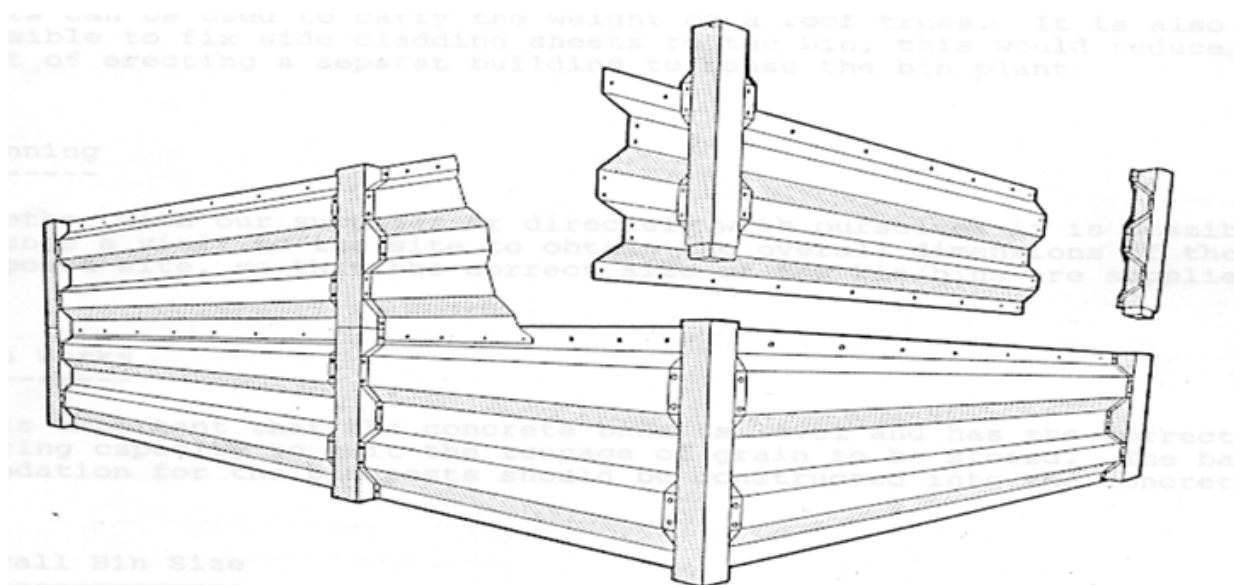




ASSEMBLY INSTRUCTIONS FOR ELEMENT SILOS



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D00268-2017_FI



Revision history

Revision	Author	Date	Amended
	T Matero	3.3.2017	Logo change, added: application of glue and fasteners for roof elements. The word "batten" replaced by "plank".



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0. MATTERS TO TAKE NOTICE DURING ASSEMBLY

NOTE!

***BEWARE HAZARDS RELATED TO ASSEMBLY.
USE PROPER STEPLADDERS AND WORK PLATFORMS
DURING ASSEMBLY.
BE CAREFUL NOT TO FALL.
BEWARE SHARP PLATE EDGES.
BEWARE FALLING OBJECTS, WEAR PROTECTIVE HELMET.***

Tools needed for assembly:

- tapering pin
- 13 mm wrenches
- a press for sealing compound
- an impact wrench + 13 mm sockets
- a pneumatic compressor

Check the delivery note to make sure that you have all parts at the assembly site.

Two people are needed to carry out the assembly.

IPE-beams and supports are not included in the delivery.



1. INTRODUCTION

Elements of the silos are made of hot-galvanized sheet steel. The standard lengths are 2, 2.5 and 3 metres. You can make efficient use of the available space by combining elements of different length. Subsequent extension of the silo system is simple, if appropriate pole types and element thickness options are selected right at the silo system's design stage.

Silos are available with the following assembly options:

1. Assembly on a conical base
2. Assembly on a flat base on a concrete foundation

COVERING THE SILO

The silo structures are designed such that the poles can be used to fasten the roof structure (see page 13, figure 14).

ASSEMBLY FOUNDATION

The foundation on which the silo is assembled has to be sufficiently strong and even. Uneven foundation affects the assembly of the silo. For a flat base silo make sure that moisture insulation of the foundation is adequate. For an outdoor silo install the grip plates, to which the bottom poles of the silo are welded, when concrete is cast.

ELEMENTS

Depending on the height of the silo, elements of different thickness are used such that thicker sheets are used in the lower part of the silo. Before starting the assembly, sort the elements according to their dimensions and thickness in separate piles, and then follow the assembling order provided on the next page.



Material thickness of Mepu Silo Elements with different elements and heights of the silo

T	Tier
h	Silo height
h1	Bottom cone height
2	Element thickness
1	Silo pole thickness

T	h [m]	2000 [mm]		2500 [mm]		3000 [mm]	
		2	1	2	1	2	1
1	0,84	1,5	3	1,5	3	1,5	3
2	1,68	1,5	3	1,5	3	1,5	3
3	2,52	1,5	3	1,5	3	1,5	3
4	3,36	1,5	3	1,5	3	2,5	3
5	4,20	1,5	3	1,5	3	2,5	3
6	5,04	1,5	3	2	3	2,5	3
7	5,88	1,5	3	2	3	2,5	3
8	6,72	1,5	3	2	3	2,5	5
9	7,56	1,5	3	2	3	3	5
10	8,40	1,5	3	2	5	3	6
11	9,24	1,5	3	2,5	5	3	6
12	10,08	1,5	5	2,5	6		
13	10,92	1,5	5	2,5	6		
14	11,76	1,5	5				
15	12,60	1,5	5				
16	13,44	1,5	5				
17	14,28	1,5	5				
18	15,12	1,5	6				
19	15,96	1,5	6				

Blade valve \varnothing 160mm or \varnothing 200mm, 120mm

Discharge trough 45° or straight

Support legs for bottom trough 2300mm, 2000mm, 1680mm, 1325mm

NB! 3x3 cone-base silo max 3 tiers on support legs.



2. ASSEMBLY ON A CONICAL BASE

1. Before mounting the base check the height of the grip plates, e.g. with a builder's level.
2. Assemble the cone base according to the instructions provided below
 - 1) Assemble the side plates (Figure 1) No. 1 (4 pcs) (with M8x16 screws). **Note!** In 2x2.5, 2.5x2.5 and 3x3 cones the side plate consists of two parts – No. 1 and No.2, with a reinforcement seam between them.
Assemble all the parts of the side plates; do not tighten the screws yet.
 - a) Make sure that the cones are rectangular and straight and that the seams are tight.
 - b) Tighten the screws.
 - 2) Fasten the edge reinforcements No. 3 (4 pcs) to the cone (with M8x16 screws). Check that the fastening holes of the silo elements are aligned.
 - 3) Silos on support legs
 - 4) Fasten the cone legs No. 4 to the corners of the cone (with M8x25 screws).
See support legs on the next page.
 - a) These screws need to be loosened when the first silo element is installed.
 - b) NOTE! Only loosen the screws required to assemble one silo element at a time, and attach the pole/ silo element/ leg
 - 5) Assemble the discharge connector No. 5 to the cone (with M8x16 screws + washers).
 - 6) Backup welds are made as double welds through the holes in the band plate. (Page 5)
 - 7) Install the cross supports (depending on the type) as shown in the picture (drawing 300341).

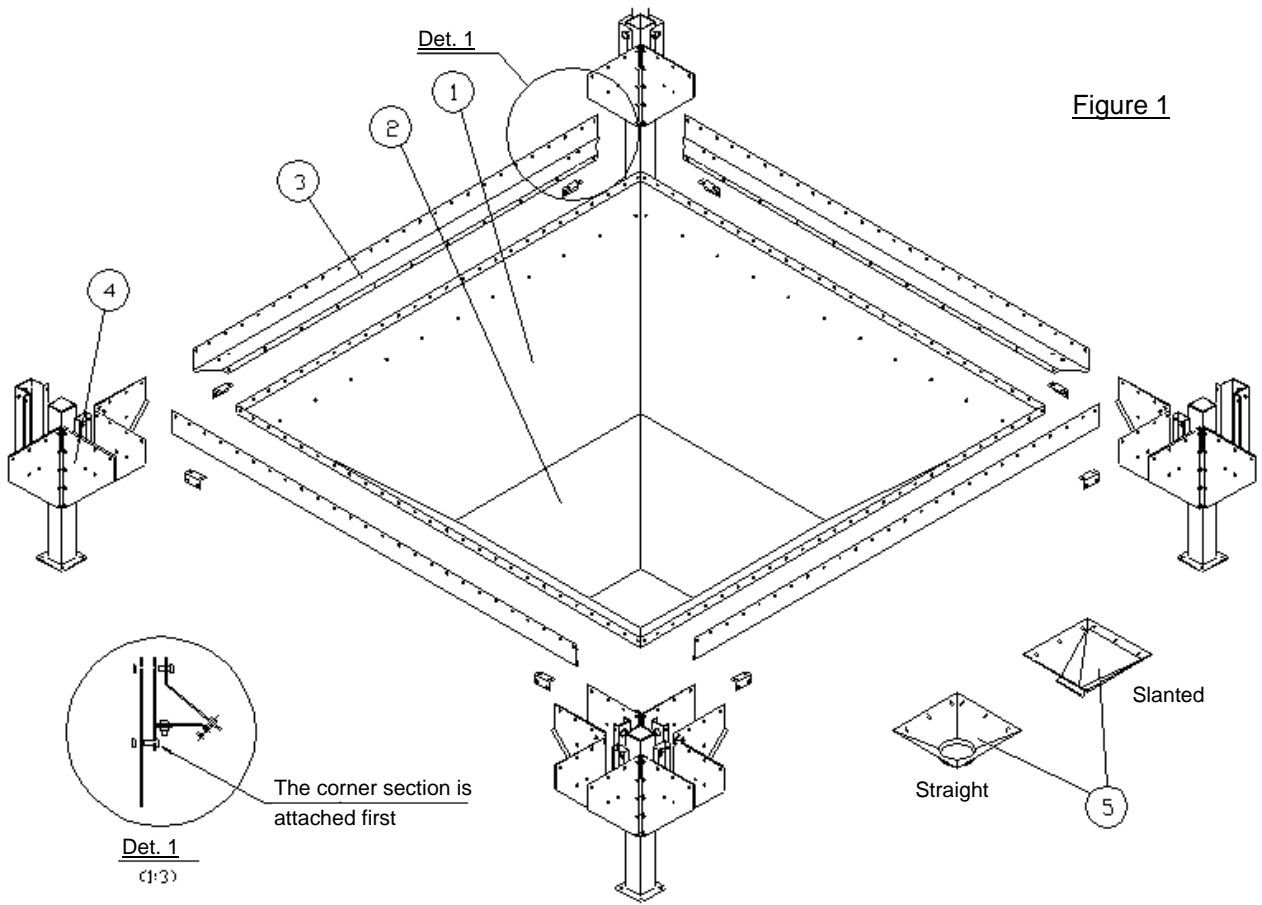
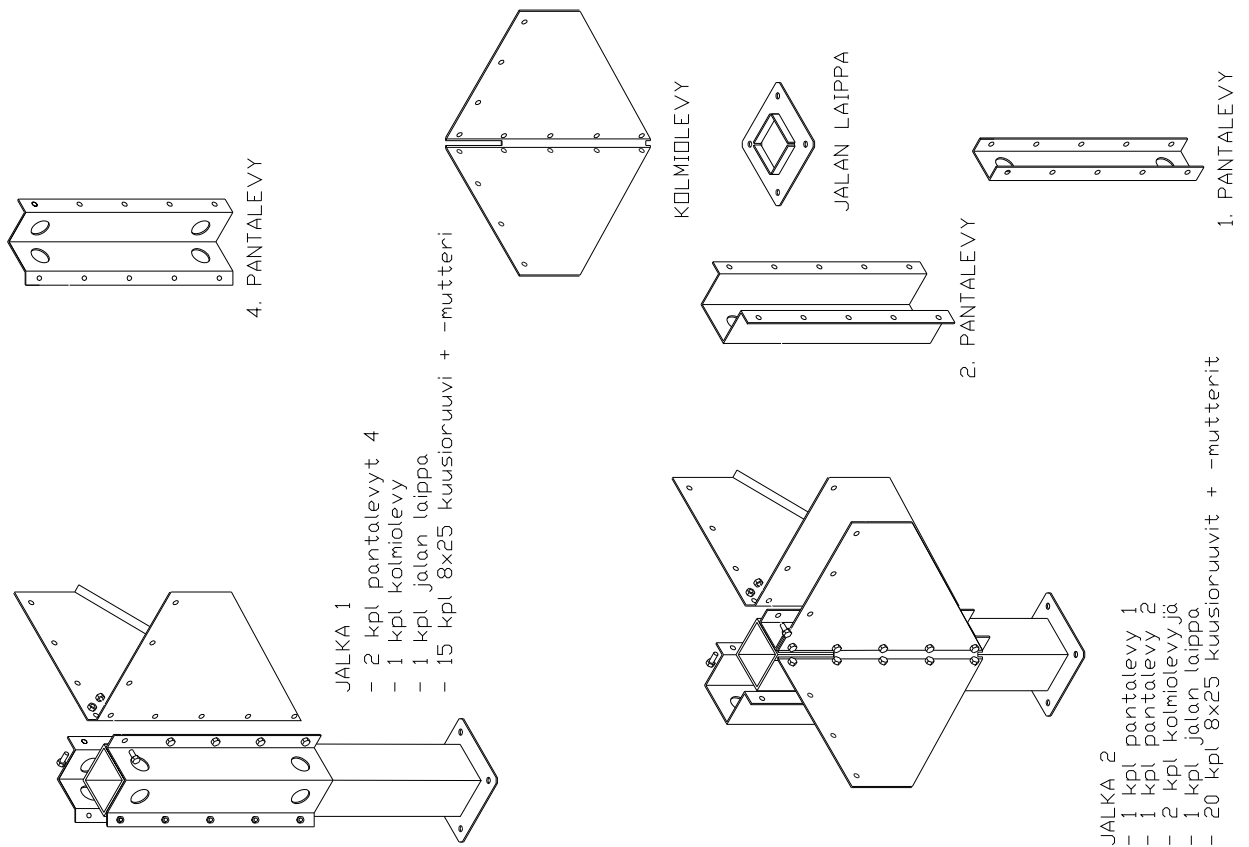
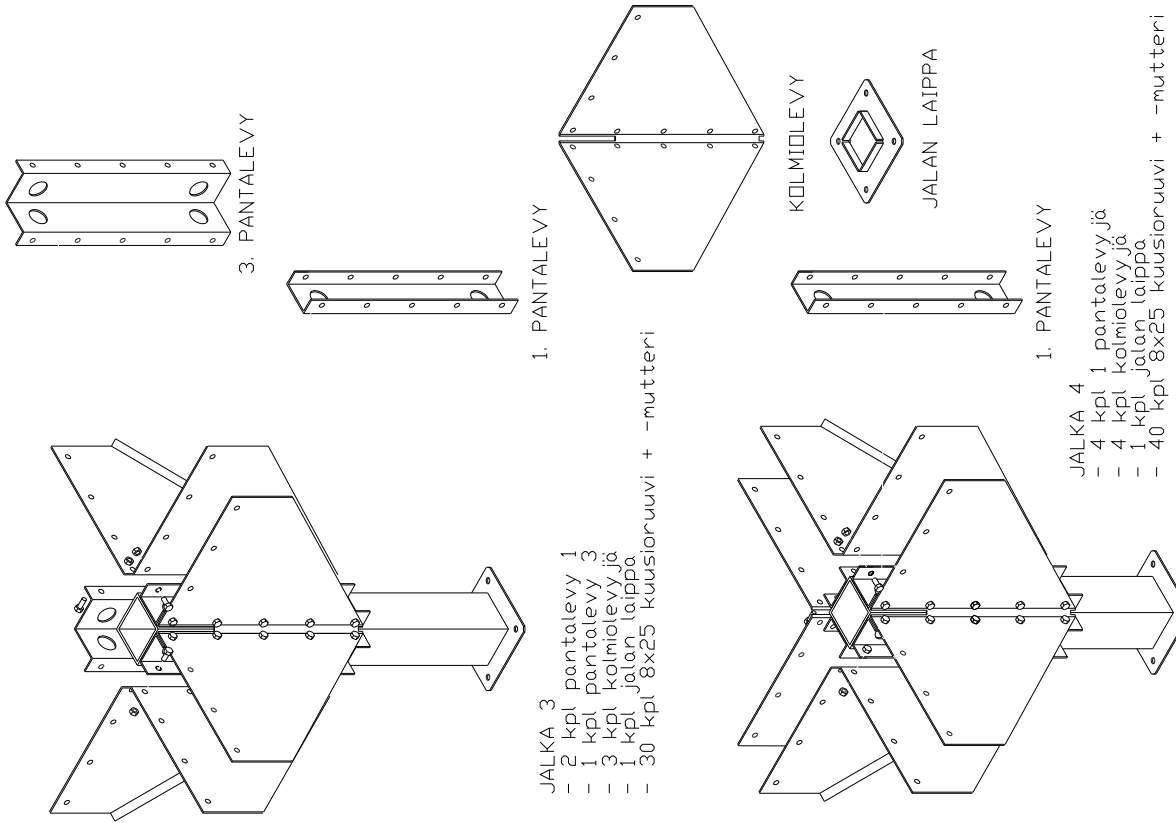


Figure 1





3. Lift the base cones to their places with e.g. an agricultural loader. Lifting is easier if you use a lifting lever inserted between the edge reinforcements (Figure 3). (The lifting lever is not included in the delivery).
If the working range of the loader/ hoist is insufficient, lift the cone from the discharge trough side as far as possible, and pull it to its place along the base and the support beam. (Figure 4, Photo E)

Figure 3
lifting lever

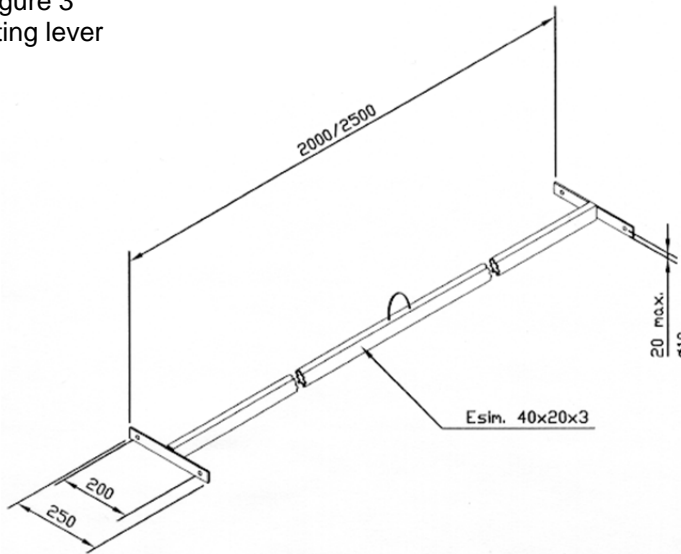
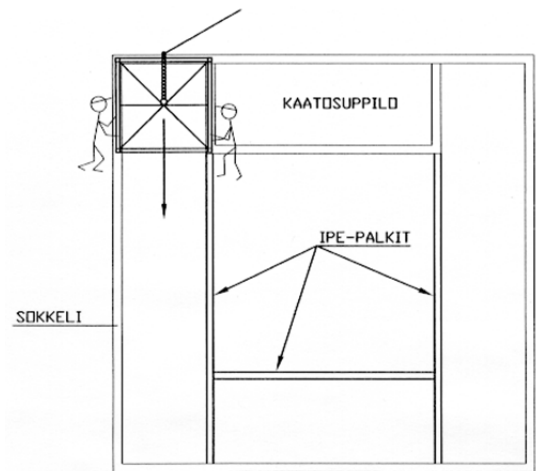
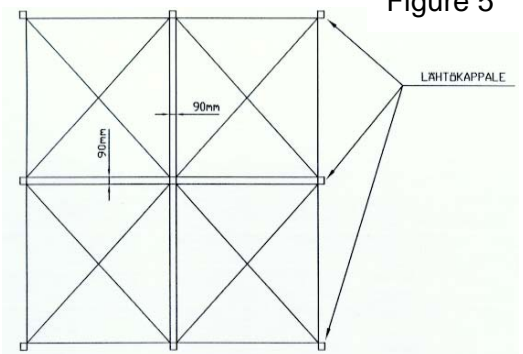


Figure 4



4. After the bases are all mostly positioned in their designated spots, attach the starting pieces 90x90x3 L=120 to the location shown in the drawing (Figure 5). The starting pieces are positioned in the corners of the cone, not between them. After all the starting pieces are installed, check the starting heights and the cross-dimension (Figures 15 and 16, Photos H and E).

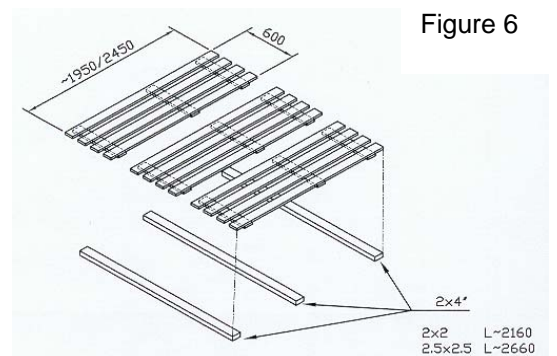
Figure 5



5. Before assembling the first element tier it is advisable to prepare work platforms to facilitate the work and to ensure work safety.

Timber required: Work platforms made of 3-4 pcs 2 meter planks (50x100mm) per silo, and 4" boards. 2"x4" planks are subsequently used for framing the silo lids. You will need 3 platforms per silo (Figure 6, photo E).

Figure 6



2.1. FASTENING OF SUPPORT LEGS TO CONES

A photo of the fastening of a corner leg from outside, do not insert bolts into the topmost row.



A photo of the fastening of a corner leg from inside.
The corner leg is fastened to the supports of the cone, tightened to finger-tightness.



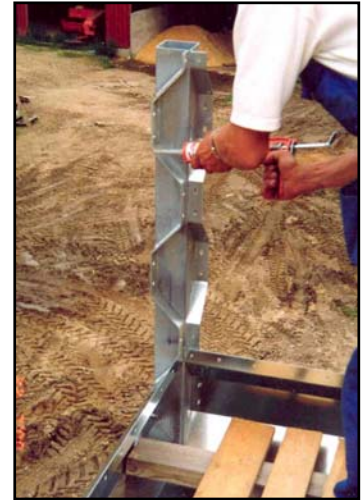
A photo showing the fastening of the central leg to the cone. The arrows point to the topmost row of perforation without bolts inserted.





2.2 Assembly of the first element tier

Sort poles of different types (2A, 3O, 3V, 4) by groups (Figures 7 and 8). After that install the poles of the first tier to their respective places according to the assembly diagram (Figures 9 and 10). Next, spread some sealing compound along the pole and the lower edge of the element. After that install the elements of the bottom tier. The elements are always positioned against the flange of the pole such that the element is inside, towards the non-welded side of the flange. Thereafter install the bottom (thickest) elements to their places and attach with bolts to the poles and the base (tighten to finger-tightness).



USE WEATHER-RESISTANT SEALING COMPOUND IN THE JOINTS OF THE OUTER PERIMETER. (MS POLYMER SEALING COMPOUND)

The photo shows a pole 3V and two external walls, seen from inside the silo.





- The photo shows a pole 3V with two external walls to be attached to it, seen from outside the silo.
- The bottom and the top rows with no bolts inserted!

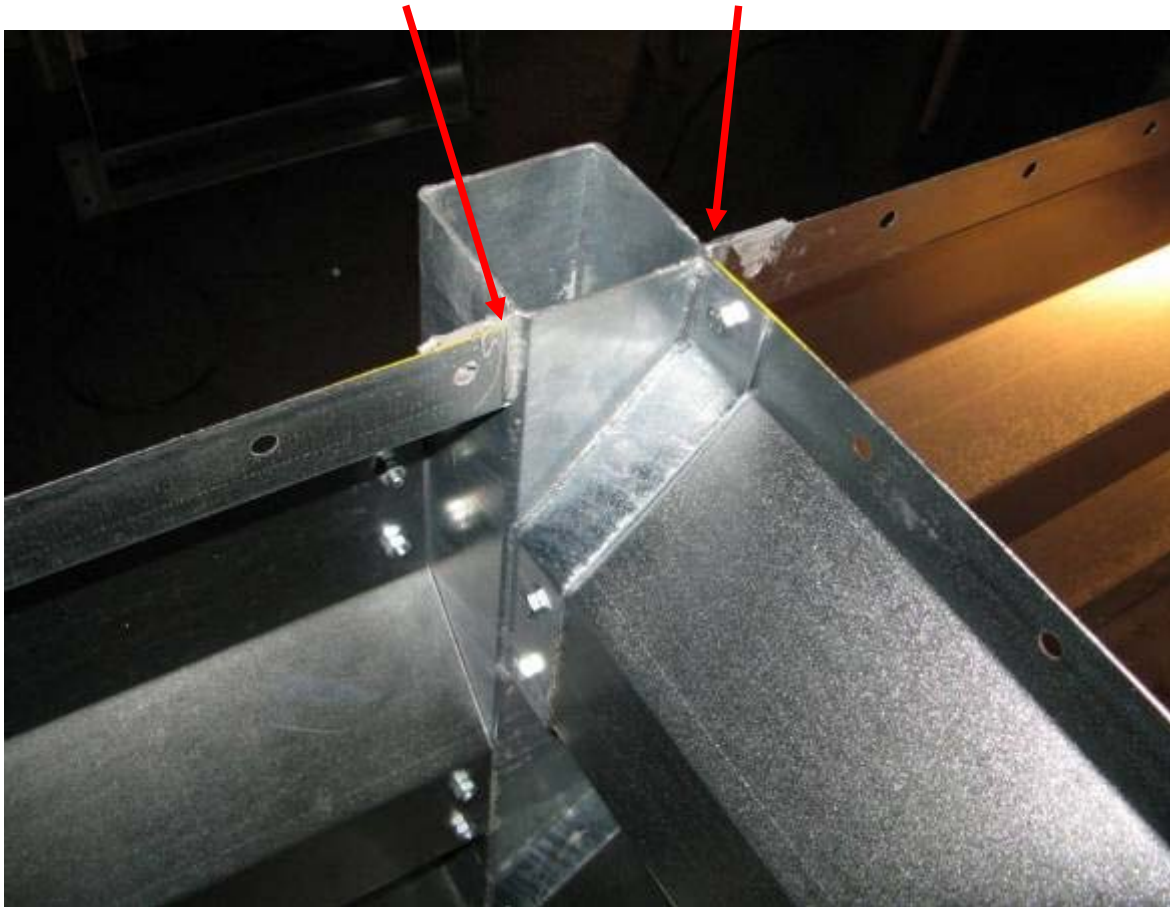


- Place the lower silo poles more or less to their designated installation locations in the flat-base silo.
- Next spread some weather-resistant sealing compound on each pole. The compound is spread between the edge of the flange and the row of perforations.

USE WEATHER-RESISTANT SEALING COMPOUND IN THE JOINTS OF THE OUTER PERIMETER. (MS POLYMER SEALING COMPOUND)



A photo showing the fastening of a partition wall to a 3V pole. The sealing compound shall be spread in the joint between each pole and the wall element on the external wall side.



Note! Do not forget the partition wall support plates (Figure 11). Install the strip 250x2000 or 2500 according to the instructions (Figure 12) and seal the corners with butyl sealing compound, finally tighten all nuts.

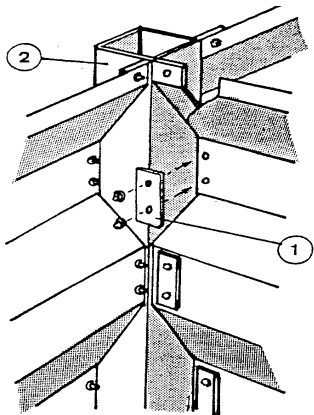


Figure 11

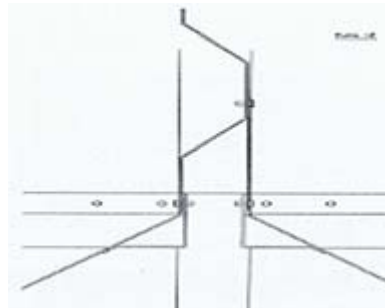


Figure 12



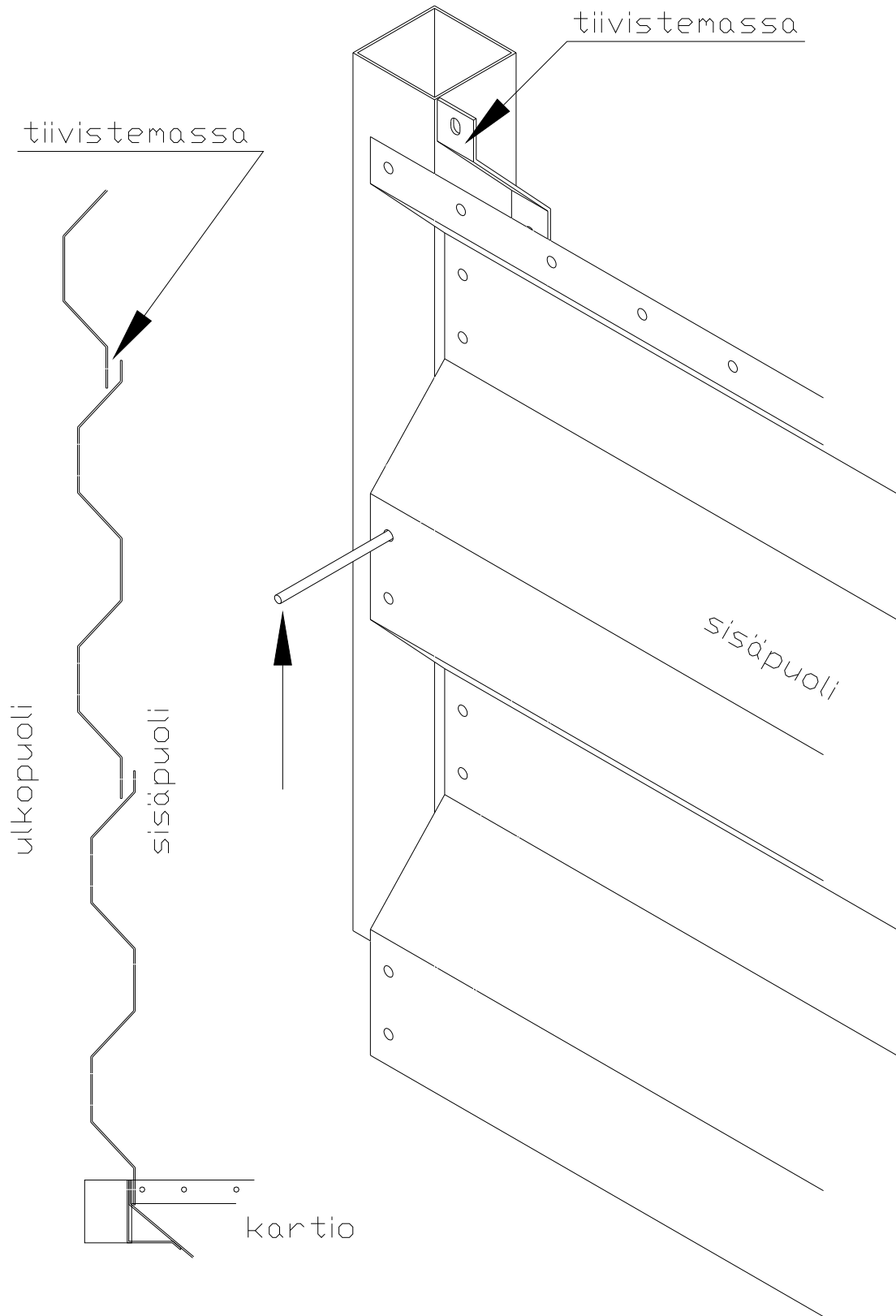
When tightening the nuts lift the element with the tapering pin so that the element pole and pole flange are aligned (see Figure on the next page). To speed up work use pneumatic tools

2.3 Assembly of the second tier

Set up the work platform according to the instructions. Install the poles as described above. Lift the required quantity of elements onto the work platform (check the thickness) and install them the same way as the first tier. Finally tighten the bolts. **NOTE! THE BOTTOM EDGE OF THE ELEMENT IS MUST BE OUTSIDE THE ELEMENT BELOW** (see the figure).

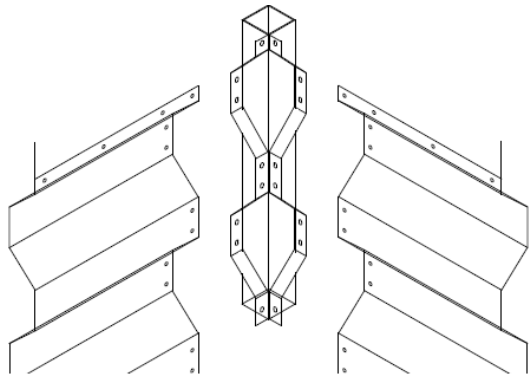
2.4. The third tier, etc.

Assembled as described above.



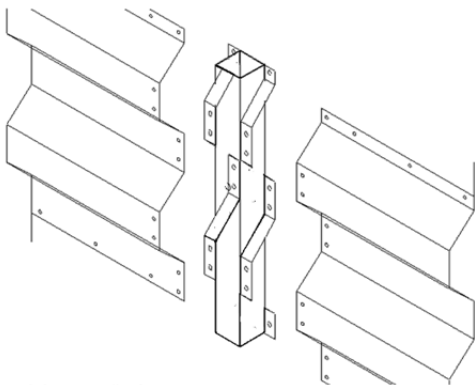
Huom! alin elementti

Figure 7



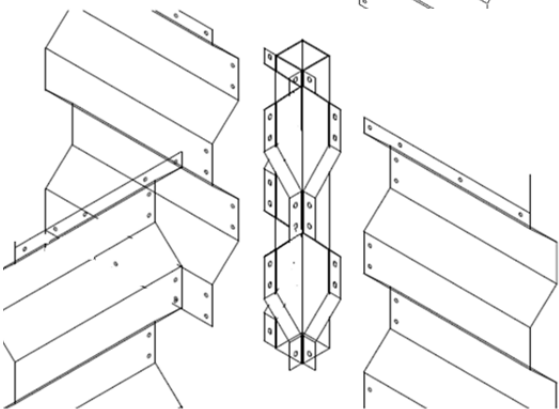
CORNER POLE 2A

Used in the outside corner of the silo.



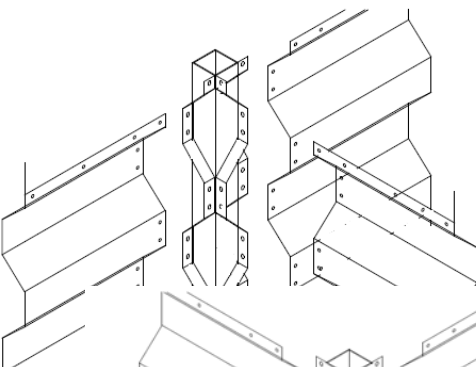
EXTENSION POLE 2B

Used to extend the elements. They feature perforations for pull-rods and support pipes.



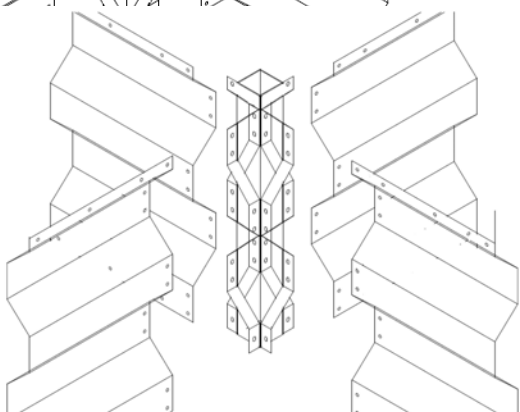
PARTITION POLE 3V

Used in a junction where three walls meet. The partition wall element is positioned against the pole plate from the left-hand side.



PARTITION POLE 3O

Used in a junction where three walls meet. The partition wall element is positioned against the pole plate from the right-hand side.



CROSS POLE 4
 This is used in a junction where
 four walls meet.

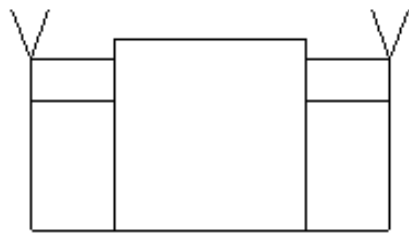
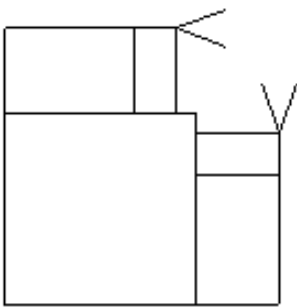
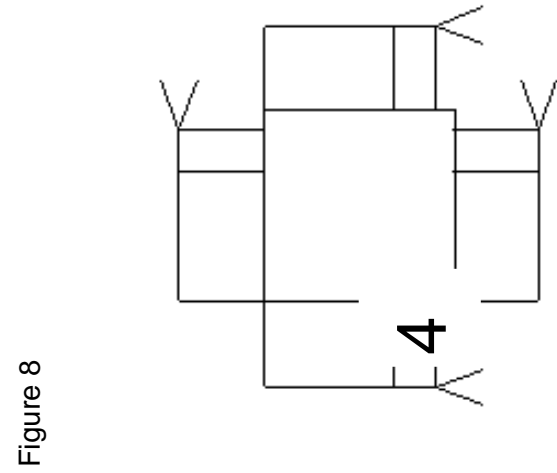
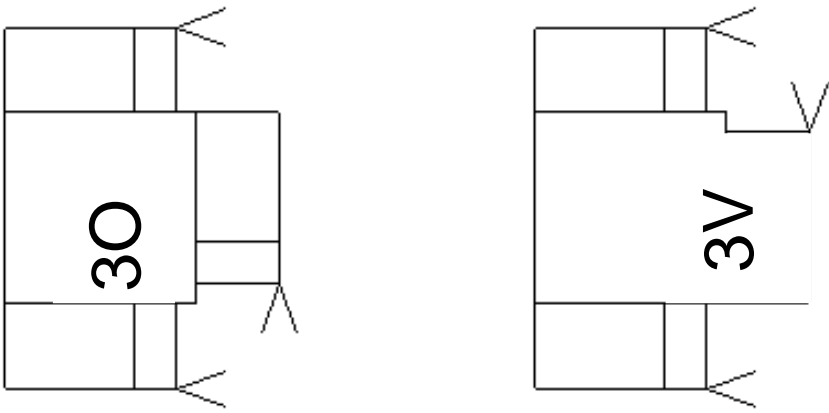


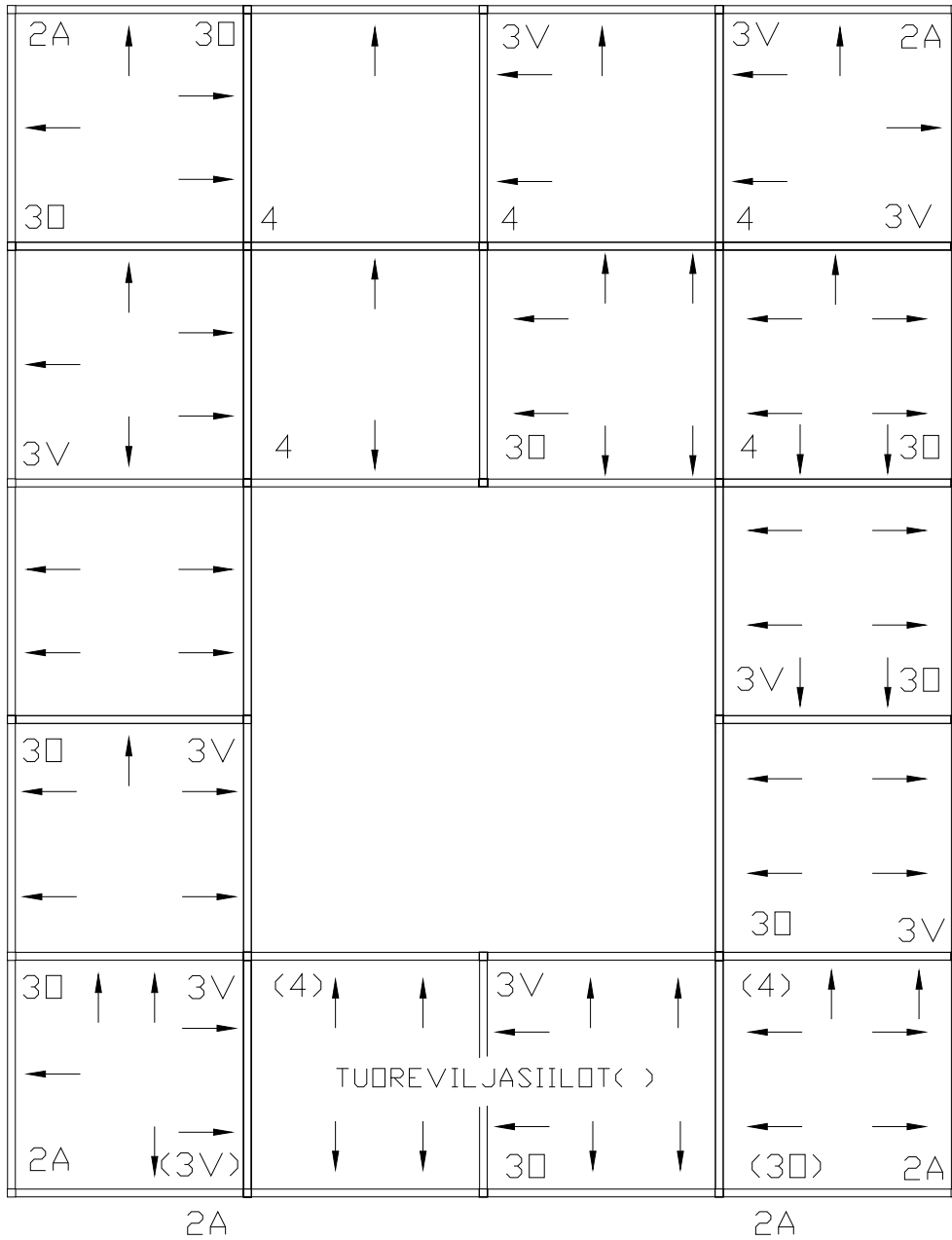
Figure 8

POLES
 → element direction
 V = fastening surface



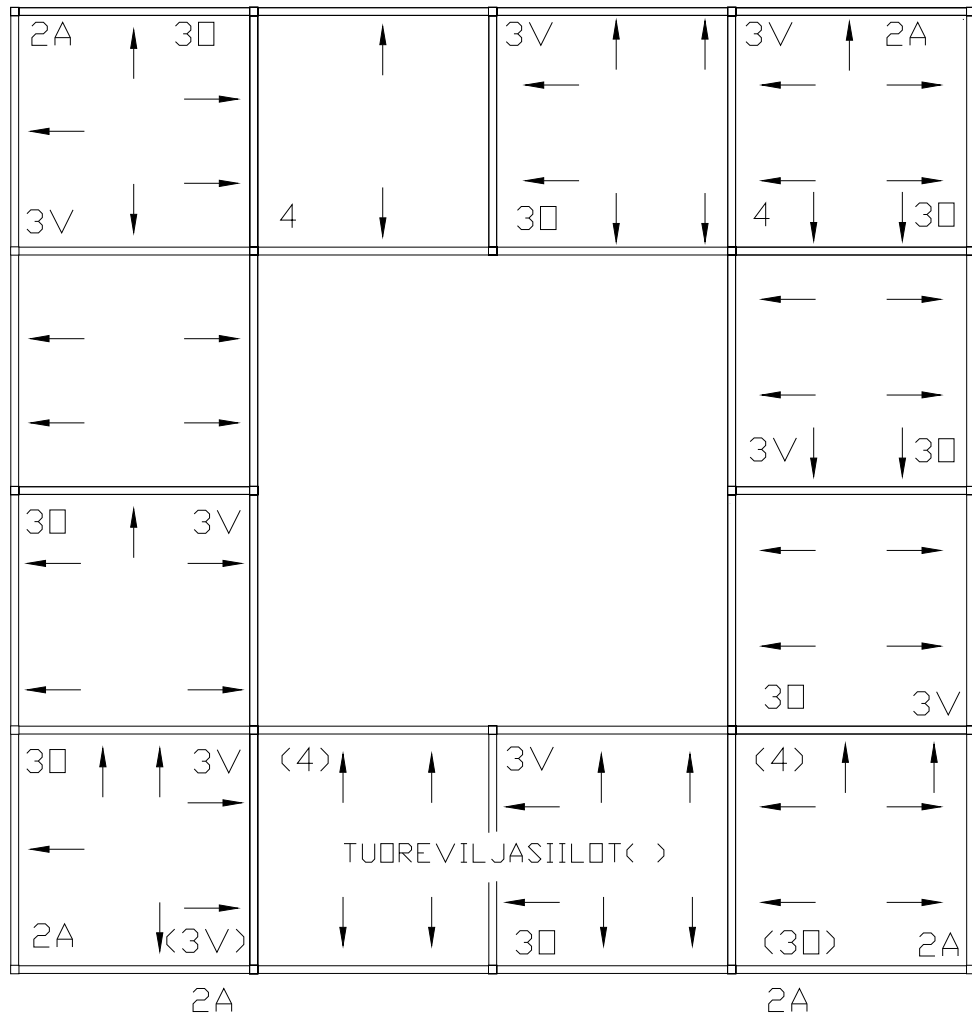


Figure 9



SIILOTOLPPIEN ASENNUSKAAVIO

Figure 10



SIILOTOLPPIEN ASENNUSKAAVIO

2.5 Operations required for the assembly of silos for green cereals

Using a gauge made of planks, make sure the space required for the silo base (size 4090 or 5090) stays the same, starting from the bottom tier (Figure 13). If the dimension changes when the assembly work progresses, it shall be either decreased with straps or increased with jacks. The silo base support beams IPE 240 or IPE 360 are welded to their spots at the height shown in the figures, and are supported on the base with 4 U-80 beams (Figure 13). Lift the silo bases to their designated location and assemble the silos as described above. Take note of the alterations made to the poles where the green cereal silos are located; see the assembly diagram (Photo D).

Installation of the U-beams of the green cereal silos. A U-beam is fastened to each pole.

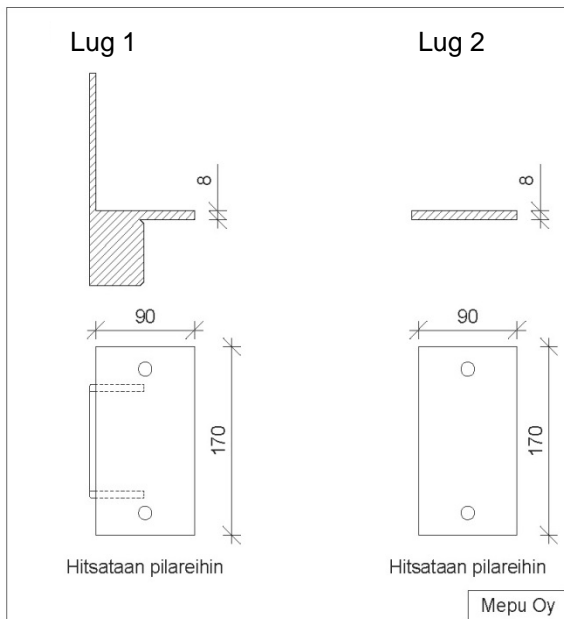


2.6 Roof of the silo

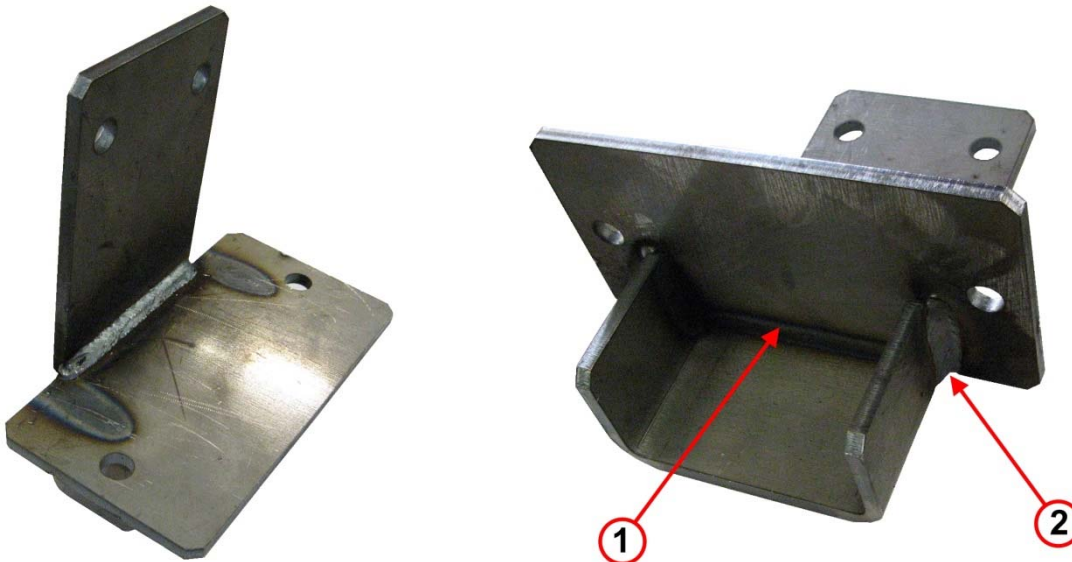
Fasten a plank (50x100mm, Figure 14) to the top edge of the elements of the topmost tier with e.g. 8x50 cover screws. Use the planks as runners for the cover. Interval between runners: according to the thickness of the cover and the element length. Cover material: e.g. matchboard or plywood- Leave filler ports 500x500; position the ports in the corner located closest to the elevator (not behind a barrier) (Photo F). Use fastening lugs to fasten the planks to the silo; there are two types of lugs. See the next section 2.6.1.

2.6.1 Installation of a lug

There are two types of lugs: lug 1 and lug 2. The assembly help to establish which lug goes where.



Lug 1.



Lug 1 is welded from top. See the figure on the left. The figure on the right (No. 2) shows the location of the weld. The inside of the lug is not welded (figure on the right, No. 1). Otherwise it does not go down to the bottom, when mounted on top of the pole.

Finally lug 1 is welded to the pole, see figure below. **Note! Welded completely to the pole!**

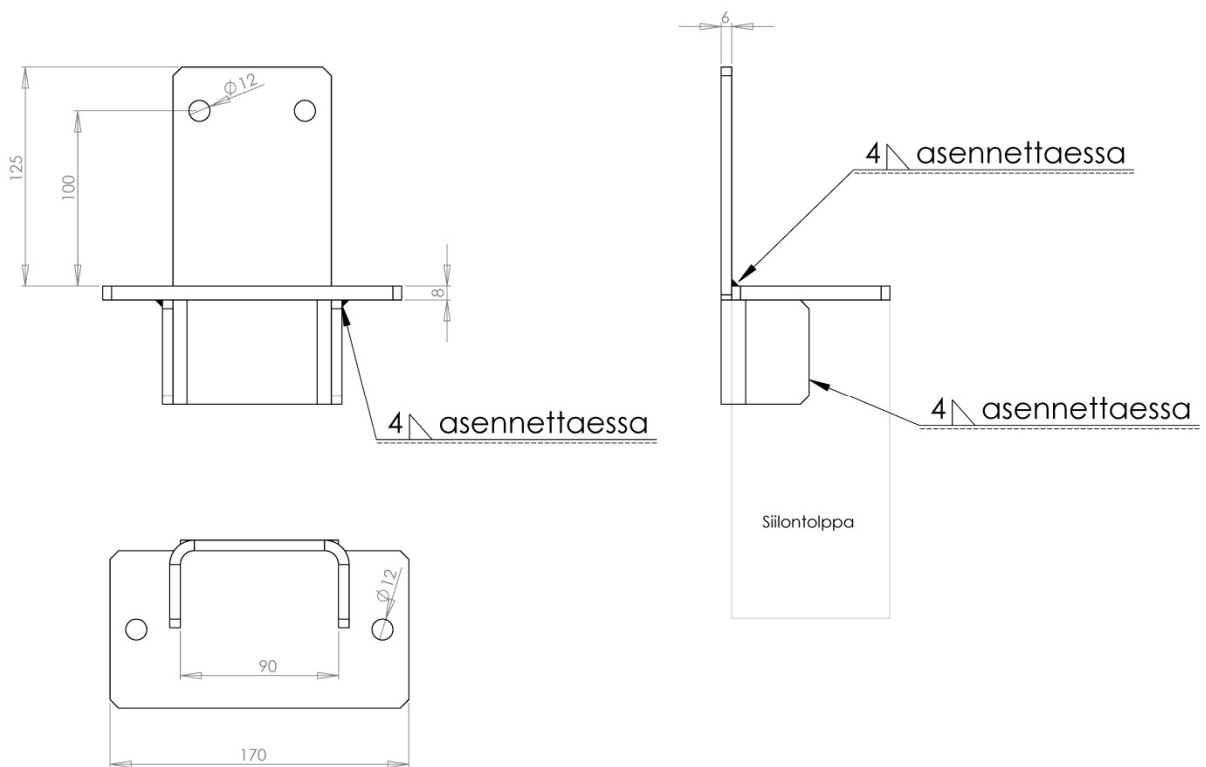
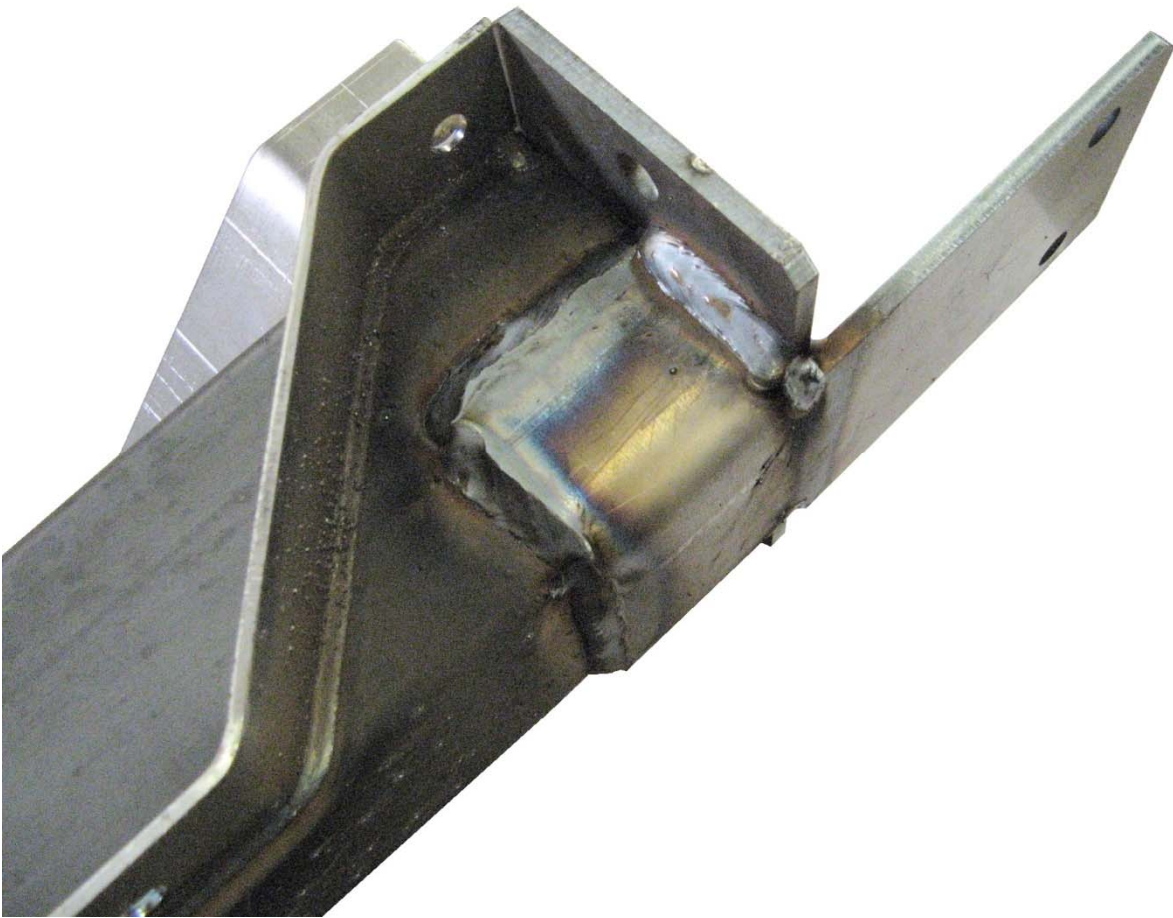


Figure showing the welding seams.
Lug 2.

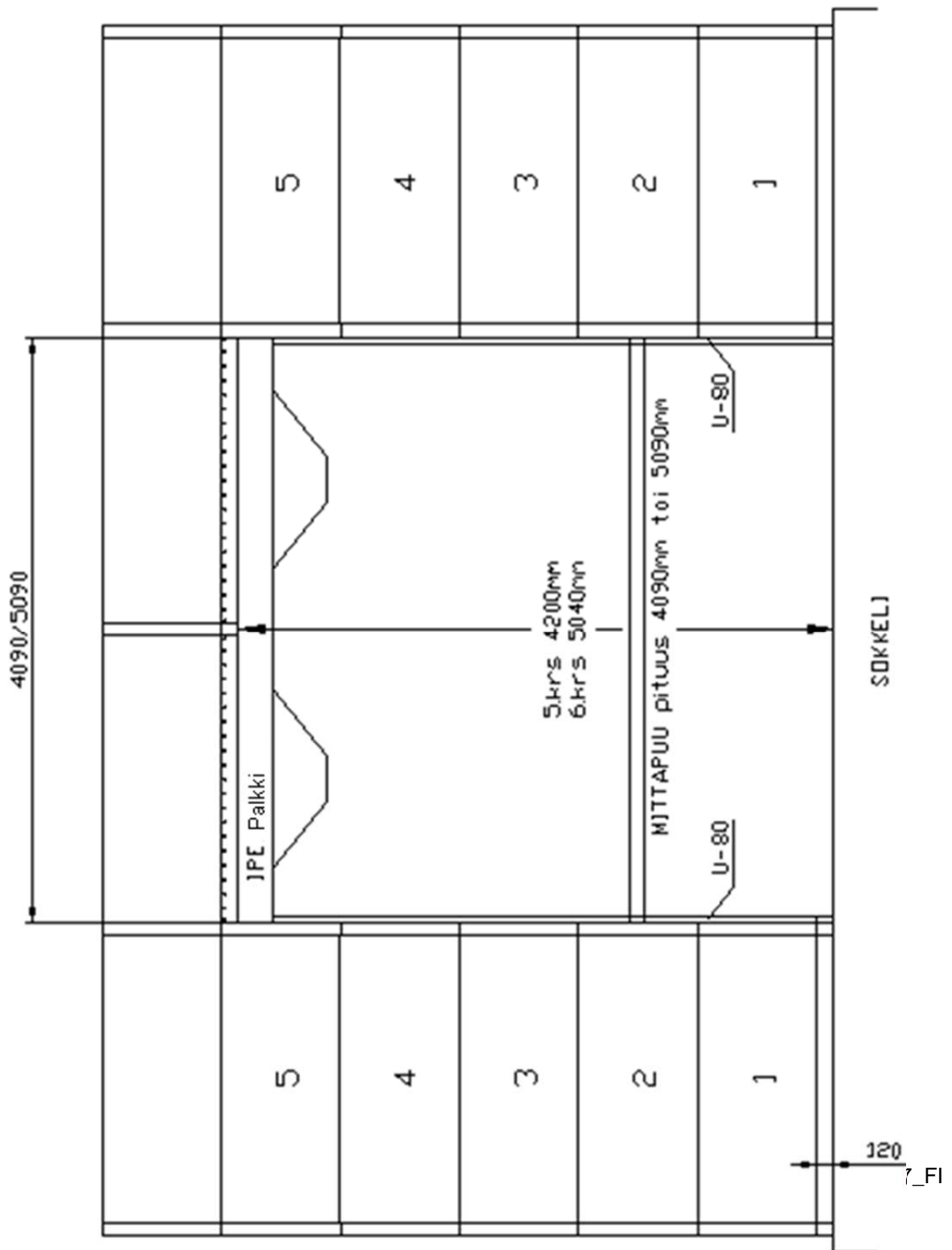


Lug 2 is welded to the pole from the sides. The plate is placed in the centre of the pole, as shown in the figure. See the assembly drawing to find the locations of the poles.



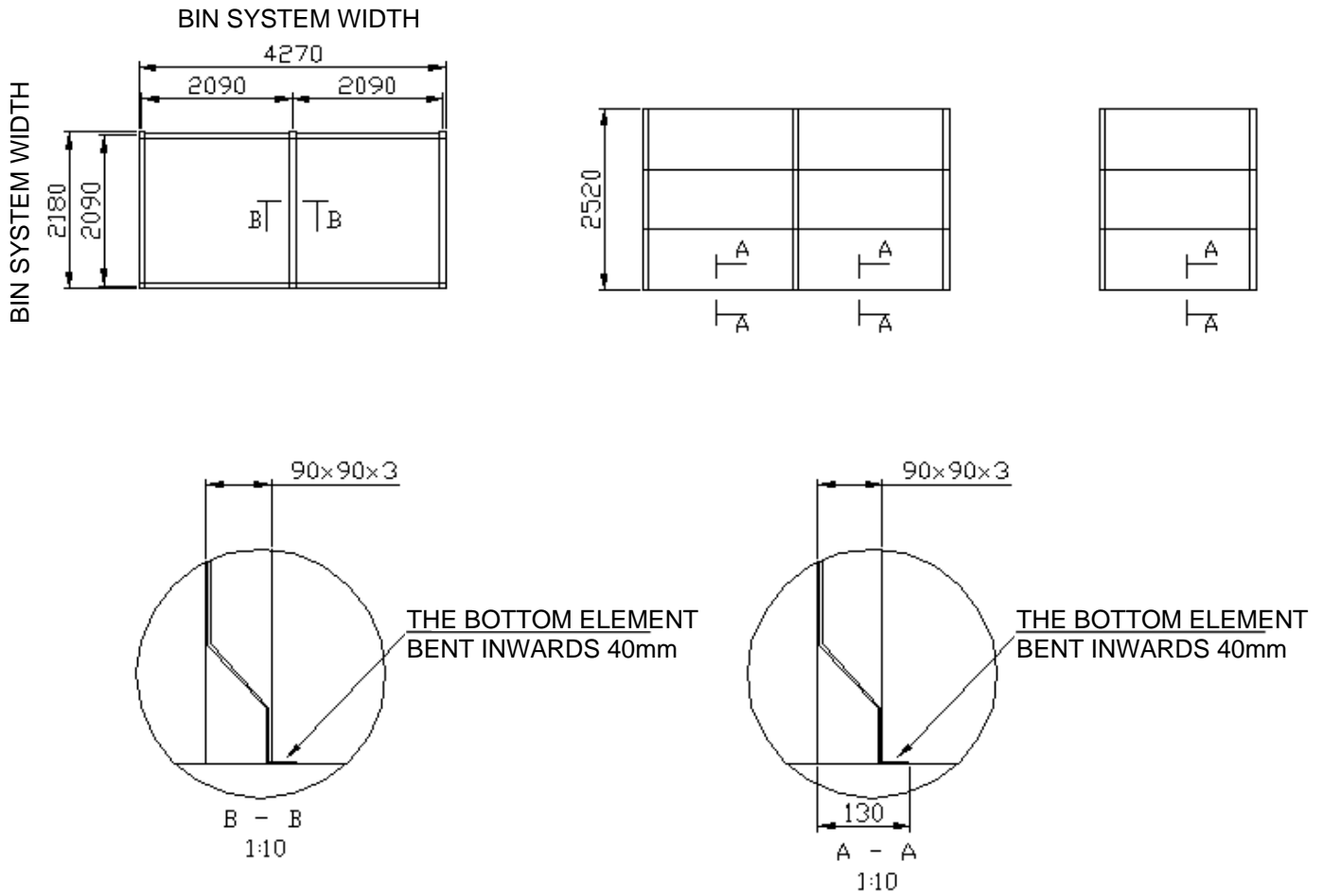
Figure 13

IPE Palkki rakennesuunnittelijan ohjeiden mukaan!

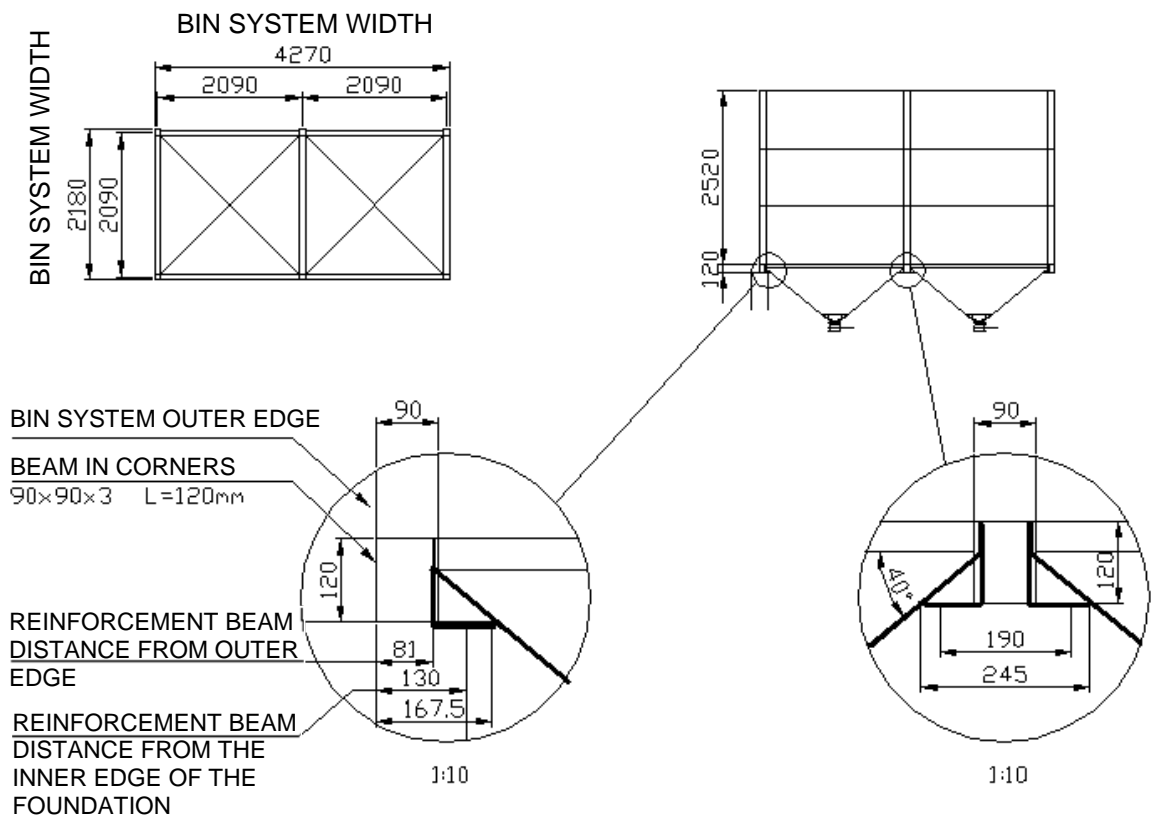




FLAT BOTTOM BINS



CONE BOTTOM BINS



4. DISCHARGE TROUGH INTO THE SILO CONE

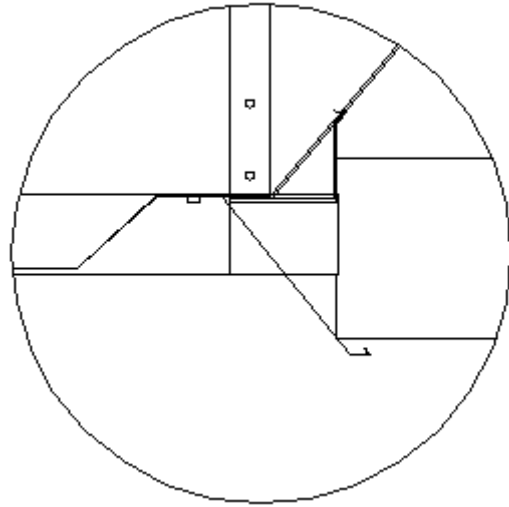
The discharge troughs (300071) are fastened to the bottom part of the cone plate with sealing compound in the seam.





Drop list

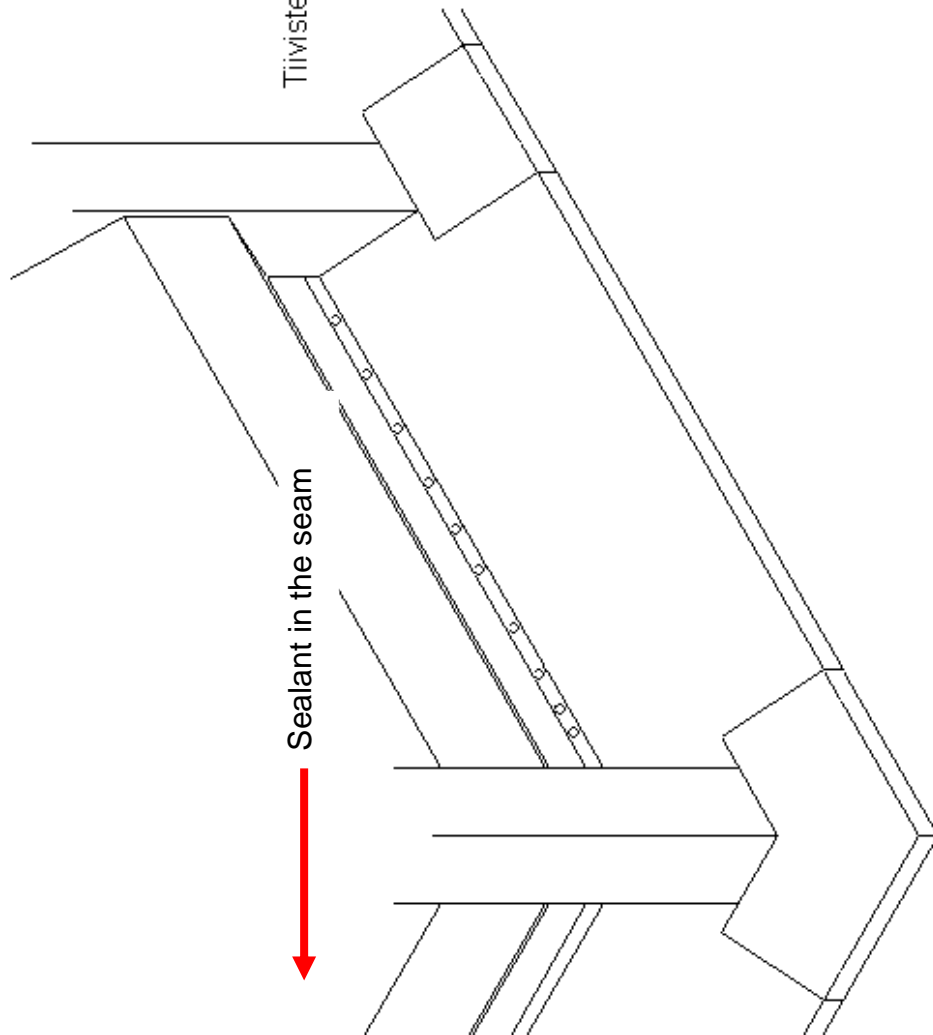
Install with
sealing compound
and self-drilling screws

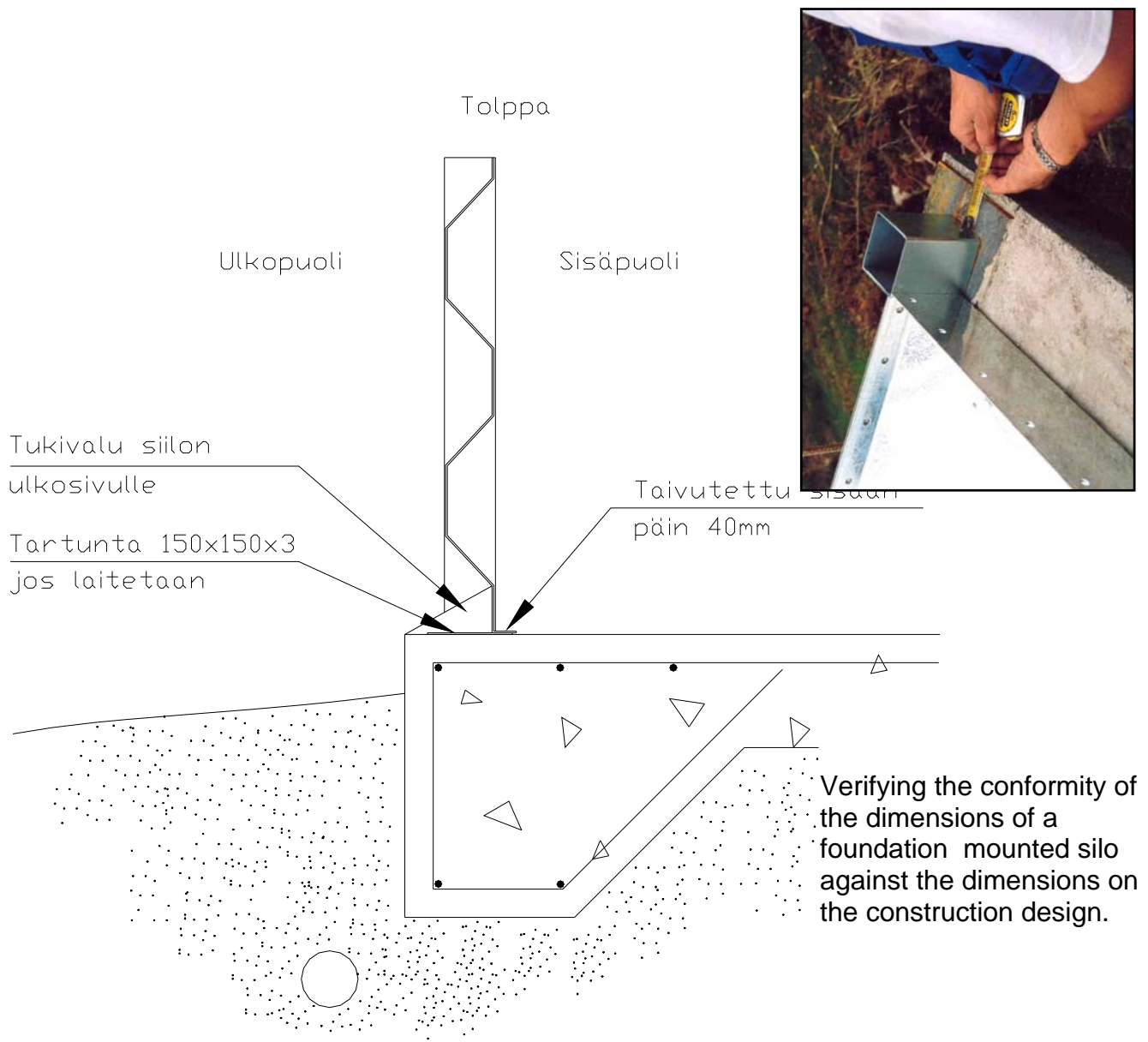


Asennusohje
Asennus tiivistemassan ja
itsensäikäisten ruuvien avulla

Tiivistemassaa saumaan

Sealant in the seam



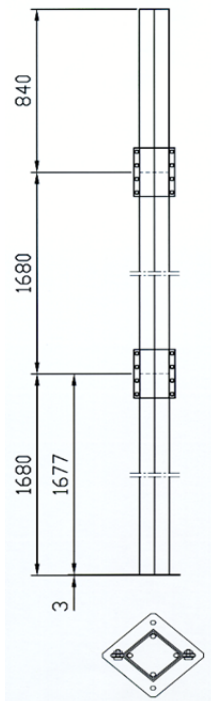
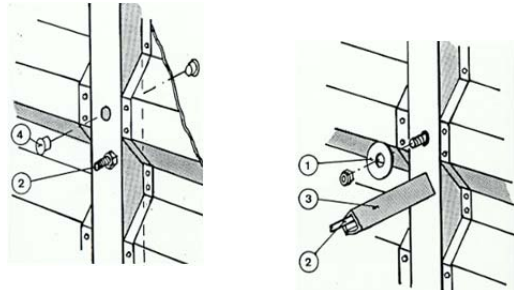


5. ASSEMBLY ON A FLAT BASE ON A CONCRETE FOUNDATION

1. Place the lower silo poles so that they are more or less in their designated installation locations in the flat-base silo.
2. Start to assemble the elements. The thickest element will be the bottom element. In flat-base silos the edge of the bottom element is bent 90°. The bent edge is placed against the assembly base.



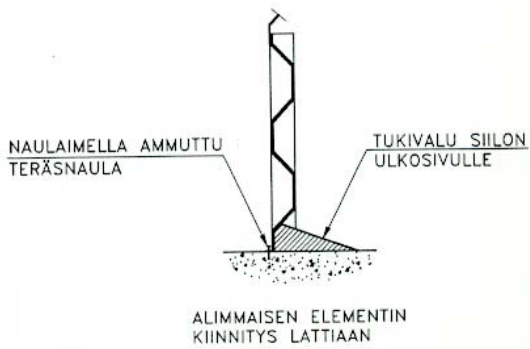
3. The elements are always positioned against the flange of the pole such that the element is inside, towards the non-welded side of the flange.
4. First assemble the complete bottom tier; tighten screws to finger-tightness. Do not insert screws in the top hole, because the bottom hole will be aligned with it.
5. By cross-measuring the structure check the proper location and shape of the bottom tier. After that tighten the screws fully.
6. Continue with the next element layer. The bottom edge of the element will be located outside the element below it.
7. If the silo is higher than the height of 2 elements, place 100x33x3 mm floating plates to the lower partition walls of the tier on that side of the wall where there is no pole flange.
8. Silos without partition walls assembled using extension poles 2B, are equipped with pull-rod pipes. Pull-rods are installed on every pole tier. The support pipe is provided on the bottom tier and then on every second tier. See the figures.



9. The gun;

The central pole is installed, when the length of the support pipe and the support rod is over 3 m. The central poles are assembled with bands; see the figure.

external and partition walls of a flat-base silo are either supported with cast concrete support, shown in the figure; or fastened through the flanges to the foundation using a nail 3 nails /element. You can also use deck screws.

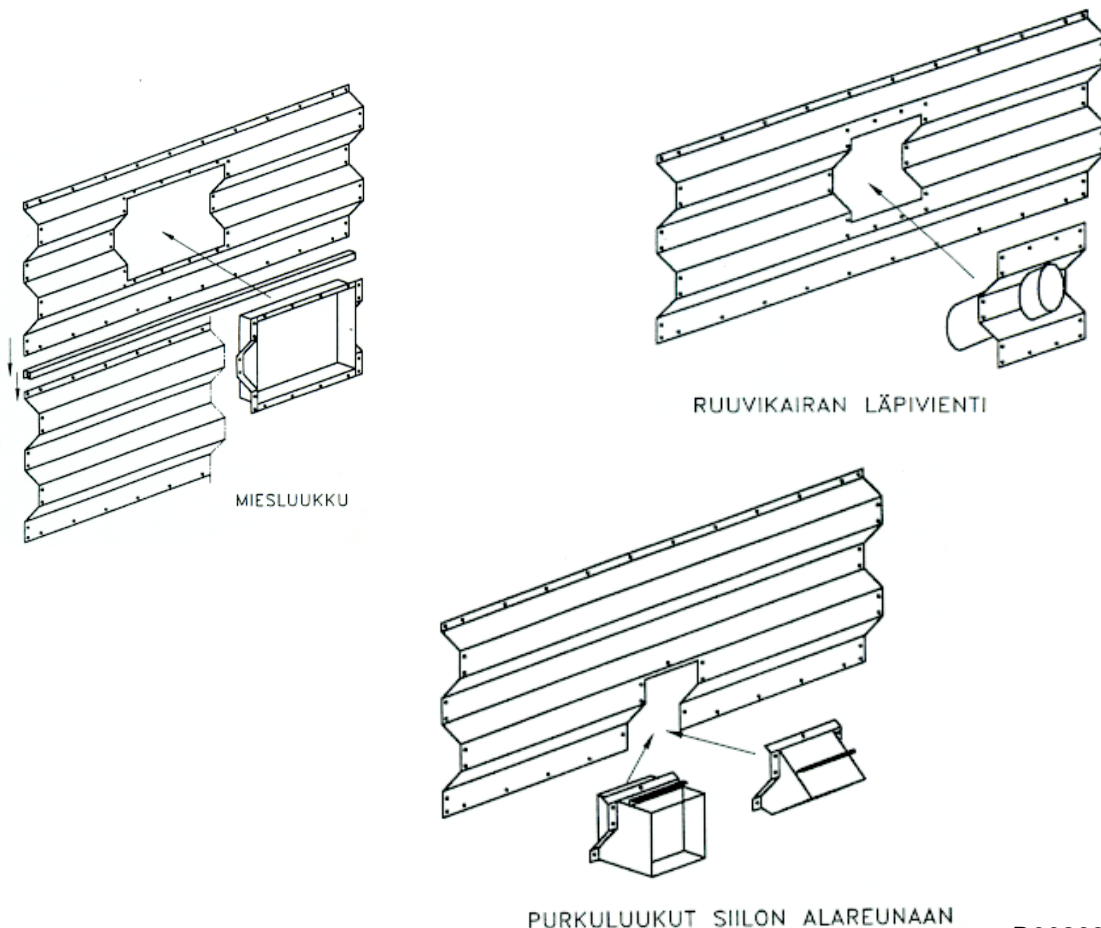


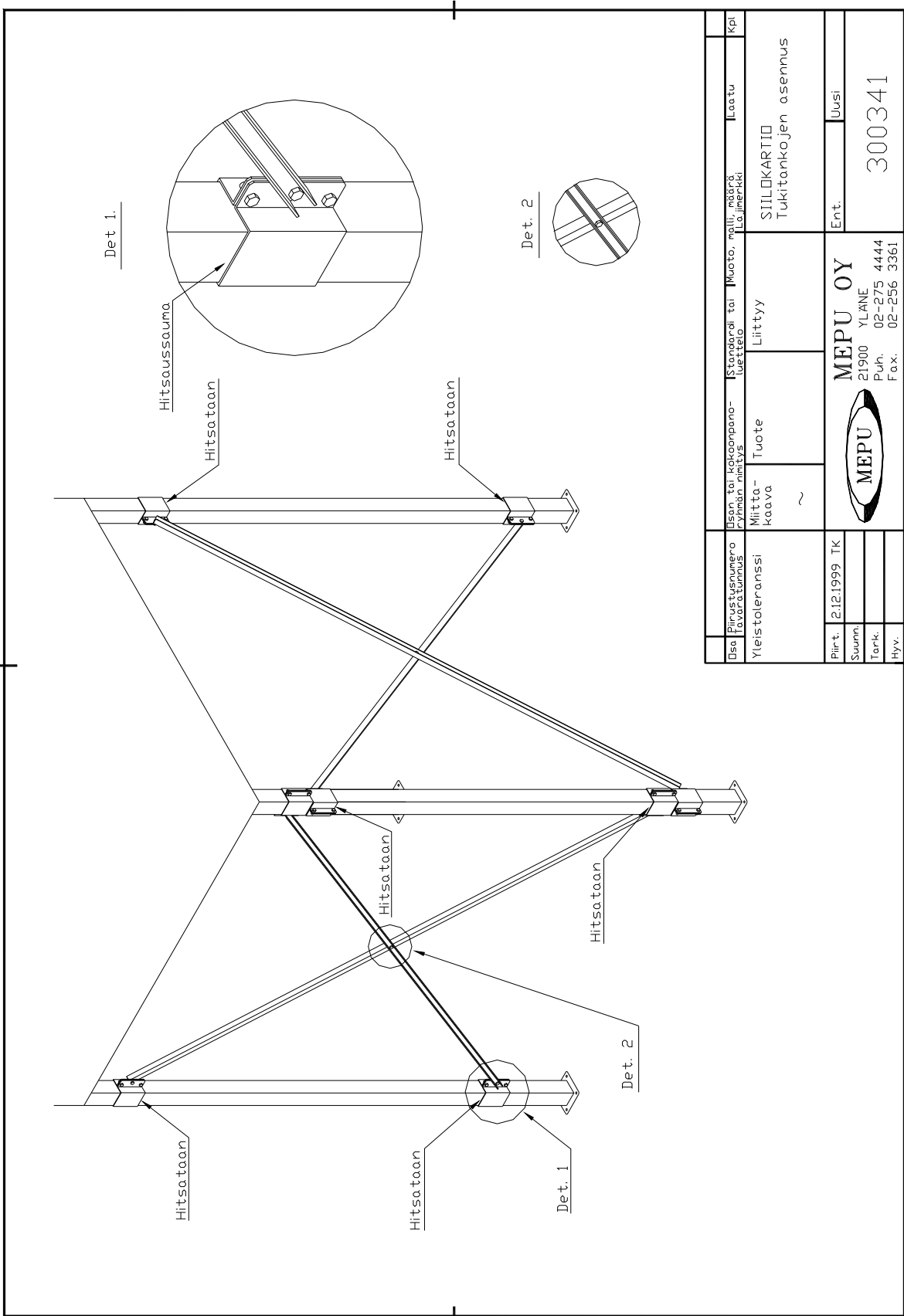
6. MANHOLE, DISCHARGE CHUTE AND LEAD-THROUGH FOR THE AUGER


Generally the manhole is mounted in the second element tier from the foundation. In this case a reinforcement beam is installed between the first and the second element, shown in the fig.

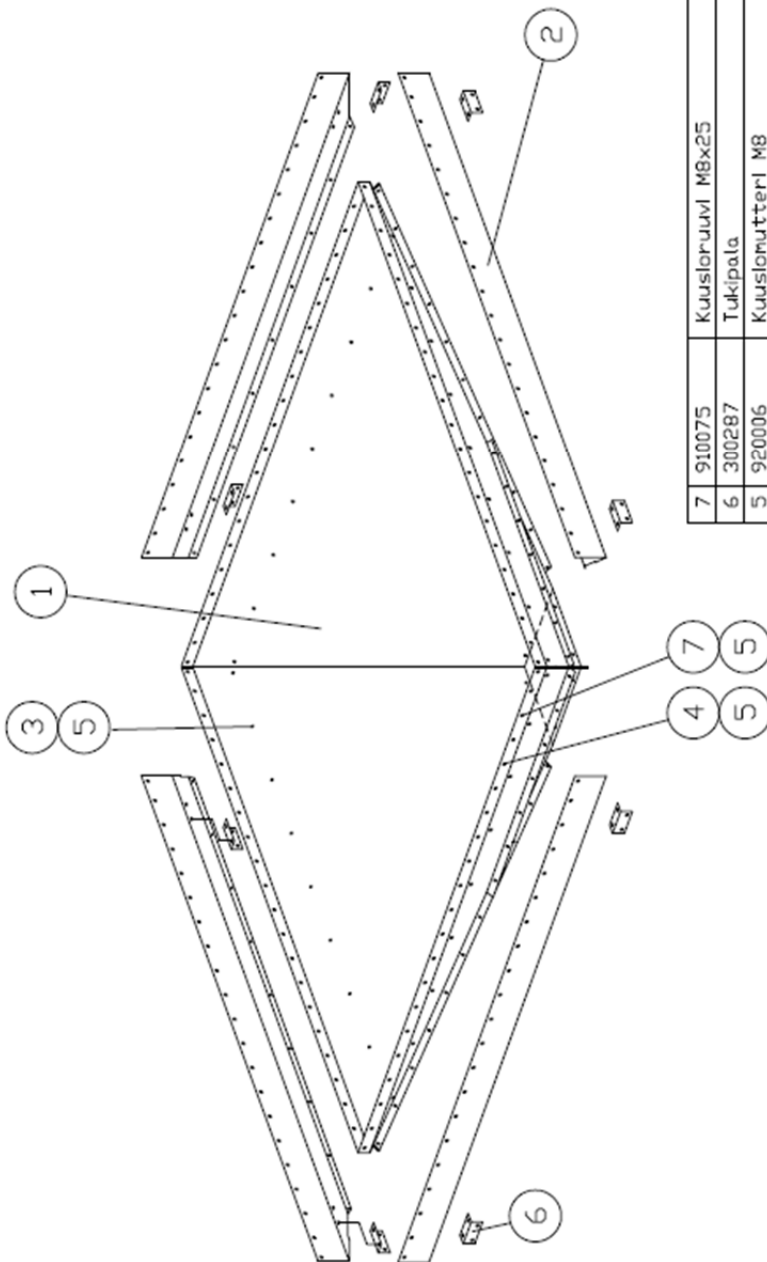
The opening for the manhole is drawn on the element and it is cut out with a cutting disc. The manhole is inserted in the hole, and holes matching the perforations of the manhole flange are drilled in the elements.

The lead-through for the auger and the discharge chutes are fastened the same way.

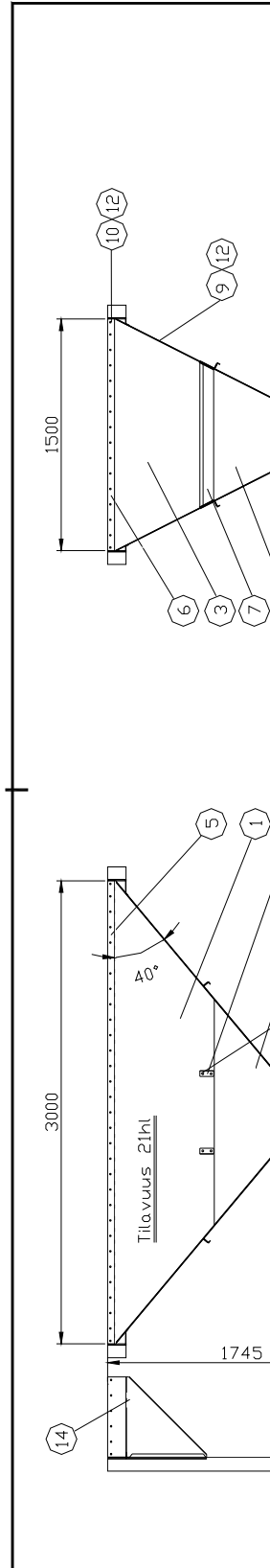


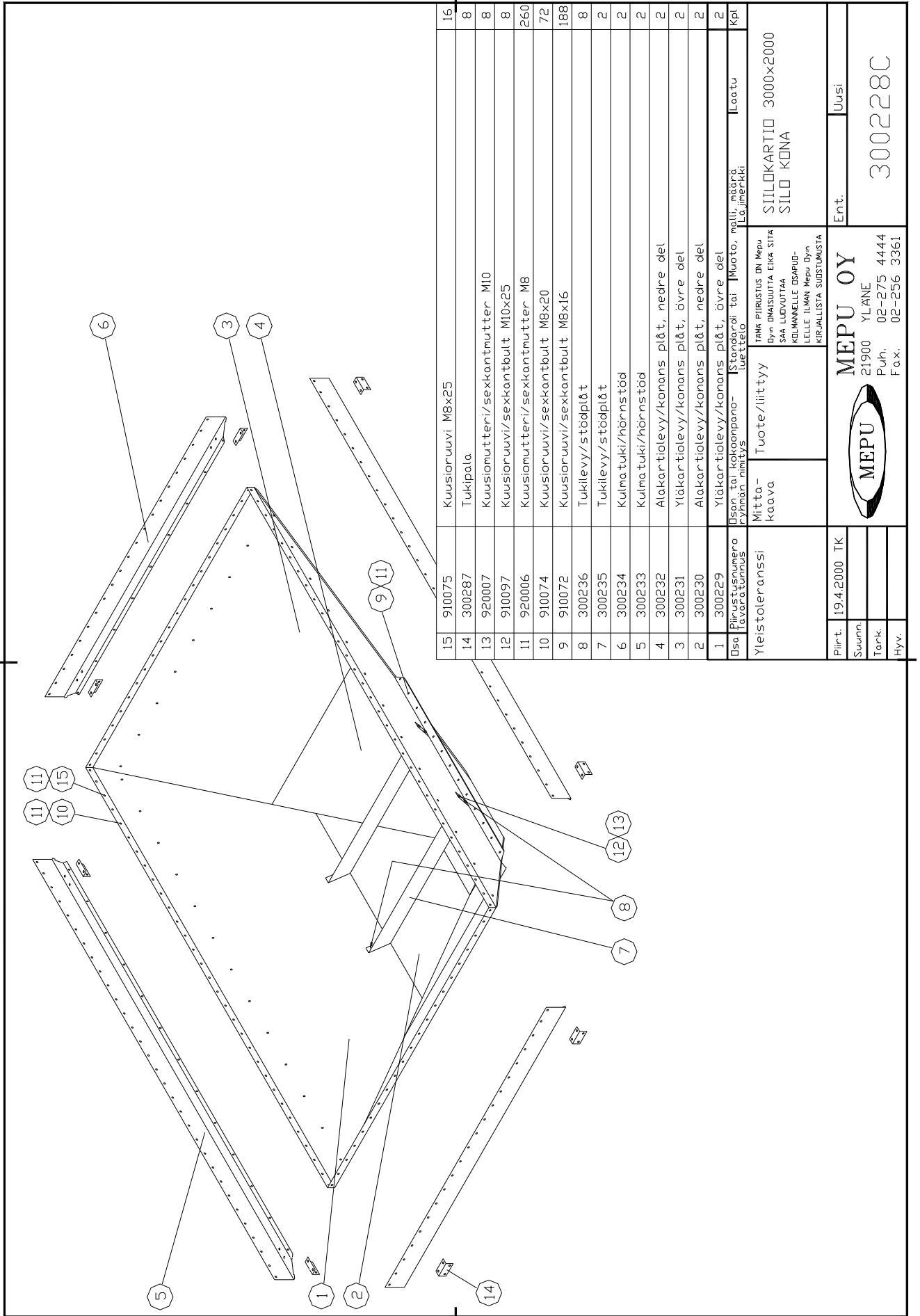


Isä	Piirustusnumero Luvostunnus	Isän tai kokonpano- ryhmän nimitys	Standardi tai Luettelo	Muoto, malli, määrä Lajimerkki	Laatu	Kpl
Yleistaleranssi		Mittä- kaava	Liittyy		SIILOKARTIO Tukitankojen asennus	
Piirt.	2.12.1999 TK				MEPU OY	Ent.
Suunn.					21900 YLANE	Uusi
Tarkk.					Puh. 02-275 4444	
Hyv.					Fax. 02-256 3361	
						300341



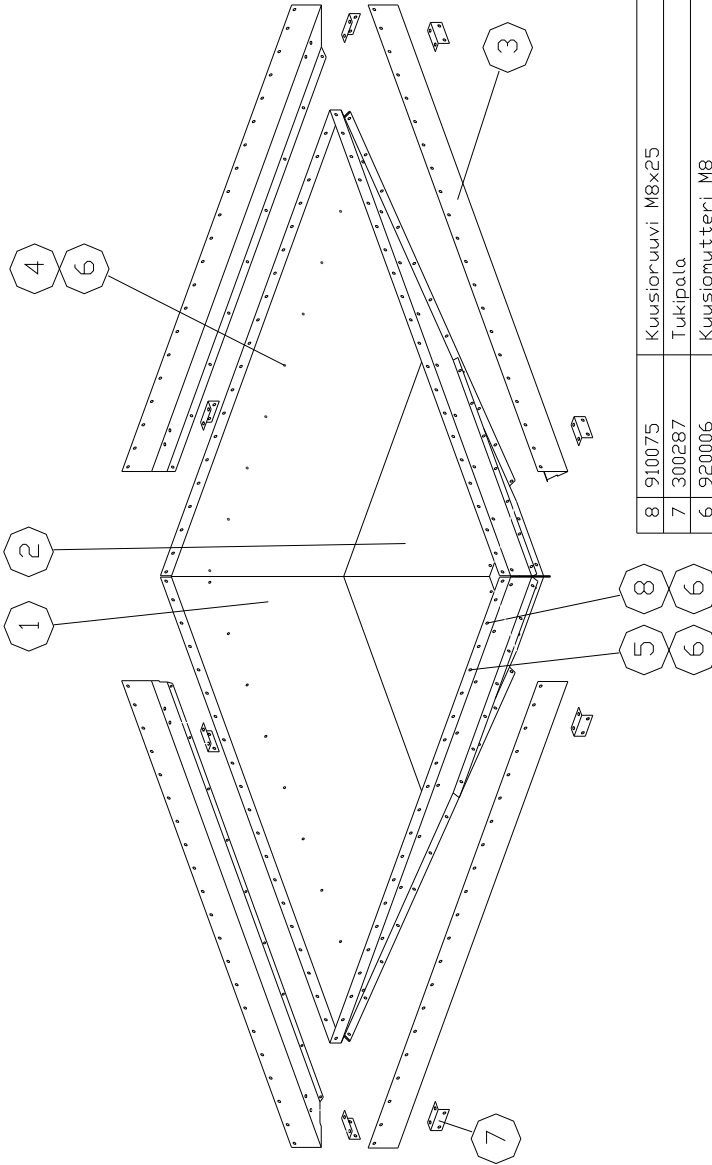
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6	300287	Tukkipala	8
5	920006	Kuusloruuvli M8	180
4	910074	Kuusloruuvli M8x20	52
3	910072	Kuusloruuvli M8x16	112
2	300107	Kulmatuki	4
1	300106	Karttilevvy	4
Osa / Komponentti / Part / Component		Standardi tai Muoto, noll, pöytä / La / Merkki /	Laatu
Yleistoleranssi		Liittyy	SIILOKARTIID 2000x2000
Pirt.	16.12.98	TK	Ent.
Suunn.	MEPU OY		Uusi
Tark.	21900 YLÄNE		300105C
Hyv.	Puh. 02-275 4444		
	Fax. 02-256 3361		




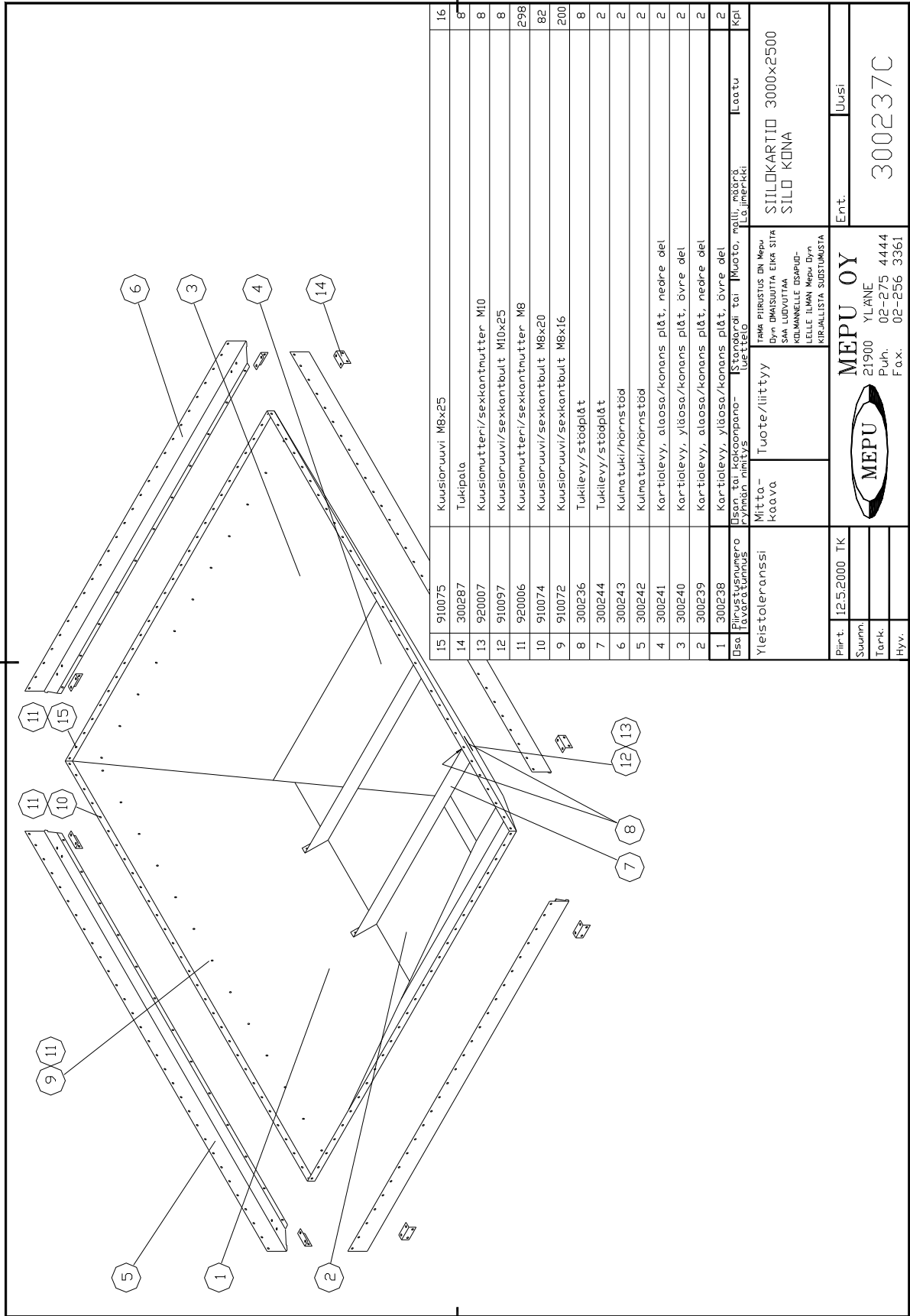


15	910075	Kuusioruuvi M8x25	16
14	300287	Tukipala	8
13	920007	Kuusiomutteri/sekskantmutter M10	8
12	910097	Kuusioruuvi/sekskantbolt M10x25	8
11	920006	Kuusiomutteri/sekskantmutter M8	260
10	910074	Kuusioruuvi/sekskantbolt M8x20	72
9	910072	Kuusioruuvi/sekskantbolt M8x16	188
8	300236	Tukilevy/stöplåt	8
7	300235	Tukilevy/stöplåt	2
6	300234	Kulma tuki/hörnståb	2
5	300233	Kulma tuki/hörnståb	2
4	300232	Alakartiolevy/konans plåt, nedre del	2
3	300231	Yläkartiolevy/konans plåt, övre del	2
2	300230	Alakartiolevy/konans plåt, nedre del	2
1	300229	Yläkartiolevy/konans plåt, övre del	2
Osio	Piirustusnumero Tovärätunnus	Standardi tai Luettelo	Muoto, malli, määrä Läimäkirje
Yleistoleranssi		Mitta- kaava	Tuote/liittyy
Piir-t. 19.4.2000 TK		TAMA PIIRUSTUS ON Mepu DYN OHJEISTUSTA EIKA SITA SAA LUOVUTTAA KOLMANNELLE OSAPUO- LLELLE ILMAN Mepu Dyn KIRJALLISTA SUOSTUNUSTA	
Suunn.		SIILOKARTIO 3000x2000 SIILO KONA	
Tarkk.		Ent.	
Hyv.		Uusi	
		300228C	

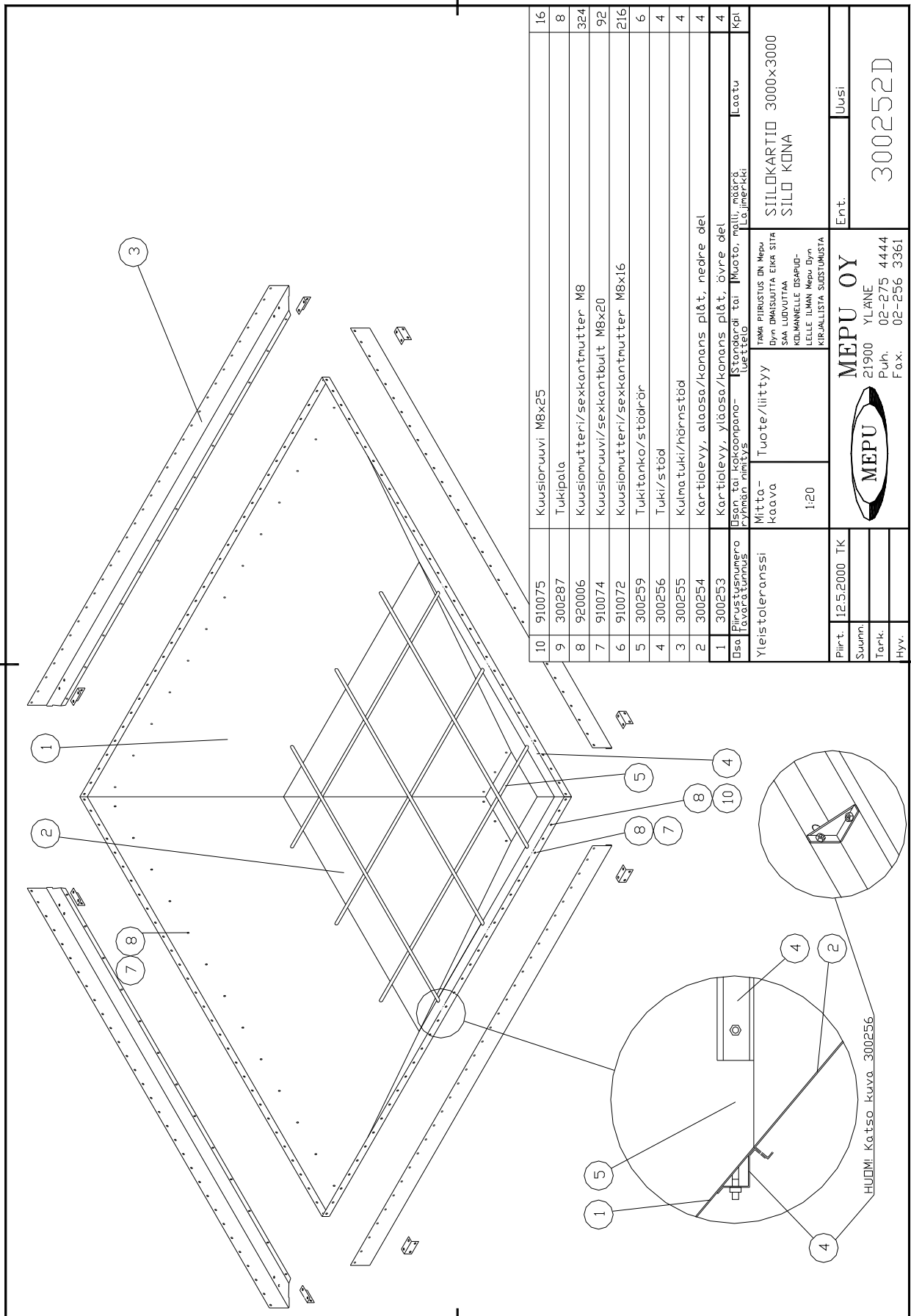
MEPU OY
21900 YLANE
Puh. 02-275 4444
Fax. 02-256 3361



8	910075	Kuusioruuvi M8x25	16
7	300287	Tukipala	8
6	920006	Kuusiomutteri M8	260
5	910074	Kuusioruuvi M8x20	72
4	910072	Kuusioruuvi M8x16	172
3	300111	Kulmatuki	4
2	300110	Kartiolevy, alaosa	4
1	300109	Kartiolevy, yläosa	4
Isä		Pivustusnumero	Isä
Yleistoleranssi		Mitta- kaava	Liittyy
Suunn.		16.12.98 TK	Ent.
Tarkk.			Uusi
Hyv.			300108C
Yhteystiedot		 MEPU OY 21900 YLANE Puh. 02-275 4444 Fax. 02-256 3361	
Yhteystiedot		Siltokartio 2500x2500	



15	910075	Kuusioruuvi M8x25	16			
14	300287	Tukipala	8			
13	920007	Kuusiomutteri/sekskanttutter M10	8			
12	910097	Kuusioruuvi/sekskanttult M10x25	8			
11	920006	Kuusiomutteri/sekskanttutter M8	298			
10	910074	Kuusioruuvi/sekskanttult M8x20	82			
9	910072	Kuusioruuvi/sekskanttult M8x16	200			
8	300236	Tukilevy/stöoplätt	8			
7	300244	Tukilevy/stöoplätt	2			
6	300243	Kulmatuki/hörnstöd	2			
5	300242	Kulmatuki/hörnstöd	2			
4	300241	Kartalevy, alaosajonans plät, nedre del	2			
3	300240	Kartalevy, yläosajonans plät, övre del	2			
2	300239	Kartalevy, alaosajonans plät, nedre del	2			
1	300238	Kartalevy, yläosajonans plät, övre del	2			
Osat	Piirustusnumero	Osan tai kokoonpanon pyhän nimi	Standard tai Luokka	Muoto, malli, määrä, Läimäkki	Laatu	Kpl
Yleistoleranssi		Mitta- koava	Tuote/liittyy		SILOKARTIO 3000x2500 SILOKONA	
Piirt.	12.5.2000	TK	Ent.		Juusi	
Suunn.			MEPU OY		300237C	
Tarkk.			MEPU			
Hyv.			21900 YLANE			
			Puh. 02-275 4444			
			F.ax. 02-256 3361			



10	910075	Kuusioruuvi M8x25	16	
9	300287	Tukipala	8	
8	920006	Kuusiomutteri/sexkantmutter M8	324	
7	910074	Kuusioruuvi/sexkantbolt M8x20	92	
6	910072	Kuusiomutteri/sexkantmutter M8x16	216	
5	300259	Tukitanko/stöbrör	6	
4	300256	Tuki/stöd	4	
3	300255	Kulma tuki/hörnstöd	4	
2	300254	Kartiolevy, alaosu/konans plåt, nedre del	4	
1	300253	Kartiolevy, yläosa/konans plåt, övre del	4	
Osia / Pirstusnumero / Tavara tunnus		Osan tai takonpanon ryhmän nimi / Yhteinen tai luettelo	Muoto, malli, määrä / Laajennus	Kpl
Yleistoleranssi		Mitta-kaava	Tuote/liittyy	
Pirt. 12.5.2000 TK			FINN PIRUSTUS DN Mepu Dynn IMHISUUTTA EIKÄ SITA SAA LUVUUTTA KOLMANNELLE OSAPUOLELLE TILMAN Mepu Dynn KIRJALLISTA SUOSTUMISTA	SIILOKARTIO 3000x3000 SILO KONA
Suunn.		MEPU OY		Ent.
Tark.		21900 YLANE		Uusi
Hyv.		Puh. 02-275 4444		300252D
		Fax. 02-256 3361		

Installation of the silo cone spacer plates.



7. Installation of the U-beams of the green cereal silos. A U-beam is fastened to each pole.





Lähtökappale 90x90x120

Pohjakartioiden asennus

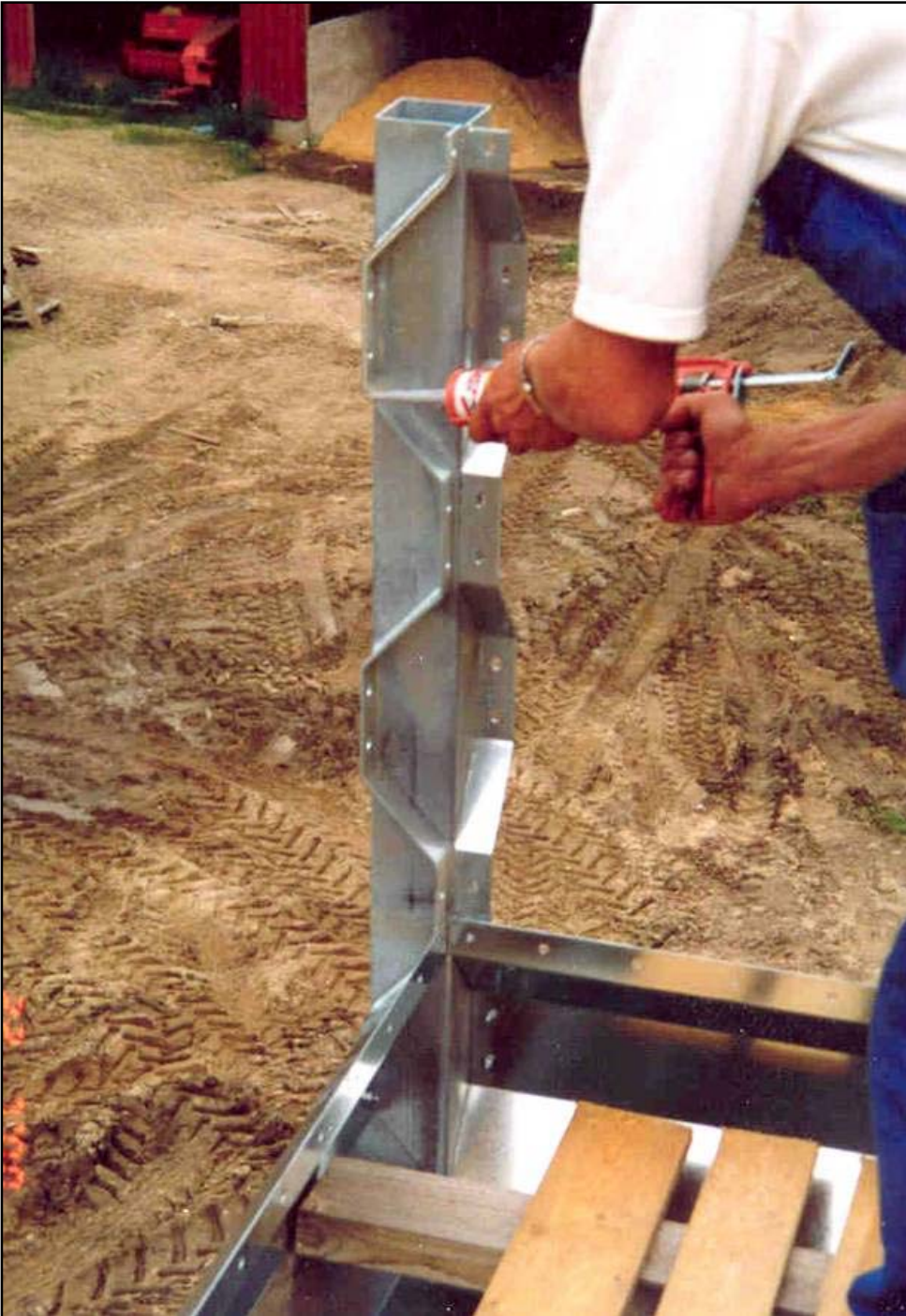


Siilon kansivanerointi



G

Spreading the sealing compound.



H



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