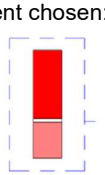
Gable floating Element ET6a

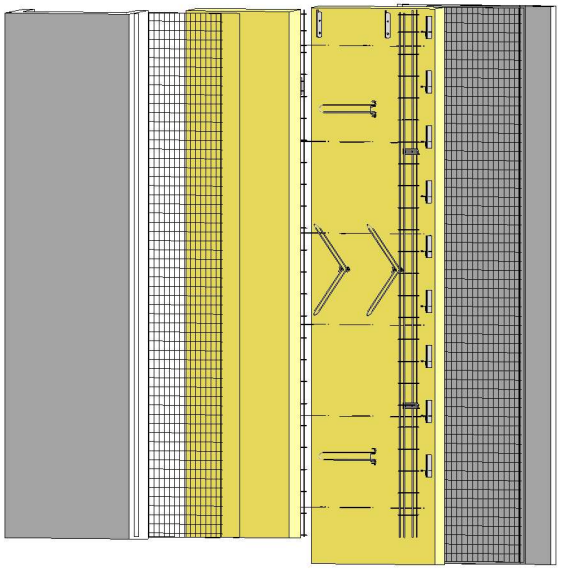
This booklet is a guideline made for the project ID05 Grejs Kulturcenterfor and contains information and step by step on how the production of the Element ET6b should be carried out

Element chosen: ET6b



Element Plan

3D view of finished element



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BYGGESAG: Grejs Kulturcenter - ID05	DATO:05/25/22	1
EMNE: Front Page Booklet	MÅL:	
UDFØRT AF: Ana Araújo	KLASSE:	

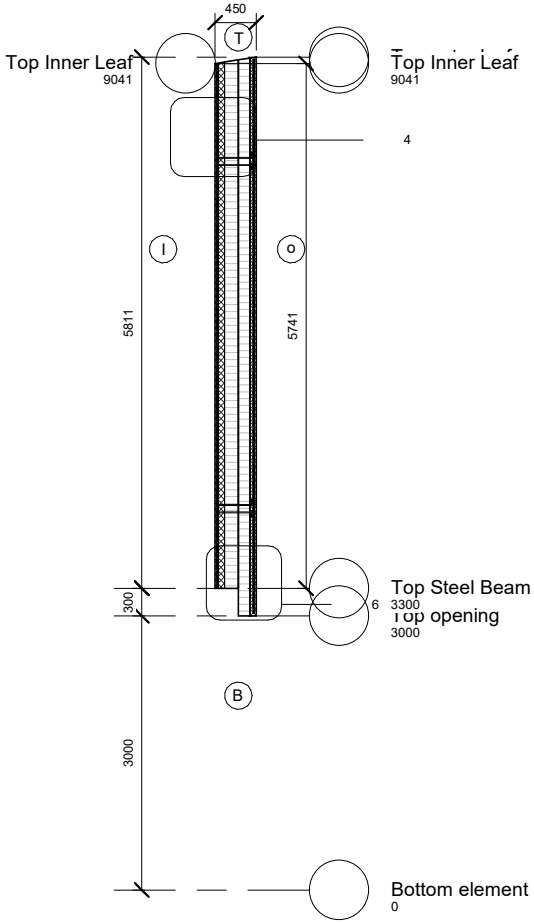
Preface

Information table:

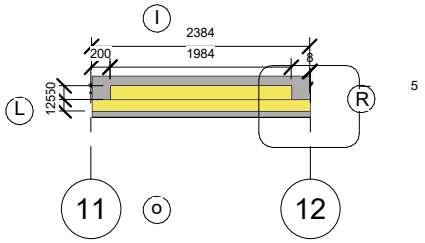
Mix	Cement	Admix	Aggregate	W/C	Cement/Sand/Stones/Water
1	Basiscement	Fly ash	4-8mm	0.55	1:02:03
Sizes	**Thickness**	**Area**	**Volume**		
Outer leaf	70mm	14m2	0.97m3		
Insulation	150/125	24m2	3.2m3		
Inner leaf	105mm	13m2	1.66m3		
Concrete	**Mix**	**Control class**	**Strenght**	**Density**	
Outer leaf	1	Normal	C30/37	2500 kg/m3	
Inner leaf	1	Normal	C20/25	2500 kg/m3	
Cover					
Side	**Exposure**	**Minimum cover**	**Actual cover**		
T	Moderate	20+5	25		
B	Moderate	20+5	25		
I	Passive	10+5	15		
O	Moderate	20+5	25		
L	Moderate	20+5	25		
R	Moderate	20+5	25		
Reinforcement	**Type**	**Count**			
Rebars	Y12/Y6	8///02			
Outer mesh	Y7/70	1			
Inner mesh	Y8/75	1			
Stirrups	Y6	48			
Inserts	**Placement**	**Count**			
SPA-N (wall tie) ø6mm 00005 420	Between outer leaf and inner leaf every 1m2	18			
HLB S (loop box)	Ribs edge every 600m2	18			
TPA-FX (lifting anchors)	2x vertically 2x horizontally around gravity point	4			
HTA-CE (Railing)	Inner leaf TTS connection	1			
M16/40/6 TWS Hexagon plate	On inner leaf 1/3 from top	2			
SPA-2 Anchors	Between inner and outer leaf (horizontally and vertically)	4			
Weight	7.2 TONS				
Surfaces	Internal	Smooth formwork finish			
	External	Glat sort afsyret			

T Top
B Bottom
I Inner
O Outer
L Left
R Right

Cross section



Top view of element



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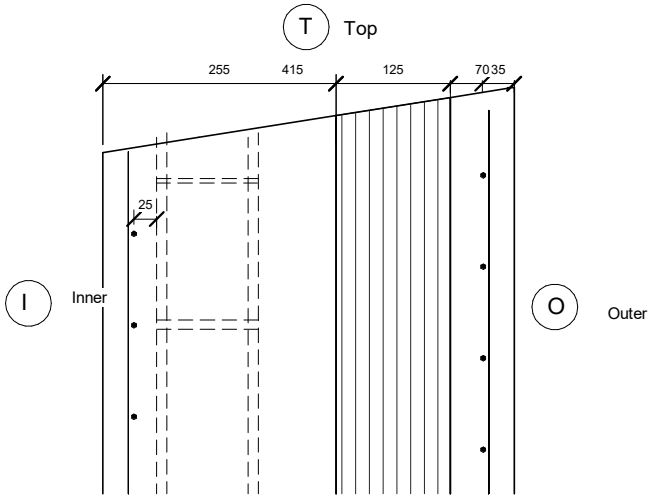
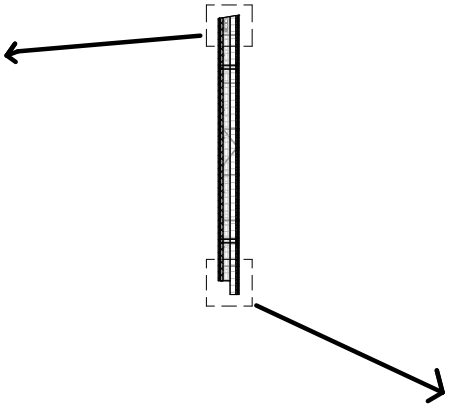
BYGGESAG: Grejs Kulturcenter - ID05	DATO:05/26/22	2
EMNE: Preface	MÅL: 1 : 50	
UDFØRT AF: Ana Araújo	KLASSE	

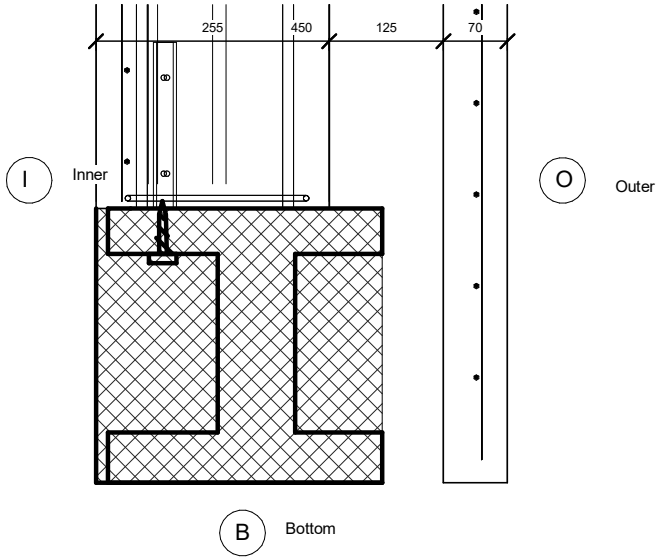
Callouts

Top of the element callout





Bottom of element callout



T Top
B Bottom
I Inner
O Outer
L Left
R Right

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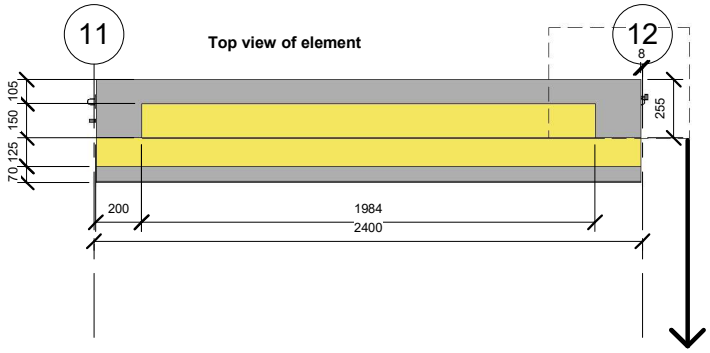
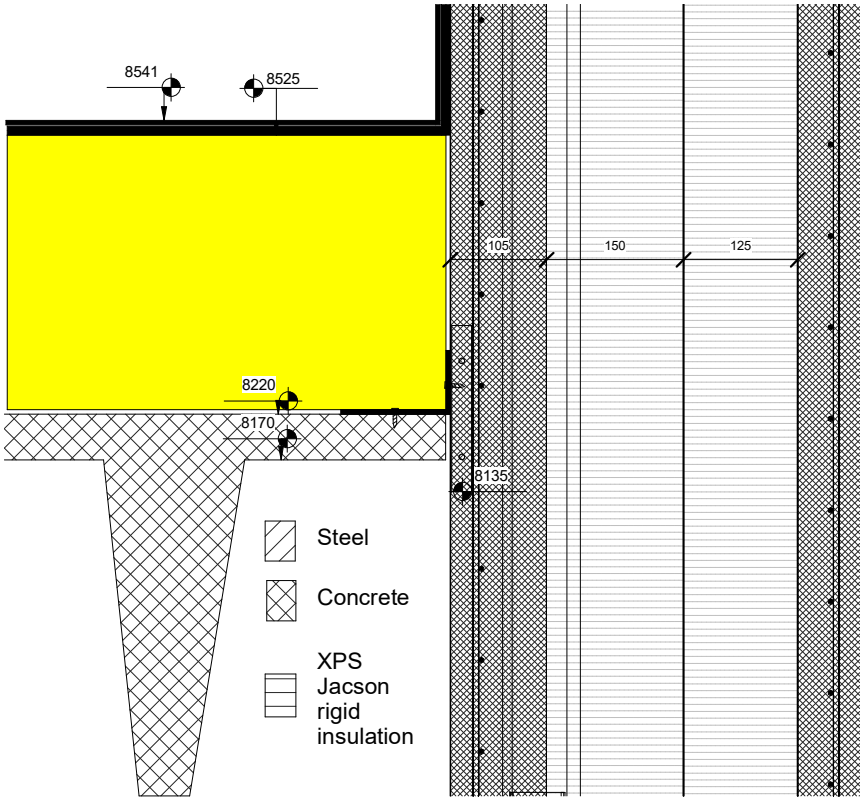
EMNE: Callouts	MÅL: As indicated	
UDFØRT AF: Ana Araújo	KLASSE:	

Element-TTS connection detail



Detail



TTS:
50mm TTS (thickness)
300mm rigid rockwool insulation
3mm and 4mm torched roofing felt
1:40 slope done with rigid insulation

TTS on gable connection:
HTA-CE railing system attatched to inner leaf and TTS by M20 screws (40x60x6)

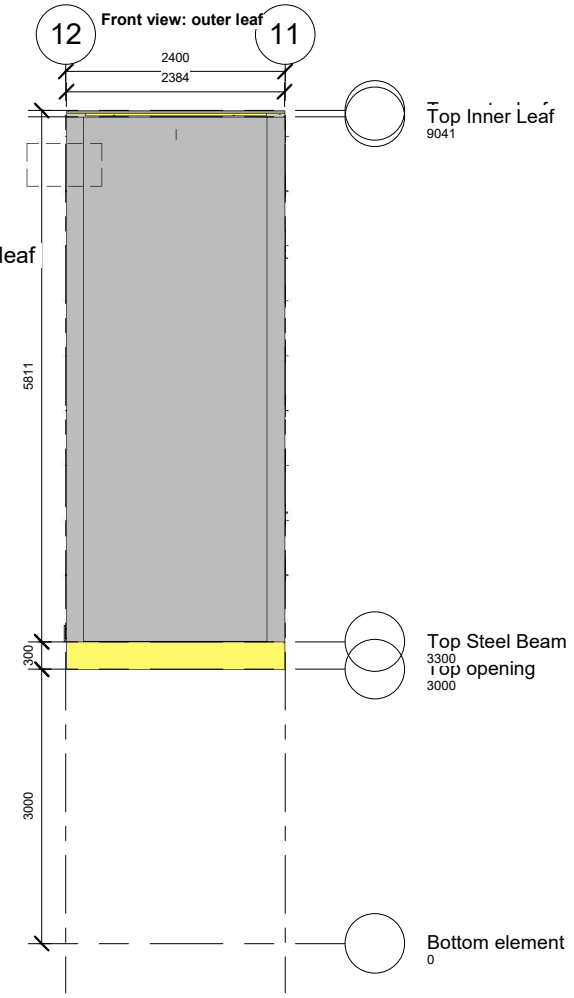
Sandwich Element:
105mm Inner Leaf
275mm XPS Jackson rigid Insulation
70mm Outer Leaf
2384mm width

Inner leaf Reinforcement:
1xY7/70mm Mesh

Outer leaf Reinforcement:
1xY8/75mm Mesh

Ribs:
48xY6 Stirrups placed 25mm from edges
10xY12 Rebars (Inside stirrups and along mesh)

Assembly sequence:
1-Mount Element
2- Mount TTS
3- Proceed with connection shown above



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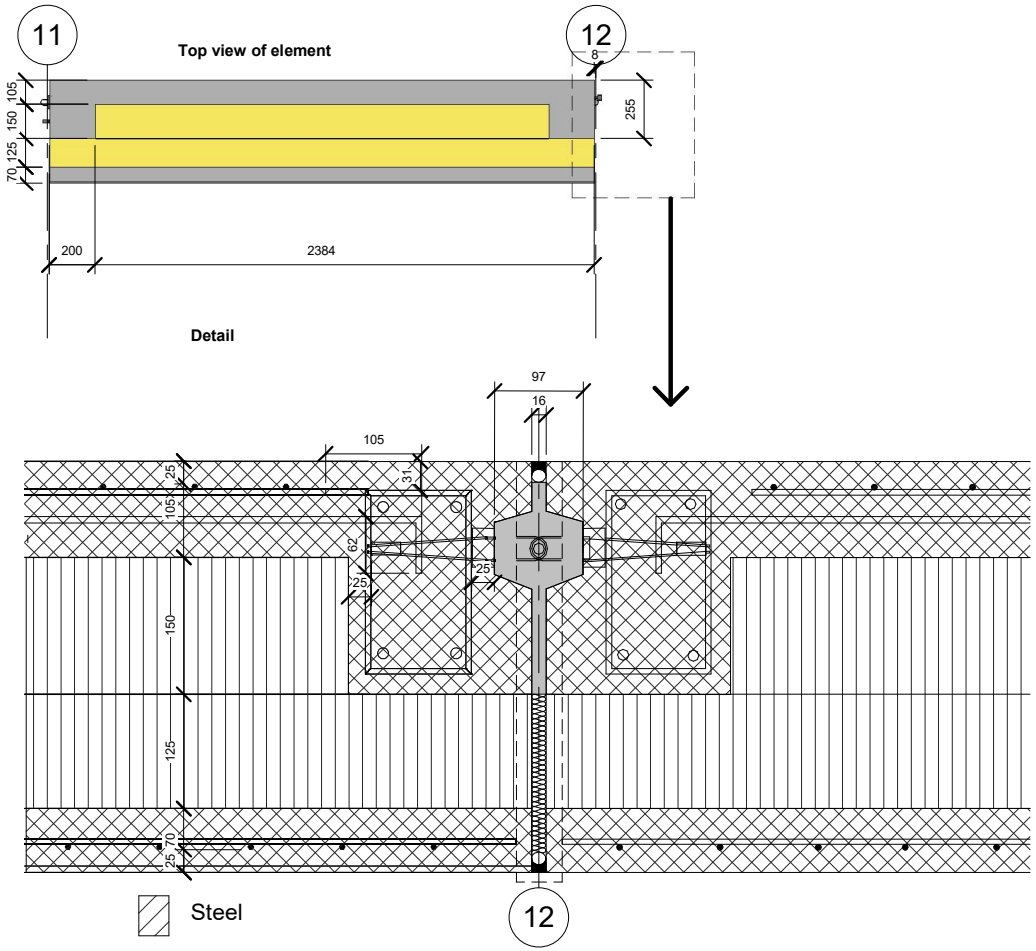
PROJECT: Grejs Kulturcenter - ID05	DATE: 05/23/22	4
SUBJECT: Element-TTS connection	SCALE: As indicated	
DRAWN BY: Ana Araújo	CLASS:	

Element-Element connection Detail



Sandwich Element:
105mm Inner Leaf
275mm XPS Jackson rigid Insulation
70mm Outer Leaf
2384mm width

Inner leaf Reinforcement:
1xY7/70mm Mesh

Outer leaf Reinforcement:
1xY8/75mm Mesh

Ribs:
48xY6 Stirrups placed 25mm from edges
10xY12 Rebars (Inside stirrups and along mesh)

ADone on site: ence:
1·The connection of loop boxes in done on
2·site by overlapping chords and placing a
3·reinforcement in the middle then filling slup with concrete
Edges are then filled with two step backstop joint
170x16mm soft insulation between elements insulation and outer leaves

Assembly sequence:
1- Mount element 11-12
2- Mount element 12-13
3- Proceed with connection in between both elements, as shown above

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PROJECT: Grejs Kulturcenter - ID05	DATE: 05/23/22	5
SUBJECT: Element-Element connection	SCALE: As indicated	
DRAWN BY: Ana Araújo	CLASS:	

Element-Steel Beam detail

Element-Steel Beam connection:

HEB 300 placed 17mm from inner leaf, above opening and supported by columns
HTA-CE railing system attatched to inner leaf and steel beam by M20 screw (40x60x6)
Steel mesh formwork placed around steel beam and plastered with mortar

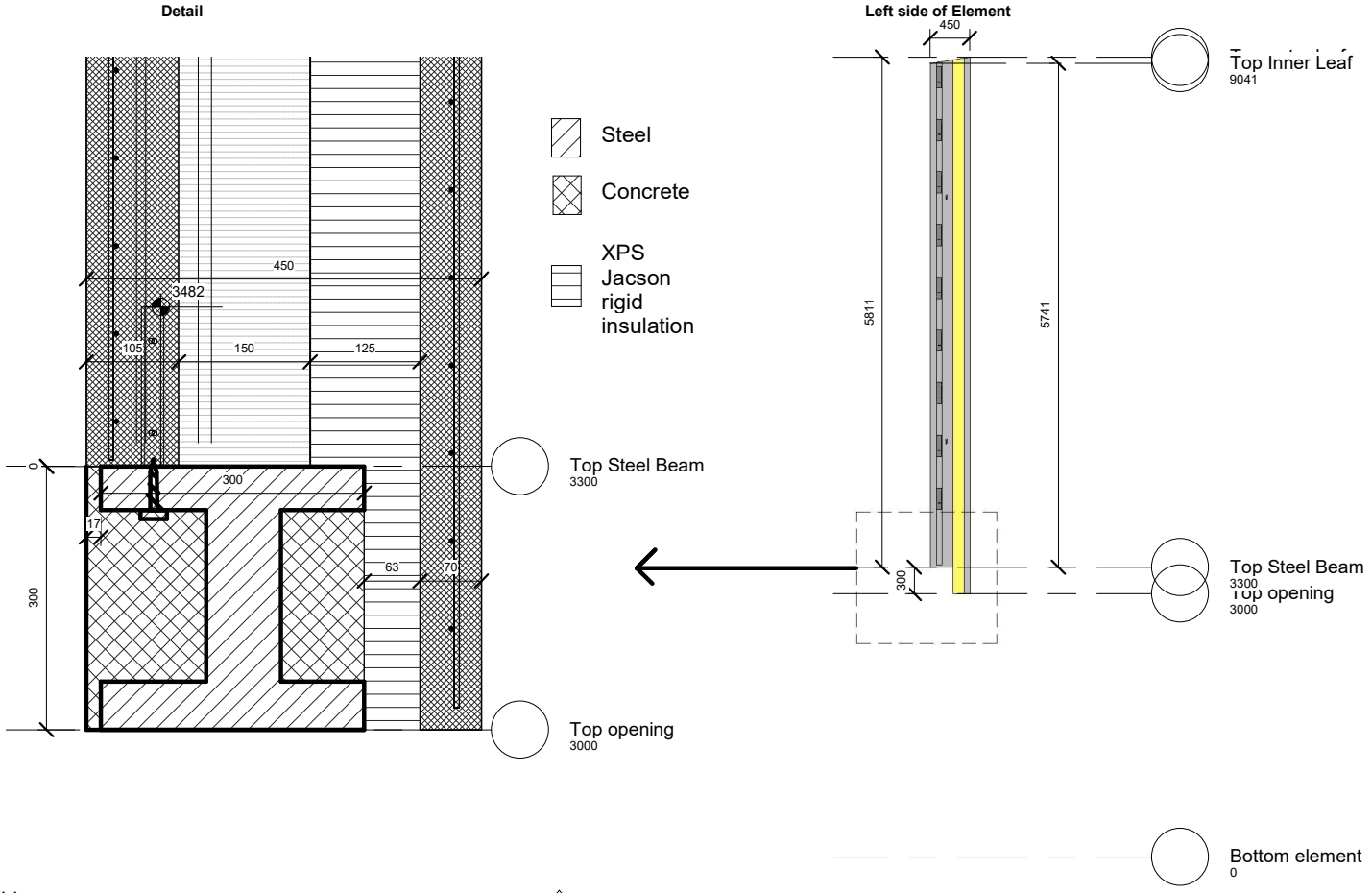
Sandwich Element:
105mm Inner Leaf
275mm XPS Jackson Insulation
70mm Outer Leaf
1984mm width

Inner leaf Reinforcement:
1xY7/70mm Mesh

Outer leaf Reinforcement:
1xY8/75mm Mesh

Outer leaf starts at steel beam height (3000mm)
63mm of insulation besides outer leaf

Assembly sequence:
There are 3 floating elements in this gable and this element in question is the middle one
1- Mount steel column
2- Mount the neigboring elements
3- Mount Steel Beam
4-Mount floating elements



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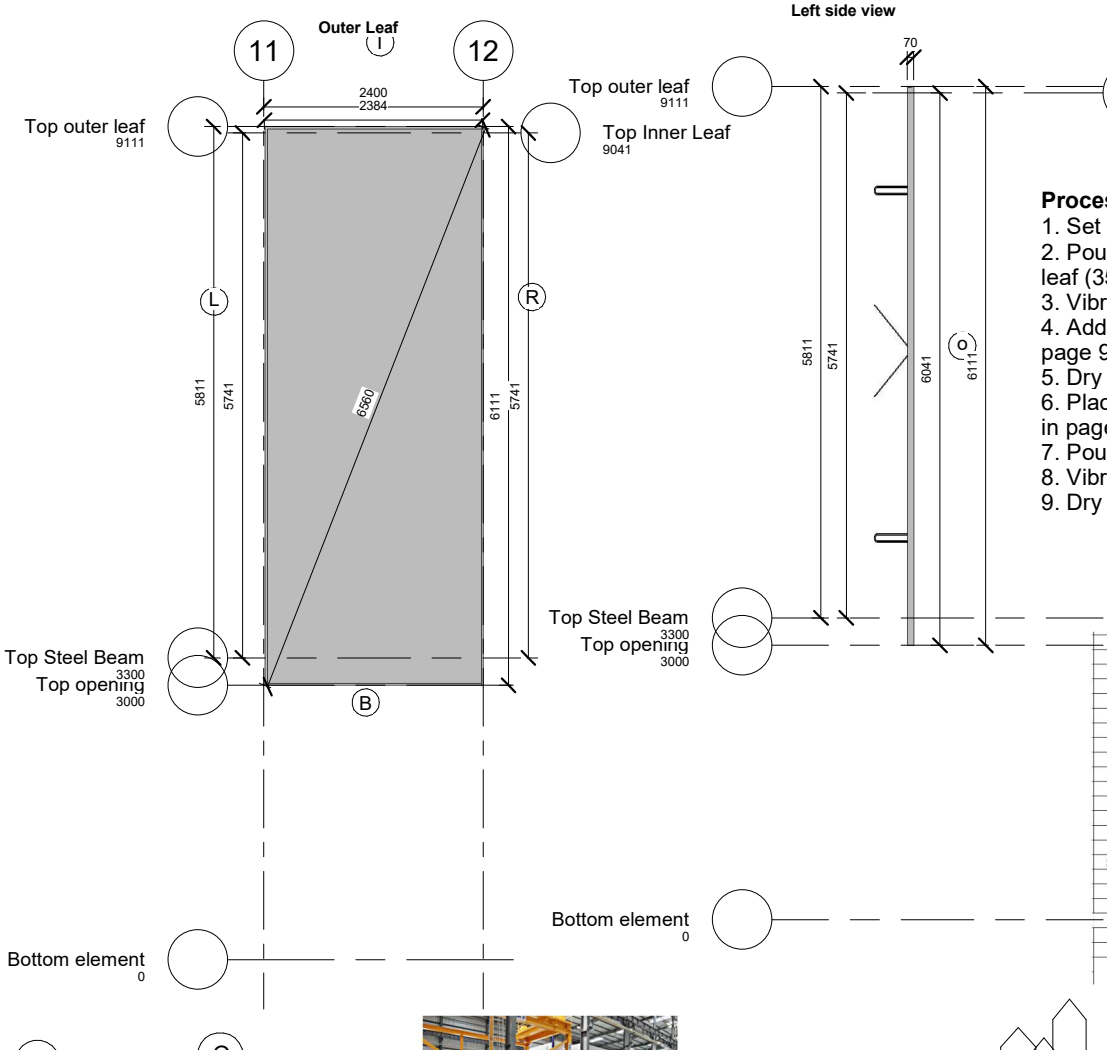
PROJECT: Grejs Kulturcenter - ID05	DATE: 05/26/22	6
SUBJECT: Element- Steel Beam Connection	SCALE: As indicated	
DRAWN BY: Ana Araújo	CLASS:	

Production Fase
Step 1 : Outer leaf



Process:
1. Set and prepare the formowrk
2. Pour the first layer of concrete for outer leaf (35mm)
3. Vibrate for 30 seconds
4. Add SPA-2 and SPA-N (see more in page 9)
5. Dry out for 45min
6. Place reinforcement mesh (see more in page 8)
7. Pour second layer of concrete (35mm)
8. Vibrate for 30 seconds
9. Dry out for 1h 15min

Formwork:
2384mm wide
450mm thickness
Top slope 1:40 from outer to inner leaf

Remark:
When outer leaf is casted (6111mm lenght) + 63mm of insulation is added Extra formwork will be added so the rest of insulation + inner leaf have the lenght of 5741mm lenght

Quality control:
1. Meassure formwork in lenght, width and diagonally
If dimensions are correct, proceed with element production
2. After drying (step 5 and 9) check for cracks

Information Table

Mix	Cement	Admix	Aggregate	W/C	Cement/Sand/Stones/Water
1	Basiscement	Fly ash	4-8mm	0.55	1:02:03
Sizes	**Thickness**	**Area**	**Volume**		
Outer leaf	70mm	14m2	0.97m3		
Concrete	**Mix**	**Control class**	**Strenght**	**Density**	
Outer leaf	1	Normal	C30/37	2500 kg/m3	
Cover					
Side	**Exposure**	**Minimum cover**	**Actual cover**		
T	Moderate	20+5	25		
B	Moderate	20+5	25		
I	Passive	10+5	15		
O	Moderate	20+5	25		
L	Moderate	20+5	25		
R	Moderate	20+5	25		
Inserts	**Placement**	**Count**			
SPA-N (wall tie) ø6mm 00005 420	Between outer leaf and inner leaf every 1m2	18			
HLB S (loop box)	Ribs edge every 600m2	18			
TPA-FX (lifting anchors)	2x vertically 2x horizontally around gravity point	4			
HTA-CE (Railing)	Inner leaf TTS connection	1			
M16/40/6 TWS Hexagon plate	On inner leaf 1/3 from top	2			
SPA-2 Anchors	Between inner and outer leaf (horizontally and vertically)	4			
Weight	7.2 TONS				
Surfaces	Internal	Smooth formwork finish			
	External	Glat sort afsyret			

T Top
B Bottom
I Inner
O Outer
L Left
R Right

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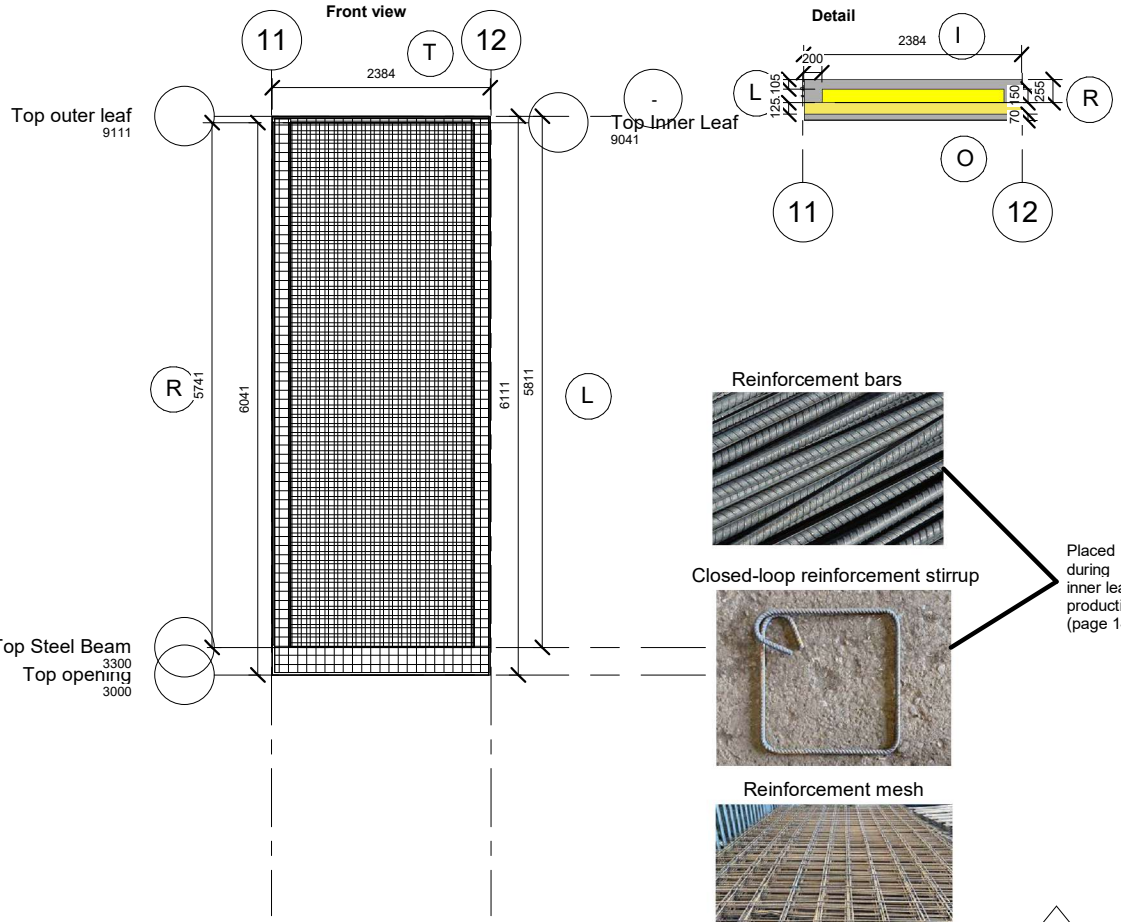
PROJECT: Grejs Kulturcenter - ID05	DATE: 01/12/21	7
SUBJECT: Outer Leaf	SCALE: 1 : 50	
DRAWN BY: Ana Araújo	CLASS:	

Production Fase
Step 2 and 5 - Reinforcement Outer and Inner leaf

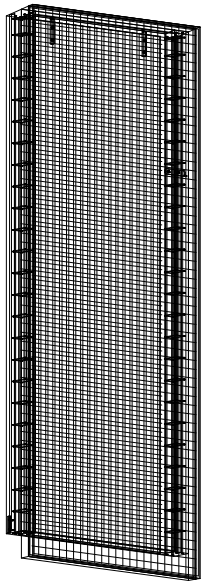


Reinforcement bars

Closed-loop reinforcement stirrup

Placed during inner leaf production (page 14)

Reinforcement mesh



3D view

Process Outer Leaf:
Mesh is placed after 1st layer of concrete is poured (35mm)
after the mesh is in its place and SPA-2 and SPA-N aore placed (see more in page 9) pour 2nd layer of concrete (35mm)

Process Inner leaf (see more in page 14)
Stirrups and rebars are mounted sepperatly and brought to ribs
Mesh is fixed 25mm from the edge of the inner leaf to the stirrups by an extra rebar.
After everything is placed on its placed,
Final inserts are placed and concrete is poured

Information Table

Reinforcement	Type	Count
Rebars	Y12/Y6	8///02
Outer mesh	Y7/70	1
Inner mesh	Y8/75	1
Stirrups	Y6	48

T	Top	O	Outer
B	Bottom	L	Left
I	Inner	R	Right

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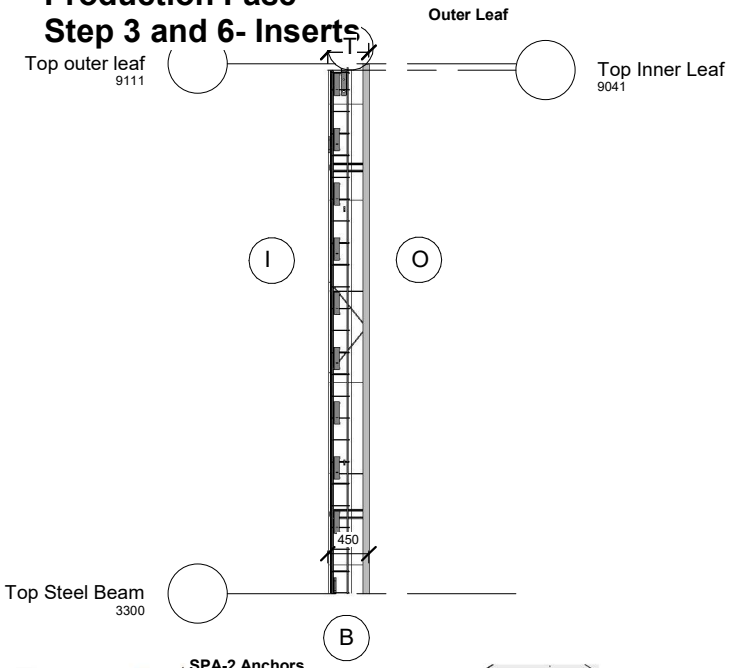
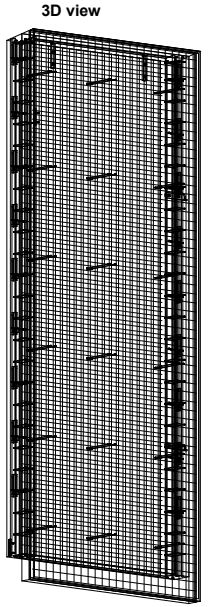
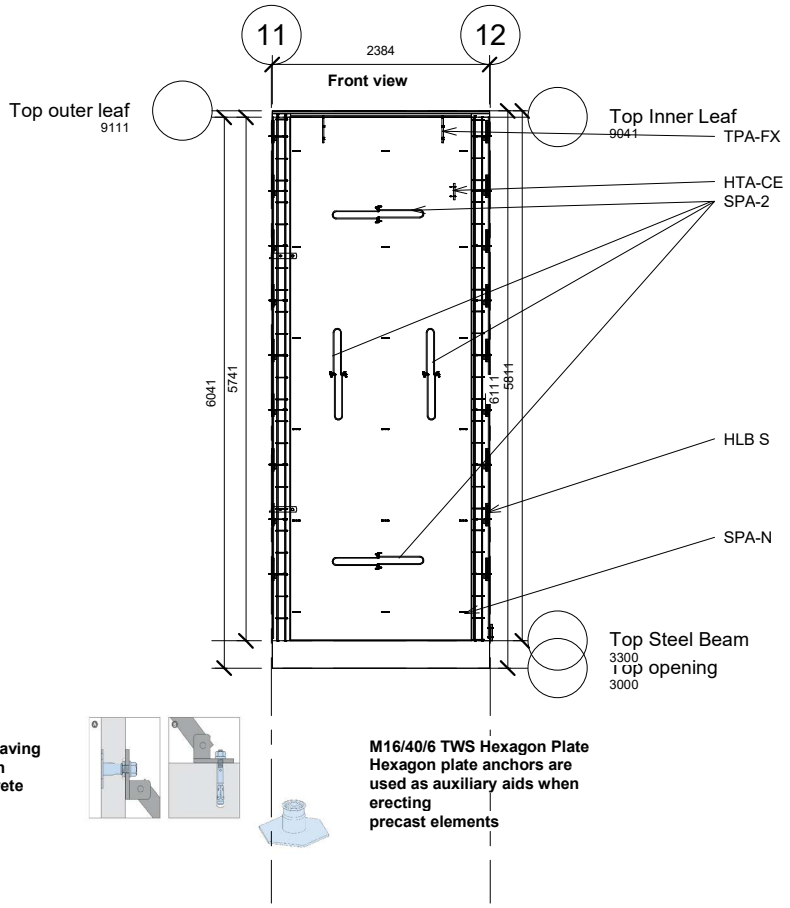
BYGGESAG: Grejs Kulturcenter - ID05	DATO:05/10/22	8
EMNE: Reinforcement inner+outer leaf	MÅL: 1 : 50	
UDFØRT AF: Ana Araújo	KLASSE	

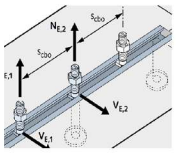
Production Fase
Step 3 and 6- Inserts







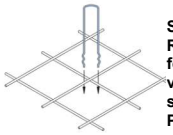
SPA-2 Anchors
Supporting anchors are primarily responsible for carrying the resulting vertical loads from the dead load of the facing layer
Placed after 1st layer of concrete of outer leaf



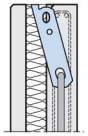
HTA-CE (Railing)
Placed to inner leaf before countrete pouring

HLB S (Loop Box)
Efficient and time-saving connection between prefabricated concrete elements.
Place in ribs before concrete pouring

M16/40/6 TWS Hexagon Plate
Hexagon plate anchors are used as auxiliary aids when erecting precast elements



SPA-N (Wall tie) ø6
Restraint ties carry the forces acting vertically to the panel surface
Placed after 1st layer of concrete of outer leaf



TPA-FX (Lifting Anchor)
Suitable for lifting and transporting all kinds of precast concrete elements under all conditions.
Placed onto inner leaf before concrete poring

Inserts	Placement	Count
SPA-N (wall tie) ø6mm 00005 420	Between outer leaf and inner leaf every 1m2	18
HLB S (loop box)	Ribs edge every 600m2	18
TPA-FX (lifting anchors)	2x vertically 2x horizontally around gravity point	4
HTA-CE (Railing)	Inner leaf TTS connection	1
M16/40/6 TWS Hexagon plate	On inner leaf 1/3 from top	2
SPA-2 Anchors	Between inner and outer leaf (horizontally and vertically)	4

O Outer
T Top
I Inner
B Bottom

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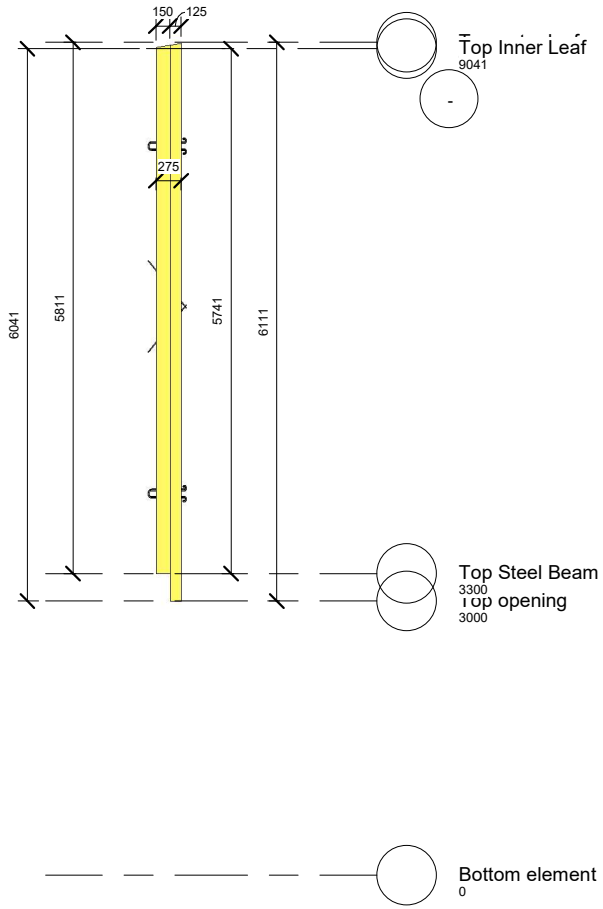
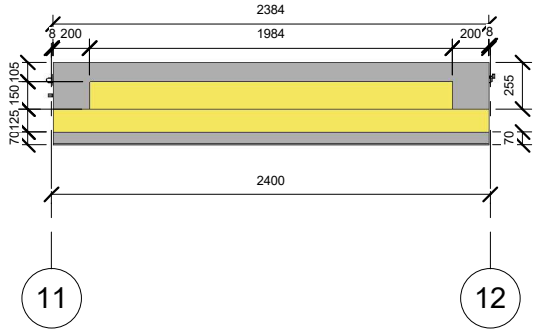
BYGGESAG: Grejs Kulturcenter - ID05	DATO:05/21/22	9
EMNE: Inserts	MÅL: 1 : 50	
UDFØRT AF: Ana Araújo	KLASSE	

Production Fase
Step 4- Insulation

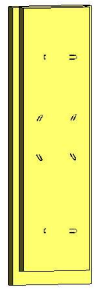
Left view



Top view



3D view

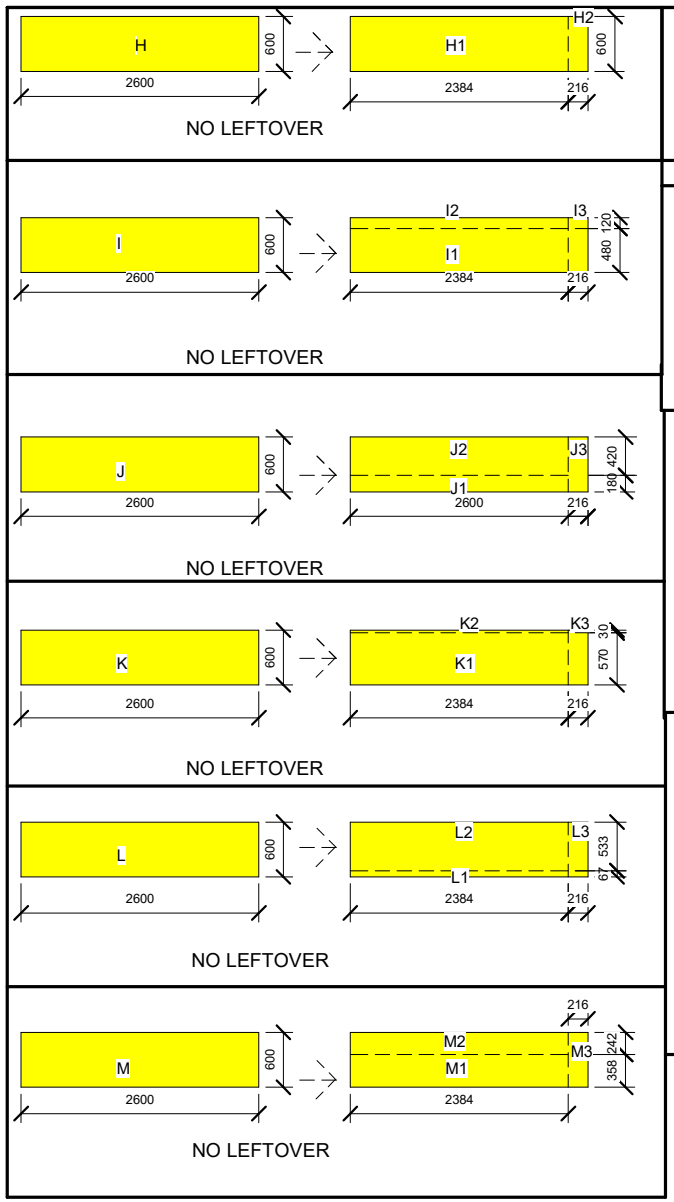


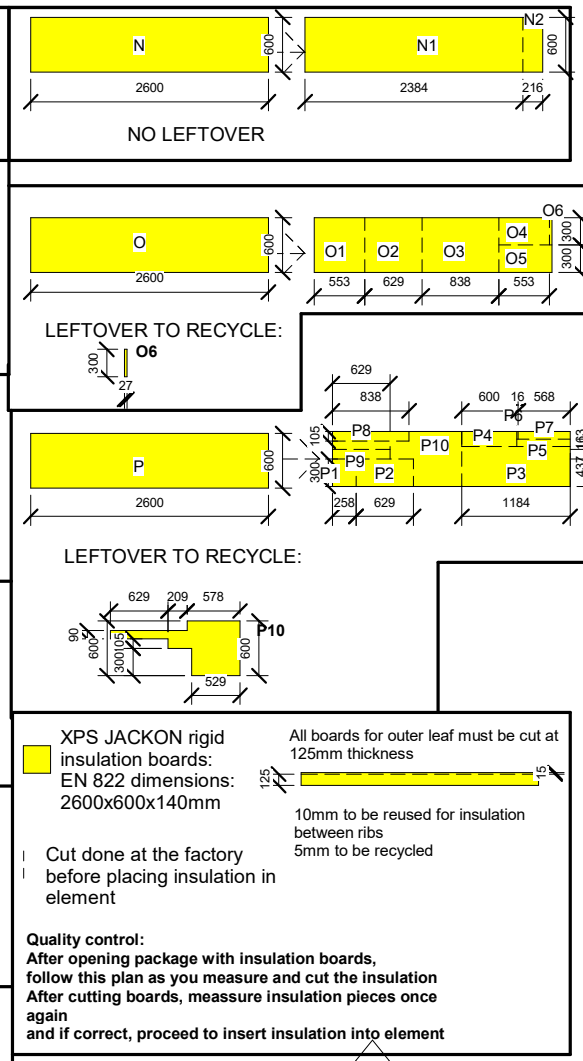
Insulation used is: XPS JACKON rigid insulation boards: EN 822 dimensions: 2600x600x140mm

Proceed to pages 11, 12 and 13 for cut and placing of Insulation

Sizes	Thickness	Area	Volume
Insulation	150/125	24m2	3.2m3
Inserts	**Placement**	**Count**	
SPA-N (wall tie) ø6mm 00005 420	Between outer leaf and inner leaf every 1m2	18	
HLB S (loop box)	Ribs edge every 600m2	18	
TPA-FX (lifting anchors)	2x vertically 2x horizontally around gravity point	4	
HTA-CE (Railing)	Inner leaf TTS connection	1	
M16/40/6 TWS Hexagon plate	On inner leaf 1/3 from top	2	
SPA-2 Anchors	Between inner and outer leaf (horizontally and vertically)	4	

Outer Leaf Insulation cut and Waste





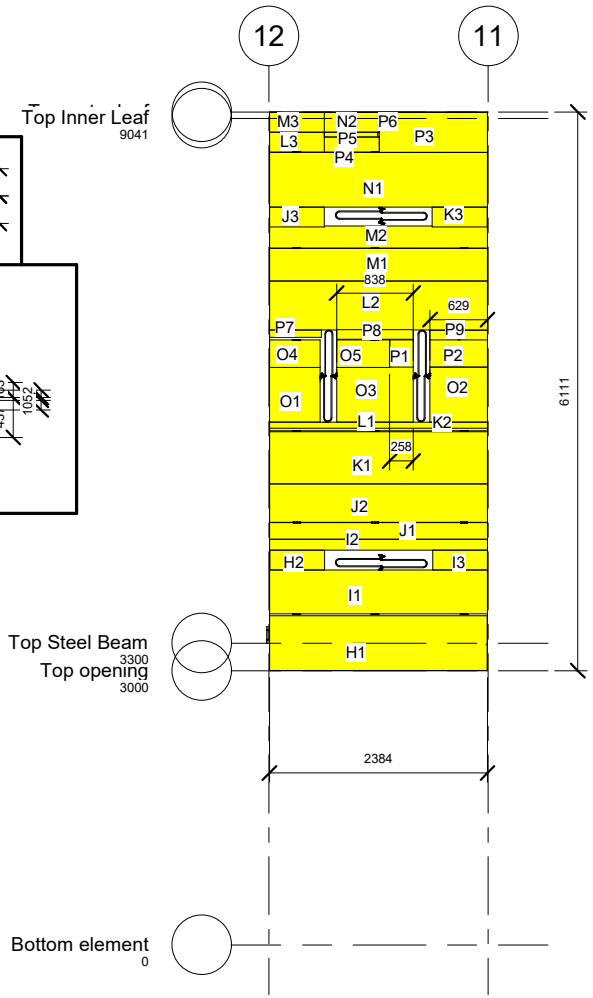
XPS JACKON rigid insulation boards:
EN 822 dimensions:
2600x600x140mm

Cut done at the factory before placing insulation in element

All boards for outer leaf must be cut at 125mm thickness

10mm to be reused for insulation between ribs
5mm to be recycled

Quality control:
After opening package with insulation boards, follow this plan as you measure and cut the insulation
After cutting boards, meassure insulation pieces once again
and if correct, proceed to insert insulation into element



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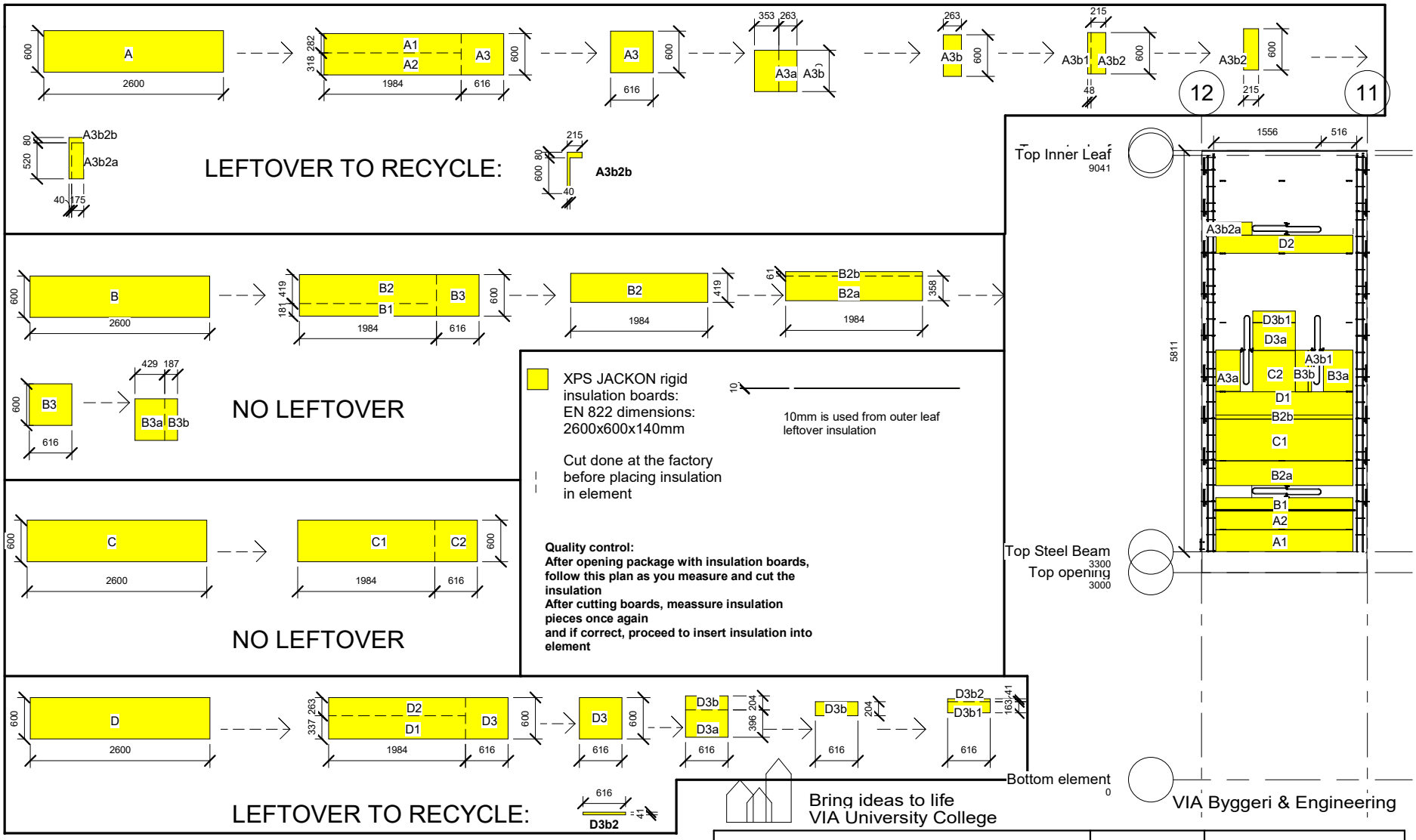
BYGGESAG: Grejs Kulturcenter - ID05	DATO:06/02/22	11
EMNE: Outer Leaf Insulation cut and Waste	MÅL: 1 : 50	
UDFØRT AF: Ana Araújo	KLASSE	

Rib Insulation cut and waste control



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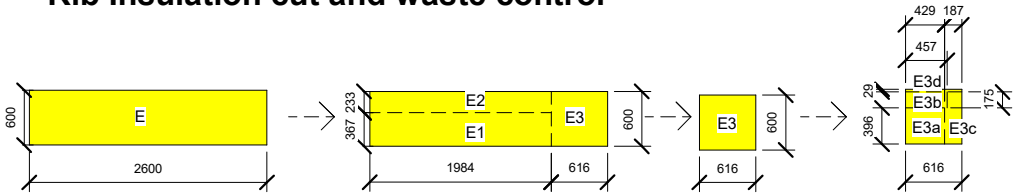
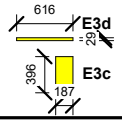
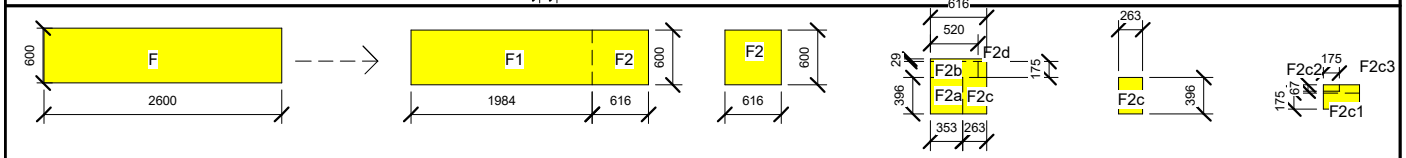
BYGGESAG: Grejs Kulturcenter - ID05	DATO:06/01/22	12
EMNE: Rib Insulation cut and Waste	MÅL: 1 : 50	
UDFØRT AF: Ana Araújo	KLASSE	

Rib Insulation cut and waste control

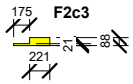


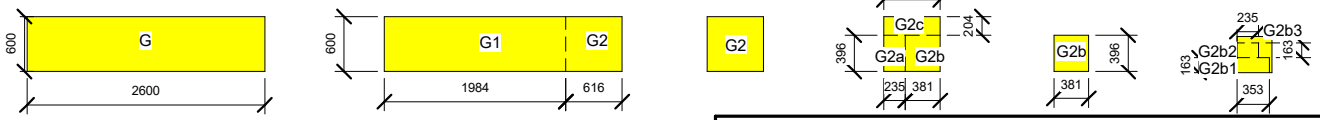
LEFTOVER TO RECYCLE:

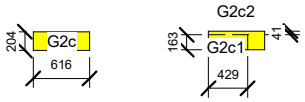




LEFTOVER TO RECYCLE:







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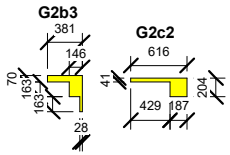
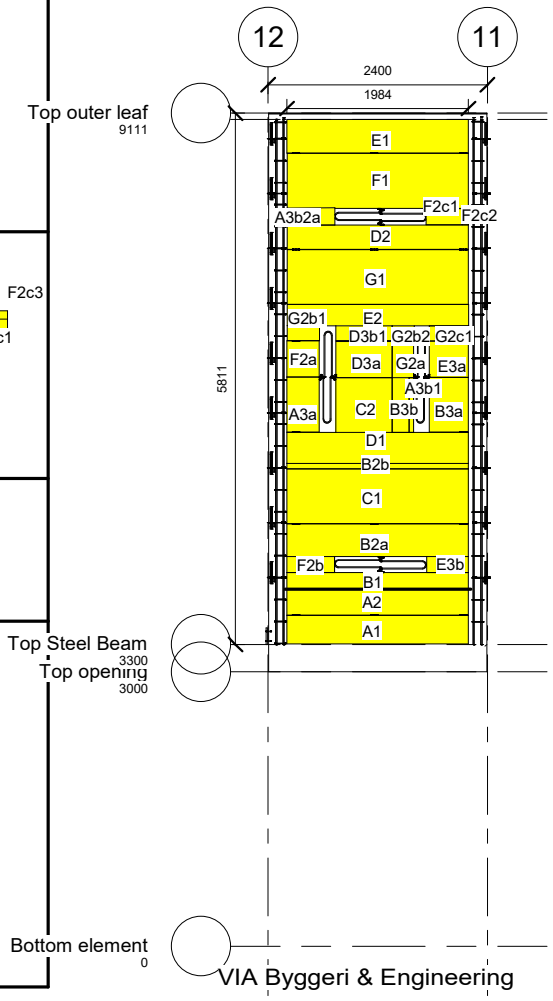


XPS JACKON rigid insulation boards:
EN 822 dimensions:
2600x600x140mm

Cut done at the factory before placing insulation in element

Quality control:
After opening package with insulation boards, follow this plan as you measure and cut the insulation
After cutting boards, meassure insulation pieces once again and if correct, proceed to insert insulation into element



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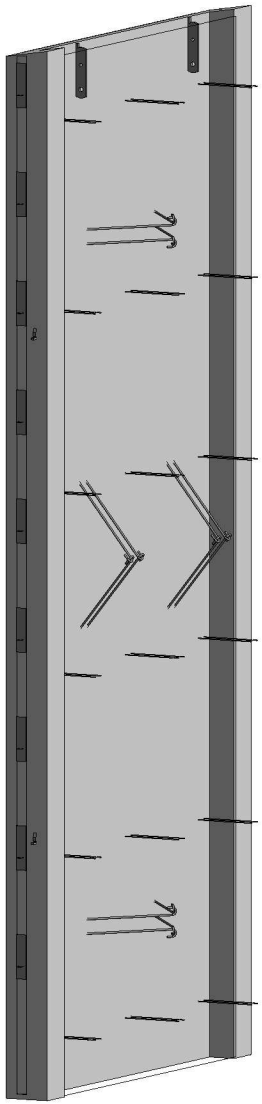
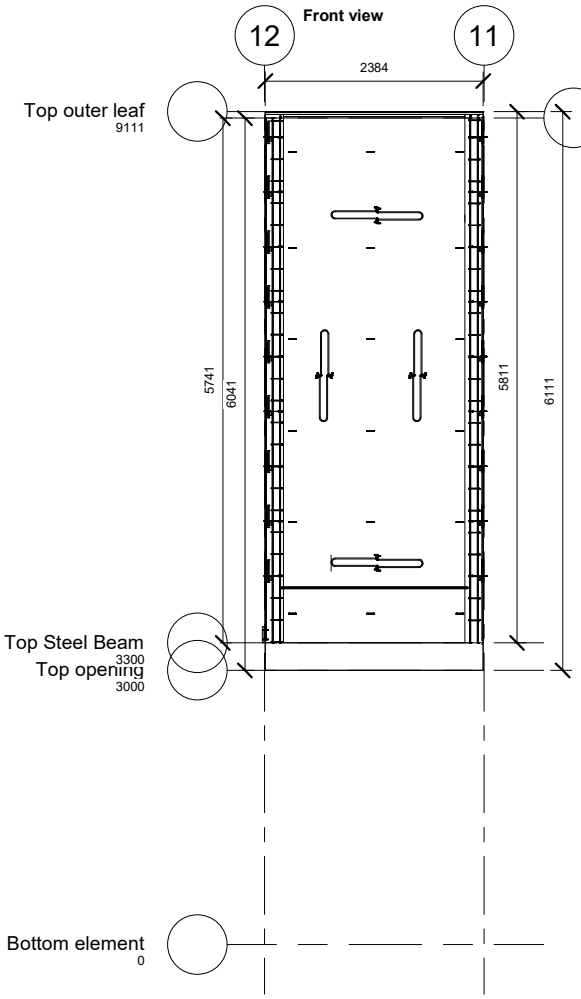
BYGGESAG: Grejs Kulturcenter - ID05	DATO:06/01/22	13
EMNE: Rib Insulation cut and Waste 2	MÅL: 1 : 50	
UDFØRT AF: Ana Araújo	KLASSE	

Production Fase
Step 6- Inner leaf

3D view



Front view



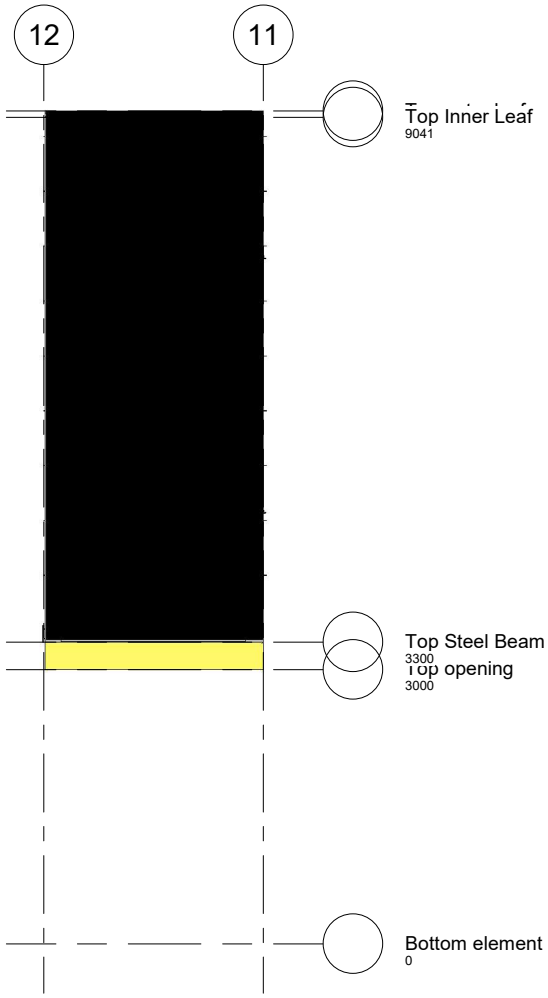
After insulation is cut and placed, proceed to place the inner leaf mesh (see more in page 8), and place the stirrups + rebars (see more in page 8)
Inserts should be twisted onto mesh for connection and 105mm of concrete is poured for inner leaf
Then vibrate for 30 seconds
Dry out for 12h

Quality control:
Inner leaf should be measured after drying, if it passes control, proceed to place inserts left (see more in page 9)

Information Table

Mix	Cement	Admix	Aggregate	W/C	Cement/Sand/Stones/Water
1	Basiscement	Fly ash	4-8mm	0.55	1:02:03
Sizes	**Thickness**	**Area**	**Volume**		
Inner leaf	105mm	13m2	1.66m3		
Concrete	**Mix**	**Control class**	**Strenght**	**Density**	
Inner leaf	1	Normal	C20/25	2500 kg/m3	
Cover					
Side	**Exposure**	**Minimum cover**	**Actual cover**		
T	Moderate	20+5	25		
B	Moderate	20+5	25		
I	Passive	10+5	15		
O	Moderate	20+5	25		
L	Moderate	20+5	25		
R	Moderate	20+5	25		
Inserts	**Placement**	**Count**			
SPA-N (wall tie) ø6mm 00005 420	Between outer leaf and inner leaf every 1m2	18			
HLB S (loop box)	Ribs edge every 600m2	18			
TPA-FX (lifting anchors)	2x vertically 2x horizontally around gravity point	4			
HTA-CE (Railing)	Inner leaf TTS connection	1			
M16/40/6 TWS Hexagon plate	On inner leaf 1/3 from top	2			
SPA-2 Anchors	Between inner and outer leaf (horizontally and vertically)	4			
Weight	7.2 TONS				
Surfaces	Internal	Smooth formwork finish			
	External	Glat sort afsyret			

Facade finish



After the element is finished and has passed quality assurance
It will then be washed to make facade finish visible
Finish is: **Glat sort afsyret** and is done on the external total area of outer leaf only
U value of Element: 0.123W7m2K

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PROJECT: Grejs Kulturcenter - ID05	DATE: 06/03/22	15
SUBJECT: Facade finish	SCALE: 1 : 50	
DRAWN BY: Author	CLASS:	