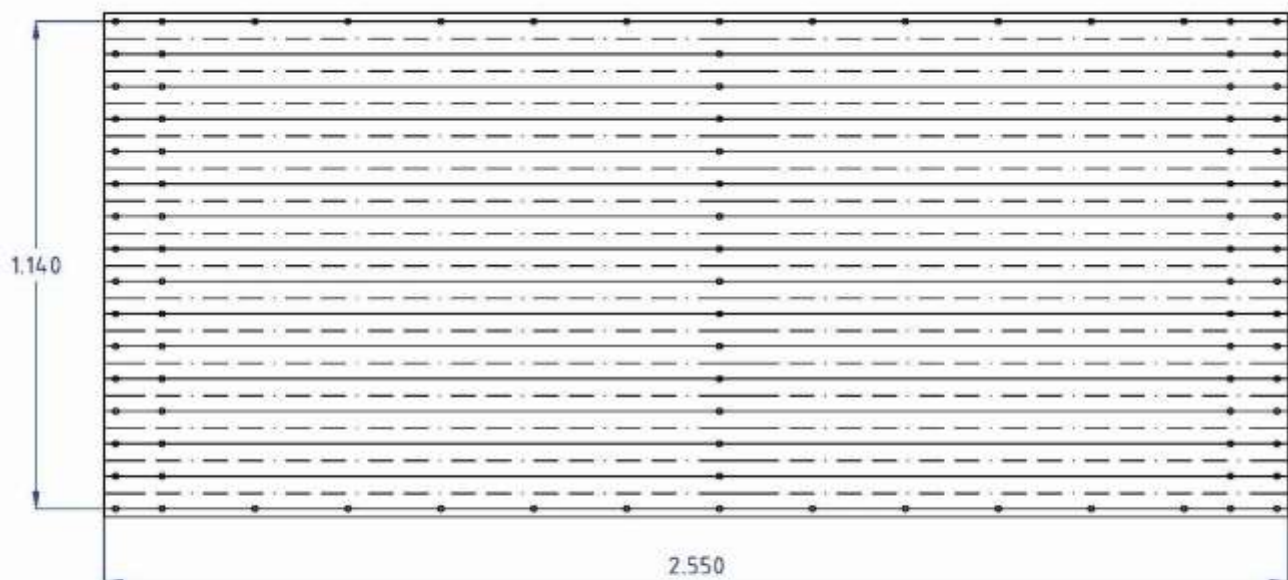
<b>BODYSHEET</b>			
110000A	BODYSHEET 2 STIFFENERS DOUBLE JOINT	1	56
110000A	BODYSHEET 2 STIFFENERS DOUBLE JOINT	1,2	28
110000A	BODYSHEET 2 STIFFENERS DOUBLE JOINT	1,5	28
110552	BODYSHEET 2 STIFFENERS TRIPLE JOINT	1,5	42
110552	BODYSHEET 2 STIFFENERS TRIPLE JOINT	1,8	84
110552	BODYSHEET 2 STIFFENERS TRIPLE JOINT	2	14
112110	BODYSHEET (1) WITH MANHOLE 2 STIFFENERS TRIPLE JOINT	4	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

MARK	DESCRIPTION	THICKNESS	QUANTITY
120276	WIND RING S1070 L= 6000mm	2	12
122955A	WIND RING COUPLER D60mm	2	24
120188A	WIND RING ATTACHMENT PLATE D60mm	3	56
<b>STIFFENERS</b>			
113362	UPPER SHORT STIFFENER 75x988mm	1,5	28
111885	STIFFENER 1 BODYSHEET 75x1140mm	1,5	28
111886	STANDARD STIFFENER 2 BODYSHEETS 75x2280mm	2	28
111886	STANDARD STIFFENER 2 BODYSHEETS 75x2280mm	2,5	28
111886	STANDARD STIFFENER 2 BODYSHEETS 75x2280mm	3	28
111886	STANDARD STIFFENER 2 BODYSHEETS 75x2280mm	3,5	28
112100	SPECIAL STIFFENER 2 BODYSHEETS 75x2280mm	4	84
113363	LOWER STIFFENER 75x2432mm	4	28
111888	INSIDE STIFFENER 67x2280mm	2	56
111888	INSIDE STIFFENER 67x2280mm	2,5	28
113364	LOWER INSIDE STIFFENER 67x2660mm	3,5	28
111882	STIFFENER'S SPLICE 67x456mm	1,5	56
111882	STIFFENER'S SPLICE 67x456mm	2	28
111882	STIFFENER'S SPLICE 67x456mm	3	56
111883	INSIDE STIFFENER'S SPLICE 60x456mm	3	84
119973	ANCHOR PLATE TYPE "C" 160x120x25mm D25	5 y 25 mm	28
121689	ANCHOR BOLT M16x333mm		28
121693	WASHER ANCHOR BOLT M16	3	28
	NUT M-16 ISO 4032 GALVANISED C-8.8 SB		56
	FLAT WASHER M-16 ISO 7093 GALVANISED		28
	BOLT 8 X 20 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		5300
	BOLT 10 X 25 ISO 4017 GALVANISED C-8.8		11400
	BOLT 10 X 30 ISO 4017 GALVANISED C-8.8		4600
	BOLT 10 X 35 ISO 4017 GALVANISED C-8.8		200
	BOLT 10 X 40 ISO 4017 GALVANISED C-8.8		400
	NUT M-8 ISO 4032 GALVANISED C-8.8		80
	NUT M-10 ISO 4032 GALVANISED C-8.8		21800
	WEATHERSEAL WASHER M-10 GALVANISED		16950
	FLAT WASHER M-8 ISO 7091 GALVANISED		80
	FLAT WASHER M-10 ISO 7091 GALVANISED		18100
	METRE OF PLASTILINE D 6mm		847
	SILICONE TUBE		4
	COLD GALVANIZING SPRAY 985 ZINC		2
<b>ROOF ACCESSORIES</b>			
	INSULATOR FOR EAVE		42
	INSULATOR FOR WAVES OF ROOF SHEETS		42
<b>HANDRAIL FOR ROOF LADDER</b>			
120691	ROOF LADDER RUNG L= 1100mm	3	3
113915	HANDRAIL BRACKET	3	15
110026	GUSSET FOR HANDRAIL BRACKET	3	20
110129A	BANISTER L= 990mm	1,5	4
110059B	BANISTER L=1028mm	1,5	4
110058A	BANISTER L= 1488mm	1,5	6
110027B	BANISTER L= 1986mm	1,5	4
	BOLT 10 X 20 ISO 4017 GALVANISED C-8.8		150
	NUT M-10 ISO 4032 GALVANISED C-8.8		150
<b>LEVEL INDICATOR</b>			
	HIGH LEVEL INDICATOR TYPE CD NEOPRENE MEMBRANE		1
120864A	WALL SUPPORT FOR MEMBRANE LEVEL	5	1
	LOW LEVEL INDICATOR TYPE CD STAINLESS MEMBRANE		1

MARK	DESCRIPTION	THICKNESS	QUANTITY
120864A	WALL SUPPORT FOR MEMBRANE LEVEL	5	1
	BOLT 6 X 40 ISO 4017 ZINC-NIQUEL C-8.8		10
	BOLT 10 X 30 ISO 4017 GALVANISED C-8.8		30
	NUT M-6 ISO 4017 ZINC-NIQUEL C-8.8		10
	NUT M-10 ISO 4032 GALVANISED C-8.8		30
	FLAT WASHER M-10 DISO 7091 GALVANISED		30
	WEATHERSEAL WASHER M-10 GALVANISED		30
	Mts. POLYETHYLENE JOINT 15x20 mm		4
<b>AERATION ROOF VENT</b>			
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

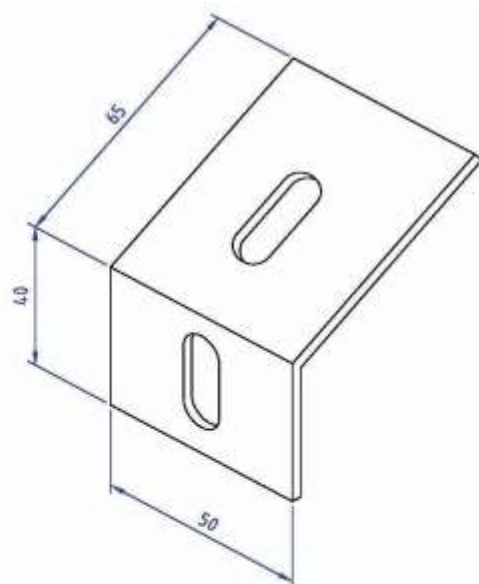
MARK	DESCRIPTION	THICKNESS	QUANTITY
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## **IDENTIFICATION OF MARKS**



MARCA 110.000A  
 MARK 110.000A  
 MARQUE 110.000A

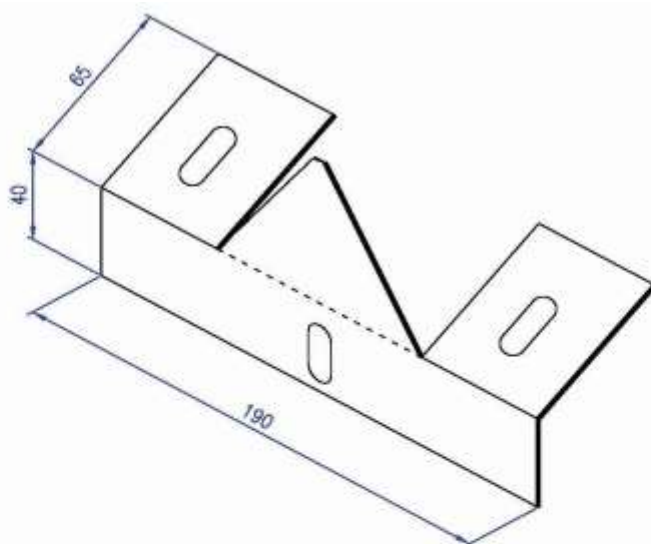
VIROLA 2 REFUERZOS DOBLE JUNTA  
 BODYSHEET 2 STIFFENERS DOUBLE JOINT  
 VIROLE 2 MONTANT DOUBLE JOINT



MARCA 110.011  
 MARK 110.011  
 MARQUE 110.011

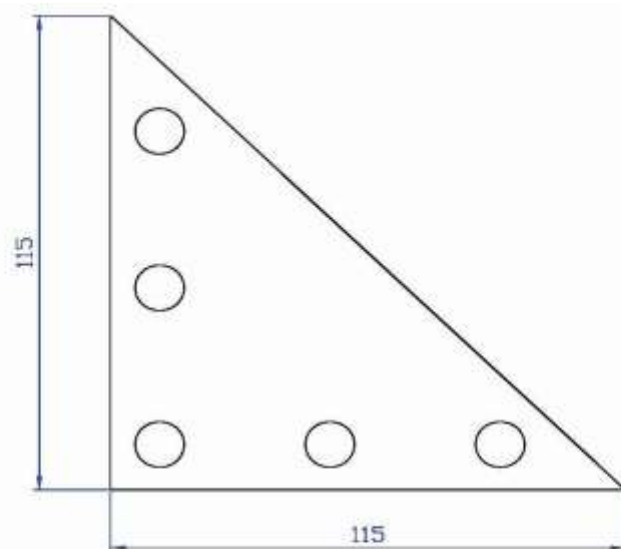
CLIP NORMAL DE TECHO  
 SMALLROOF CLIP  
 CLIP PETIT





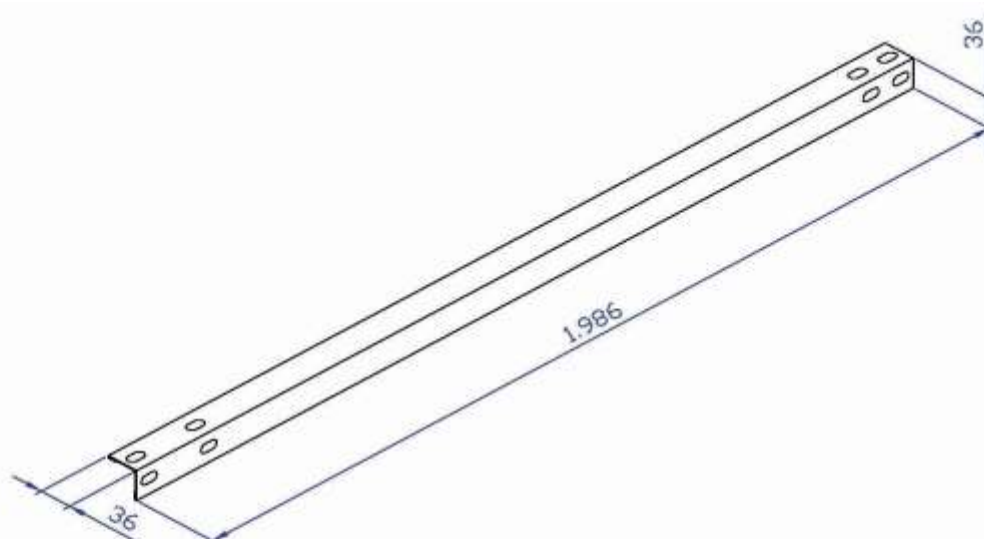
**MARCA 110.012A**  
**MARK 110.012A**  
**MARQUE 110.012A**

**CLIP DOBLE DE TECHO**  
**LARGE ROOF CLIP**  
**CLIP GRAND**

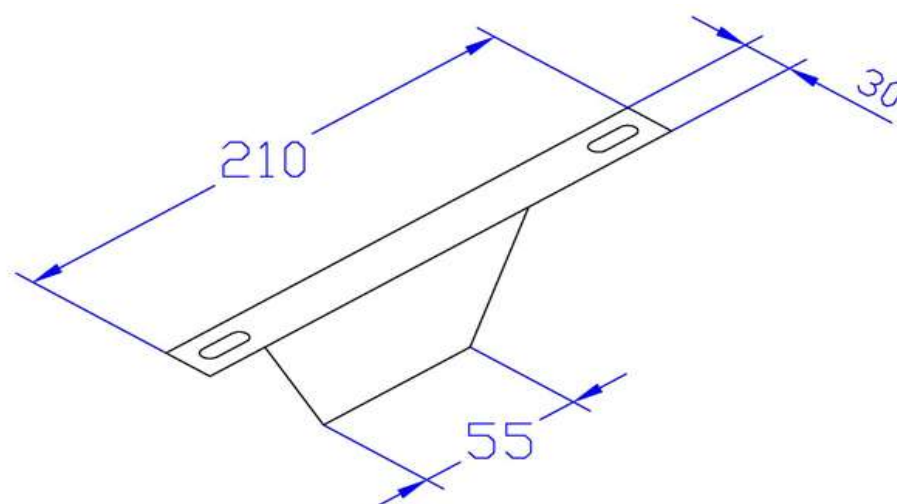


**MARCA 110.026**  
**MARK 110.026**  
**MARQUE 110.026**

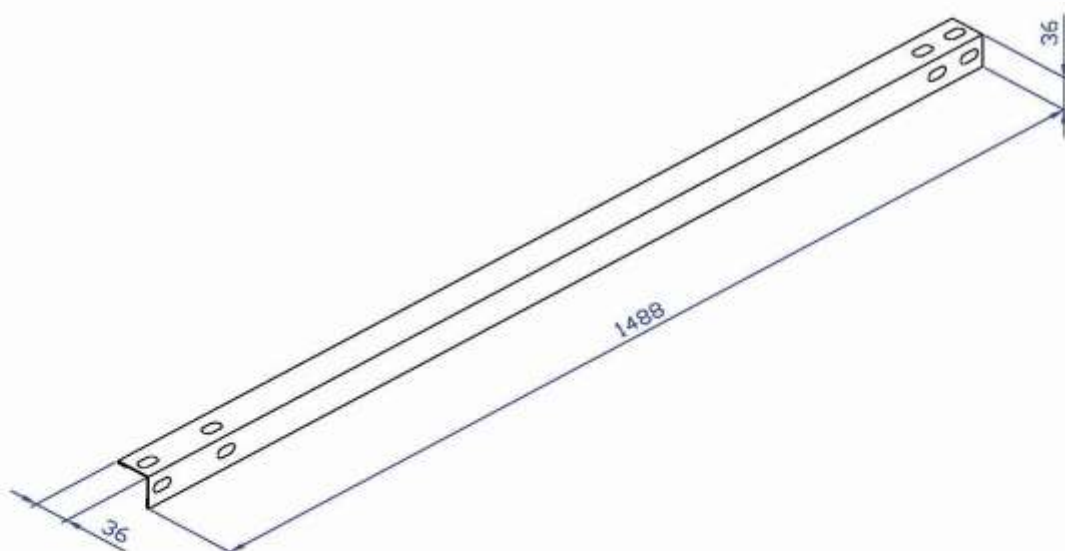
**CARTABON EN BARANDILLA TECHO**  
**GUSSET**  
**ECLIPSE DE RAMBARDE**



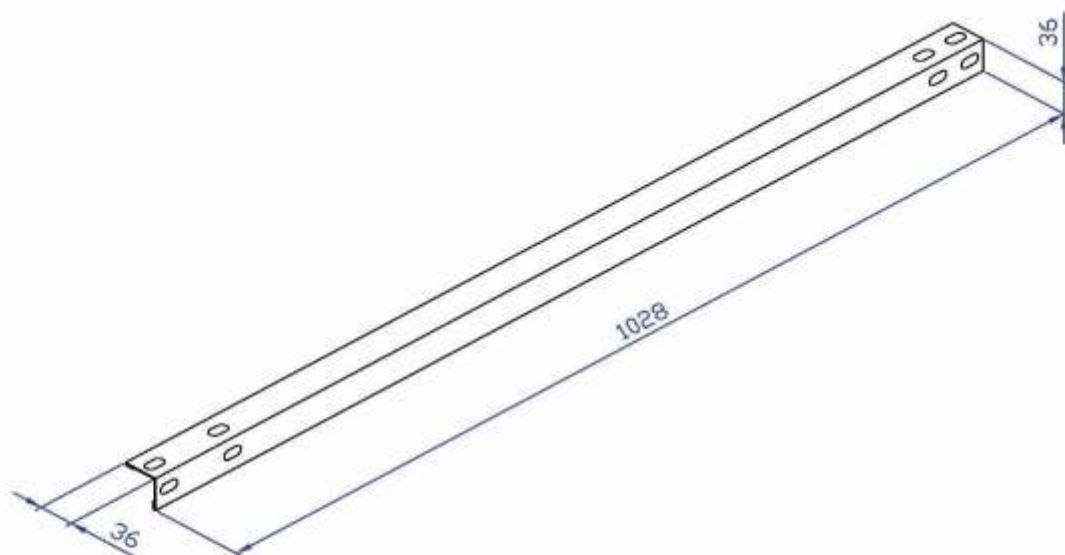
**MARCA 110.027B** ANGULAR BARANDILLA TECHO  
**MARK 110.027B** HAND RAIL  
**MARQUE 110.027B** ANGLE DE RAMBARDE



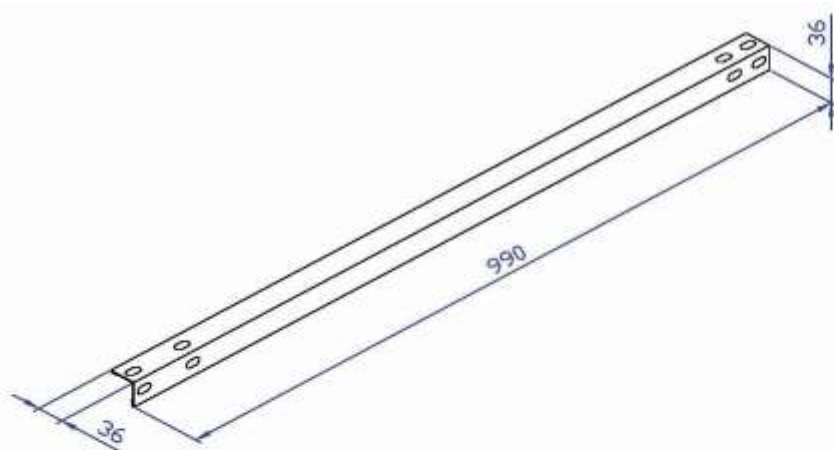
**MARCA 110.046A** CHAPA CIERRE SILO 10.70  
**MARK 110.046A** ROOF FLASHING SILO 10.70  
**MARQUE 110.046A** TOLE DE CLOTURE SILO 10.70



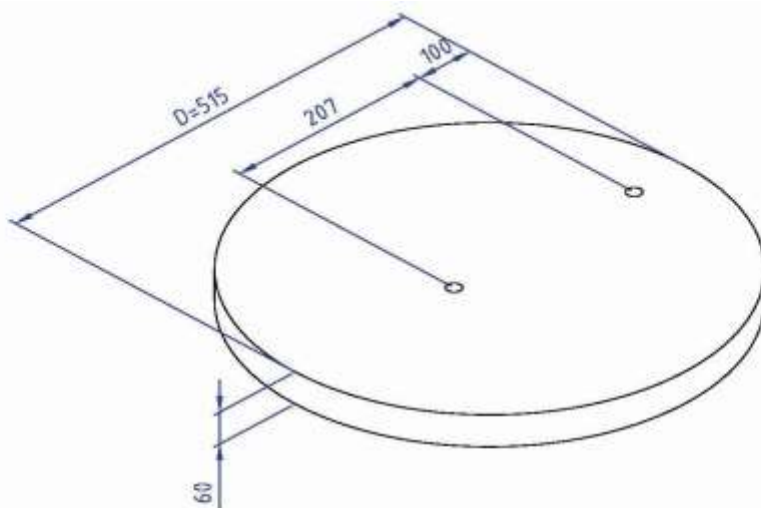
**MARCA 110.058A** ANGULAR BARANDILLA TECHO  
**MARK 110.058A** HANDRAIL  
**MARQUE 110.058A** ANGLE DE RAMBARDE



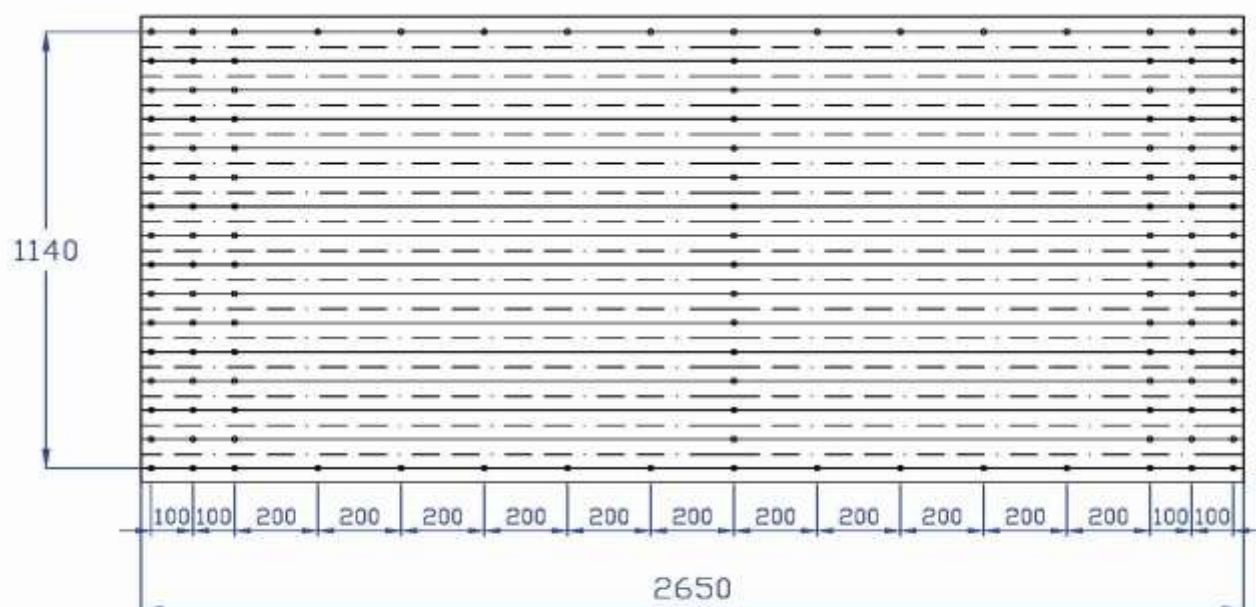
**MARCA 110.059B** ANGULAR BARANDILLA TECHO  
**MARK 110.059B** HAND RAIL  
**MARQUE 110.059B** ANGLE DE RAMBARDE



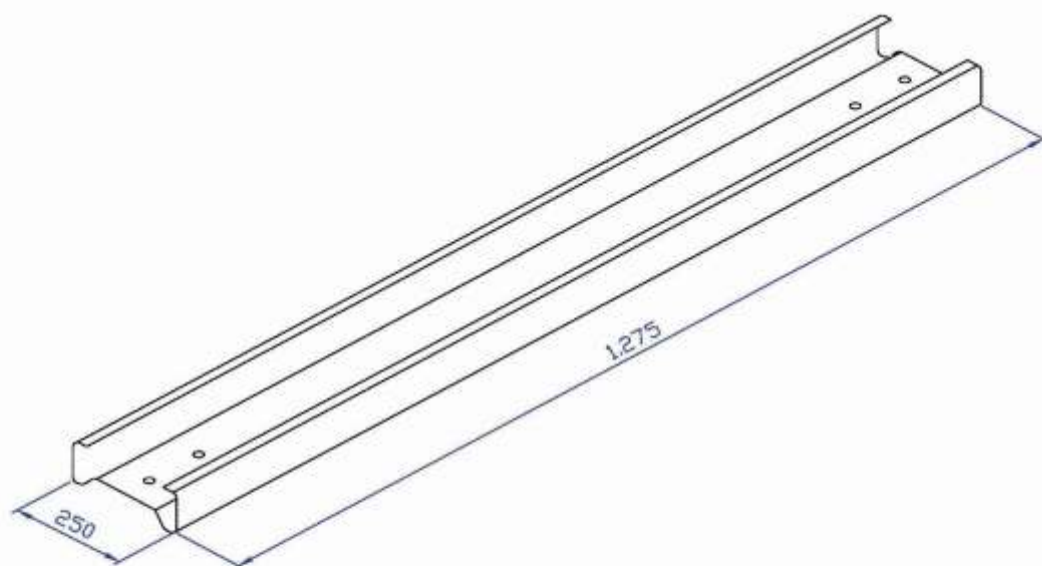
**MARCA 110.129A** ANGULAR BARANDILLA TECHO  
**MARK 110.129A** HAND RAIL  
**MARQUE 110.129A** ANGLE DE RAMBARDE



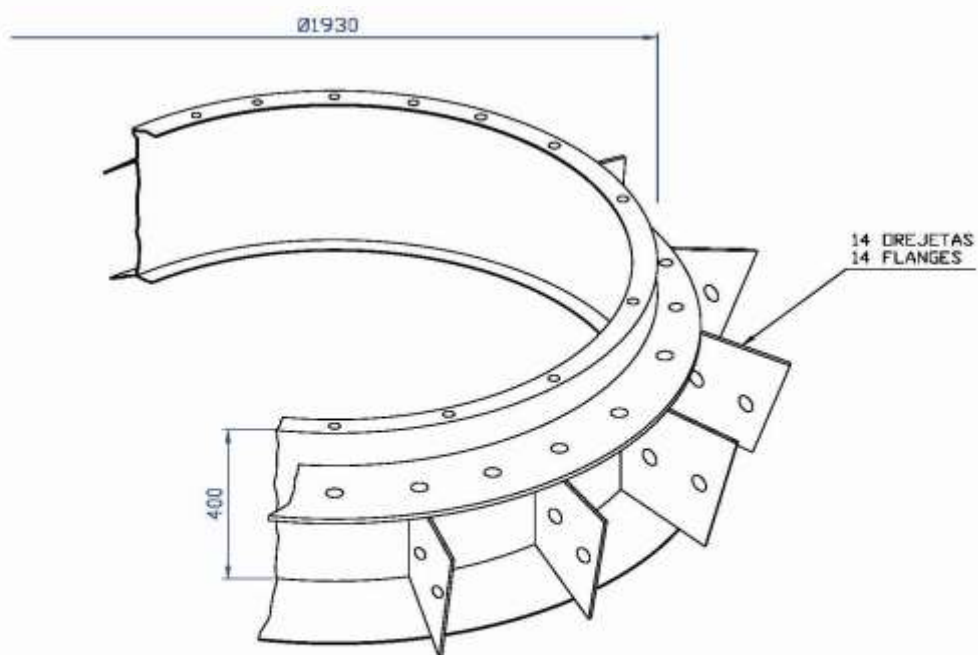
**MARCA 110.295** TAPA PUERTA TECHO  
**MARK 110.295** COVER FOR MANHOLE  
**MARQUE 110.295** PORTE D'ACCESS



<b>MARCA 110.552</b>	VIOLA 2 REFUERZOS TRIPLE JUNTA
<b>MARK 110.552</b>	BODYSHEET 2 STIFFENERS TRIPLE JOINT
<b>MARQUE 110.552</b>	VIROLE 2 MONTANT TRIPLE JOINT



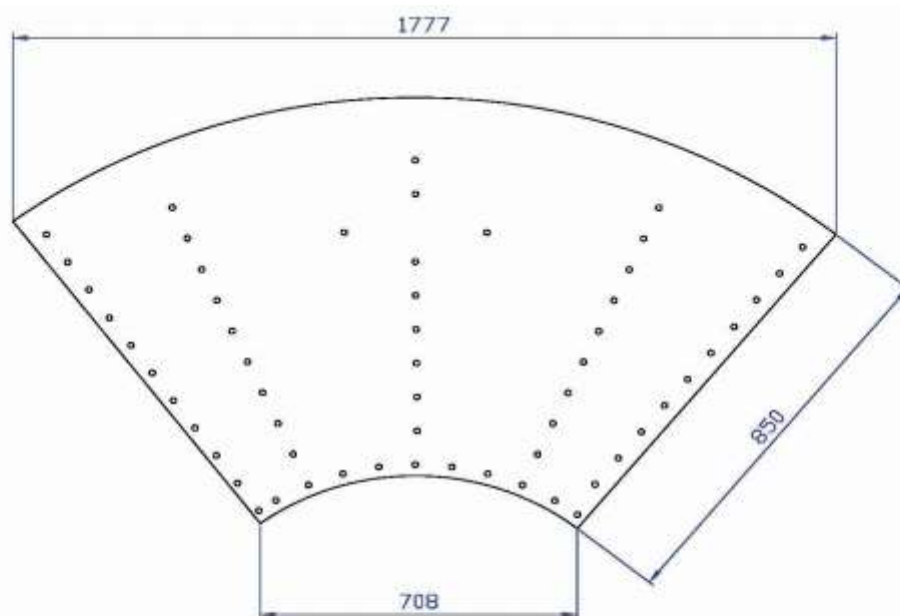
<b>MARCA 111.130</b>	VIGA TRANSVERSAL L=1.275mm SILO 10,70
<b>MARK 111.130</b>	CIRCULAR RAFTER L=1.275mm SILO 10,70
<b>MARQUE 111.130</b>	POUTRE TRANSVERSAL L=1.275mm SILO 10,70



MARCA 111.146 COLLAR DE TECHO, SILO 10,70 Ø  
MARK 111.146 ROOF COLLAR, SILO 10,70 Ø

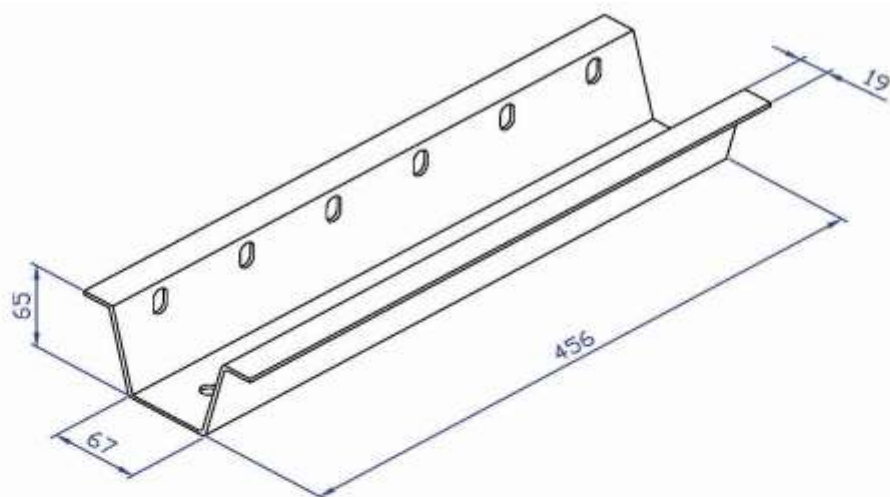
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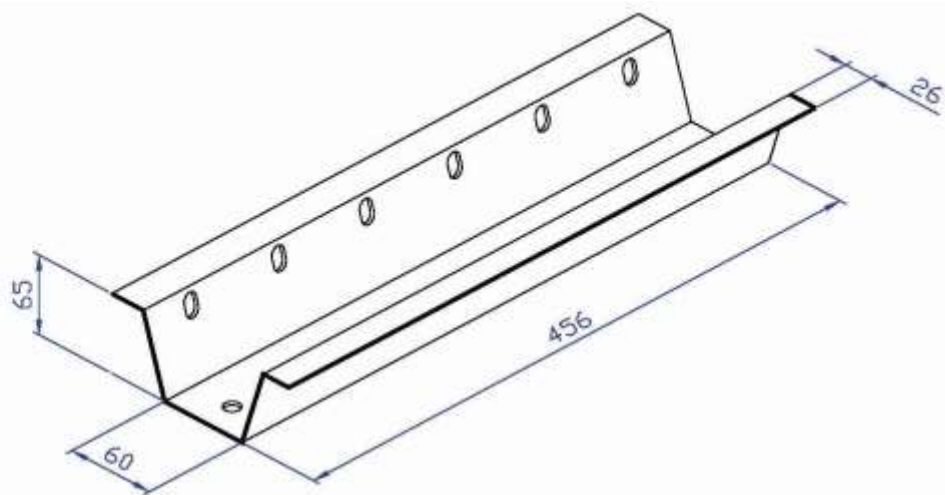


MARCA 111.420 FALDON PARA BOCA DE CARGA  
MARK 111.420 FLASHING FOR ROOF CENTER COVER  
MARQUE 111.420 BAVETTE POUR BOUCHE CHARGE

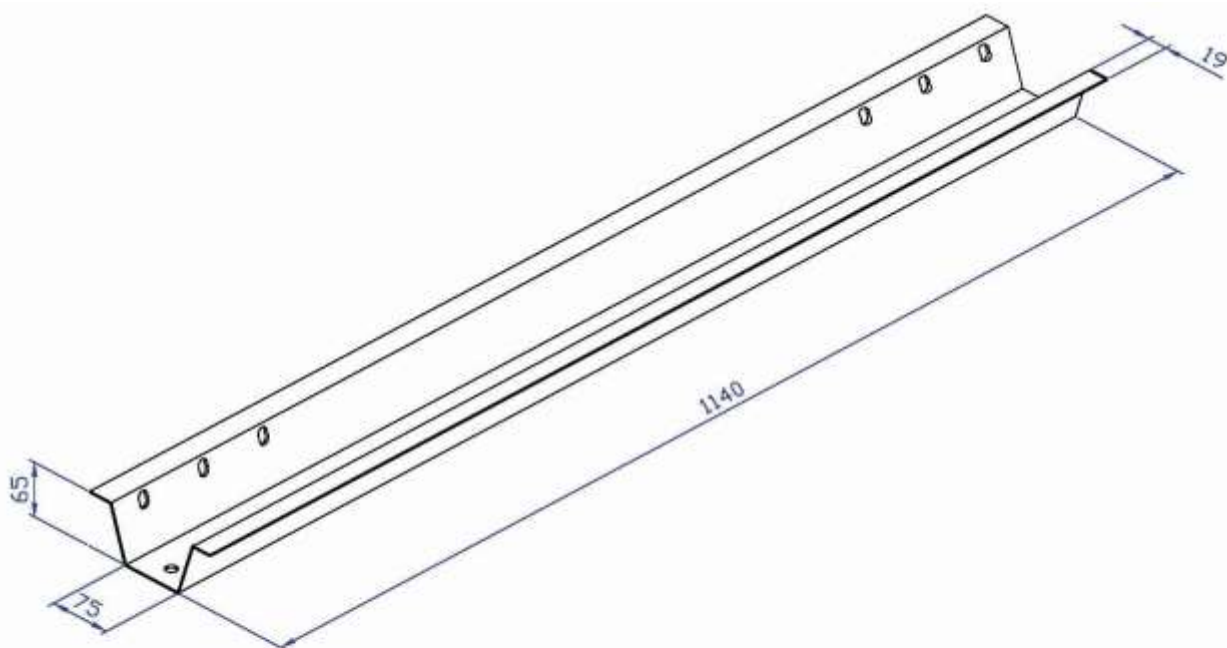




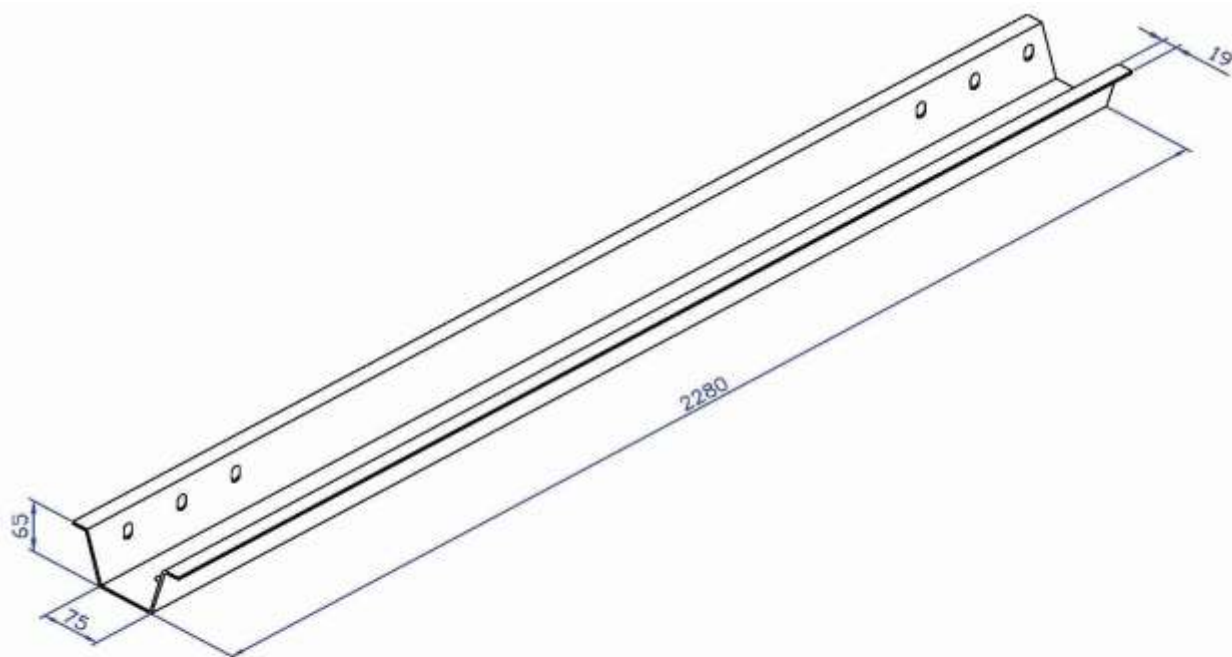
MARCA 111.882 EMPALME REFUERZO  
 MARK 111.882 SPLICE  
 MARQUE 111.882 ECLISSE



MARCA 111.883 EMPALME REFUERZO INTERIOR  
 MARK 111.883 STIFFENER SPLICE INSIDE  
 MARQUE 111.883 ECLISSE INTERIEUR

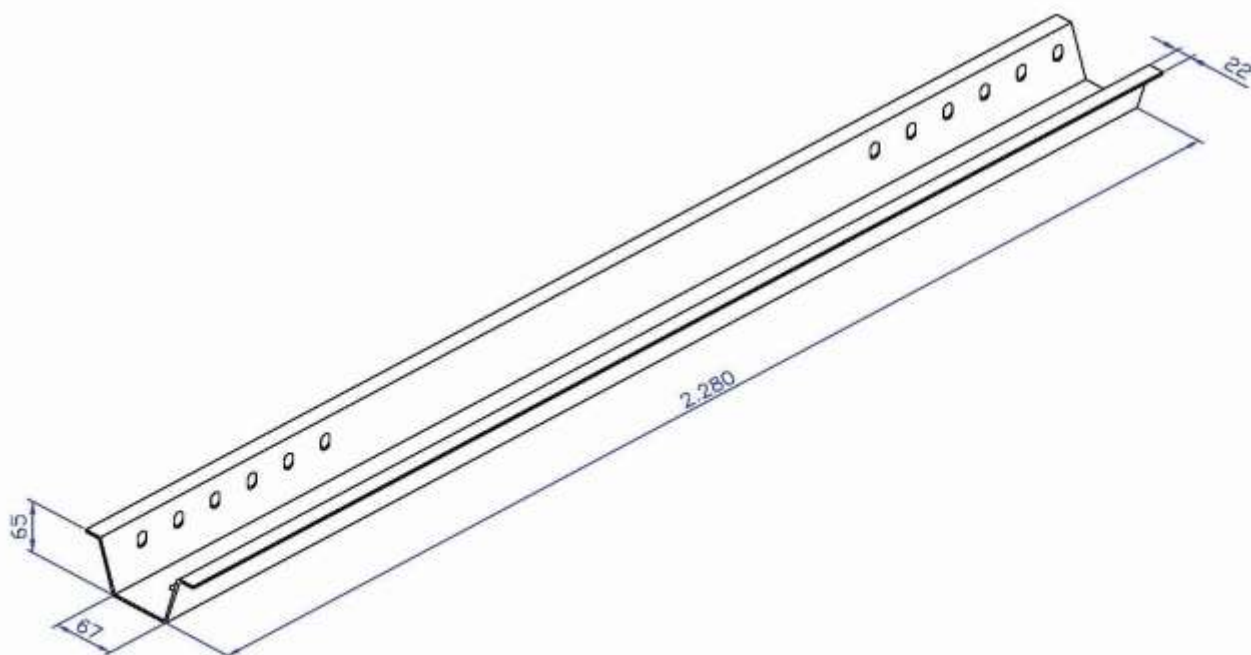


**MARCA 111.885**    REFUERZO CORTO  
**MARK 111.885**    SHORT STIFFENER  
**MARQUE 111.885**    MONTANT D'UNE VIROLE

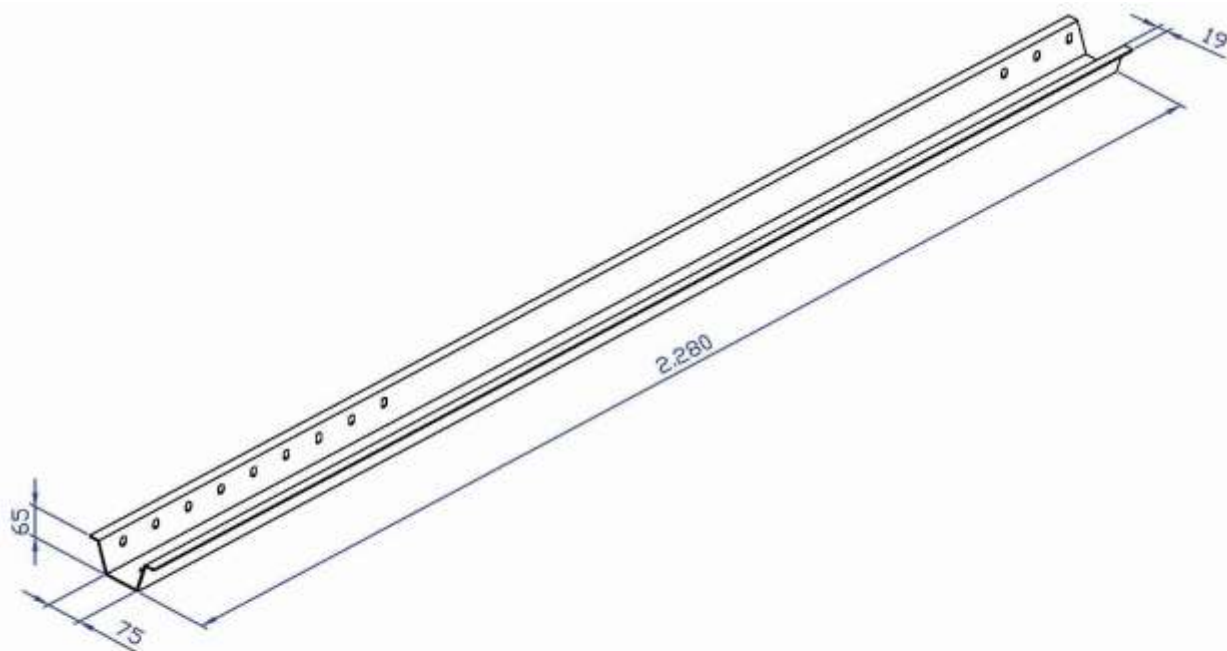


**MARCA 111.886**    REFUERZO NORMAL  
**MARK 111.886**    STANDARD STIFFENER  
**MARQUE 111.886**    MONTANT STANDARD

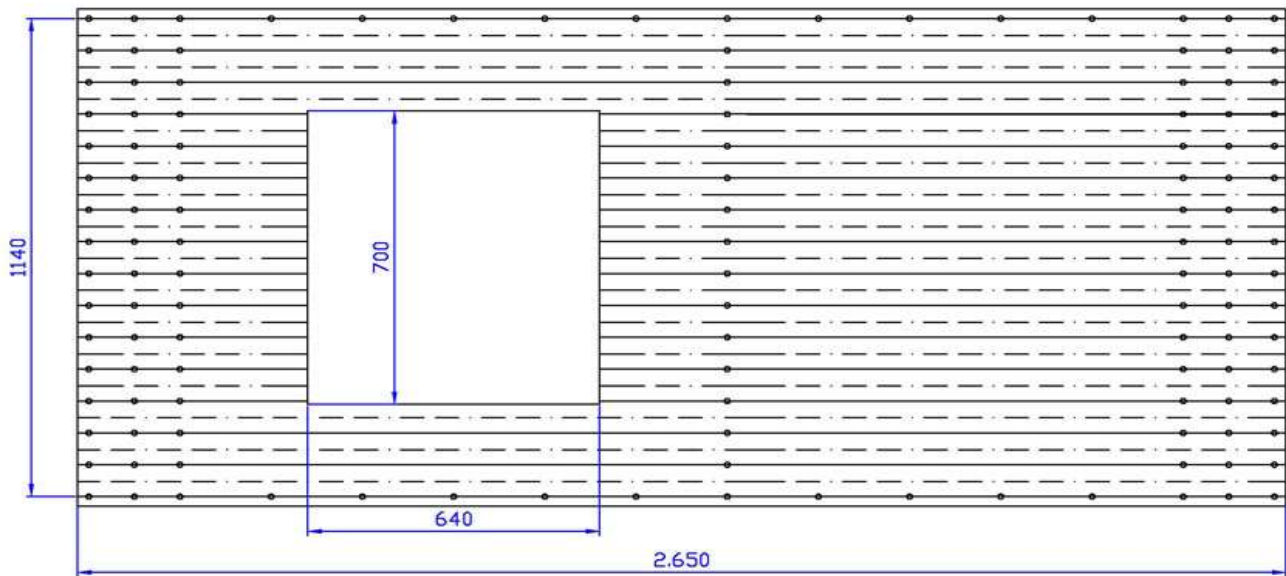




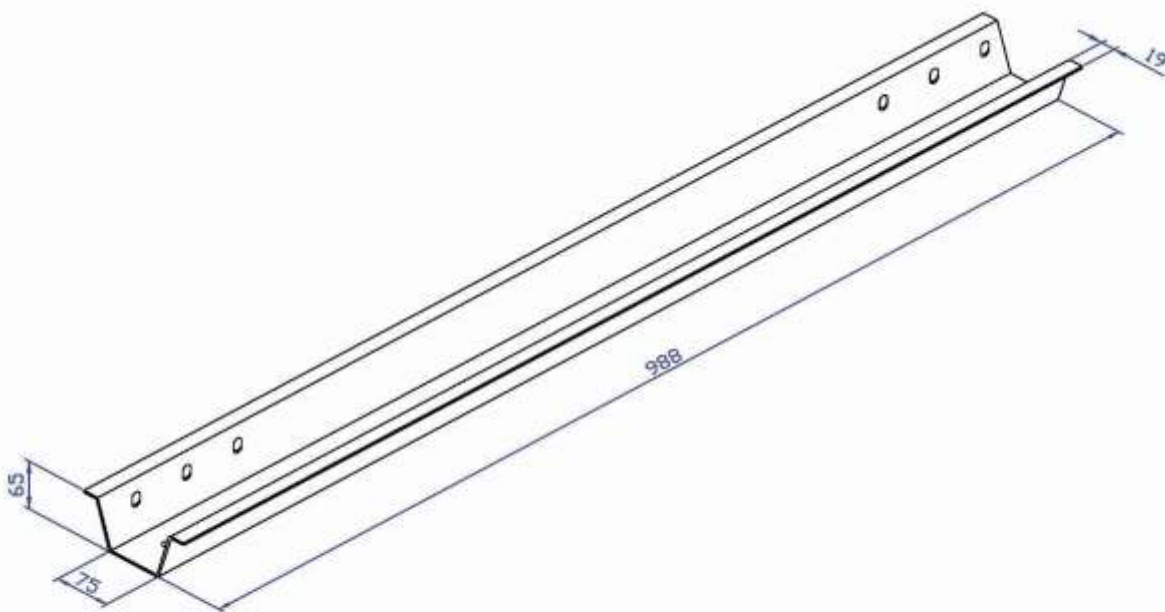
**MARCA 111.888**    REFUERZO INTERIOR  
**MARK 111.888**    INSIDE STIFFENER  
**MARQUE 111.888**    MONTANT INTERIEUR



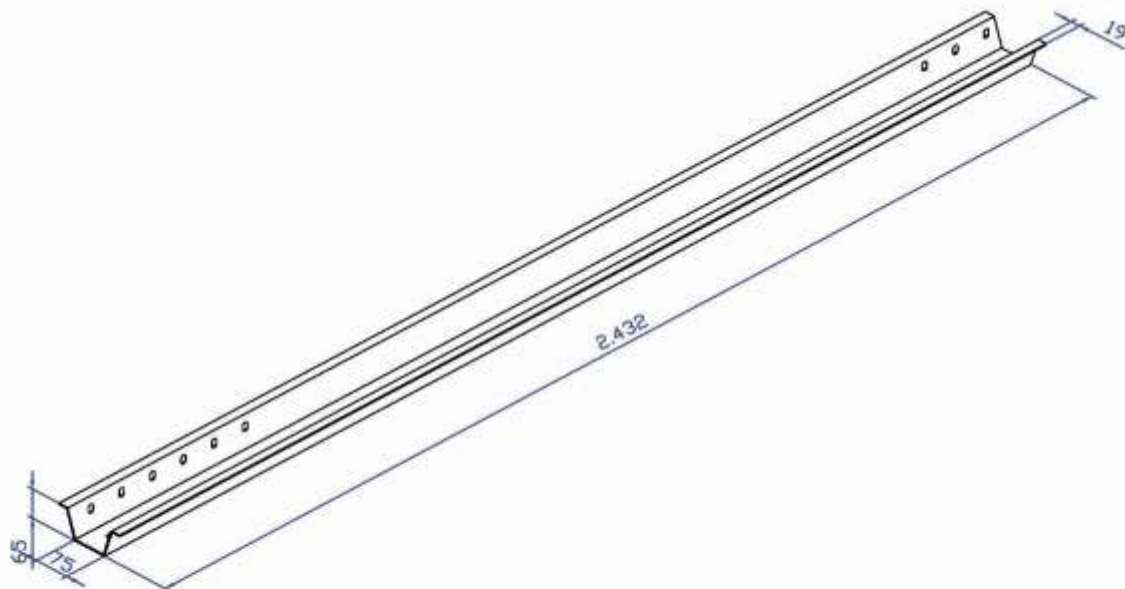
**MARCA 112.100**    REFUERZO ESPECIAL  
**MARK 112.100**    SPECIAL STIFFENER  
**MARQUE 112.100**    MONTANT SPECIAL



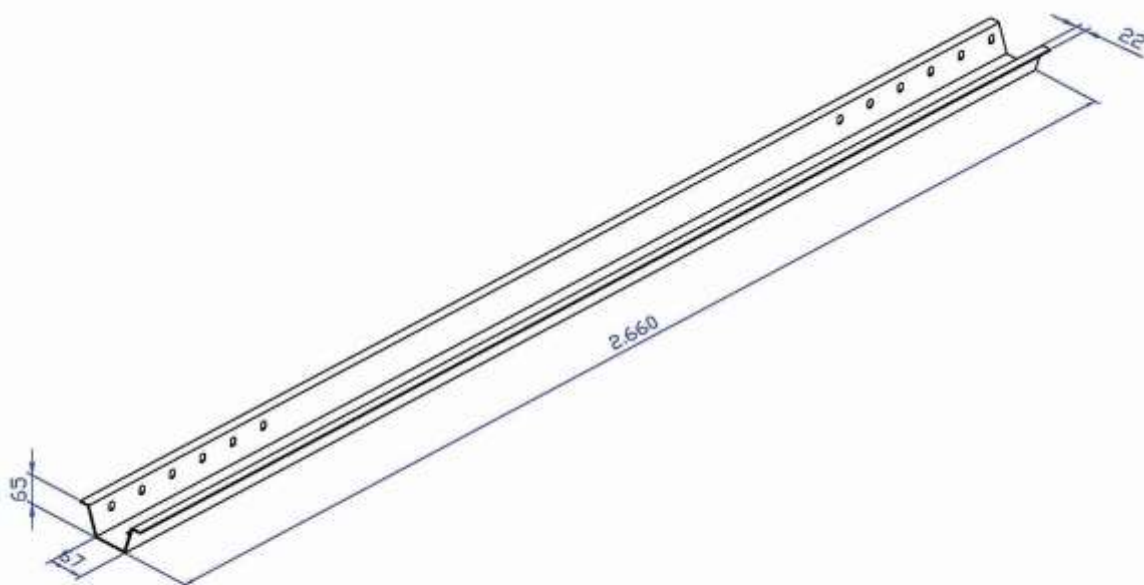
<b>MARCA 112.110</b>	VIROLA CON PUERTA 2 REFUERZOS TRIPLE JUNTA
<b>MARK 112.110</b>	ACCESS BODYSHEET 2 STIFFENERS TRIPLE JOINT
<b>MARQUE 112.110</b>	VIROLE AVEC PORTE 2 MONTANT TRIPLE JOINT



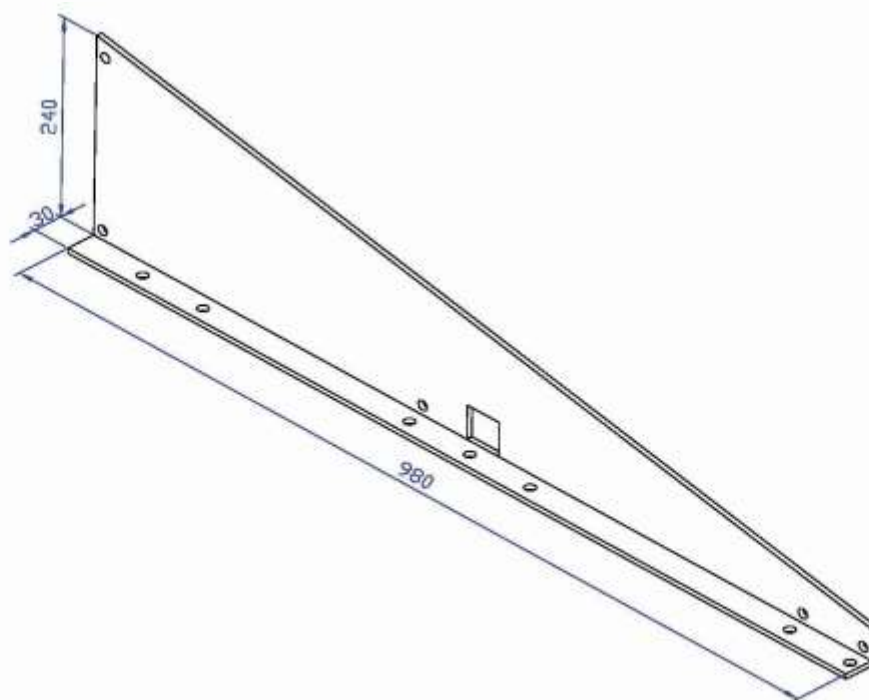
<b>MARCA 113.362</b>	REFUERZO SUPERIOR CORTO
<b>MARK 113.362</b>	SUPERIOR SHORT STIFFENER
<b>MARQUE 113.362</b>	MONTANT PETIT SUPERIEUR



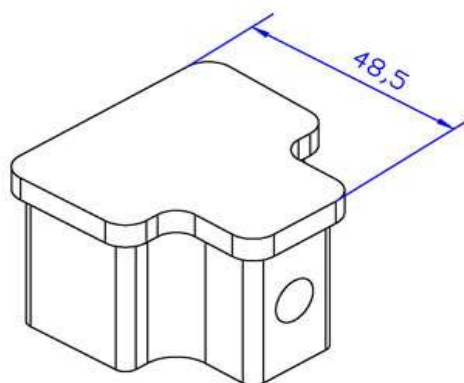
**MARCA 113.363** REFUERZO INFERIOR  
**MARK 113.363** LOWER STIFFENER  
**MARQUE 113.363** MONTANT INFERIEUR



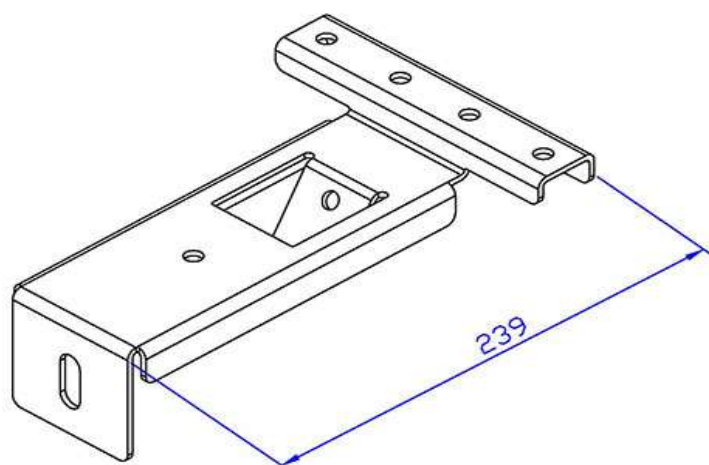
**MARCA 113.364** REFUERZO INTERIOR INFERIOR  
**MARK 113.364** LOWER INSIDE STIFFENER  
**MARQUE 113.364** MONTANT INTERIEUR INFERIEUR



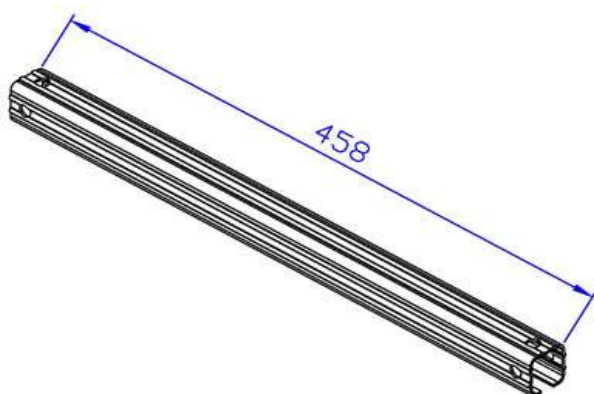
**MARCA 113.915** CHAPA BARANDILLA DE TECHO  
**MARK 113.915** HANDRAIL BRACKET  
**MARQUE 113.915** POTEAU DE RAMBARDE DU TOIT



**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

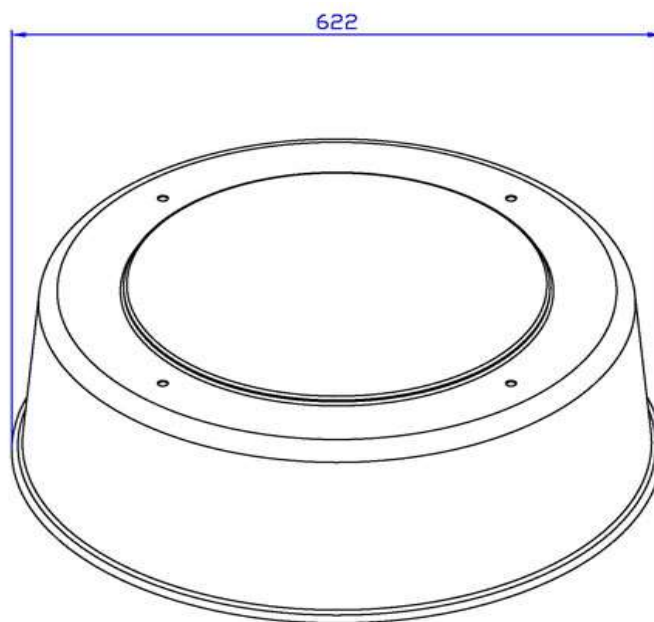


MARCA 119.611	SOPORTE DE RAIL
MARK 119.611	LADDER'S SUPPORT
MARQUE 119.611	SUPPORT D'ECHELLE

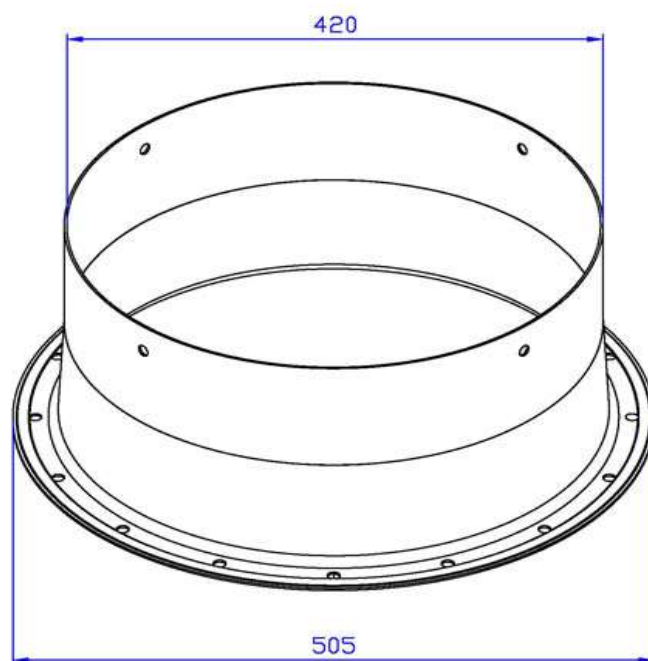


MARCA 119.616	PELDAÑO L= 460mm
MARK 119.616	LADDER RUNG L= 460mm
MARQUE 119.616	MARCHE POUR ECHELLE L= 460mm

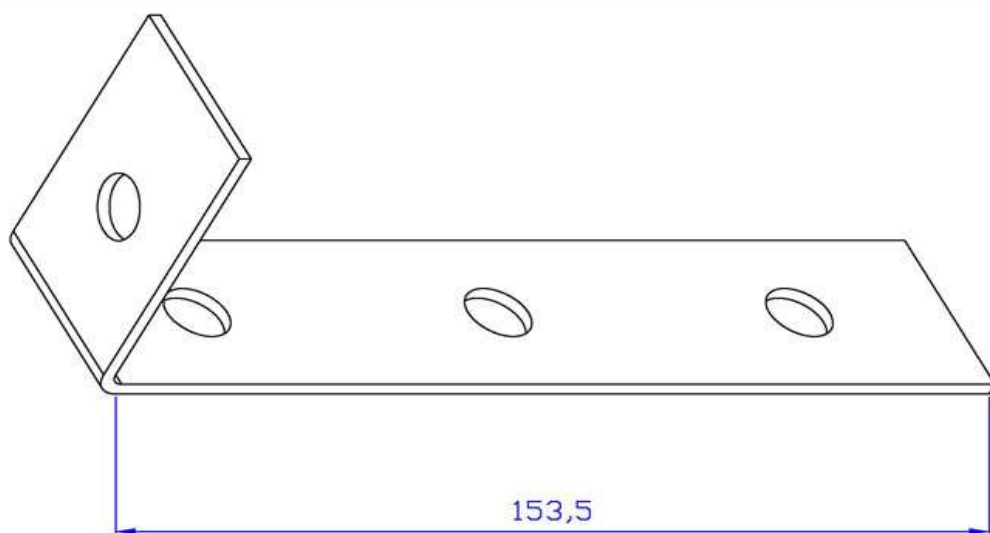




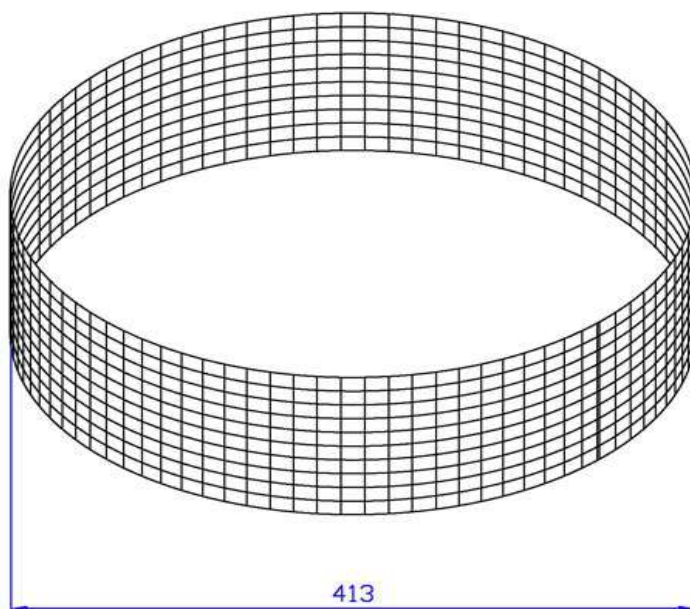
MARCA 119.623 TAPA AIREACIÓN CIRCULAR  
MARK 119.623 TOP COVER FOR AERATION  
MARQUE 119.623 TOIT DE LA COUVERTURE D'AERATION



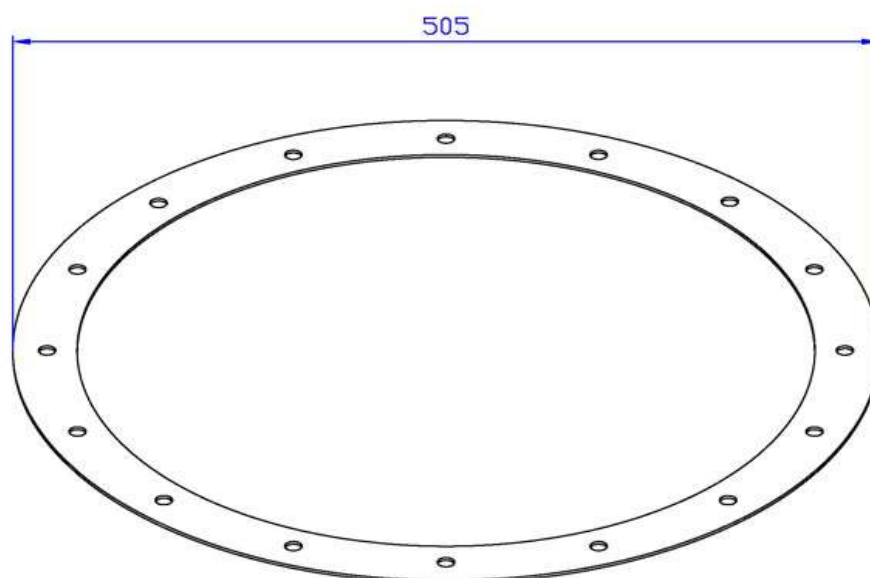
MARCA 119.624 CUERPO AIREACIÓN CIRCULAR  
MARK 119.624 TOP COVER FOR AERATION  
MARQUE 119.624 TOIT DE LA COUVERTURE D'AERATION



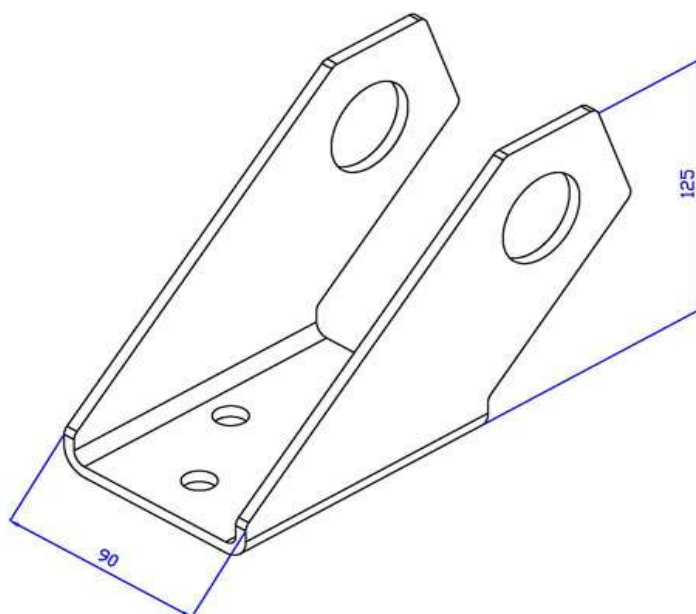
MARCA 119.625	CLIP AIREACIÓN CIRCULAR
MARK 119.625	SUPPORT CLIP
MARQUE 119.625	CLIP SUPPORT



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

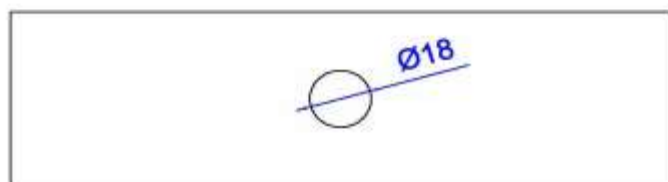
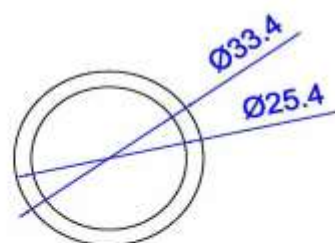
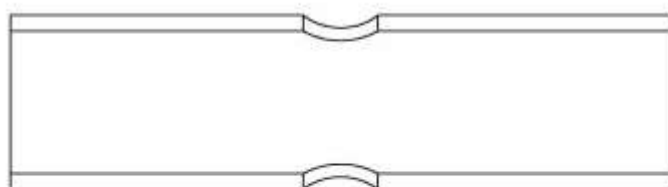


<b>MARCA 119.627</b>	BRIDA AIREACIÓN CIRCULAR
<b>MARK 119.627</b>	FLANGE FOR AERATION
<b>MARQUE 119.627</b>	BRIDE POUR AERATION

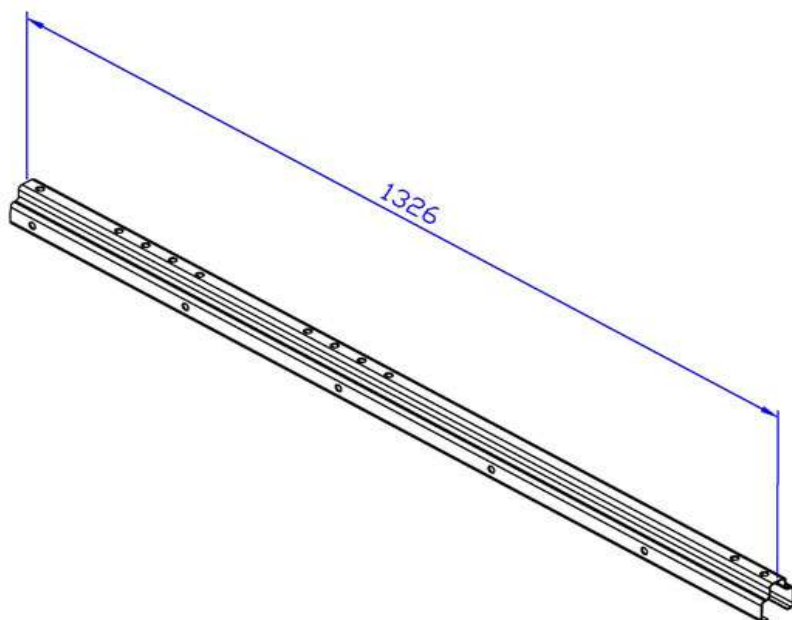


<b>MARCA 119.644</b>	CLIP VARILLA TENSORA.
<b>MARK 119.644</b>	CLIP FOR BRACE ROD.
<b>MARQUE 119.644</b>	CLIP POUR TENSEUR.

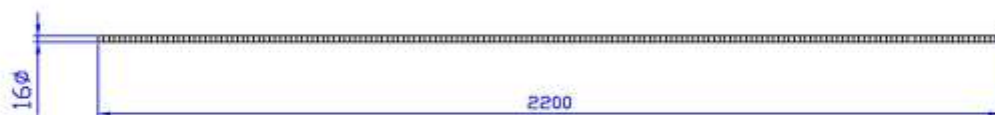




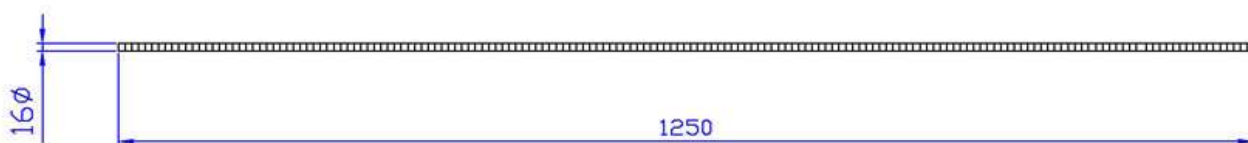
MARCA 119.676	TUBO AMARRE VARILLA TENSORA
MARK 119.676	TUBE FOR BRADE ROD
MARQUE 119.676	TUYAU POUR TENSORE



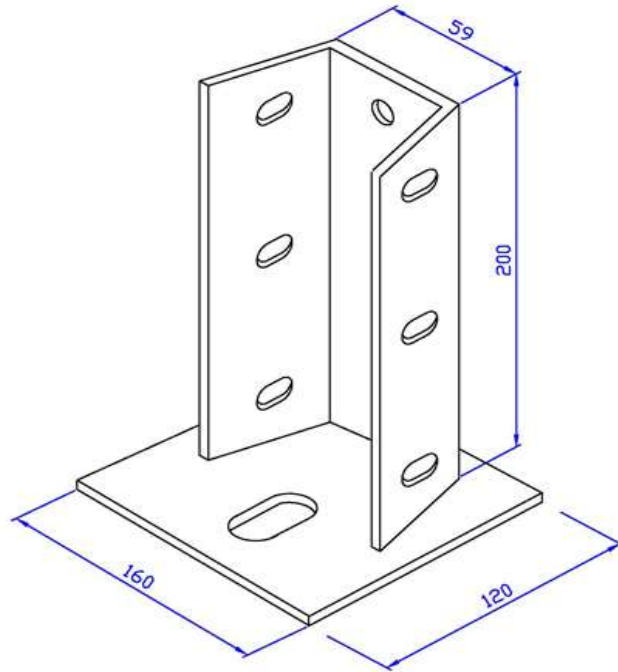
MARCA 119.714	RAIL ESCALERA TERMINAL L=1326 mm
MARK 119.714	LADDER'S TERMINAL RAIL L= 1326mm
MARQUE 119.714	RAIL D'ECHELLE TERMINAL L= 1326mm



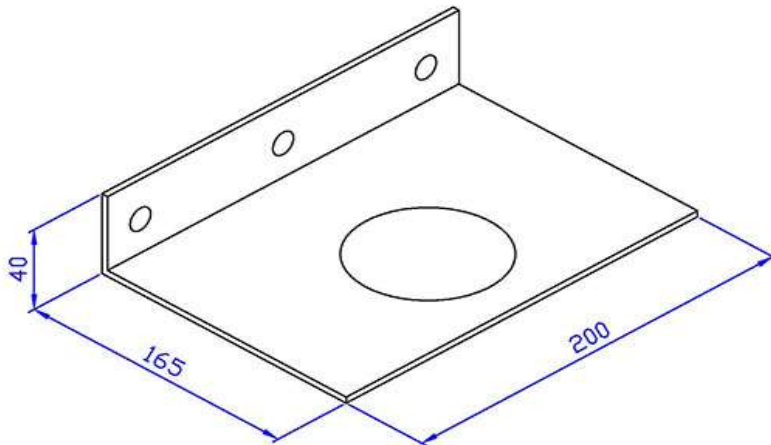
MARCA 119.745 VARILLA TENSORA L=2.200 mm.  
MARK 119.745 BRACE ROD L=2.200mm.  
MARQUE 119.745 TENSEUR L=2.200 mm.



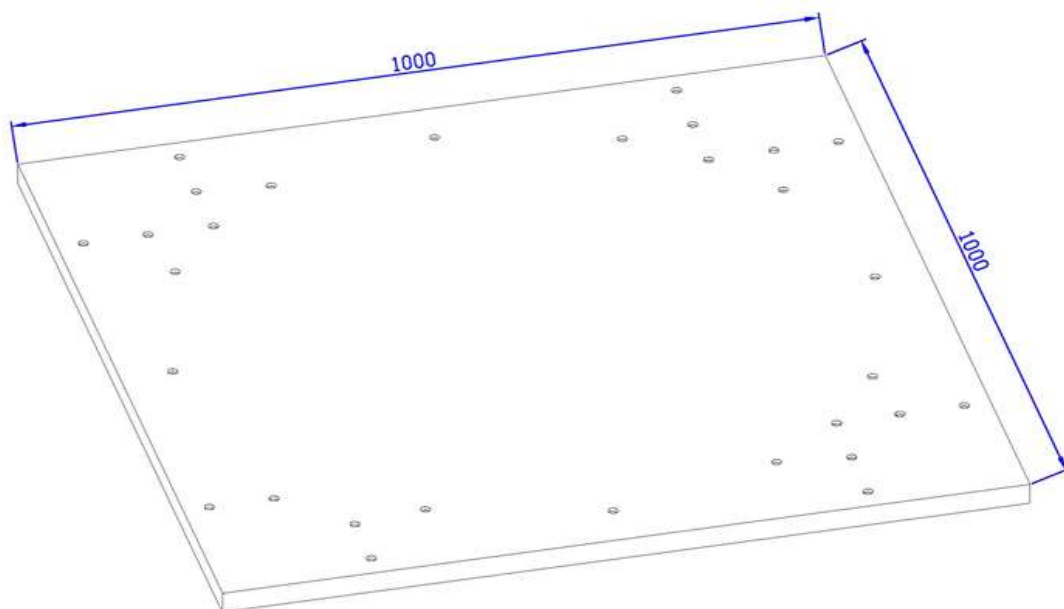
MARCA 119.804 VARILLA TENSORA L=1.250 mm.  
MARK 119.804 BRACE ROD L=1.250 mm.  
MARQUE 119.804 TENSEUR L=1.250 mm.



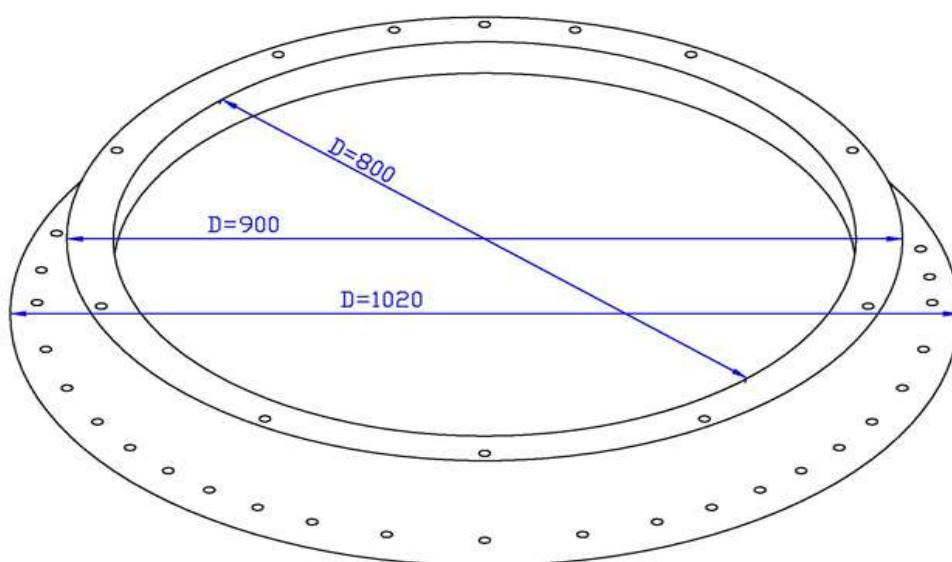
MARCA 119.973 PLACA ANCLAJE TIPO "C"  
 MARK 119.973 ANCHOR PLATE TYPE "C"  
 MARQUE 119.973 PLAQUE D'ANCRAGE "C"



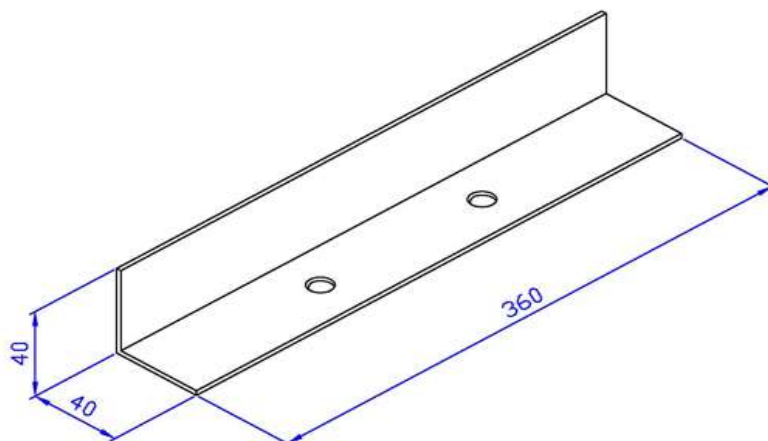
MARCA 120.188 CHAPA SOPORTE ANILLO VIENTO D60  
 MARK 120.188 WIND RING ATTACHMENT PLATE D60  
 MARQUE 120.188 TÔLE SUPPORT ANNEAU DU VENT D60



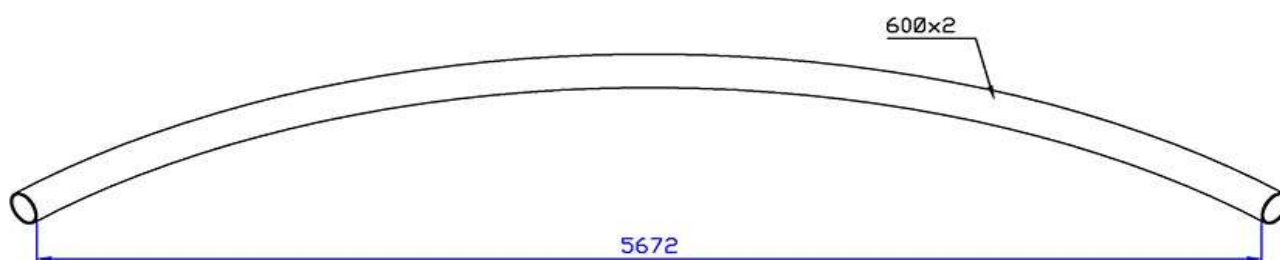
MARCA 120.241	TAPA BOCA DE CARGA
MARK 120.241	TOP FOR ROOF CENTER COLLAR
MARQUE 120.241	COUVERTURE BOUCHE DE CHARGE



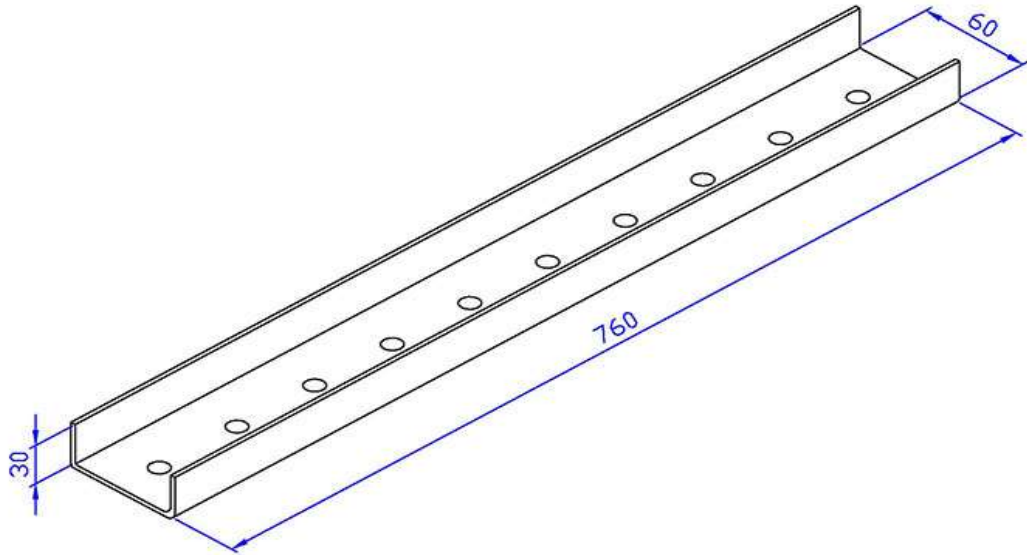
MARCA 120.244	BOCA DE CARGA
MARK 120.244	ROOF CENTER COLLAR
MARQUE 120.244	BOUCHE DE CHARGE



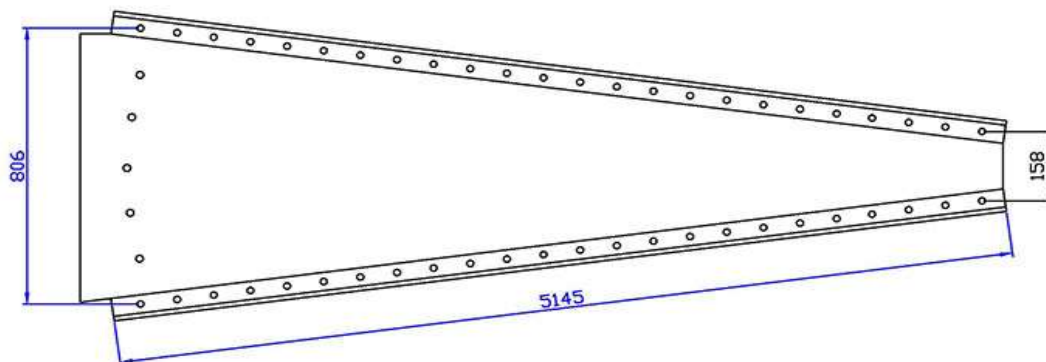
MARCA 120.261	REFUERZO TAPA BOCA DE CARGA
MARK 120.261	REINFORCEMENT FOR TOP FOR ROOF CENTER COLLAR
MARQUE 120.261	RENFORT COUVERTURE BOUCHE DE CHARGE



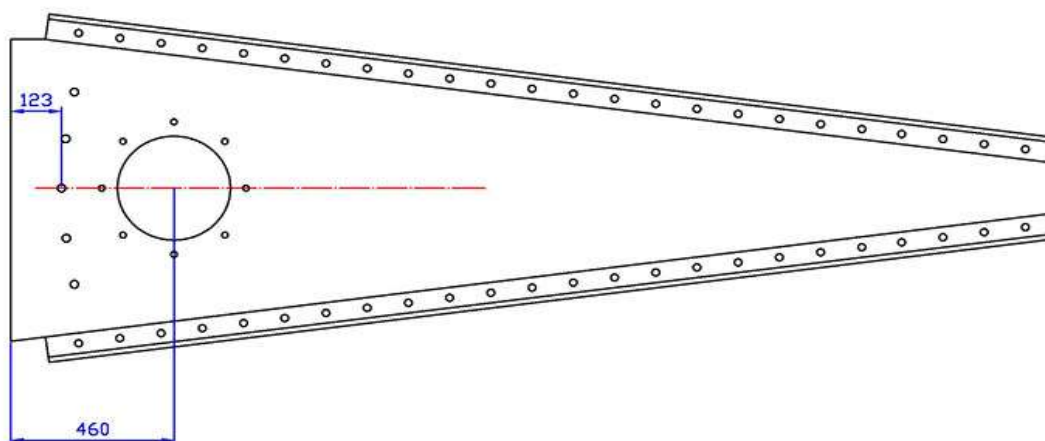
MARCA 120.276	ANILLO DE VIENTO EXTERIOR S1070 L=6000
MARK 120.276	OUTER WIND RING S1070 L=6000
MARQUE 120.276	ANNEAU DU VENT EXTERIEUR S1070 L=6000



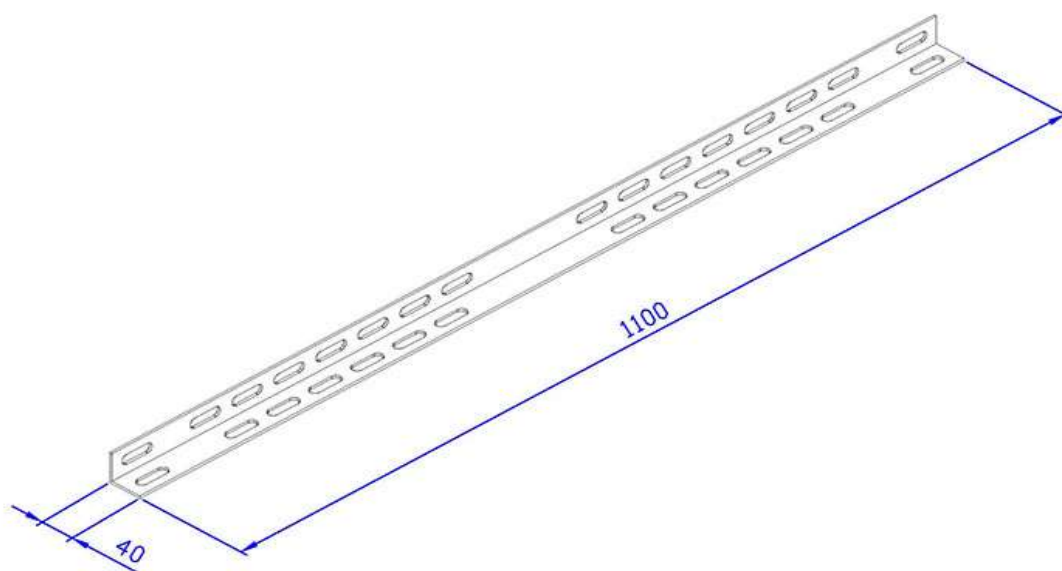
MARCA 120.384	REFUERZO BOCA DE CARGA
MARK 120.384	REINFOR ROOF CENTER COLLAR
MARQUE 120.384	RENFORT BOUCHE CHARGE



MARCA 120.505	SECTOR DE TECHO SILO 10,70
MARK 120.505	ROOF SHEET SILO 10,70
MARQUE 120.505	SECTEUR DU TOIT SILO 10,70

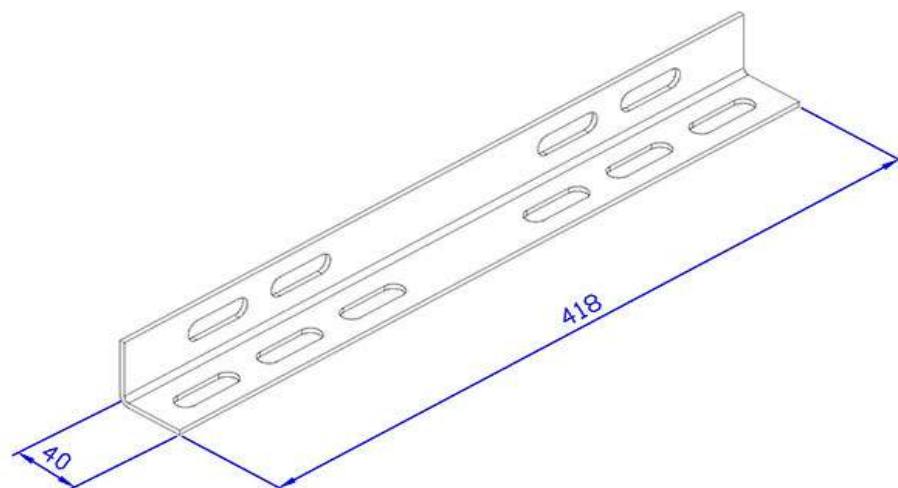


MARCA 120.542	SECTOR DE TECHO CON ABERTURA CIRCULAR SILO 10,70
MARK 120.542	ROOF SHEET WITH CIRCULAR OPENING SILO 10,70
MARQUE 120.542	SECTEUR DU TOIT AVEC OUVERTURE CIRCULAIRE SILO 10,70

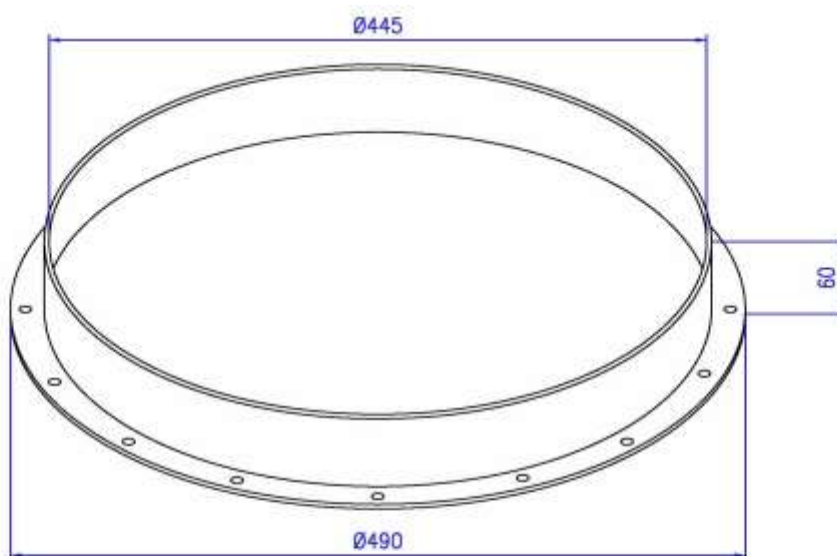


MARCA 120.691	PELDAÑO ESCALERA TECHO L=1100
MARK 120.691	ROOF LADDER RUNG L=1100
MARQUE 120.691	MARCHE DU TOIT L=1100



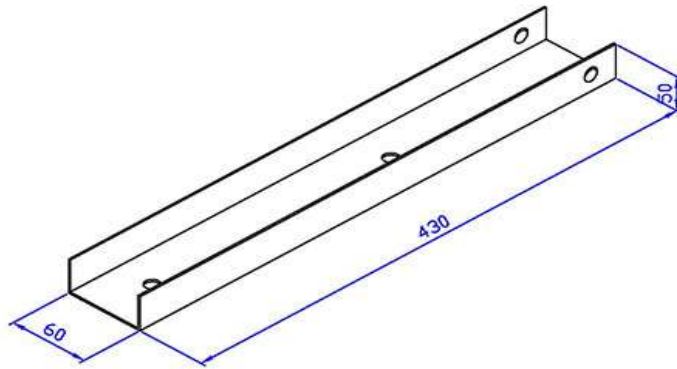


<b>MARCA 120.692</b>	PELDAÑO ESCALERA TECHO L=418
<b>MARK 120.692</b>	ROOF LADDER RUNG L=418
<b>MARQUE 120.692</b>	MARCHE DU TOIT L=418

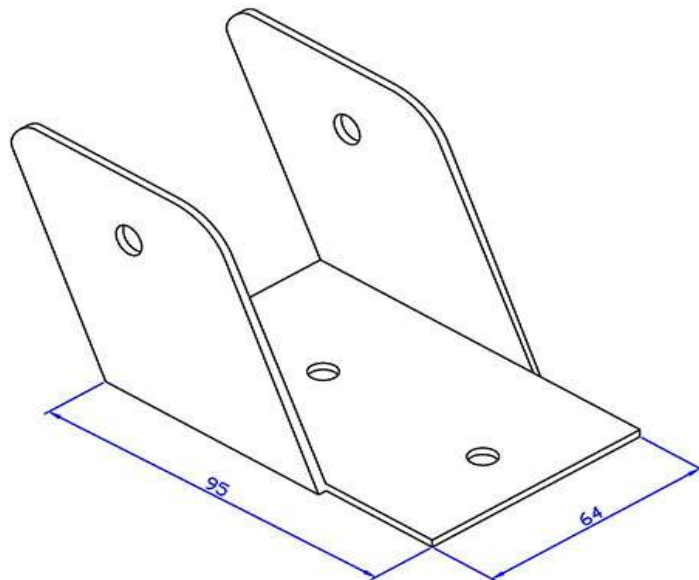


<b>MARCA 120.715</b>	ANILLO PUERTA TECHO
<b>MARK 120.715</b>	RING FOR MANHOLE
<b>MARQUE 120.715</b>	ANNEAU DU PORTE D'ACCESS

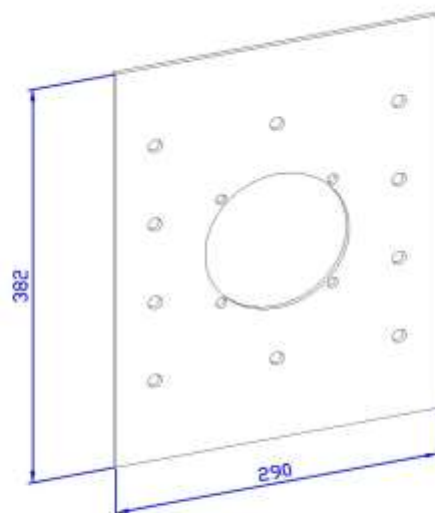




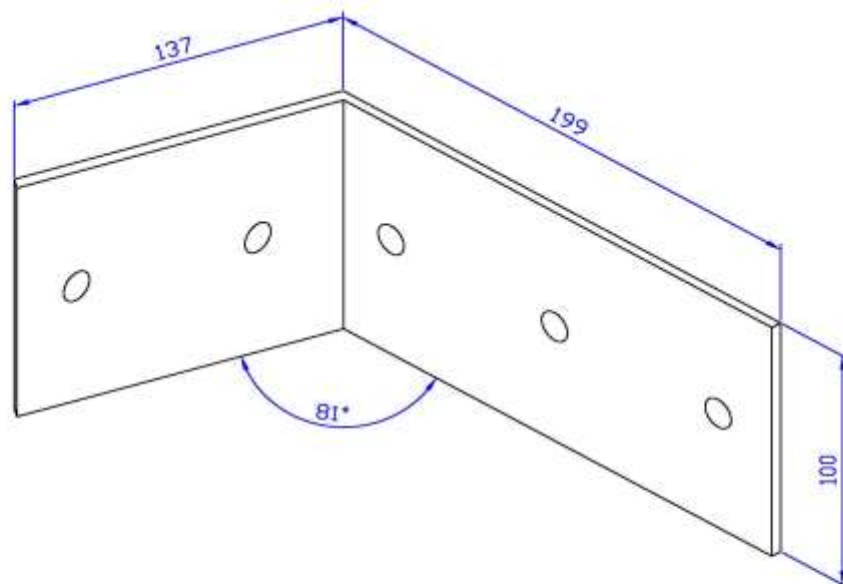
MARCA 120.779	"U" AMARRE BISAGRA
MARK 120.779	"U" FOR HINGE BASE
MARQUE 120.779	"U" ATTACHE POUR CHARNIÈRE



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



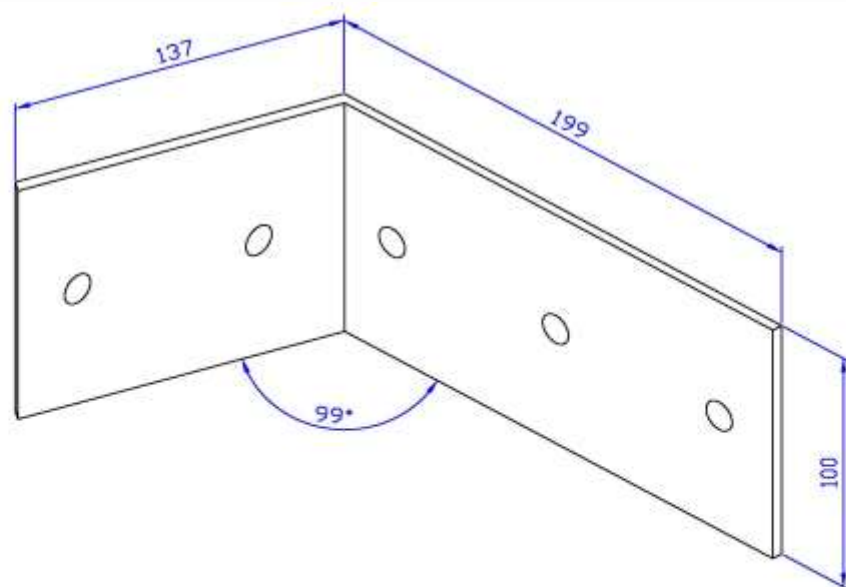
MARCA 120.864A PLACA INDICADOR NIVEL  
 MARK 120.864A PLATE LEVEL INDICATOR  
 MARQUE 120.864A PLAQUE POUR INDICATEUR NIVEAU



MARCA 121.674 CLIP VIGA TRANSVERSAL TIPO "B"  
 MARK 121.674 CLIP TIPO "A"

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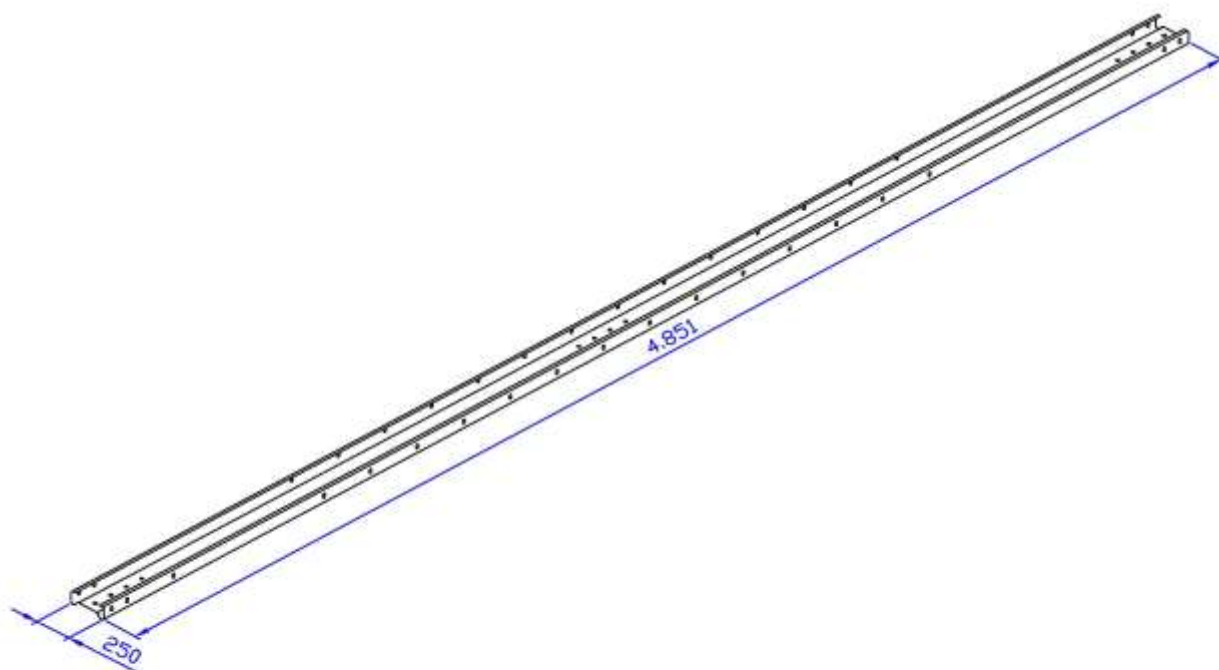
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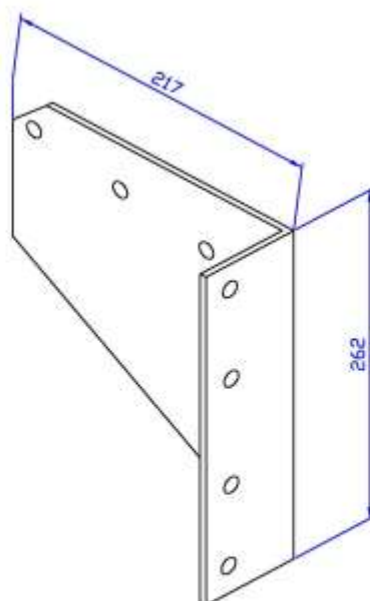
MARCA 121.675A CLIP VIGA TRANSVERSAL TIPO "A"  
 MARK 121.675A CLIP TIPO "A"

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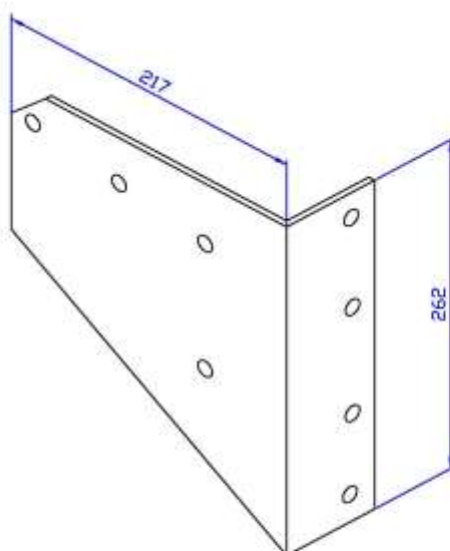
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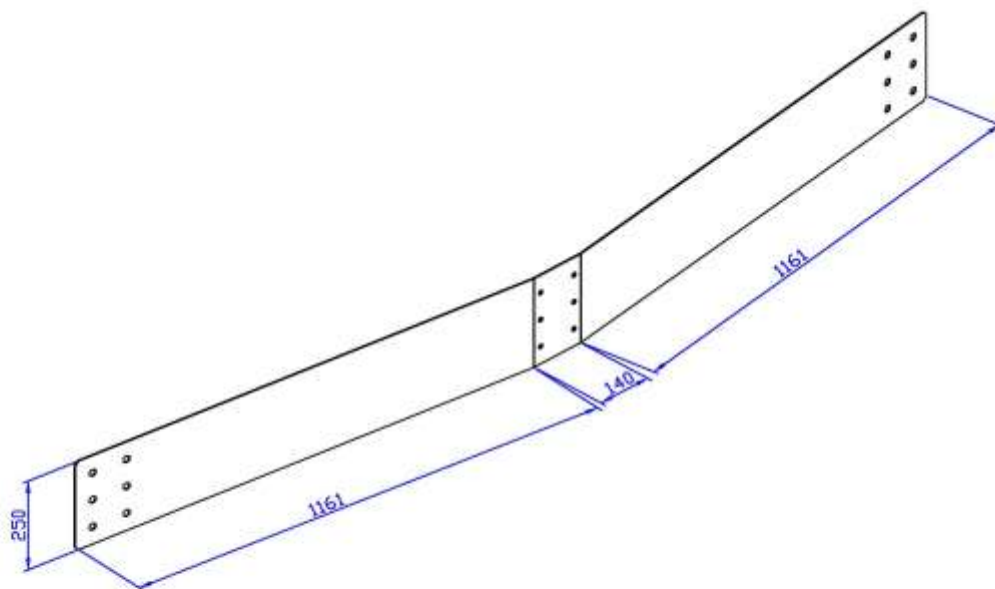
MARCA 121.684 VIGA TECHO L= 4.851mm SILO 10,70  
 MARK 121.684 ROOF RAFTER L= 4.851mm SILO 10,70  
 MARQUE 121.684 POUTRE DU TOIT L= 4.851mm SILO 10,70



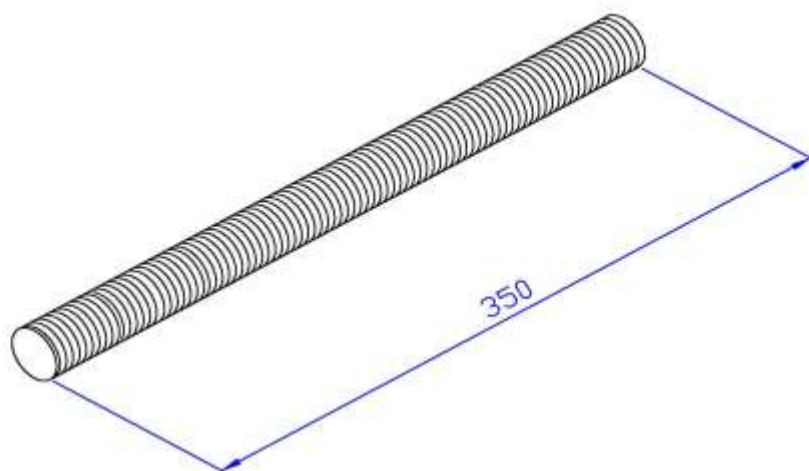
MARCA 121.685 CLIP ALERO MANO DERECHA  
 MARK 121.685 RAFTER SUPPORT R.H.  
 MARQUE 121.685 CLIP AVANT-TOIT POUR POUTRE M.D.



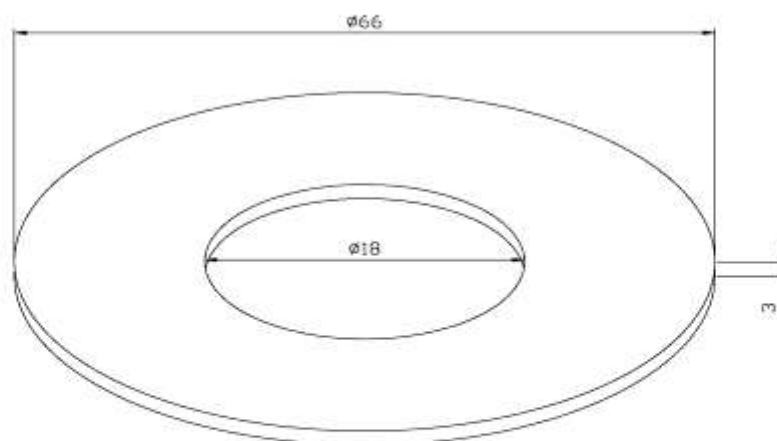
MARCA 121.686 CLIP ALERO MANO IZQUIERDA  
 MARK 121.686 RAFTER SUPPORT L.H.  
 MARQUE 121.686 CLIP AVANT-TOIT POUR POUTRE M.G.



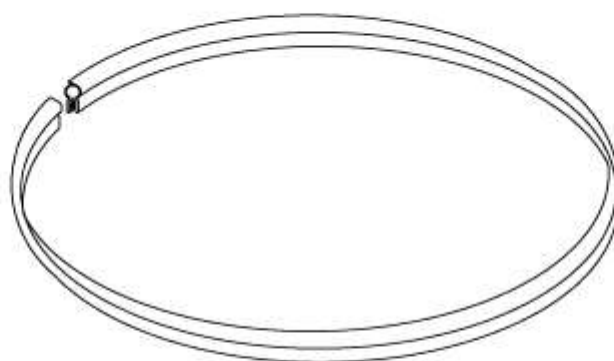
MARCA 121.687	TIRANTE PARA VIGAS L=2462
MARK 121.687	TENSION PLATE L=2462
MARQUE 121.687	TÔLE DE TENSION L=2462



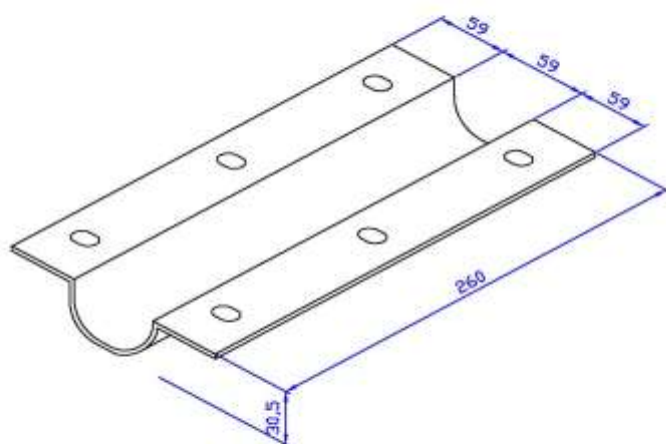
MARCA 121.689	PERNO DE ANCLAJE M16
MARK 121.689	ANCHOR BOLT M16
MARQUE 121.689	ANCRAGE M16



<b>MARCA</b> 121.693	ARANDELA PARA PERNO M16
<b>MARK</b> 121.693	WASHER FOR ANCHOR BOLT M16
<b>MARQUE</b> 121.693	RONDELLE POUR BOULON M16



<b>MARCA</b> 121.811	JUNTA DE CONTORNO L=1500mm
<b>MARK</b> 121.811	CONTOUR JOINT L=1500mm
<b>MARQUE</b> 121.811	JOINT DE CONTOUR L=1500mm



**MARCA 122.955A** SEMIABRAZADERA ANILLO VIENTO EXTERIOR D60  
**MARK 122.955A** WIND RING COUPLER D60  
**MARQUE 122.955A** DEMI FRETTE POUR ANNEAU D60

## **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 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/M<sup>2</sup> (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 WET OR UNPROPER STORAGE IS NOT COVERED BY THE WARRANTY. STORE MATERIALS IN DRY HIGH GROUND UNDER COVERED AREA, ELEVATED ON WOOD BLOQUIING. DO NOT COVER WITH PLASTIC OR TARPULINS 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 IMMEDIATELY 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 A 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 + 5° AND +20 °C.



## **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.

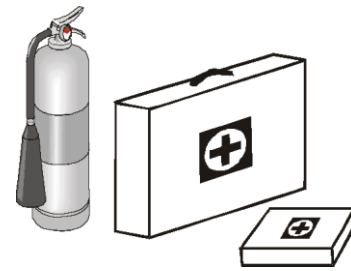
## PROTECTION EQUIPMENT

### 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.

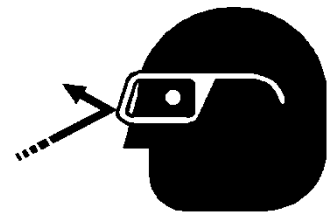
Wear hard hat and steel toe boots to help protect your head and toes from falling debris.

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**



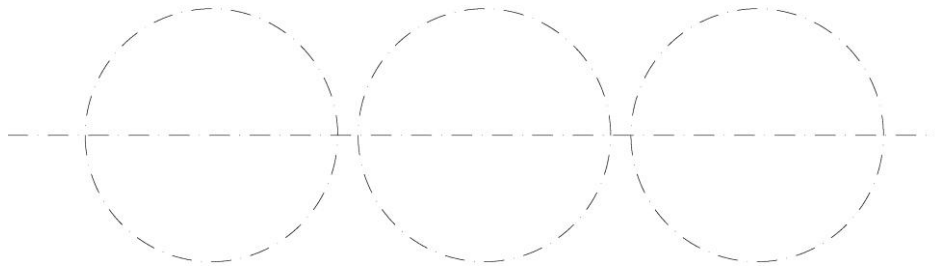
**Hard hat**



## 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 <b>0,8 mm</b>	Body sheets with thickness of <b>1,0 mm</b>	Body sheets with thickness of <b>1,2 mm</b>	Body sheets with thickness of <b>1,5 mm</b>	Body sheets with thickness of <b>1,8 mm</b>	Body sheets with thickness of <b>2,0 mm</b>	Body sheets with thickness of <b>2,2 mm</b>	Body sheets with thickness of <b>2,5 mm</b>	Body sheets with thickness of <b>2,8 mm</b>	Body sheets with thickness of <b>3,0 mm</b>	Body sheets with thickness of <b>3,5 mm</b>	Body sheets with thickness of <b>4,0 mm</b>	Body sheets with thickness of <b>5,0 mm</b>

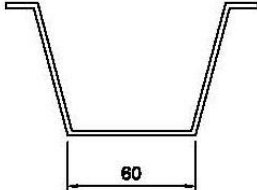
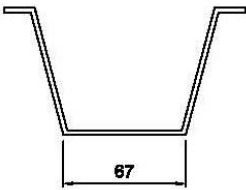
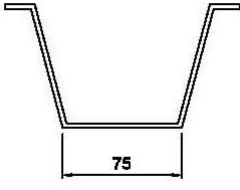
<b>A</b>	Body sheets with <b>double joint</b>
<b>B</b>	Body sheets with <b>triple joint</b>
<b>C</b>	Body sheets with <b>quadruple joint</b>
<b>E</b>	Body sheets with <b>quintuple joint</b>
<b>G</b>	Body sheets with <b>sextuple joint</b>

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
	Dark green	4,00 mm	7013

## Stiffeners

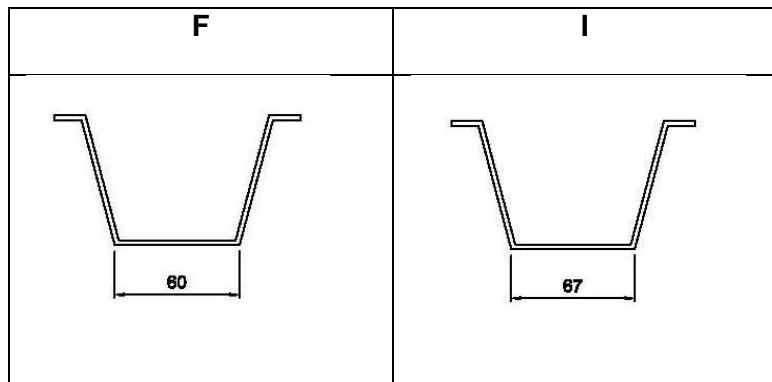
E 1.5	E 2	E 2.5	E 3	E 3.5	E 4
Stiffeners with thickness of 1,5 mm	Stiffeners with thickness of 2,0 mm	Stiffeners with thickness of 2,5 mm	Stiffeners with thickness of 3,0 mm	Stiffeners with thickness of 3,5 mm	Stiffeners with thickness of 4,0 mm

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



### 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.

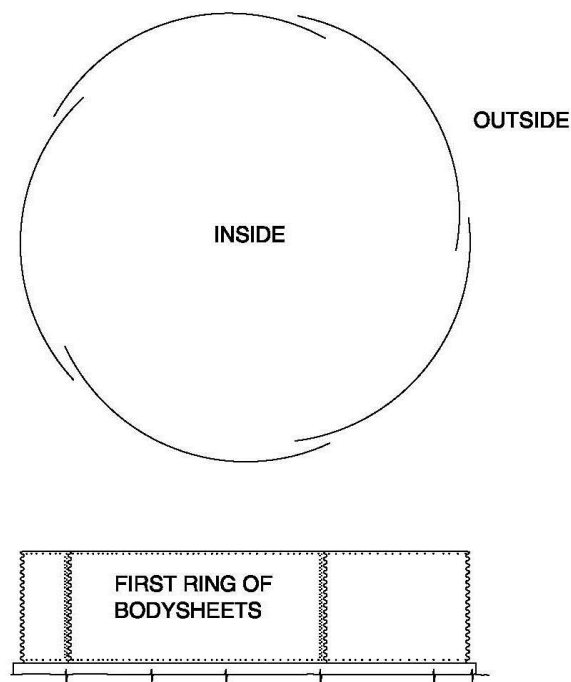
## **ASSEMBLY INSTRUCTIONS FOR GRAIN SILOS**

### **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)

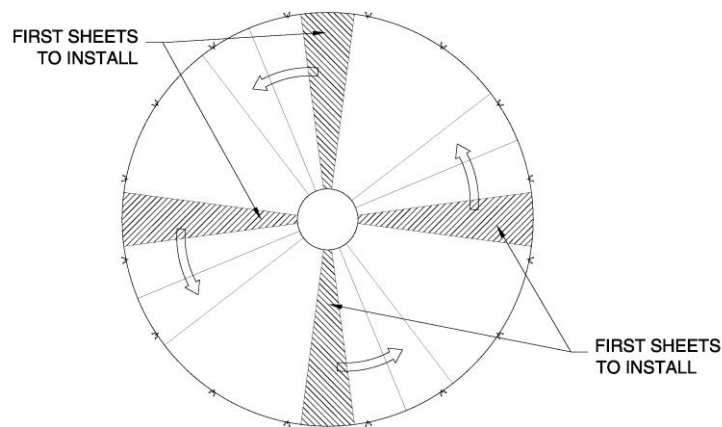
Caulk with sealant the vertical joint. The vertical lines for the holes stiffeners must be aligned with the anchor bolts in the foundation. Check to be sure that the body-sheets are positioned correctly.



**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 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. (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 3)

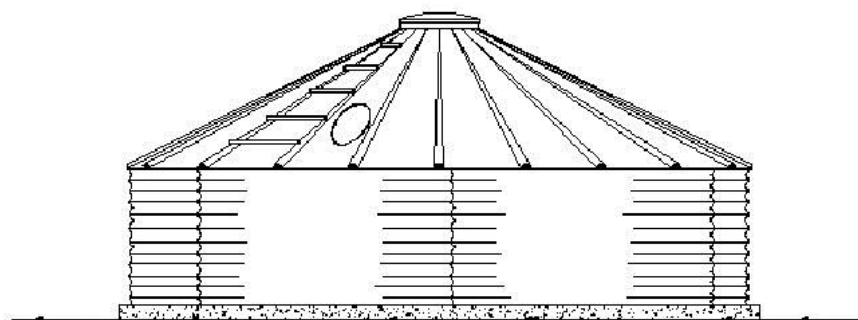
Assemble the manhole according to the detail drawing.

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.

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).

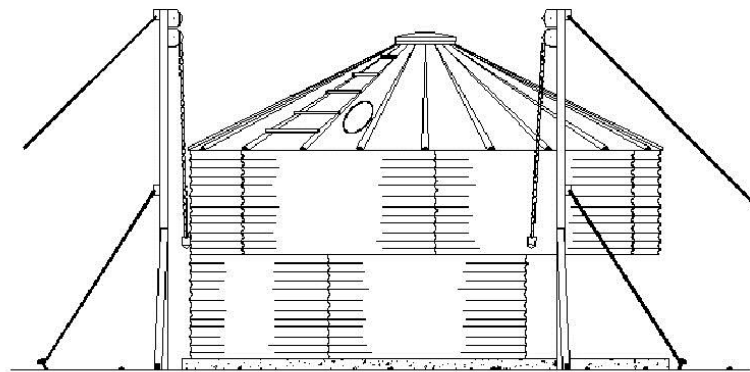
Determine the number of required lifting jacks according to the diameter and weight of the silo.

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)

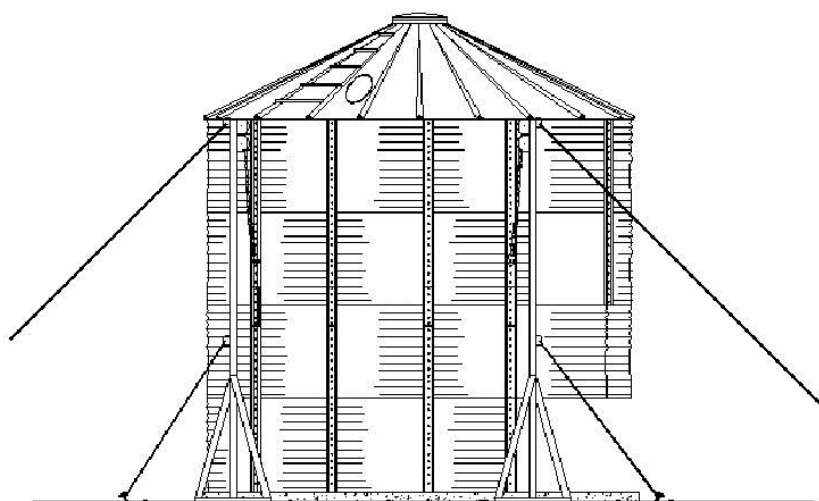
The body-sheets are assembled inside of the previous ring (see drawings).

Caulk with sealant the vertical joint.



**Figure 4**

The stiffeners are assembled after installing one or two rings of body-sheets, depending on the length of the stiffeners used. Attach stiffeners to the body-sheets using the bolts specified in the detail. (See figure 5)



**Figure 5**

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.

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.

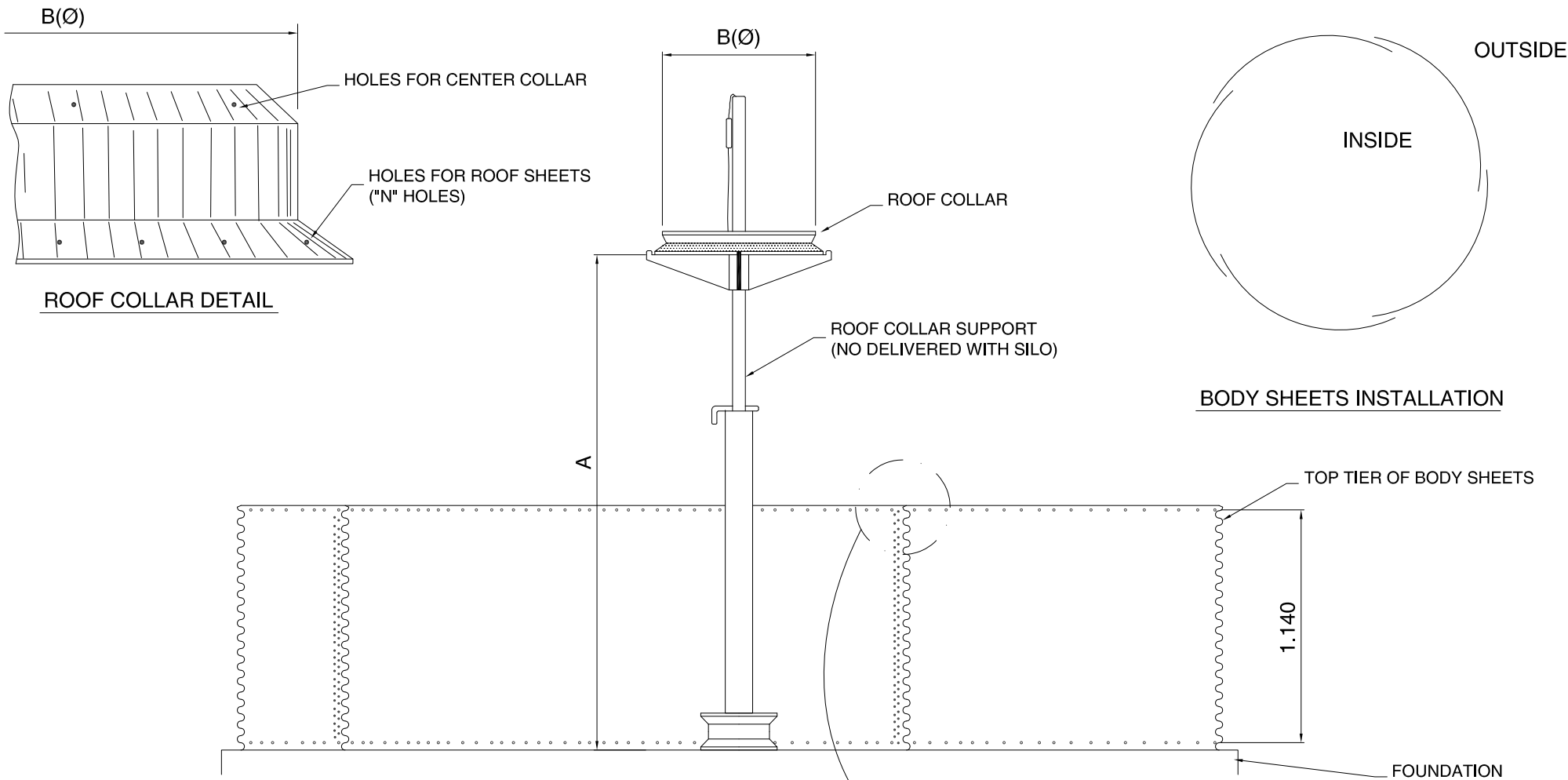
If the wind blows during the installation so that the silo wobbles and it is unstable, proceed as follows:

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

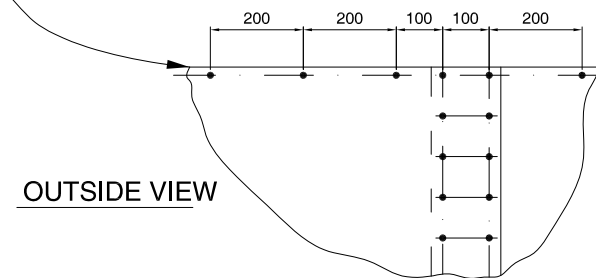
1.2.-Fix anchor plates and tie them to the foundation by elements that can be released easily (as cables for example).

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.

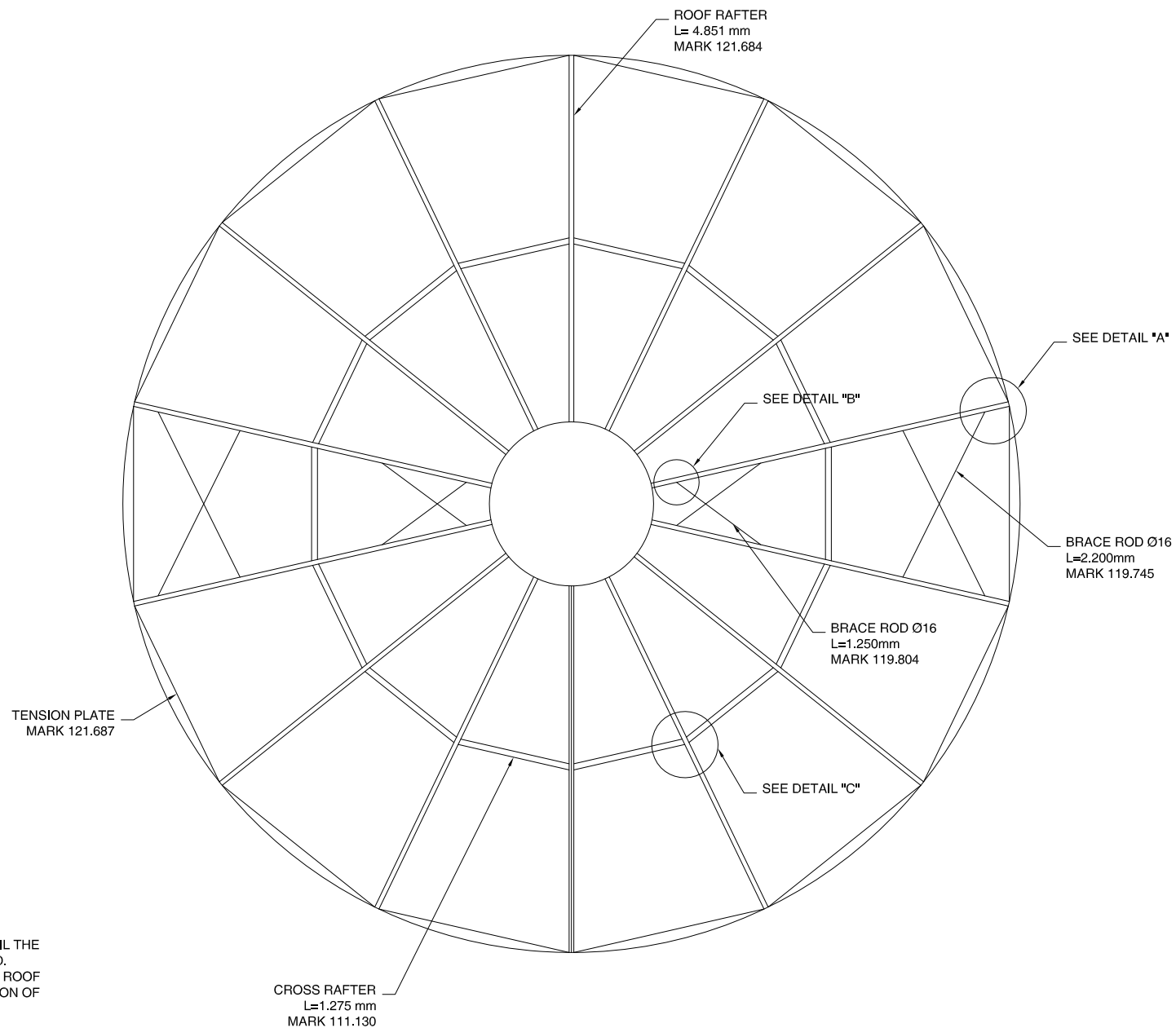


SILO	(A) mm	(B) mm	N	MARK
4.60	2.070	1.400	18	110.079
5.35	2.290	1.400	21	110.135
6.10	2.510	1.400	24	110.037
6.87	2.730	1.400	27	110.110
7.60	2.950	1.400	30	110.088
8.40	3.170	1.400	33	110.008
9.20	3.390	1.400	36	110.144
9.93	3.460	1.930	39	110.155
10.70	3.680	1.930	42	110.044
11.45	3.900	1.930	45	116.719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



# ROOF ASSEMBLY INSTRUCTIONS

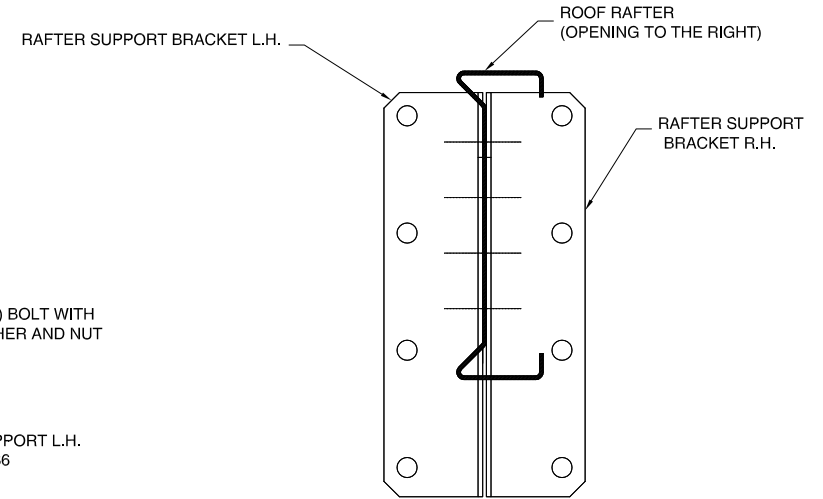
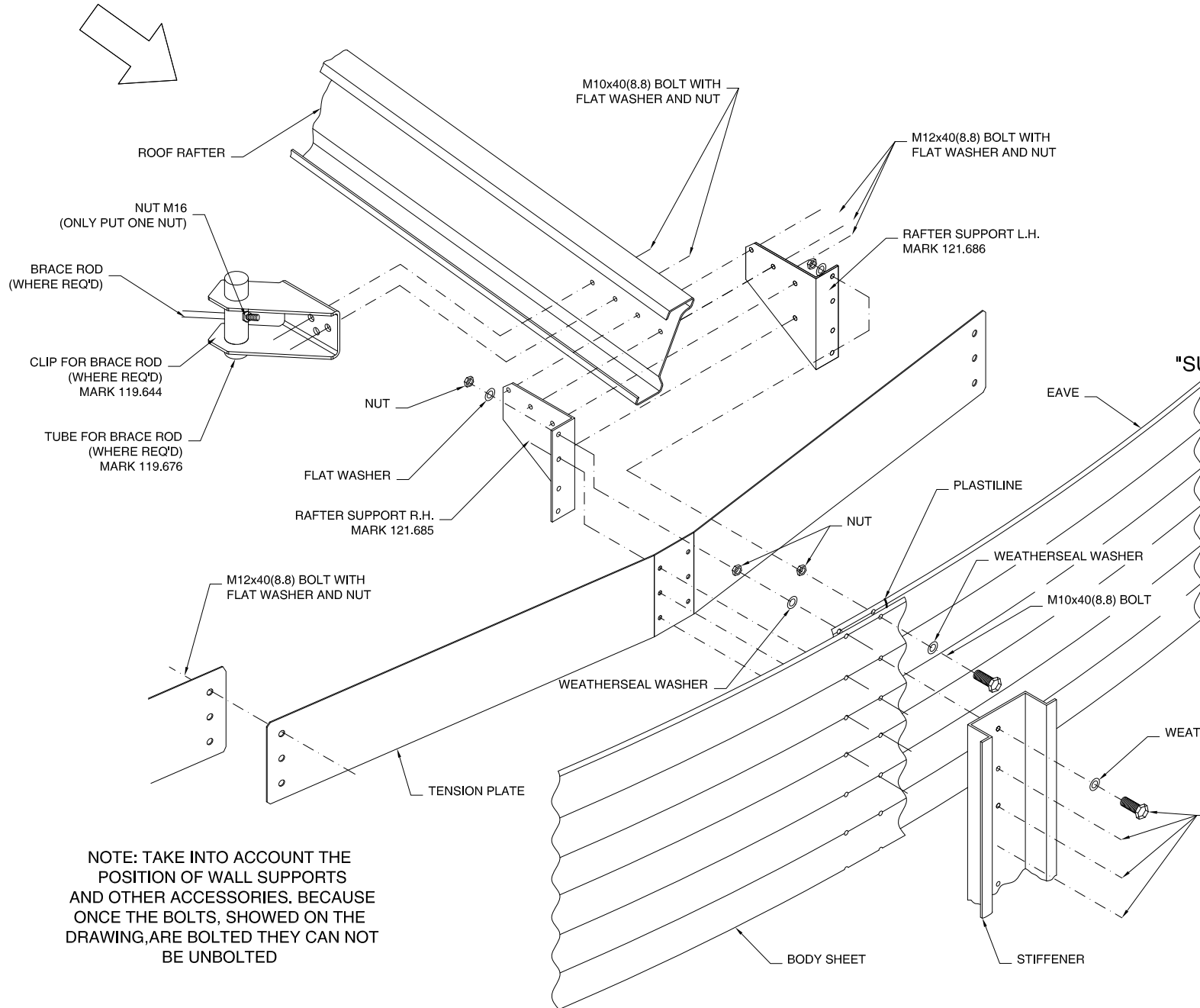




NOTES:  
 -DO NOT DROP CENTER POST UNTIL THE  
 ROOF IS COMPLETELY ASSEMBLED.  
 -USE BRACE RODS TO SQUARE UP ROOF  
 BEFORE STARTING ON INSTALLATION OF  
 ROOFSHEETS.

ROOF STRUCTURE OF SILO 10,700

VIEW FROM "A"

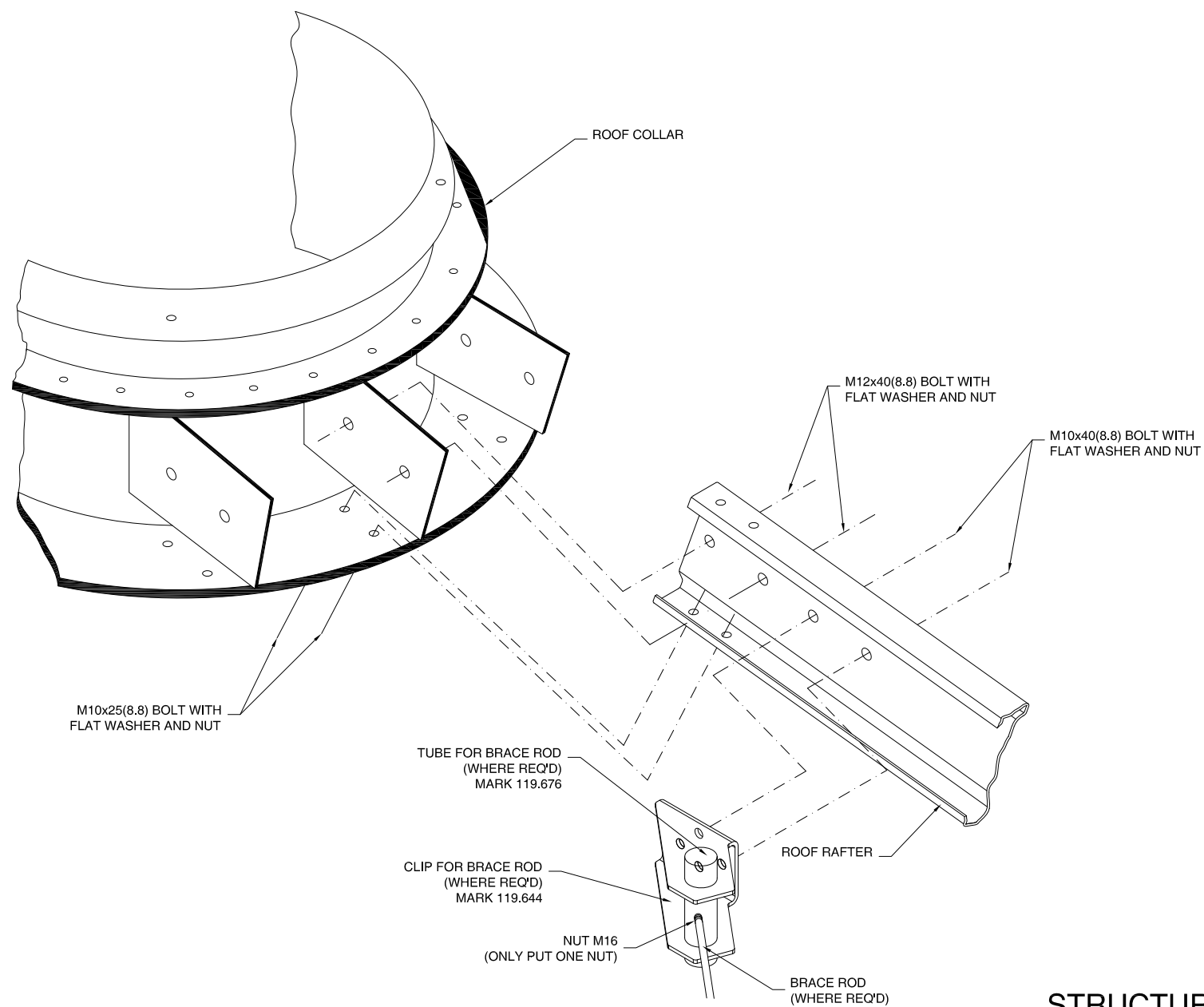


VIEW FROM "A"

"SUPPORT ROOF RAFTER" DETAIL  
(INSIDE VIEW)

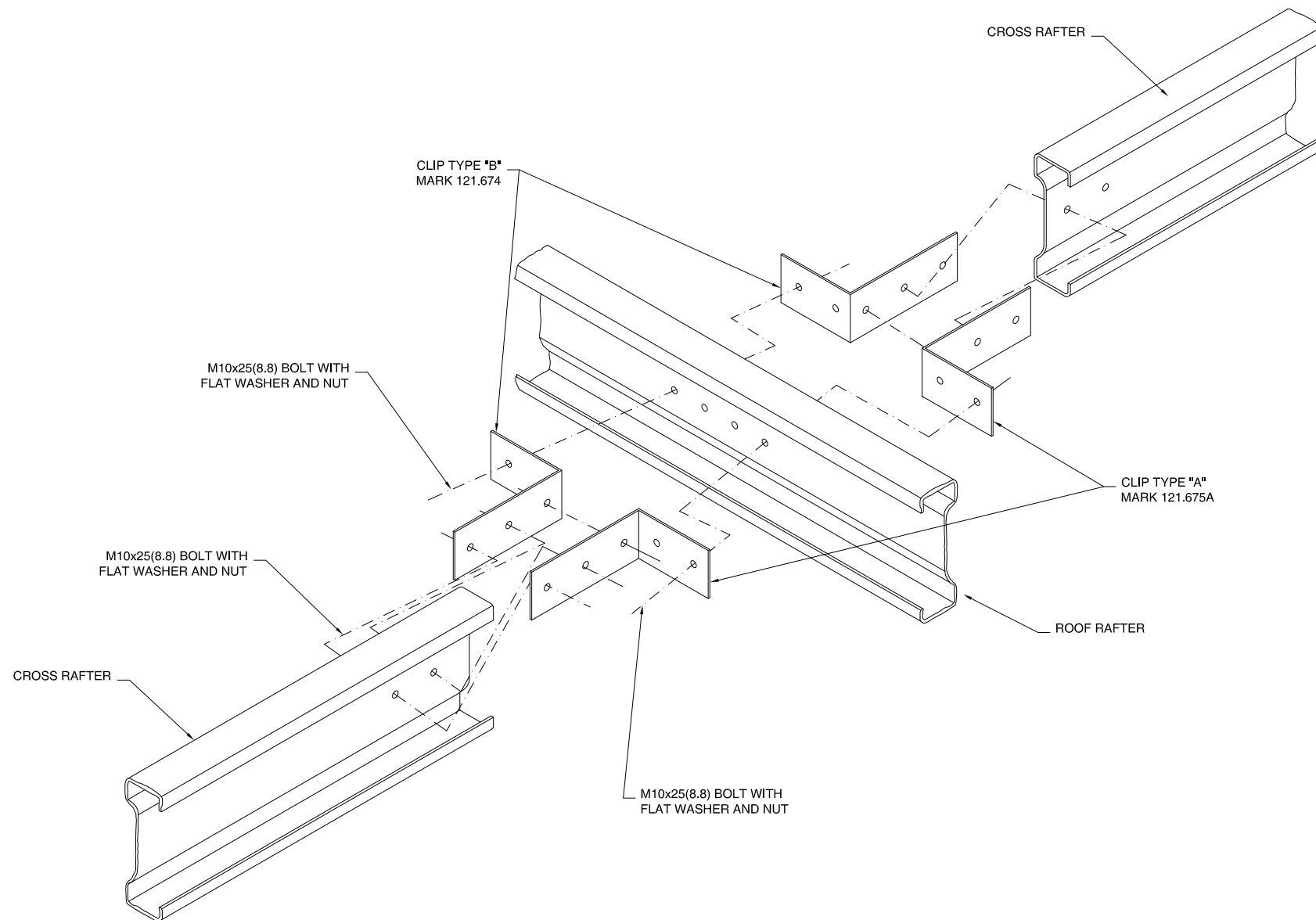
DETAIL "A"

SILO Ø10,70-16,80  
STRUCTURAL ROOF DETAILS



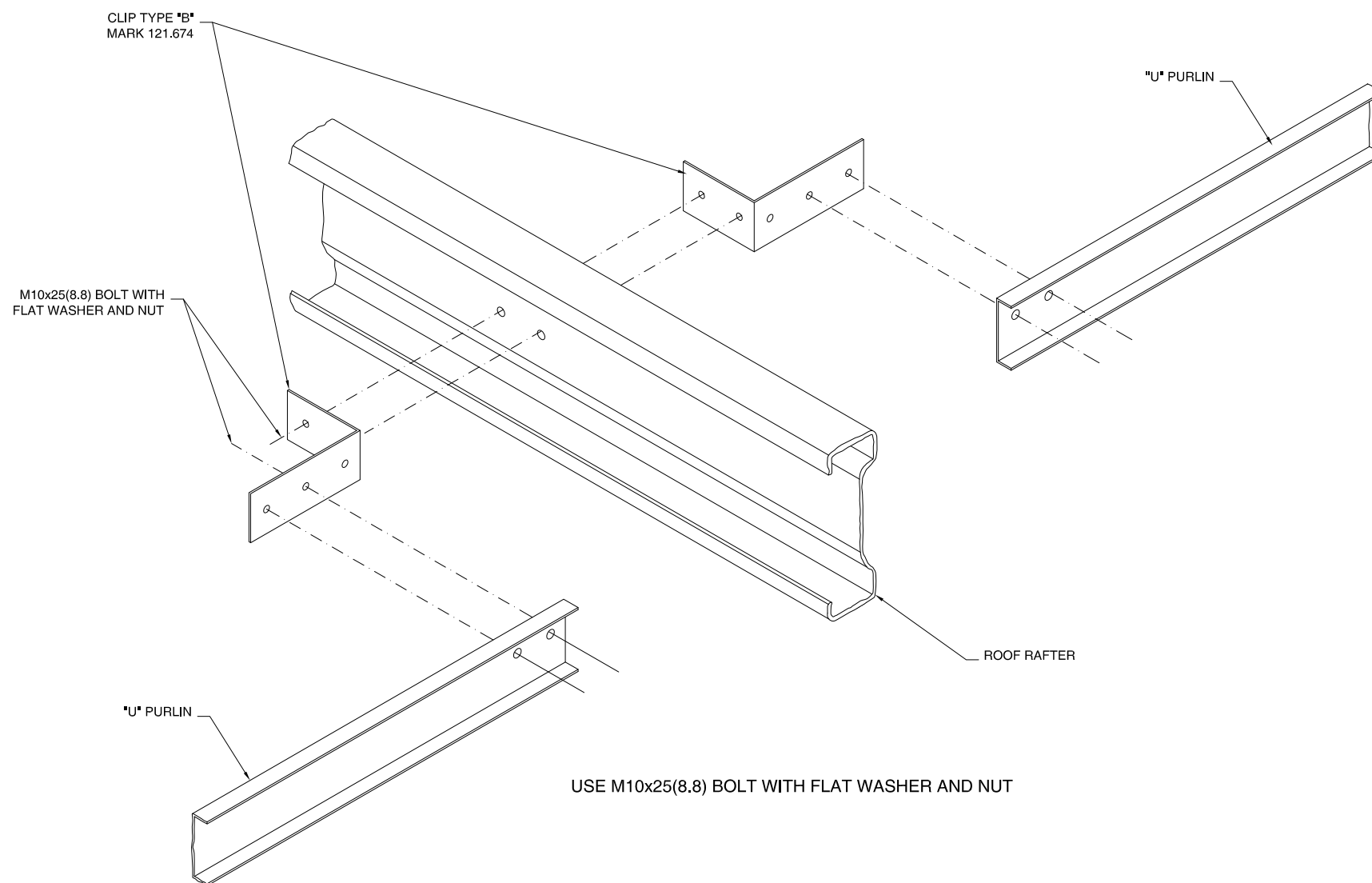
DETAIL "B"

SILO Ø10,70-16,80  
STRUCTURAL ROOF DETAILS



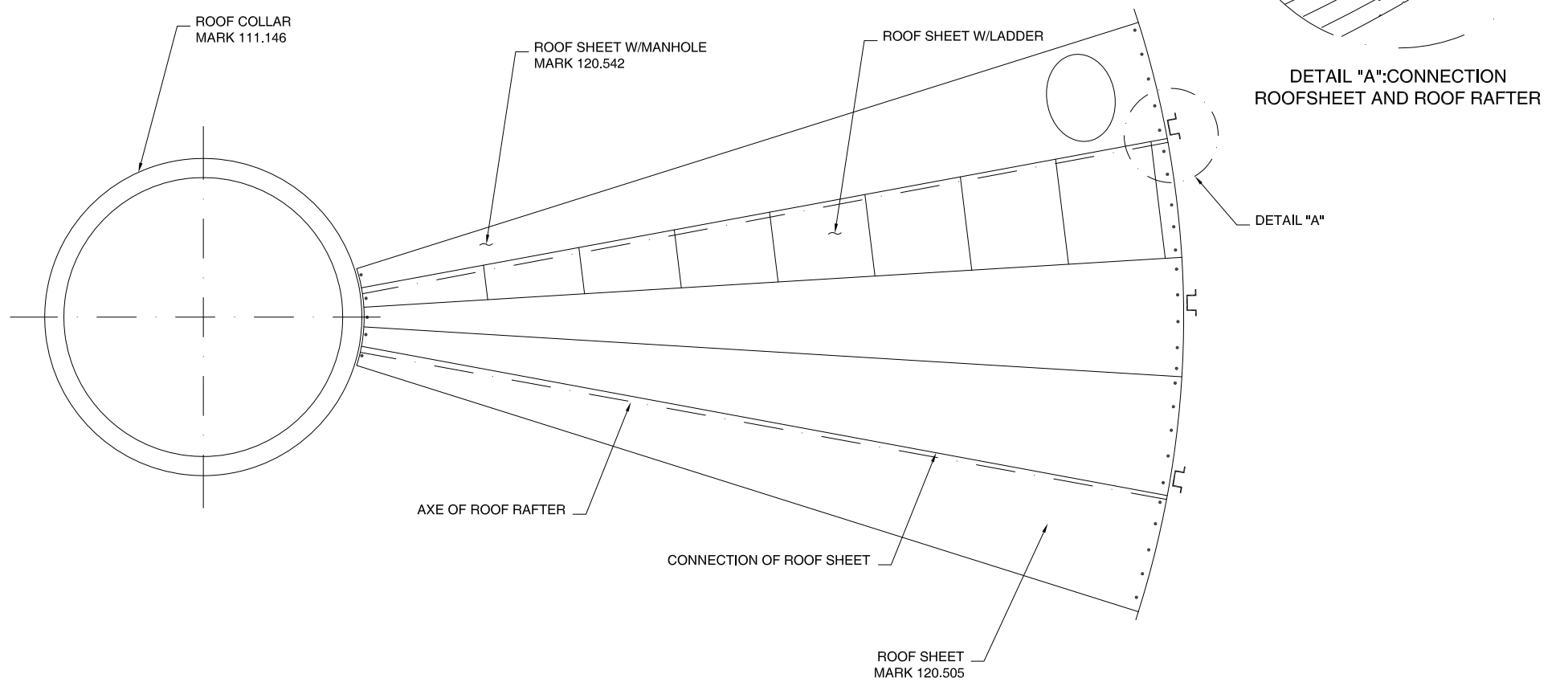
DETAIL "C"

SILO Ø10,70-16,80  
STRUCTURAL ROOF DETAILS

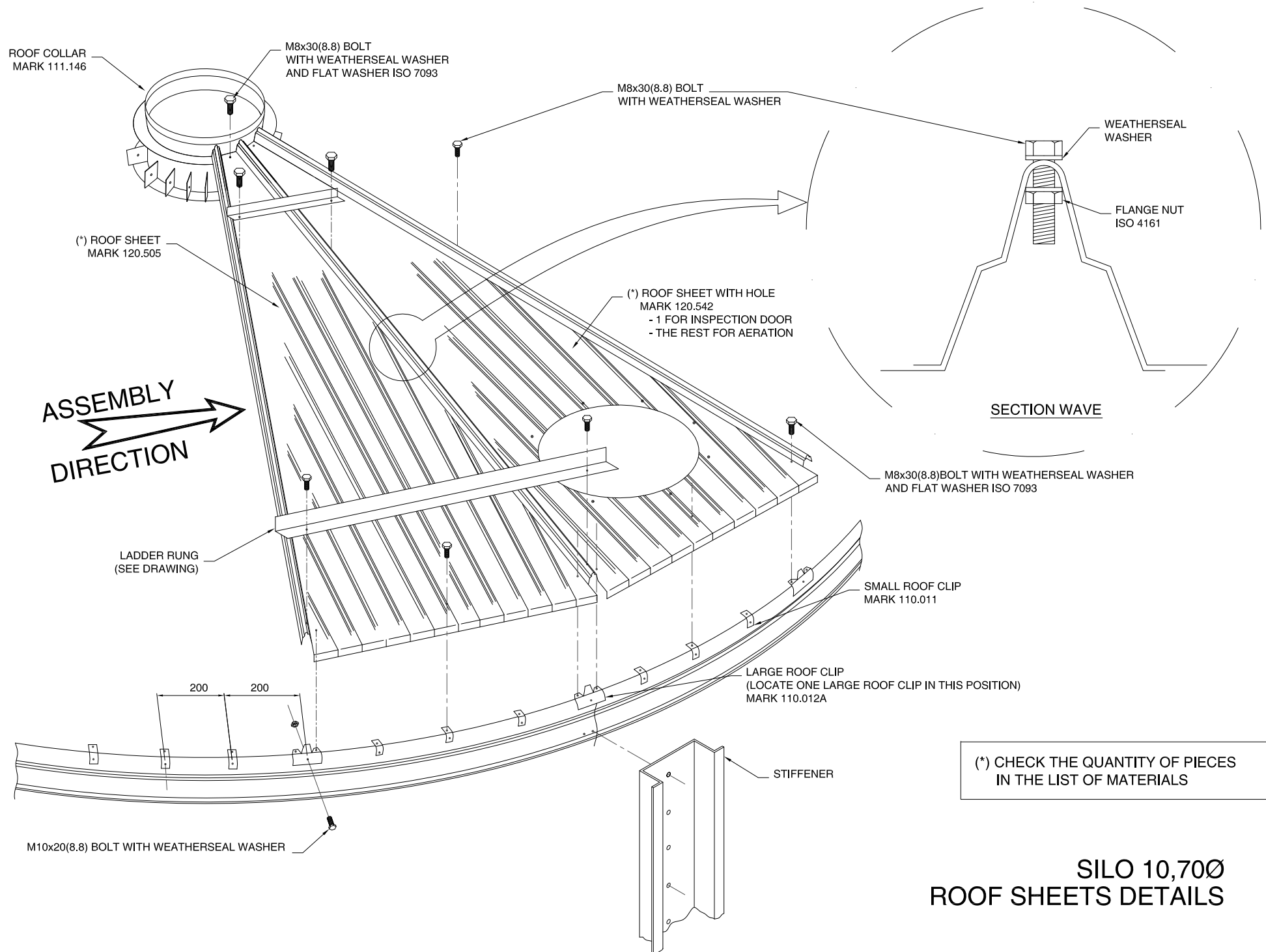


SILO Ø10,70-16,80  
STRUCTURAL ROOF DETAILS

NOTE: IN CASE THERE IS A MANHOLE ROOFSHEET, LOCATE ONE STIFFENER  
BESIDE THE MANHOLE ROOFSHEET(LIKE THE DRAWING SHOWS) CONNECTED  
TO ONE VERTICAL BODYSHEET SEAM AND ONE ROOF RAFTER.



SILO 10,700  
ROOF SHEETS INSTALLATION

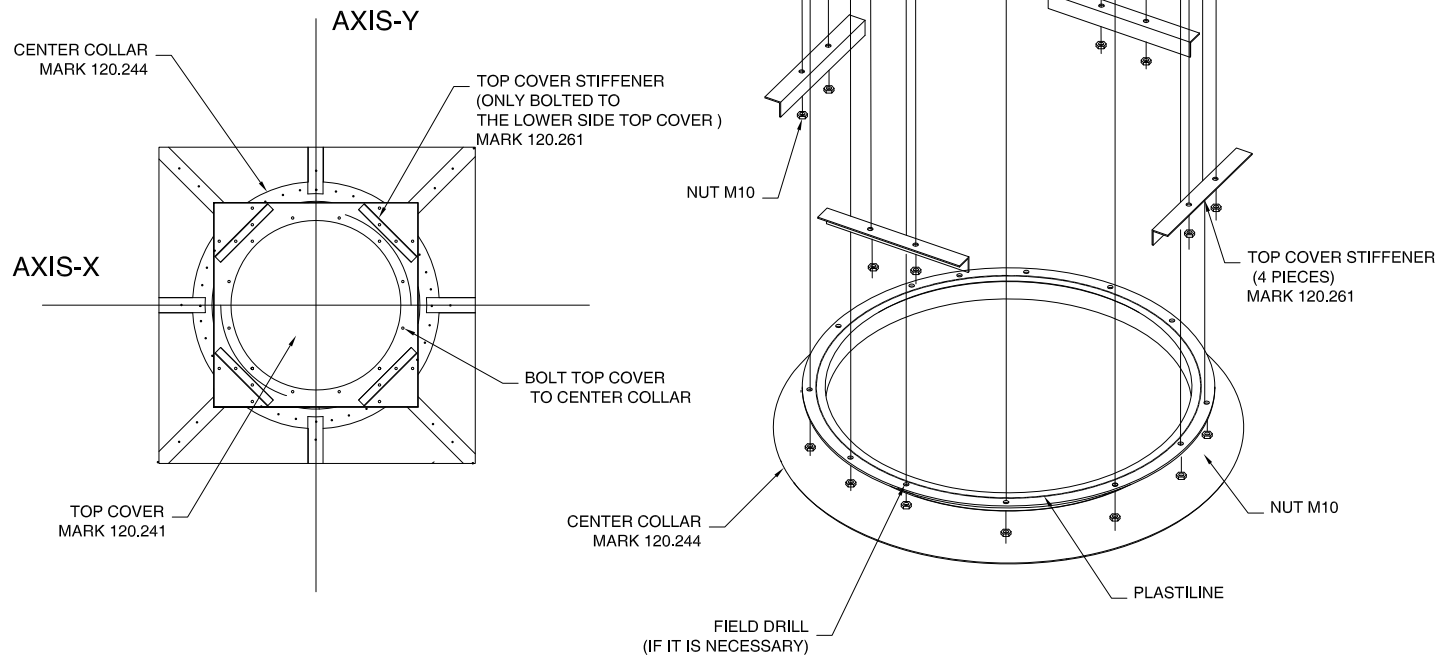




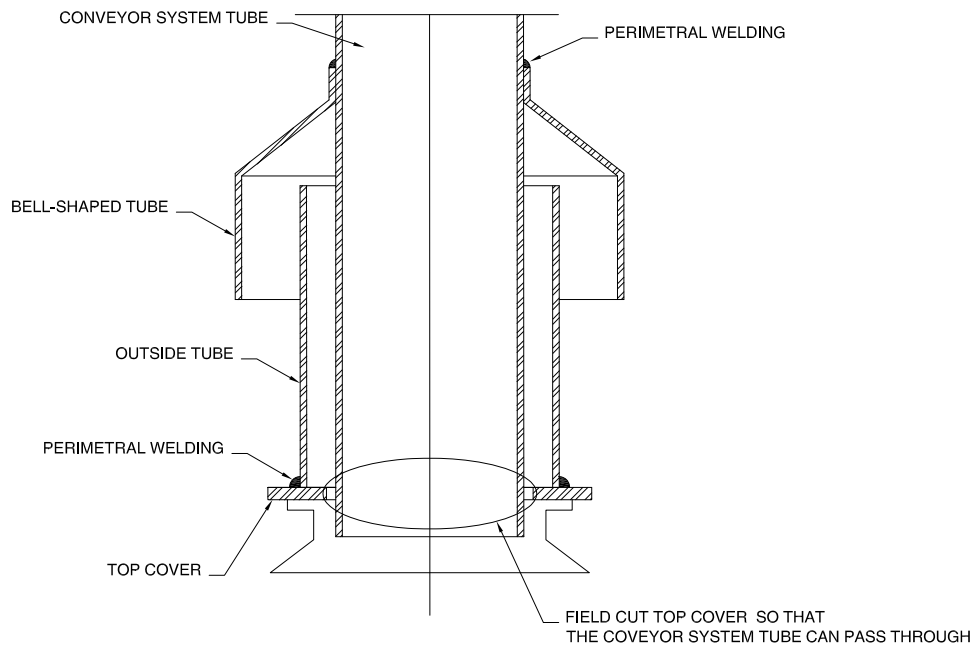


**NOTE:**

- 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

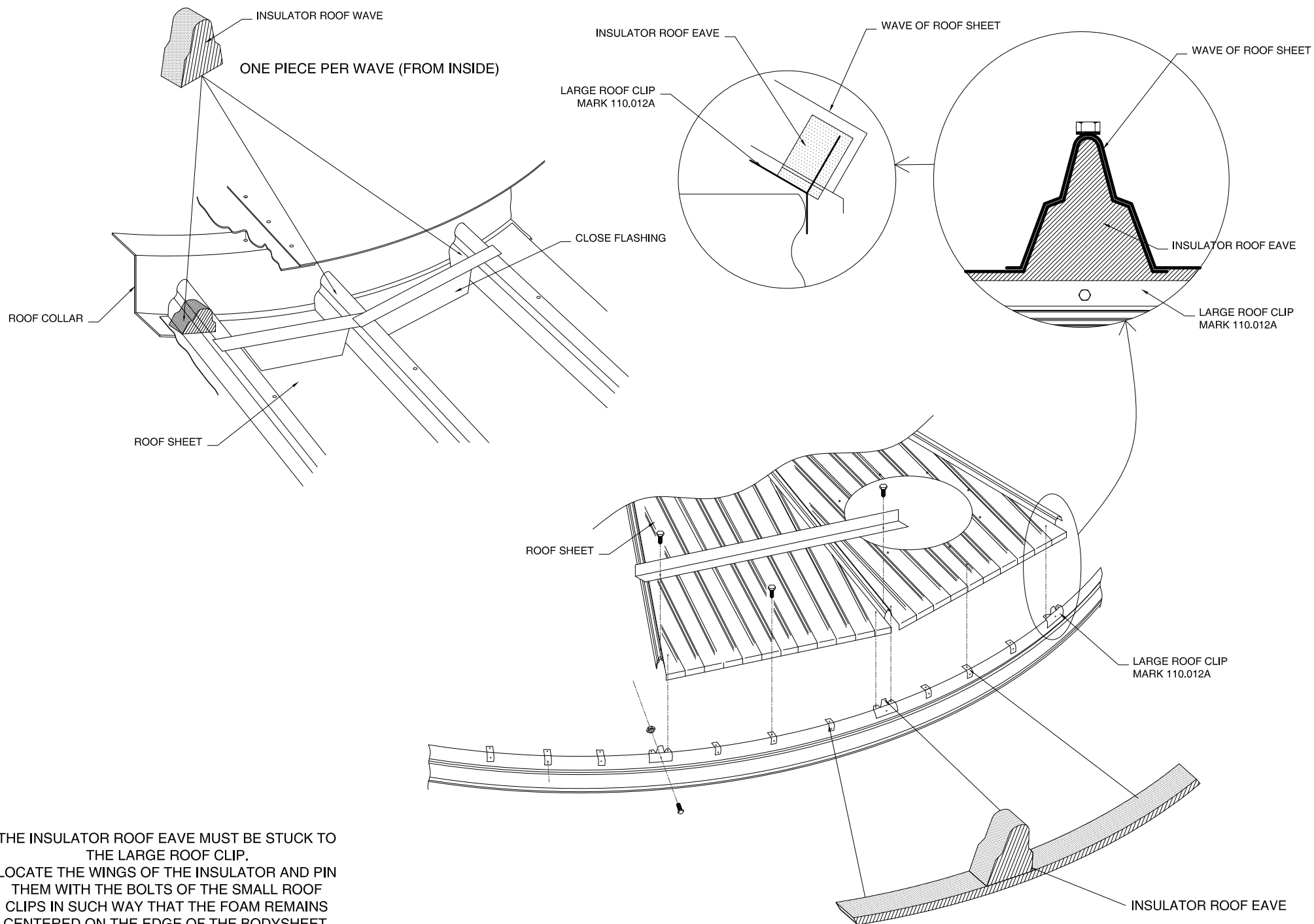


TOP COVER-CENTER COLLAR UNION DETAIL



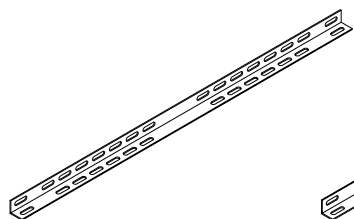
RECOMMENDED CONVEYOR SYSTEM-TOP COVER UNION

## ASSEMBLY TOP COVER DETAIL

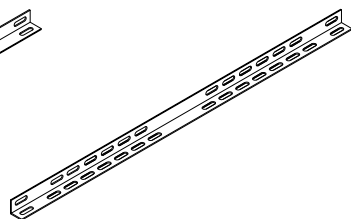


THE INSULATOR ROOF EAVE MUST BE STUCK TO THE LARGE ROOF CLIP. LOCATE THE WINGS OF THE INSULATOR AND PIN THEM WITH THE BOLTS OF THE SMALL ROOF CLIPS IN SUCH WAY THAT THE FOAM REMAINS CENTERED ON THE EDGE OF THE BODYSHEET.

## SEALING DETAIL OF ROOF SHEETS WAVES



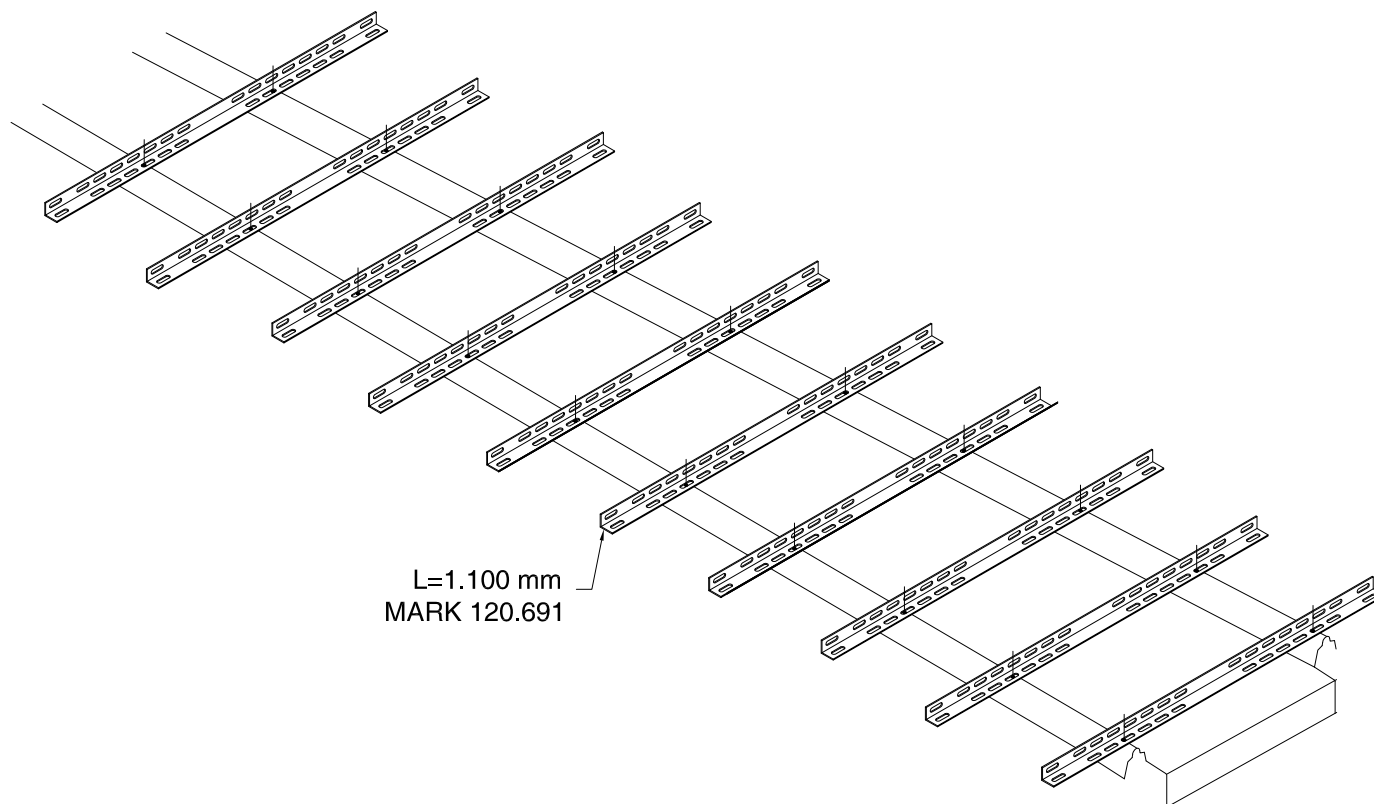
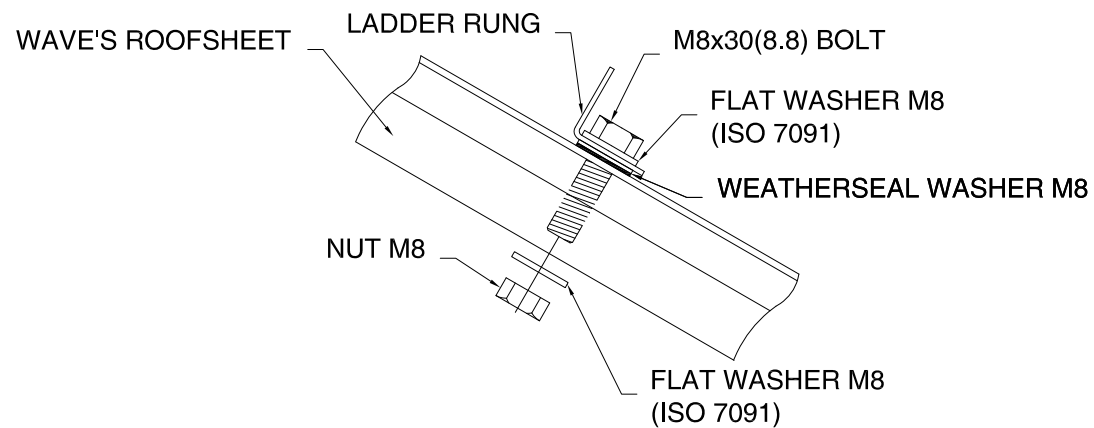
POSITION "A"



POSITION "B"

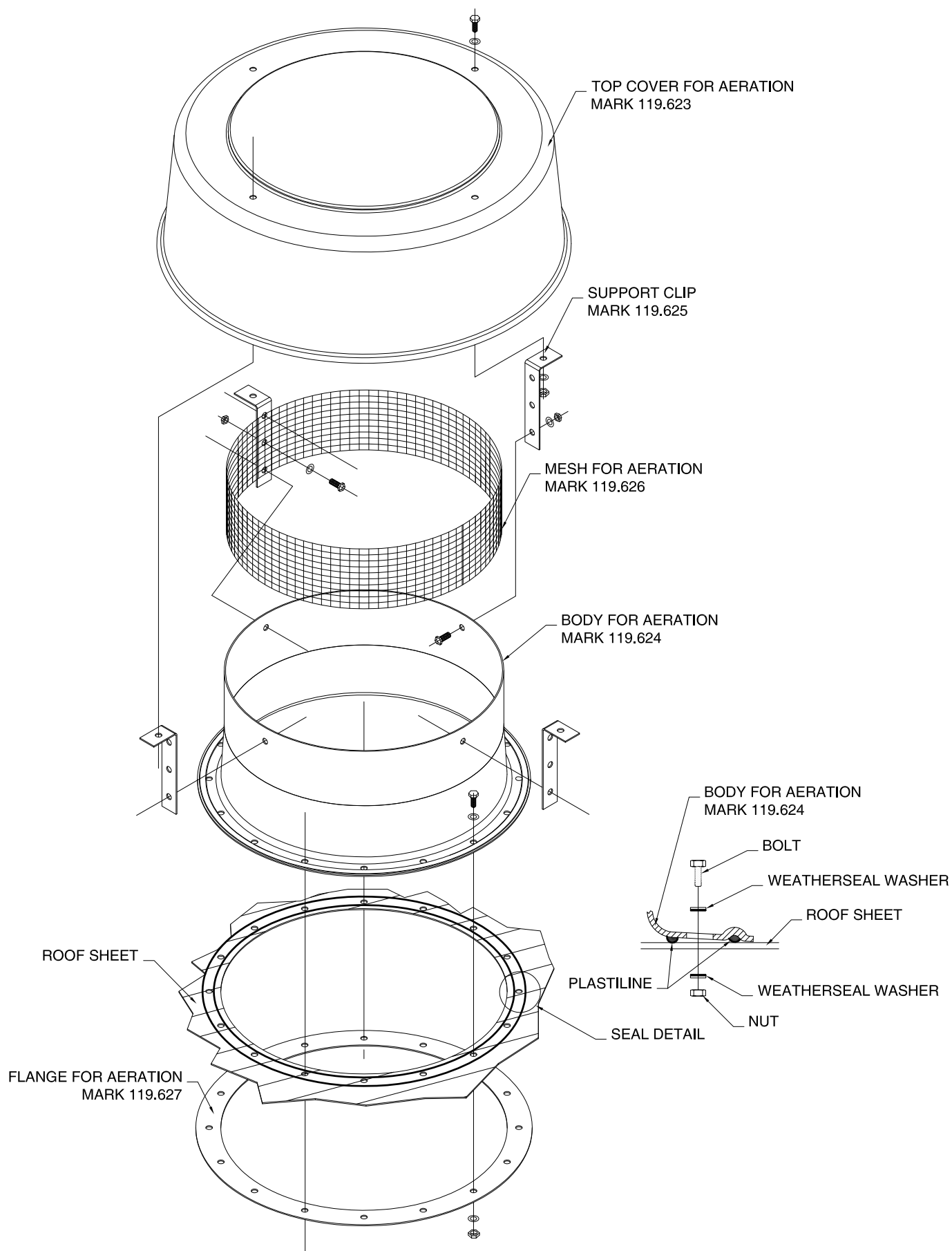
NOTE:

- 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

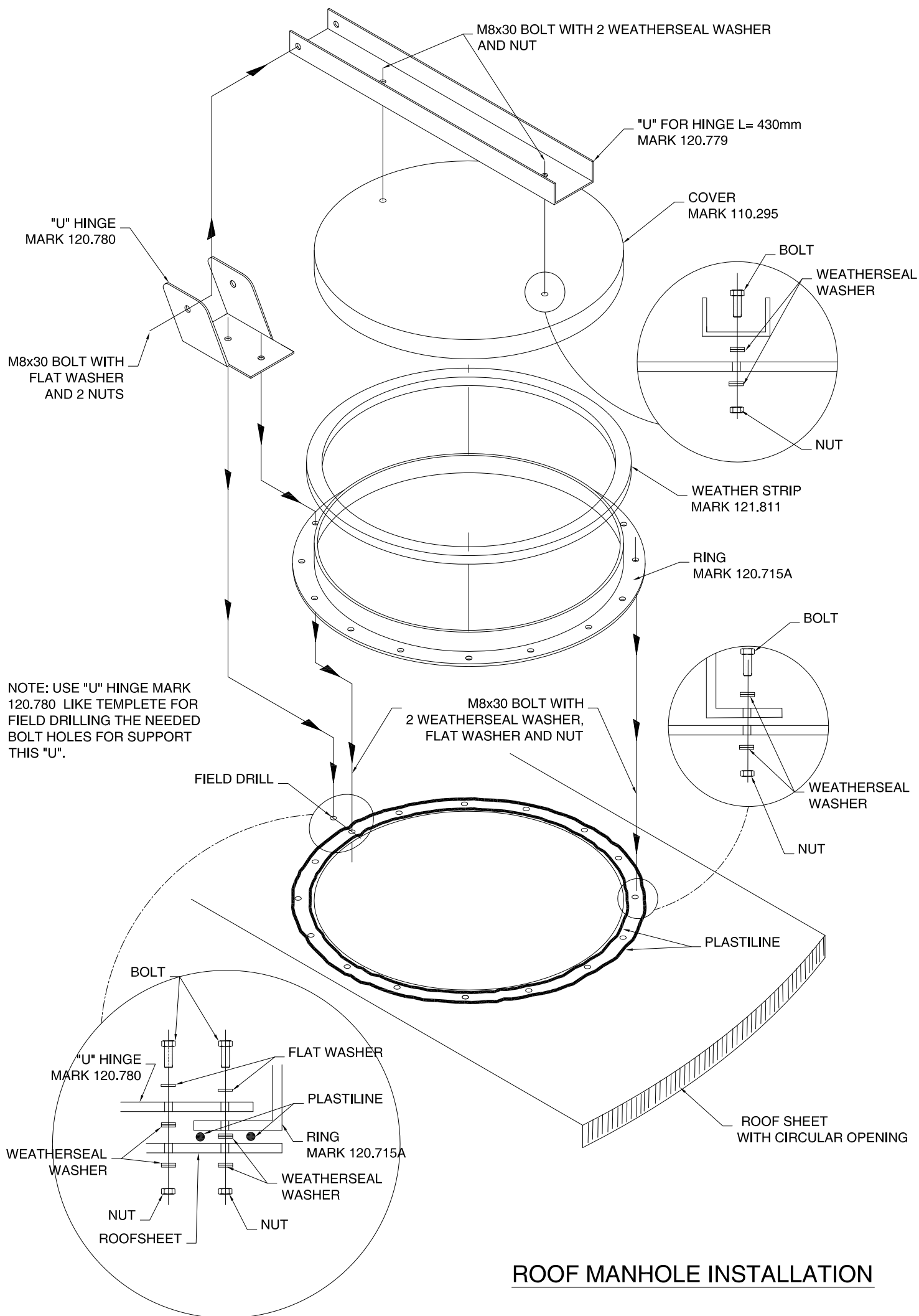


## LADDER RUNG ROOF ASSEMBLY SILO 10,700

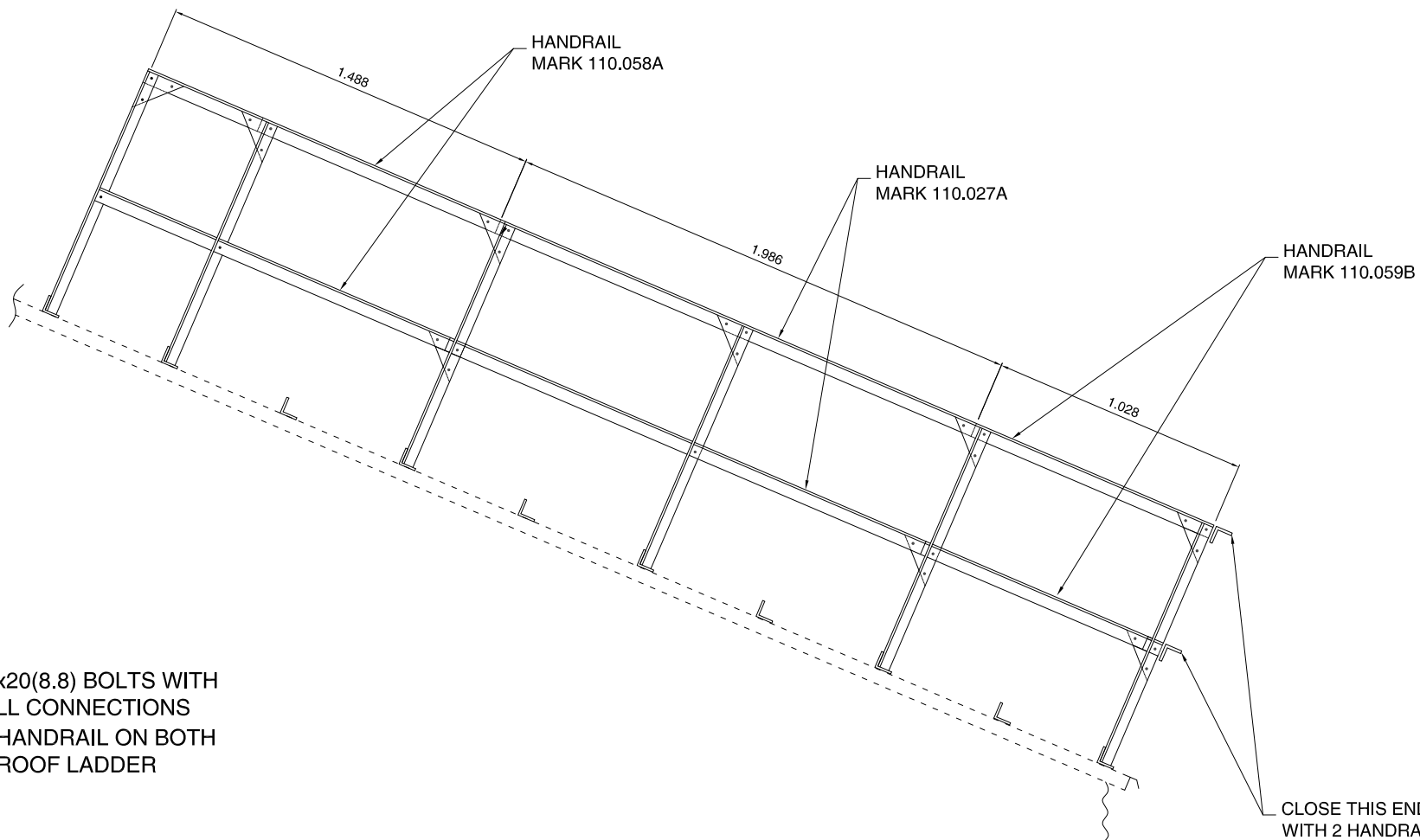
- IT IS VERY IMPORTANT TO SEAL CORRECTLY ALL JOINTS BETWEEN PARTS WITH PLASTILINE
- USE BOLTS M8x20 (8.8) WITH HEAD OUTSIDE, WEATHERSEAL WASHER OUTSIDE, FLAT WASHER AND NUT INSIDE
- THE DISTRIBUTION OF ROOF AERATION MUST BE UNIFORM AROUND THE SILO ROOF



## INSTALLATION OF ROOF AERATION

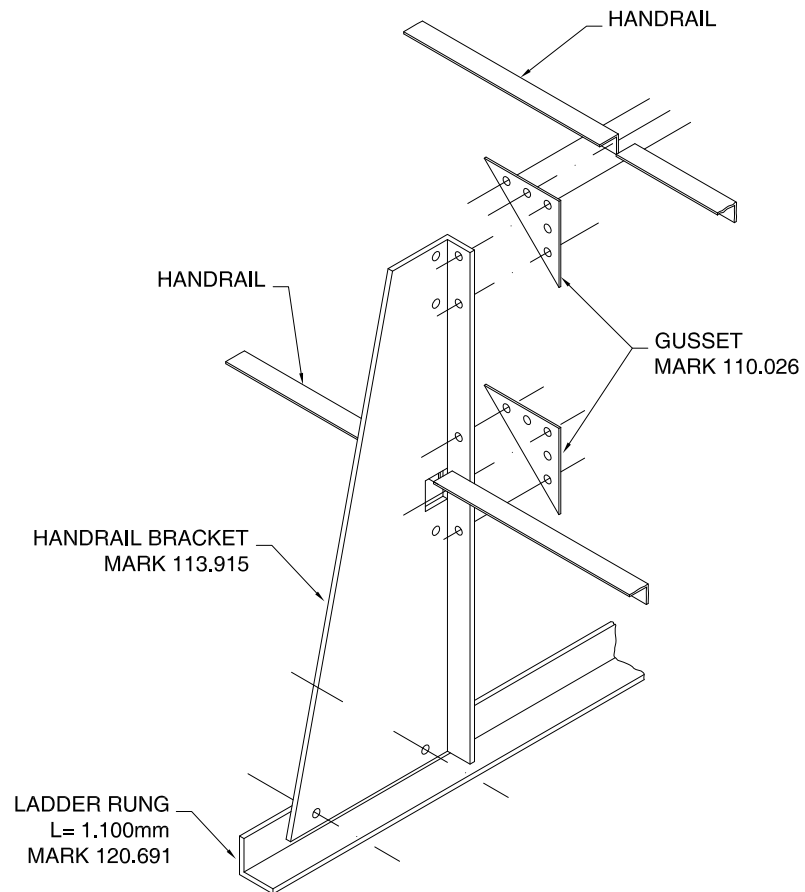


## ROOF MANHOLE INSTALLATION

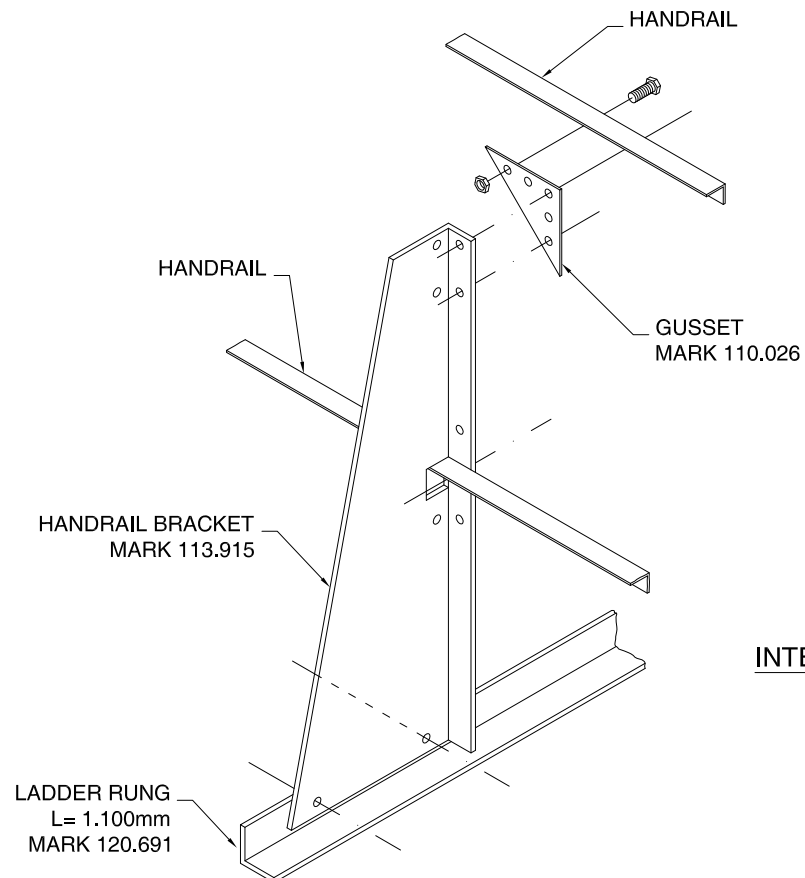


**SILO 10,700**  
**ROOF HANDRAIL DETAILS**





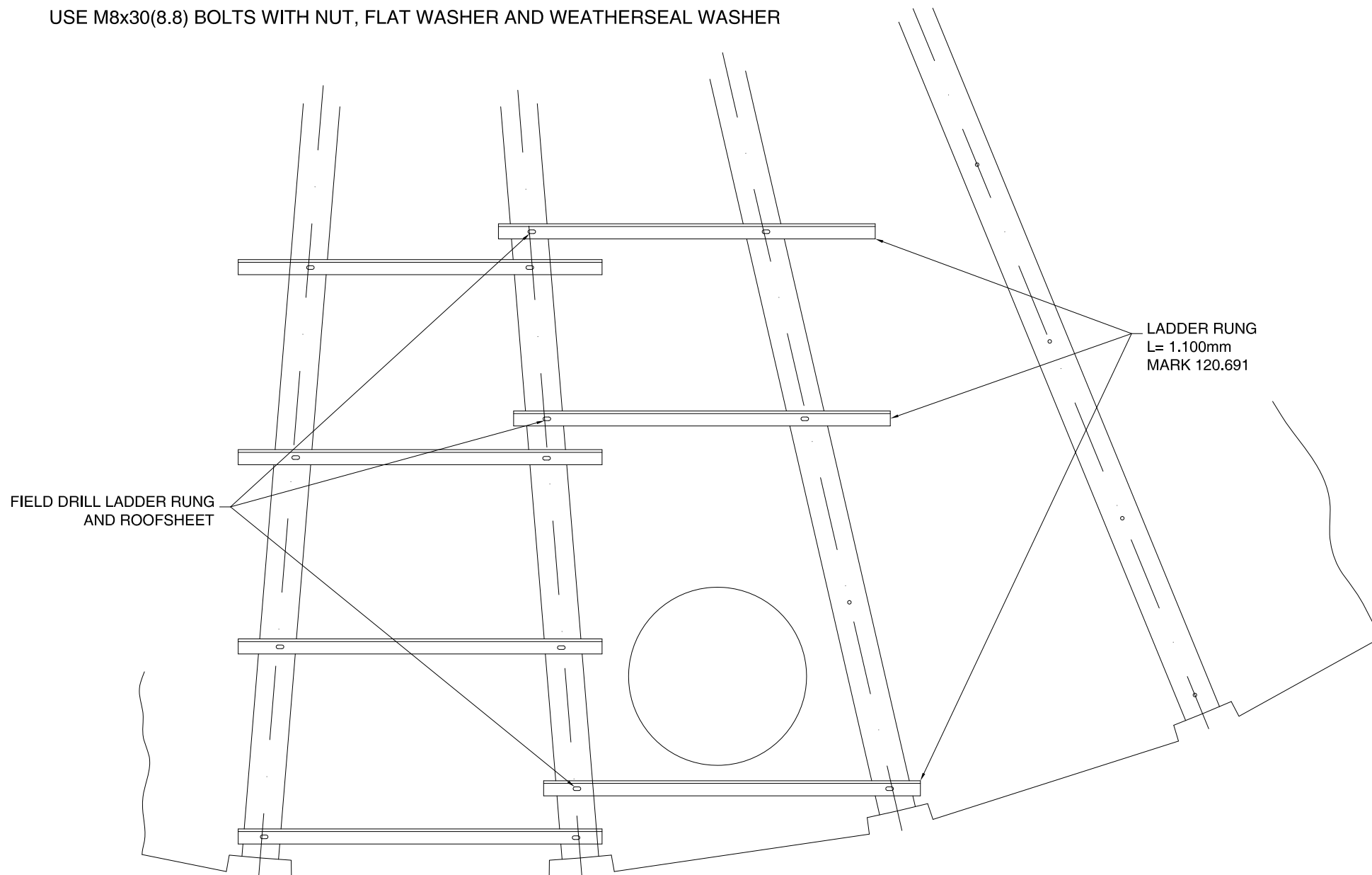
SPLICE DETAIL



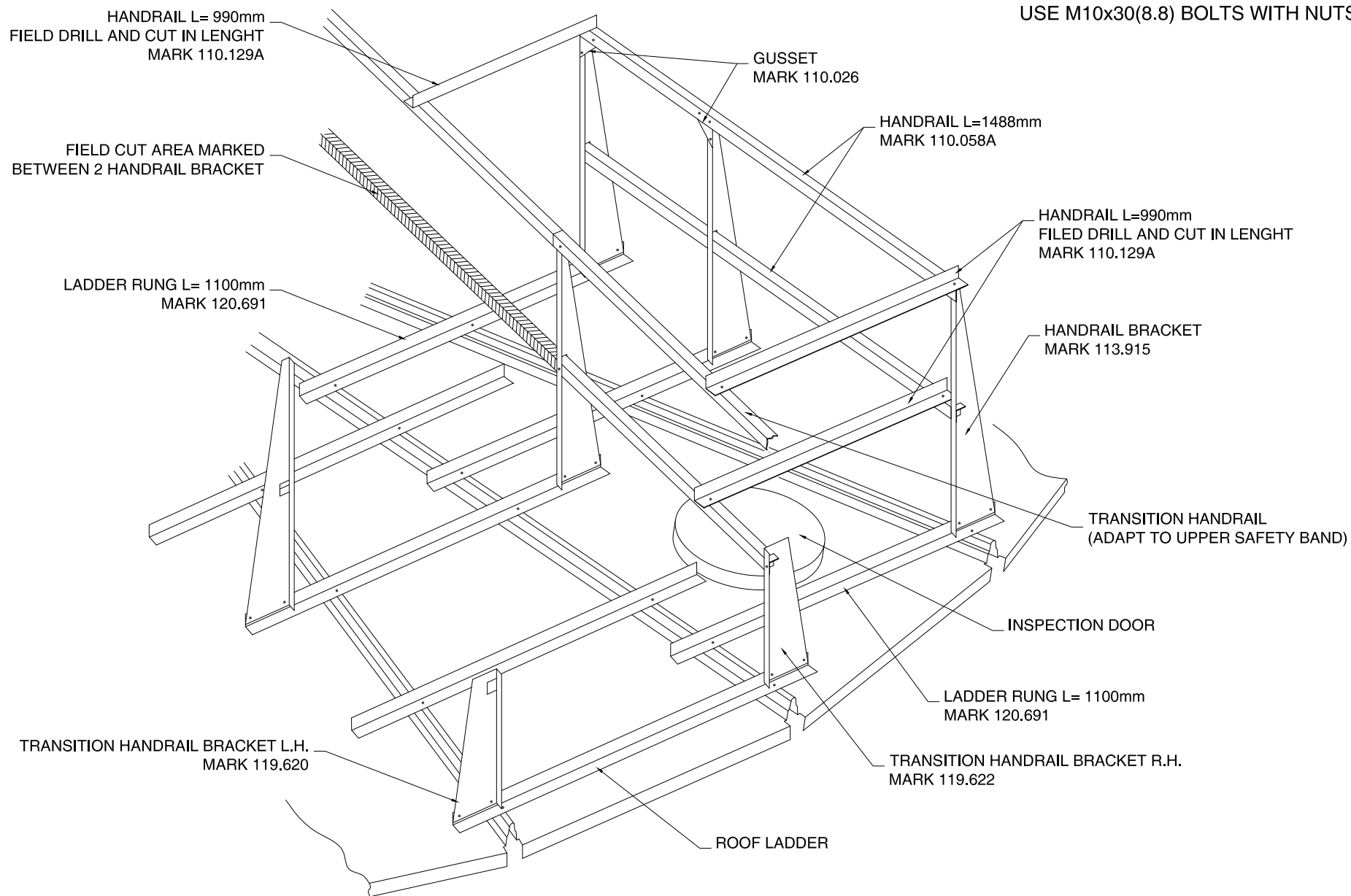
INTERMEDIATE DETAIL

## ROOF HANDRAIL DETAILS

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



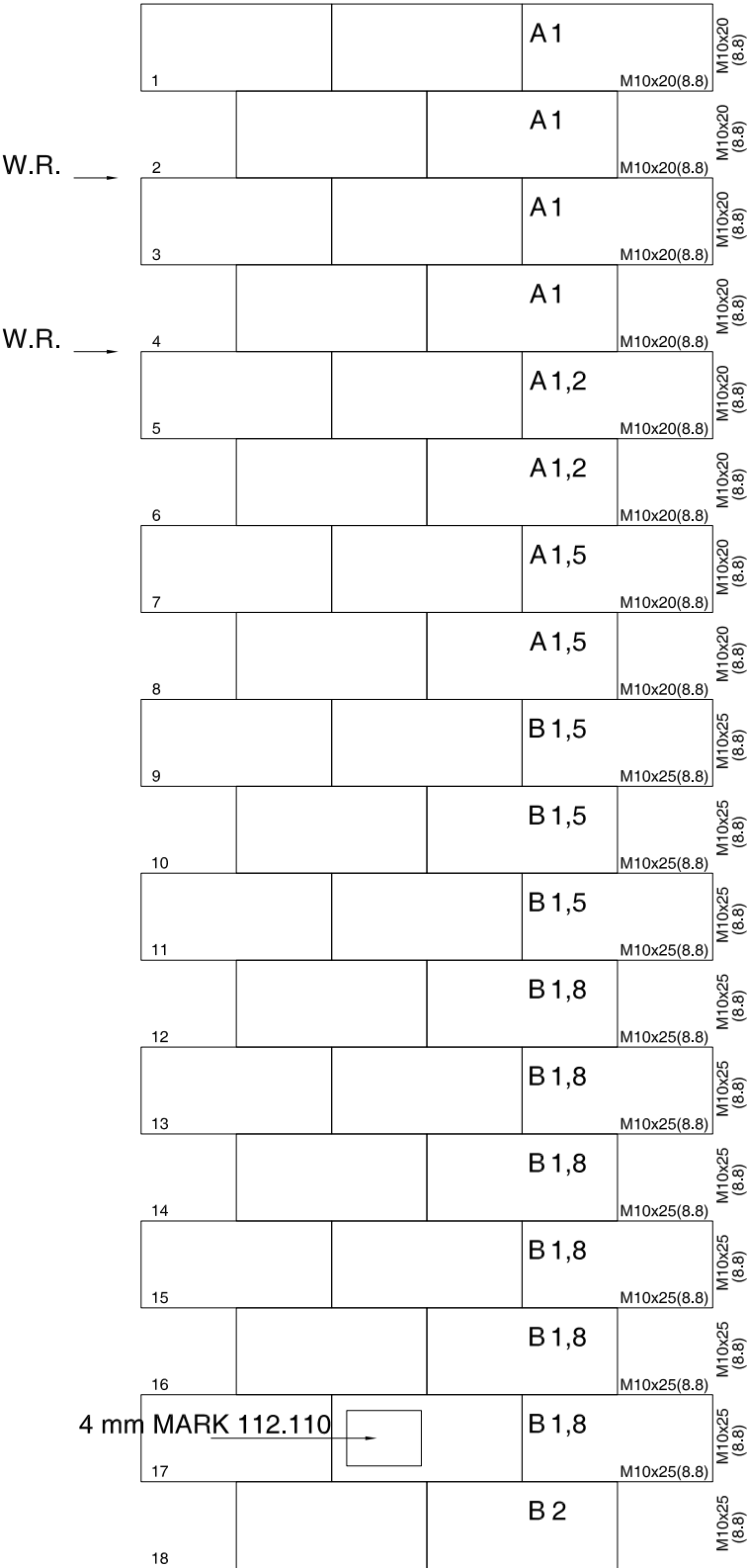
INSTALLATION OF LADDER RUNGS FOR PROTECTION OF INSPECTION DOOR



## 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.

SILO10,70 TE/ 18

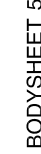


QUANT.	THICKNESS (mm)	MARK
14	1	110.000A
14	1	110.000A
14	1	110.000A
14	1	110.000A
14	1,2	110.000A
14	1,2	110.000A
14	1,5	110.000A
14	1,5	110.000A
14	1,5	110.552
14	1,5	110.552
14	1,5	110.552
14	1,8	110.552
14	1,8	110.552
14	1,8	110.552
14	1,8	110.552
13	1,8	110.552
14	2	110.552

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

BODY SHEET COMPOSITION

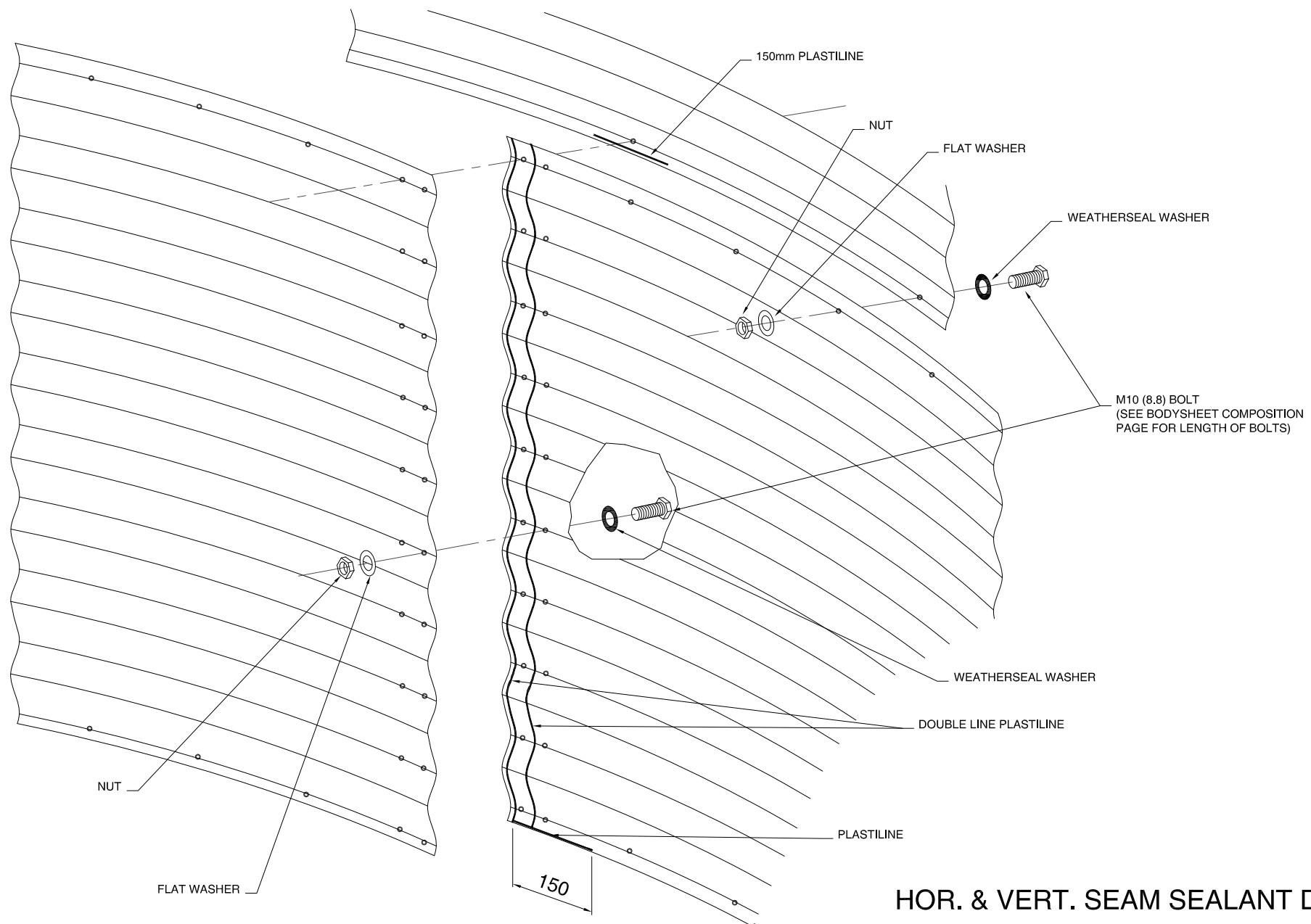
EAVE LINE



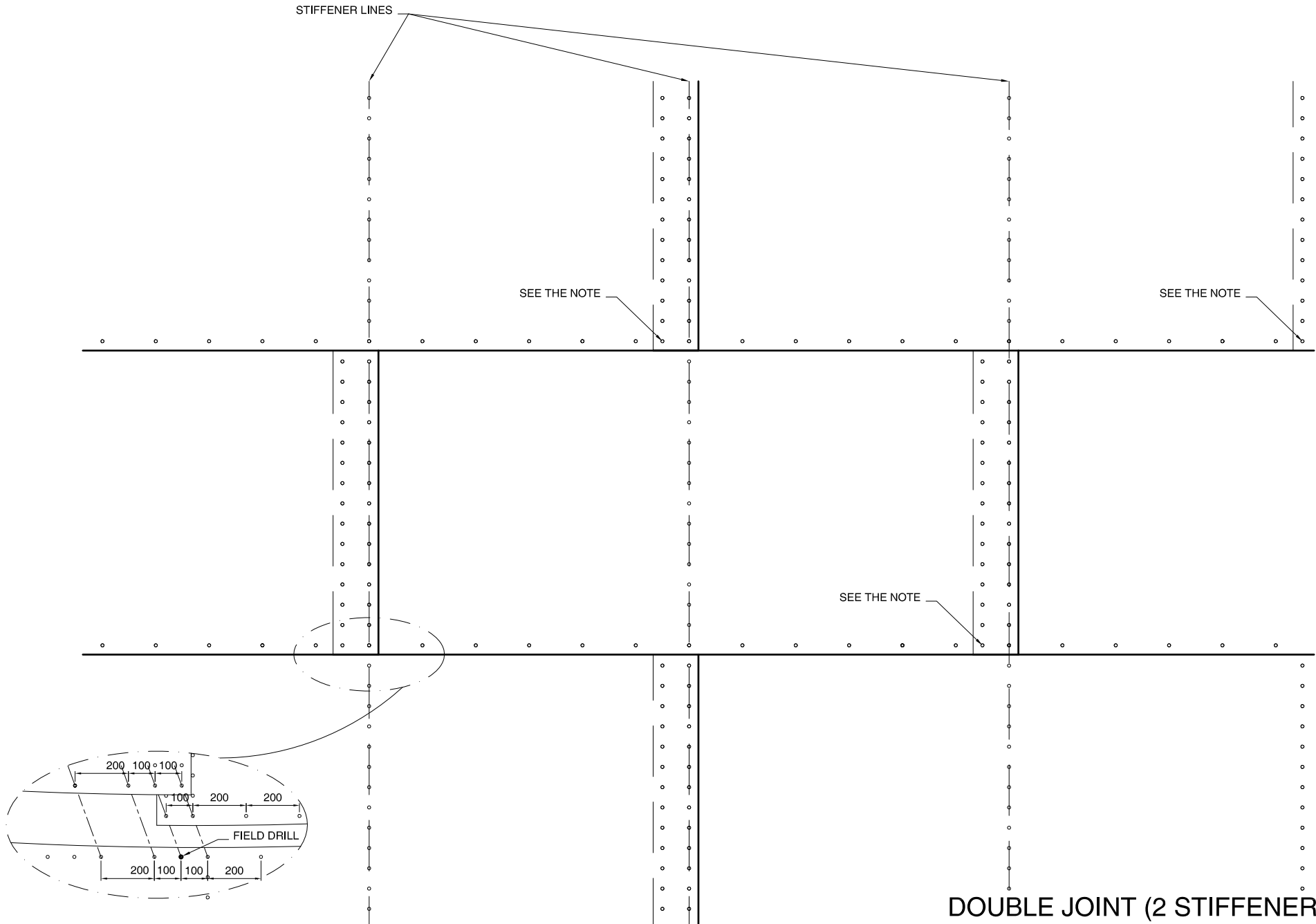
## STIFFENERS INSTALLATION

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

Use bolts with nut and two flat washers.

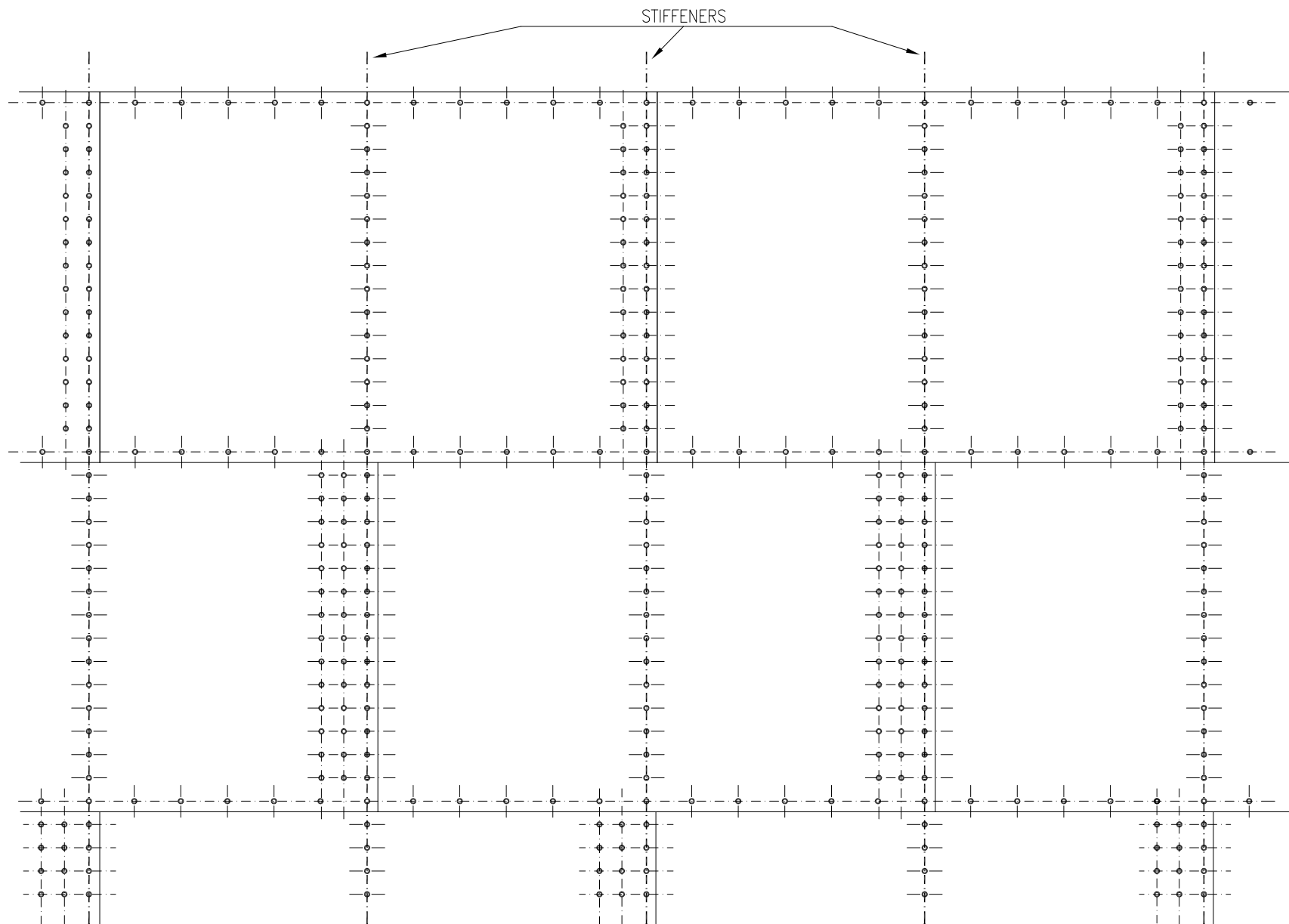


**HOR. & VERT. SEAM SEALANT DETAIL  
(INSIDE VIEW)**



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.

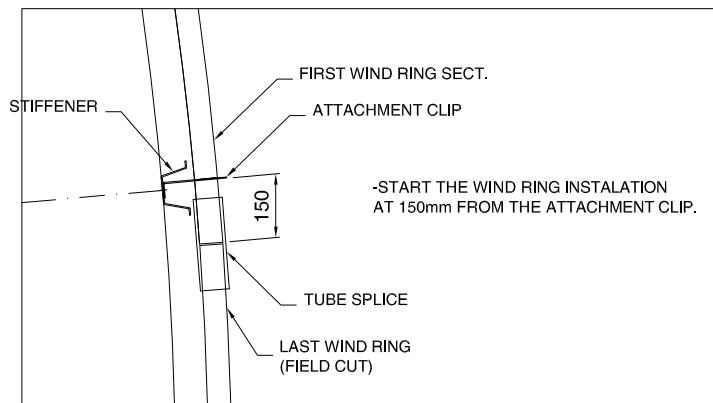
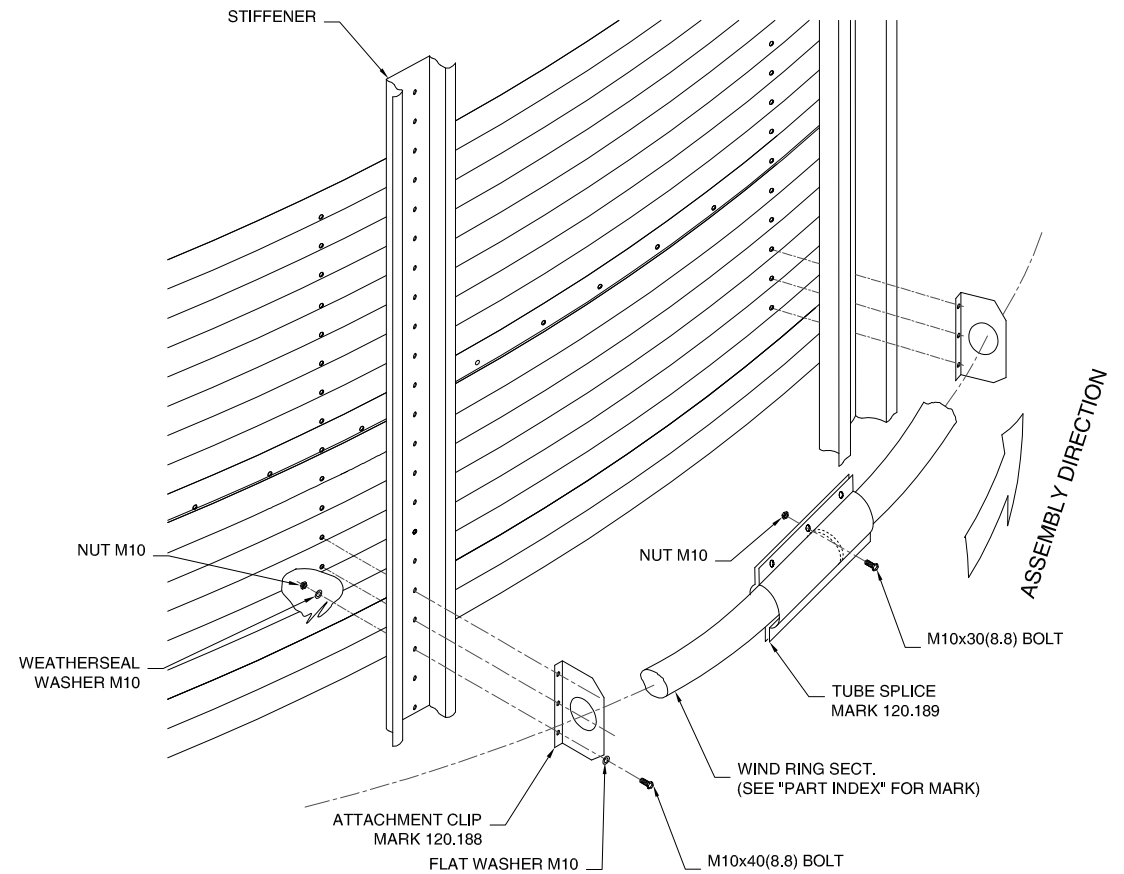
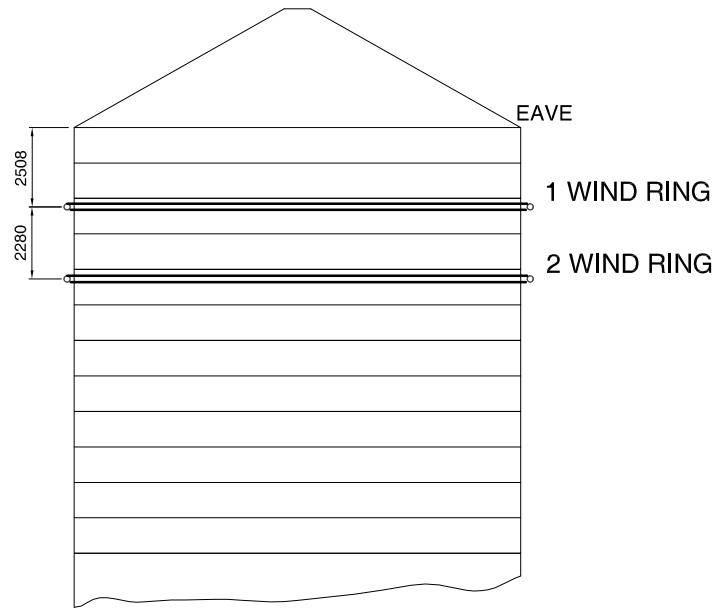
DOUBLE JOINT (2 STIFFENERS)  
BODYSHEETS AND STIFFENERS INSTALLATION  
(OUTSIDE VIEW)



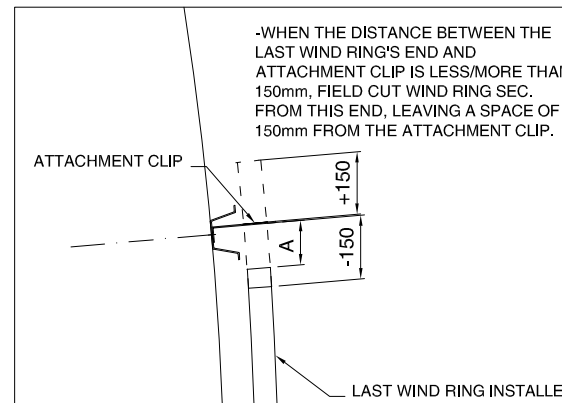
TRIPLE JOINT  
BODYSHEETS AND STIFFENERS INSTALLATION  
(OUTSIDE VIEW)



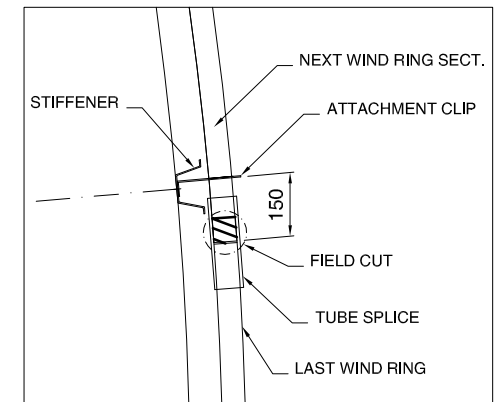
- WIND RING ATTACHMENT CLIP IS LOCATED IN EACH STIFFENER.
- DISTANCE BETWEEN CLIPS DEPENDS THE DISTANCE BETWEEN STIFFENERS
- THE LAST PIECE OF TUBING IN THE RING MUST BE FIELD CUT TO LENGTH. CUT THE END AS SQUARE AS POSSIBLE, LEAVING LITTLE OR NO GAP BETWEEN TUBE ENDS.



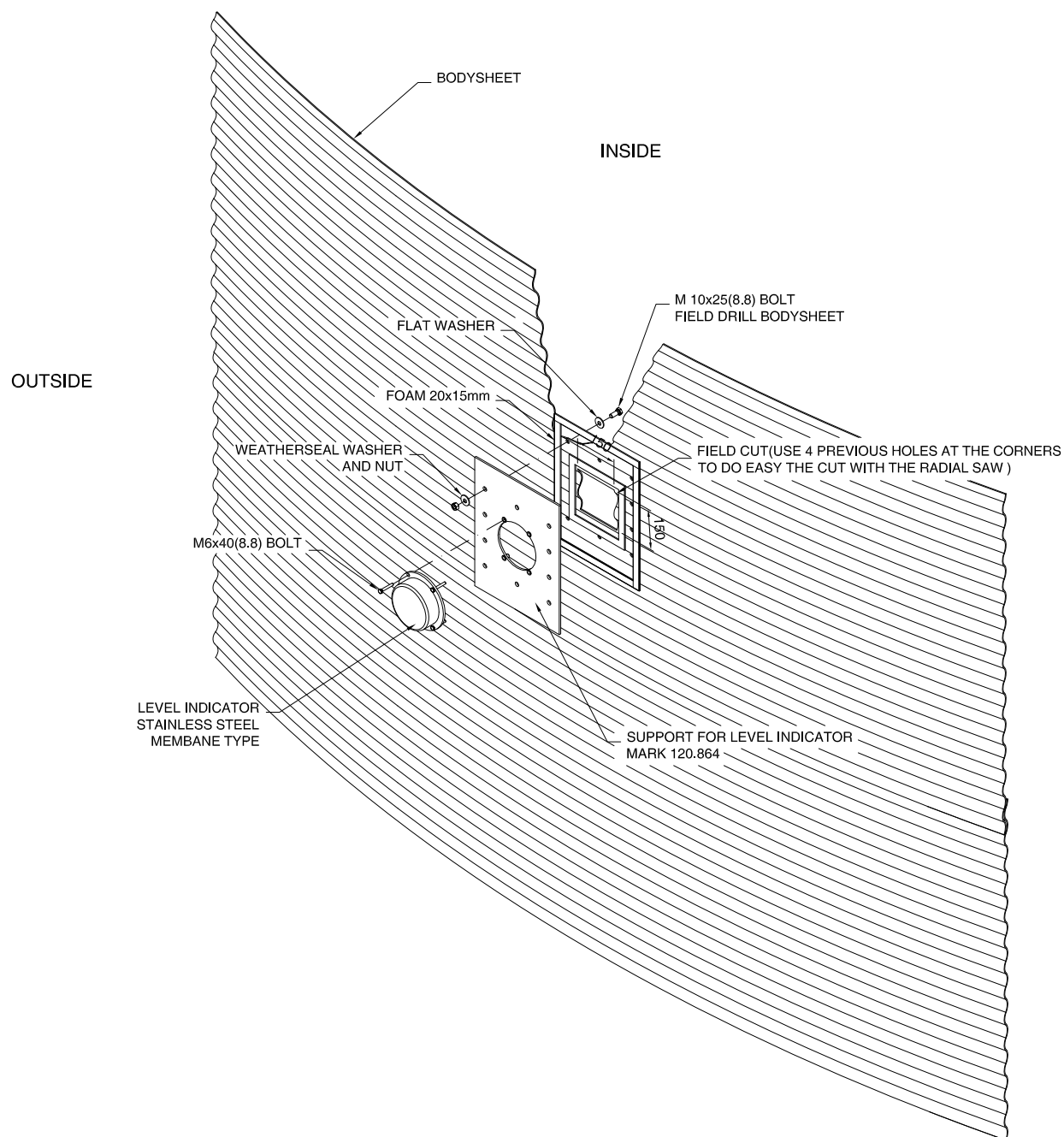
WIND RING ASSEMBLY BEGINNING / END DETAIL



INTERMEDIATE ASSEMBLY WIND RING DETAIL



WIND RING INSTALLATION



THIS LEVEL INDICATOR'S SUPPORT CAN BE USED LIKE UPPER LEVEL INDICATOR OR LIKE LOWER LEVEL INDICATOR.

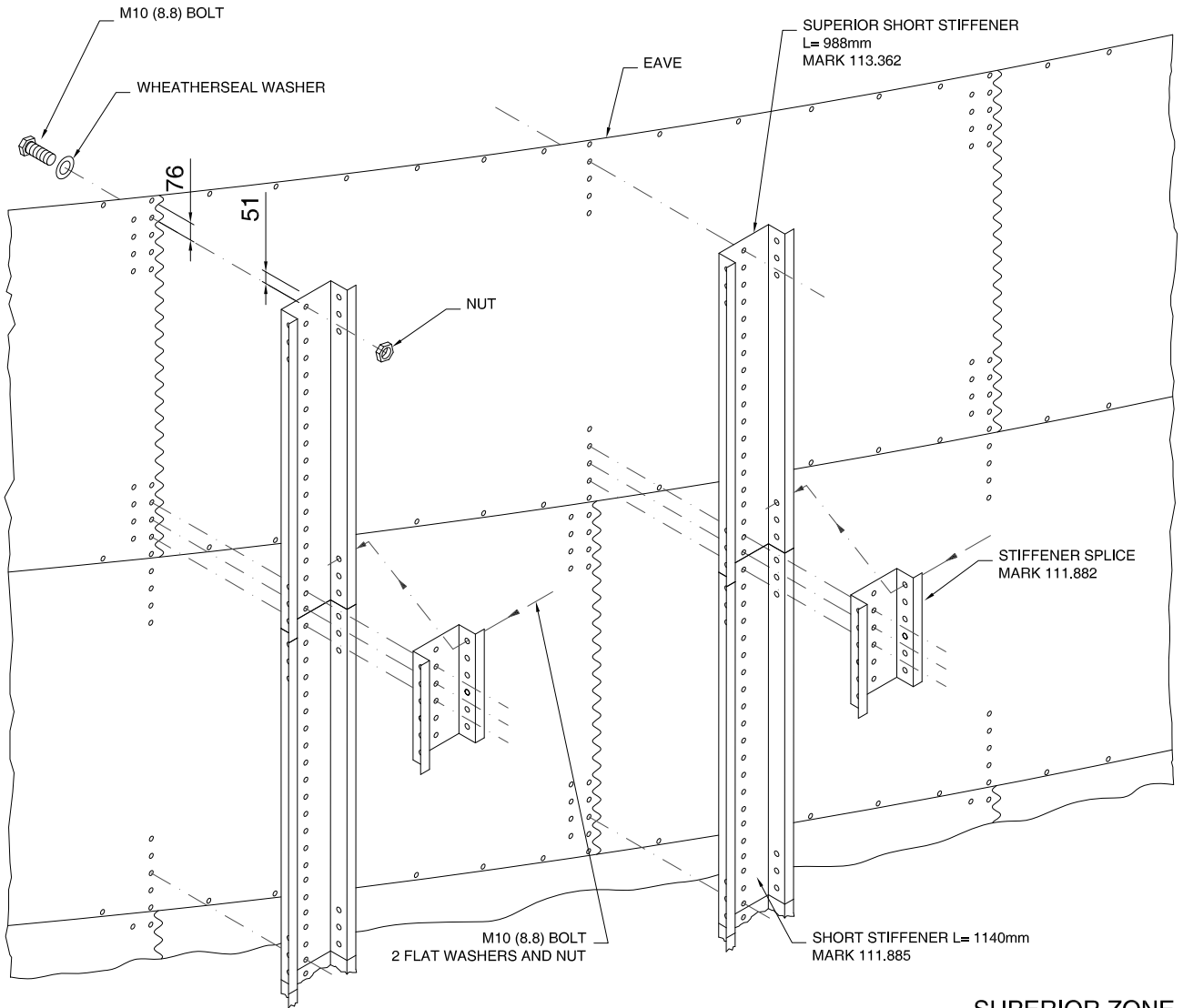
IN BOTH CASES, LOCATE IT NEAR OUTSIDE LADDERS OR REST PLATFORM.

IF IT IS USED LIKE UPPER LEVEL INDICATOR, LOCATE IT NEAR TO THE ROOF SHEET WITH MANHOLE, 342mm FROM EAVE TO INDICATOR CENTER.

IF IT IS USED LIKE LOWER LEVEL INDICATOR, LOCATE IT 342mm BELOW THE LAST HORIZONTAL JOINT .

## LEVEL INDICATOR

\* SEE BODYSHEET COMPOSITION PAGE FOR LENGTH OF BOLTS



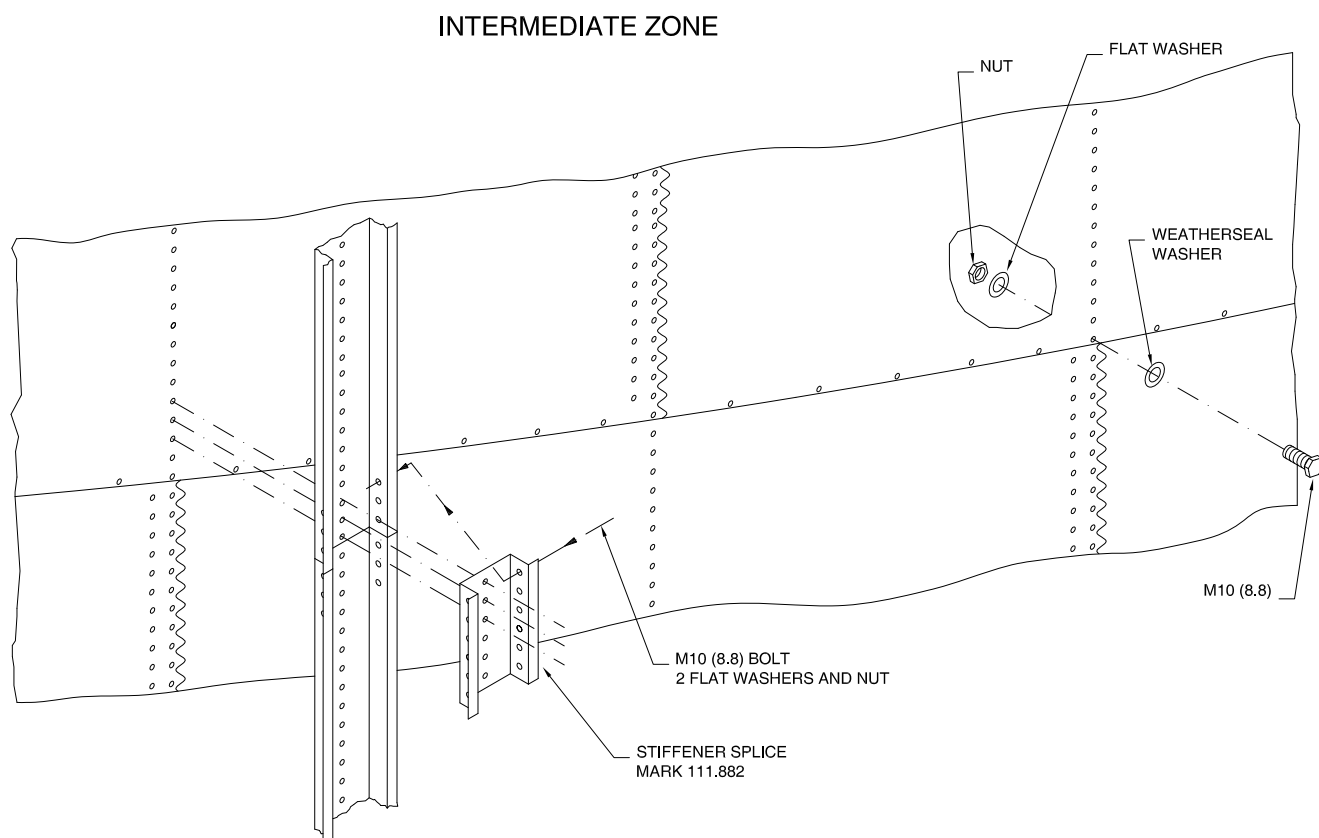
**SUPERIOR ZONE**

**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 COMPOSITION PAGE FOR LENGTH OF BOLTS

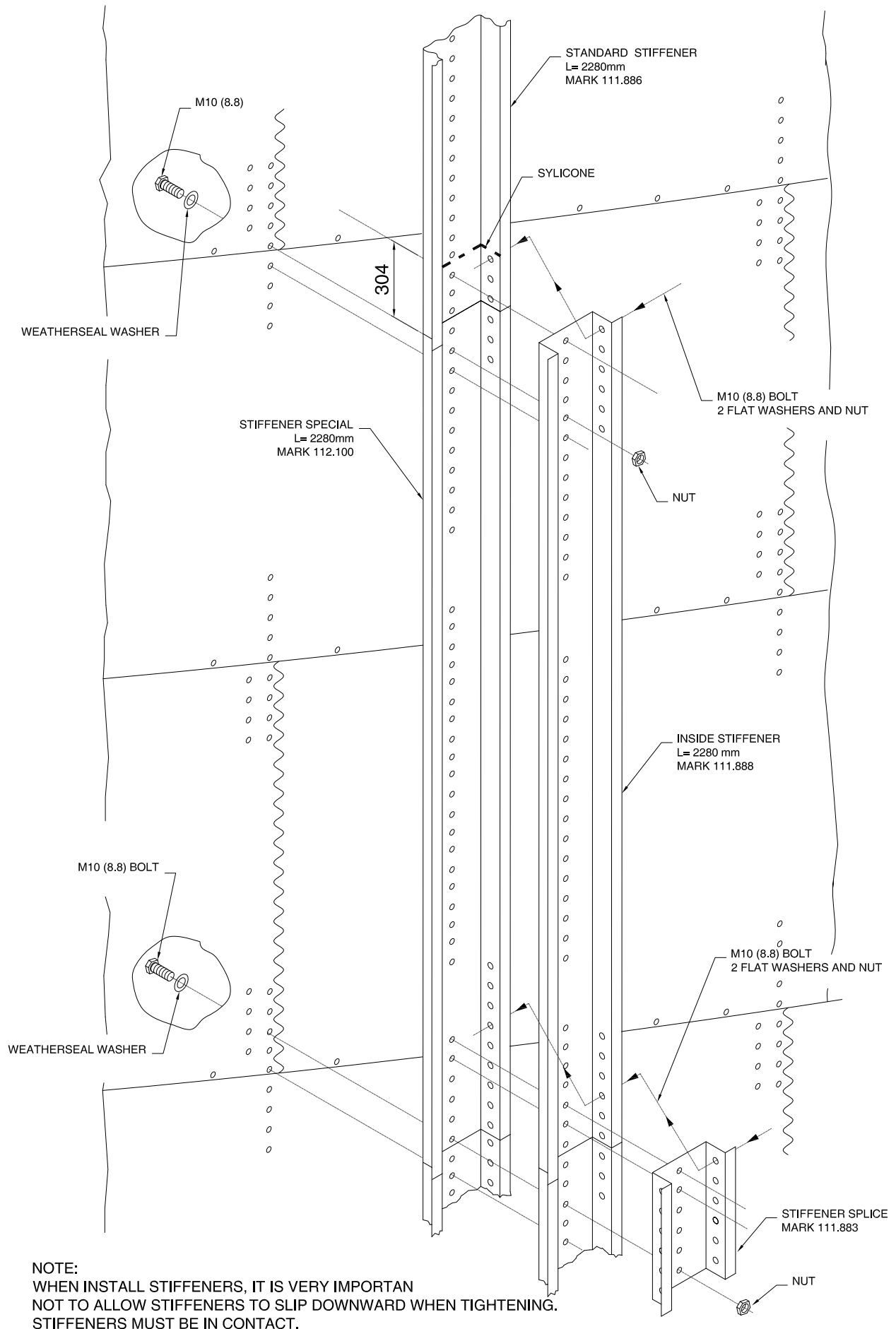


**NOTE:**

WHEN INSTALL STIFFENERS, IT IS VERY IMPORTANT  
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**BODYSHEETS AND STIFFENERS DETAILS  
(OUTSIDE VIEW)**

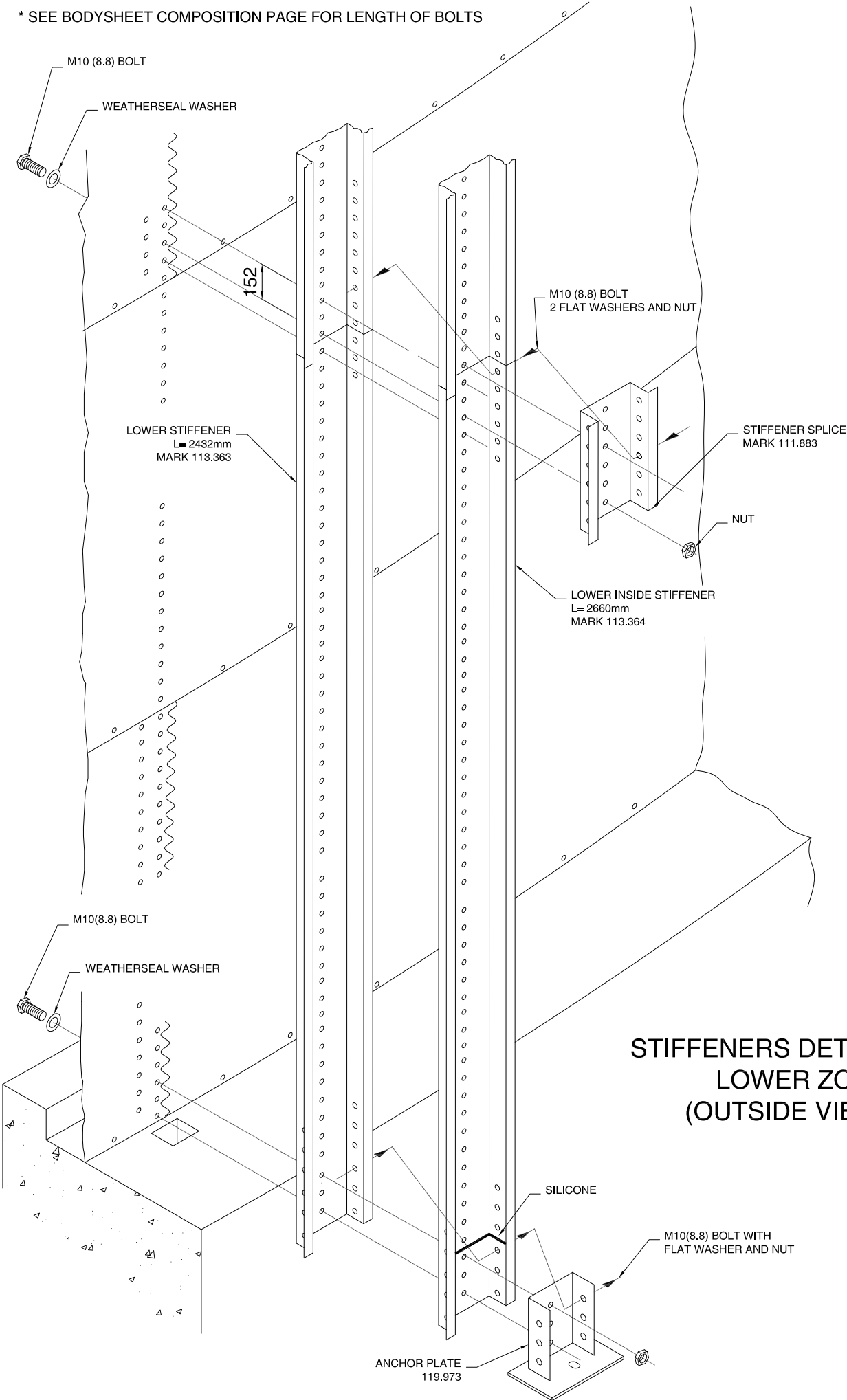
\* SEE BODYSHEET COMPOSITION PAGE FOR LENGTH OF BOLTS



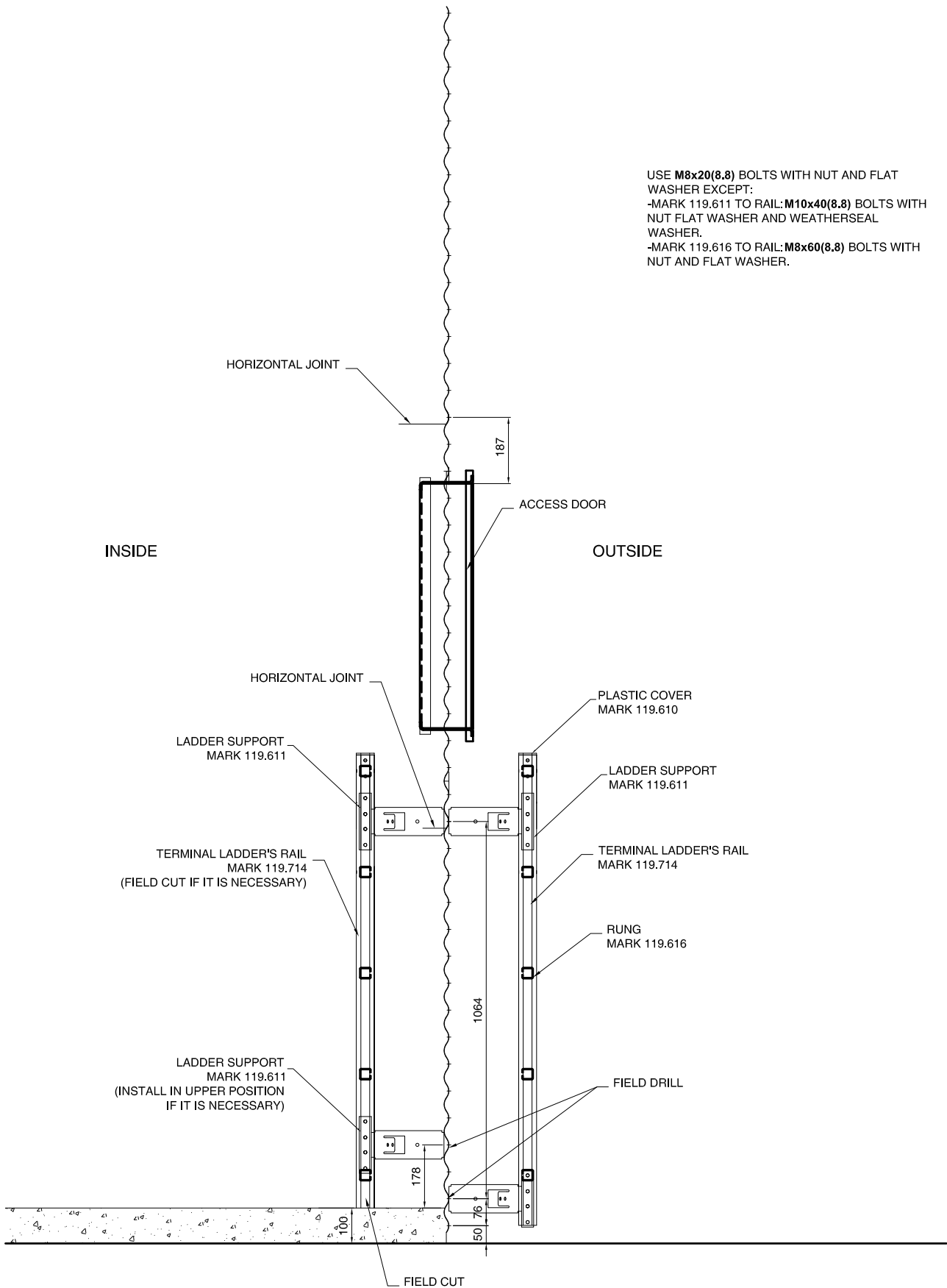
INTERMEDIATE ZONE

BODYSHEETS AND STIFFENERS DETAILS  
(OUTSIDE VIEW)

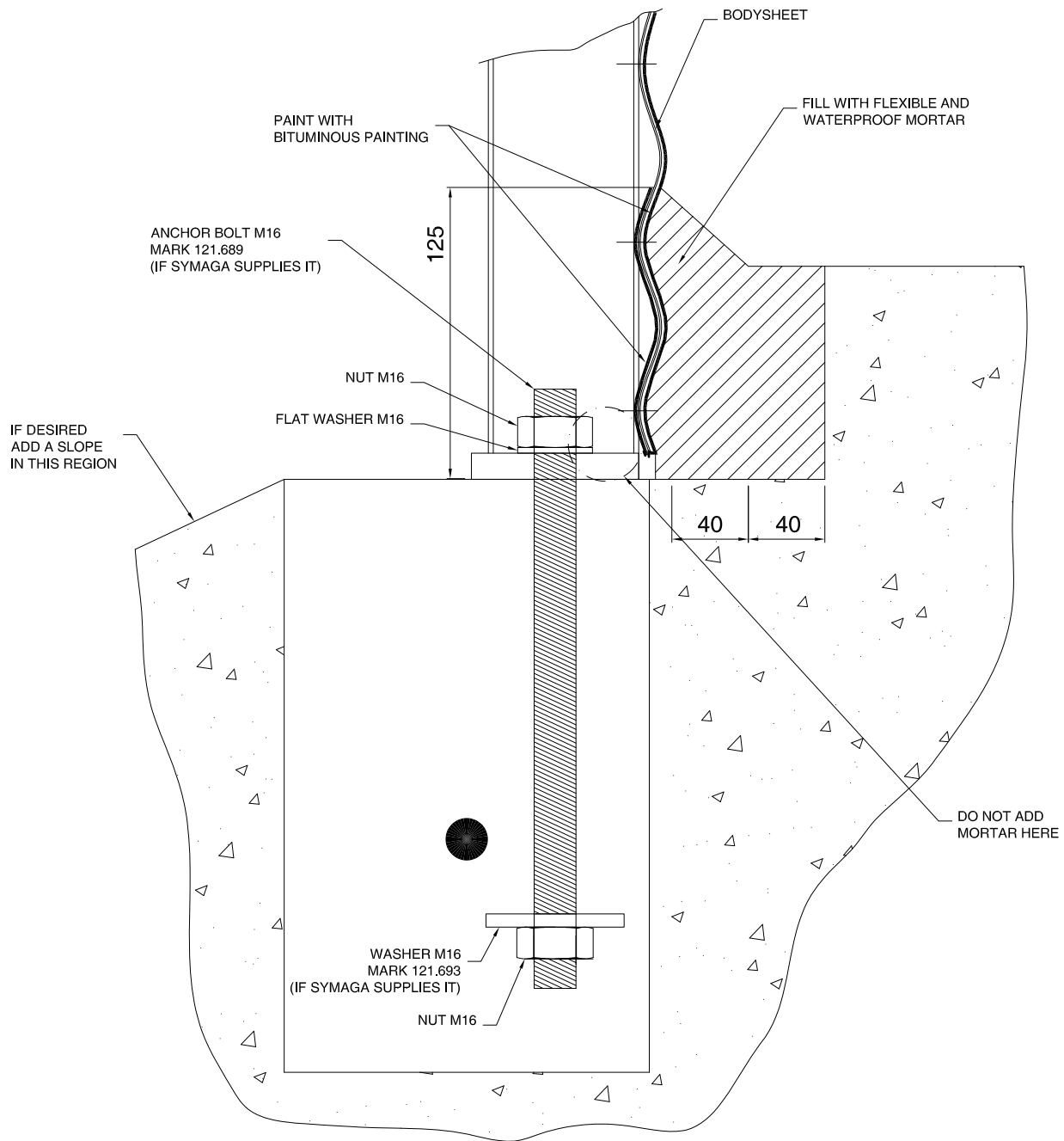
\* SEE BODYSHEET COMPOSITION PAGE FOR LENGTH OF BOLTS



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



#### PROCEDURE TO SEAL THE FOUNDATION:

- 1.-FILL THE ANCHOR HOLES WITH FAST SETTING CONCRETE WITH EXPANSIVE ADD.
- 2.-CLEAN THE CAVITY AROUND THE SILO AND PAINT THE BODYSHEETS WITH A BITUMINOUS PAINTING, INSIDE AND OUTSIDE, AS INDICATED IN THE DRAWING.
- 3.-FILL THE GAP BETWEEN BODYSHEETS AND FOUNDATION WITH FLEXIBLE AND WATERPROOF MORTAR.
- 4.-IF DESIRED, ADD A SLOPE IN THE FOUNDATION. IMPORTANT: DO NOT ADD MORTAR OUTSIDE OF THE BODYSHEET (SEE DRAWING).

## ANCHORAGE SYSTEM