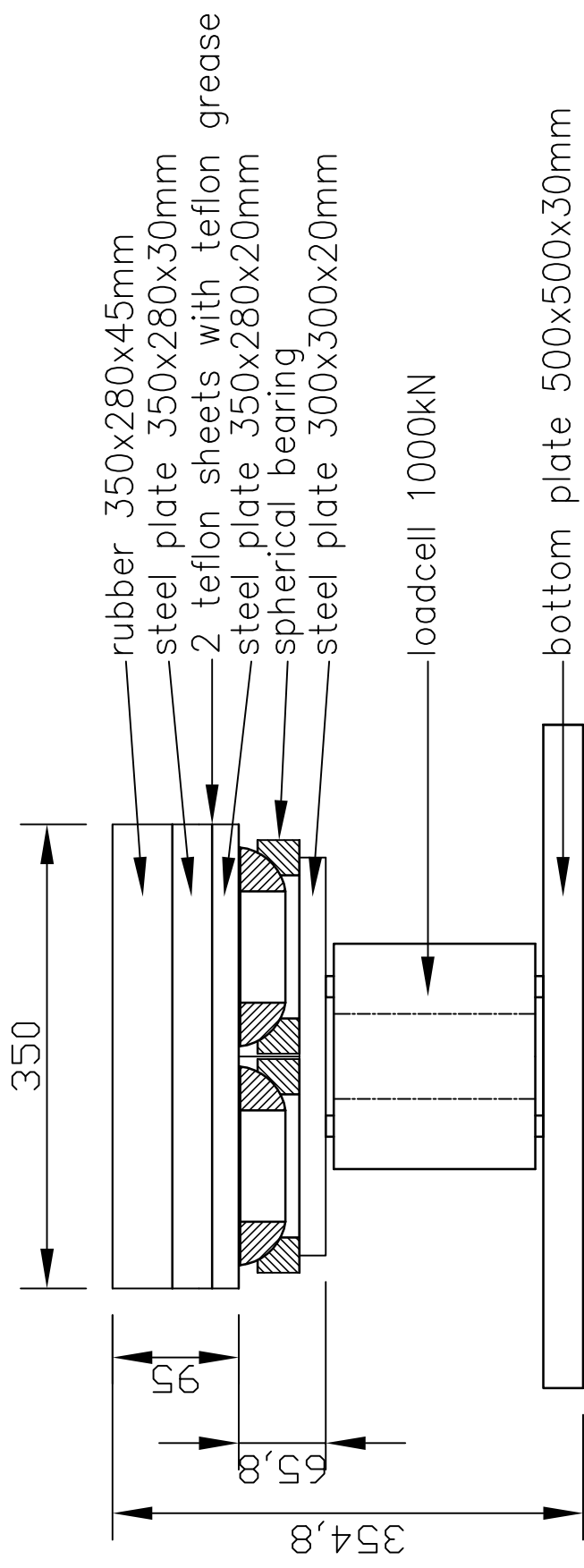
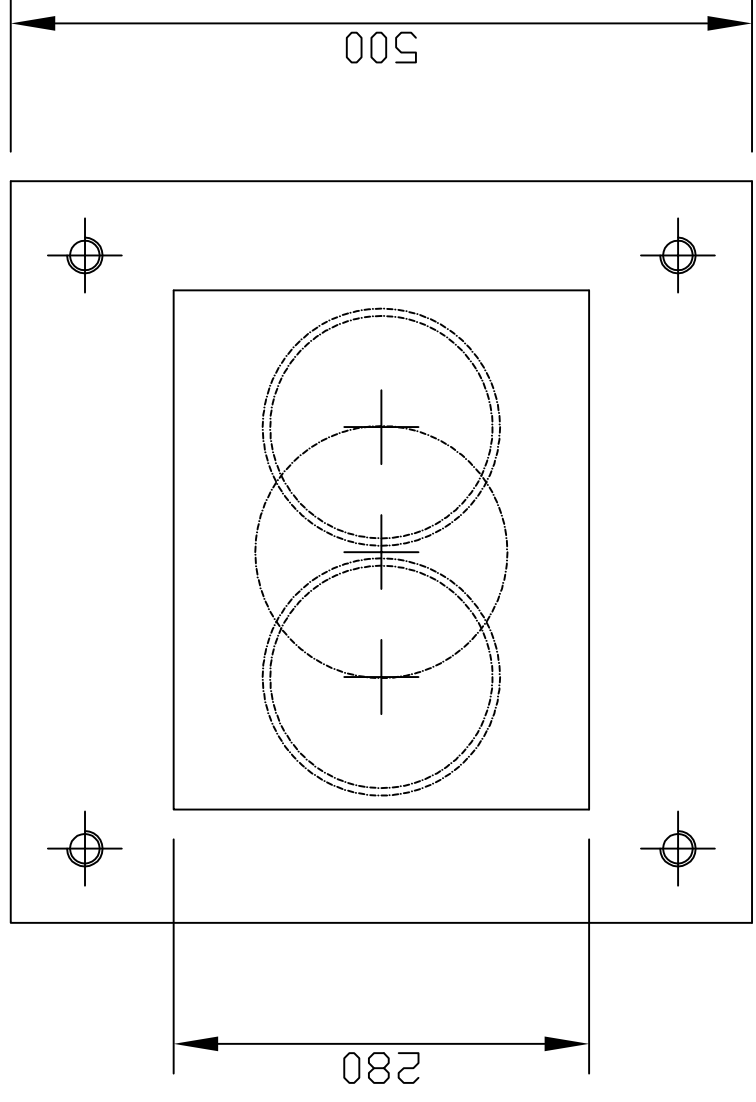


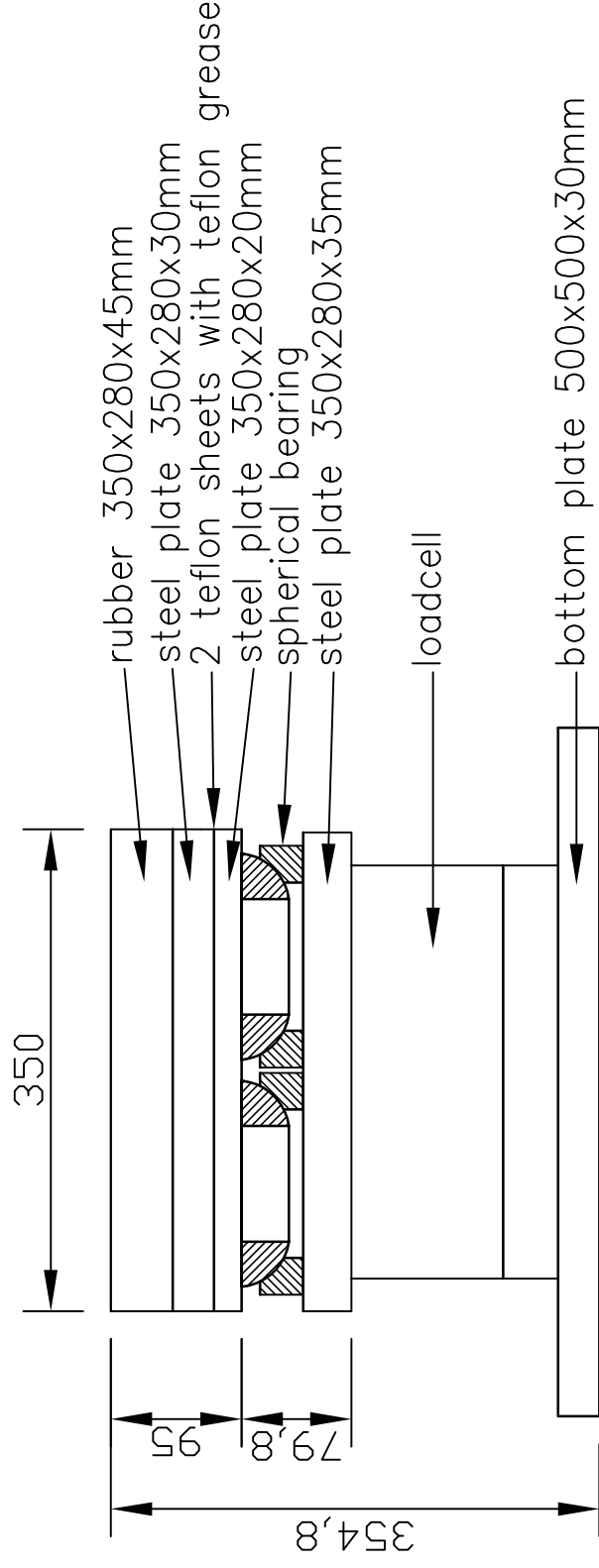
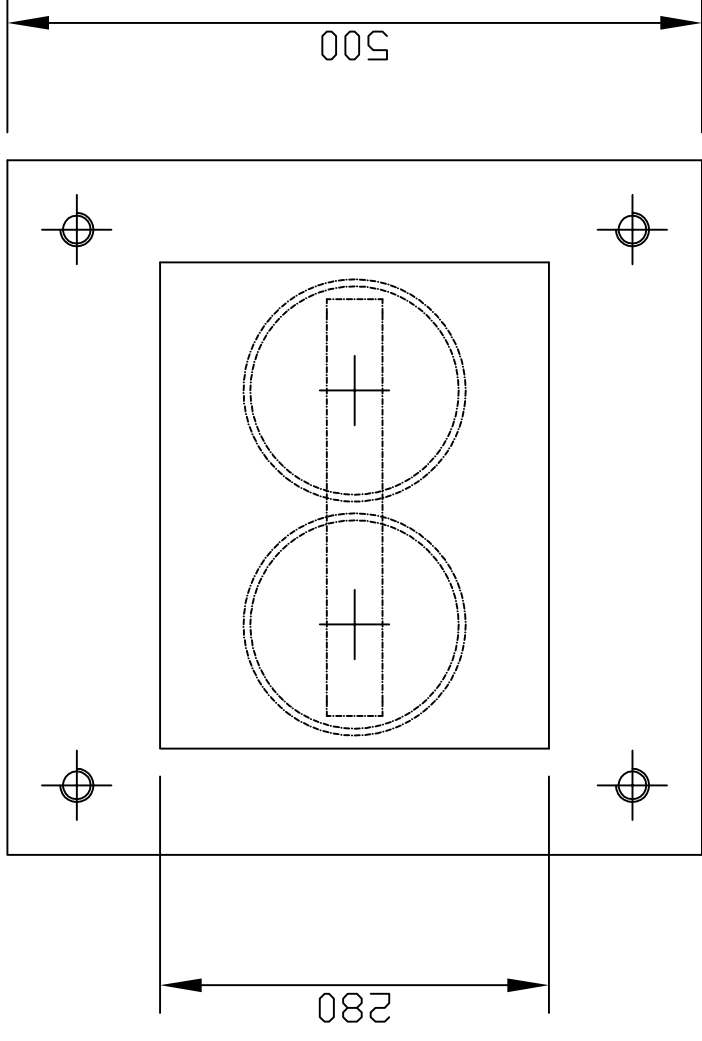
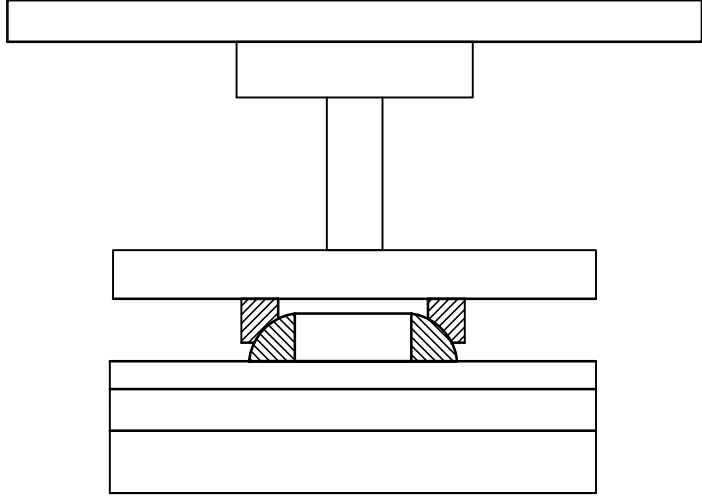
APPENDIX A: DIMENSIONS AND PROPERTIES SUPPORTS AND LOADING JACK

Contents:

- **Drawing of support type A**
- **Drawing of support type B**
- **Drawing of loading jack**
- **Compression Test of Rubber (under the load)**

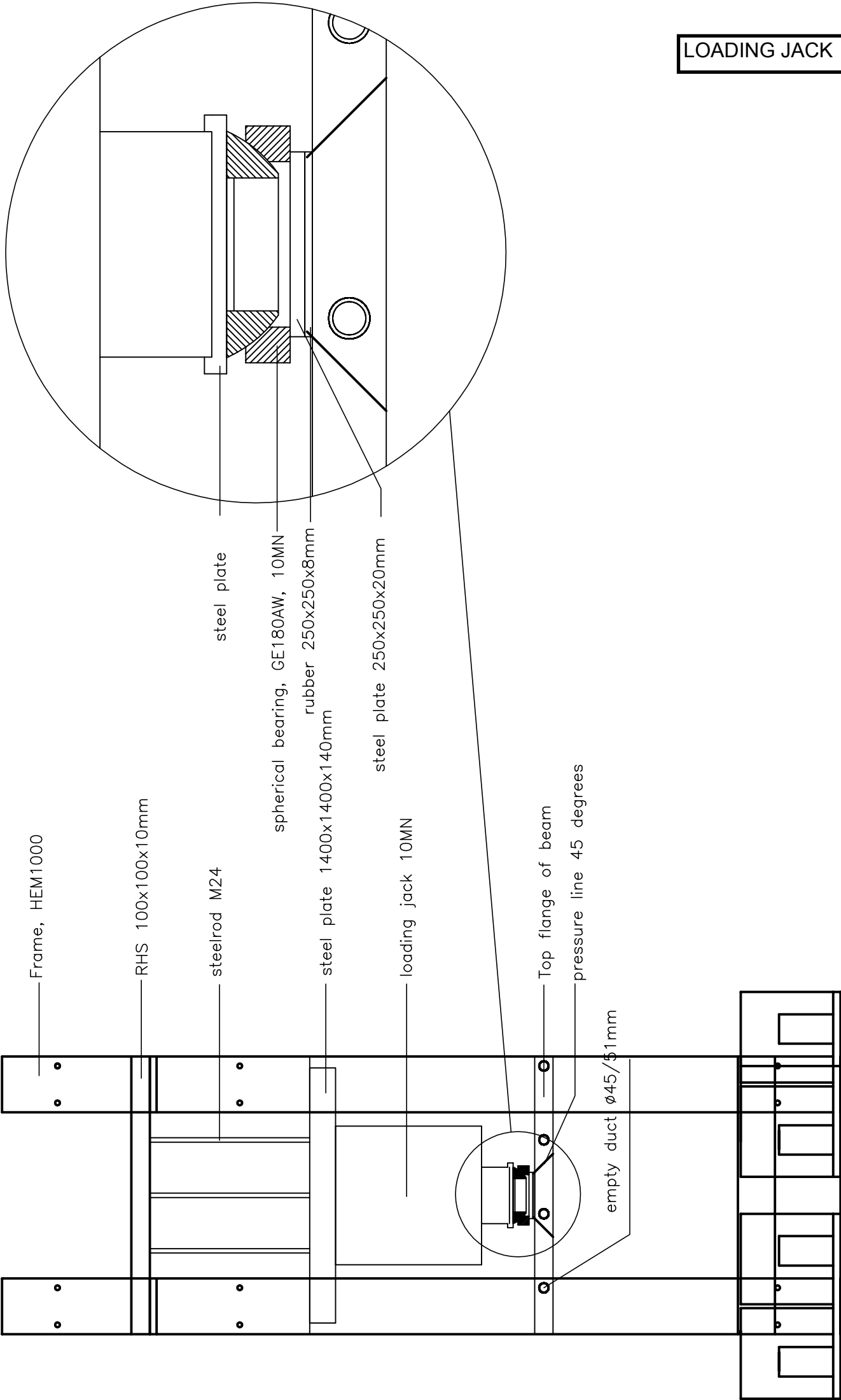
Important note: the compression test of the rubber (under the load) was conducted with dimensions 200x200 mm whereas with the shear test a rubber pad with dimensions 250x250 mm will be used.





LOADING JACK

Detail scale 1:5



Compression Test of Rubber

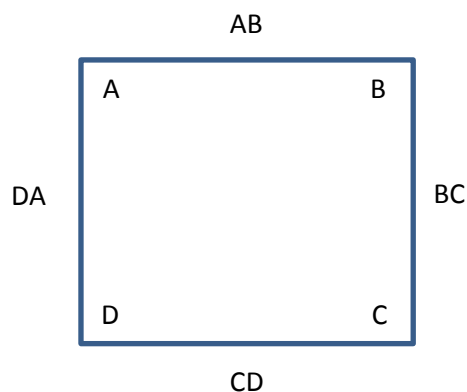
1. Introduction:

Four rubber pads have been tested according to EN 1337-3 though the specimens did not fully conform to the specification. The rubber pads have been proposed to be used as bearing pads for point loads in the punching shear tests on 1:2 scale model bridge in the concrete lab, CITG TU Delft.

2. Material:

The material consists of alternating four layers of rubber and three layers of fibre.

3. Specimen sizes:



Specimen Length	AB (mm)		BC (mm)		CD (mm)		DA (mm)	
	Untested	Tested	Untested	Tested	Untested	Tested	Untested	Tested
1	201	200	204	203	204	204	205	204
3	204	203	201.5	200	202	203	205	203
4	200	200	201	200	200	197	198	197
5	200	199	201	201	199	198	200	200

Specimen thickness		A (mm)		B (mm)		C (mm)		D (mm)	
	Wt (g)	Untested	Tested	Untested	Tested	Untested	Tested	Untested	Tested
1	372.1	8.35	8.62	8.02	8.22	8.50	8.34	8.38	8.66
3	373.9	8.9	8.96	8.75	8.52	8.21	8.26	8.50	8.32
4	364	7.43	7.5	7.43	7.44	8.36	8.41	8.38	8.32
5	362.1	7.77	7.52	8.85	7.94	8.39	8.31	8.32	8.69

Temperature: 20 – 21 deg C

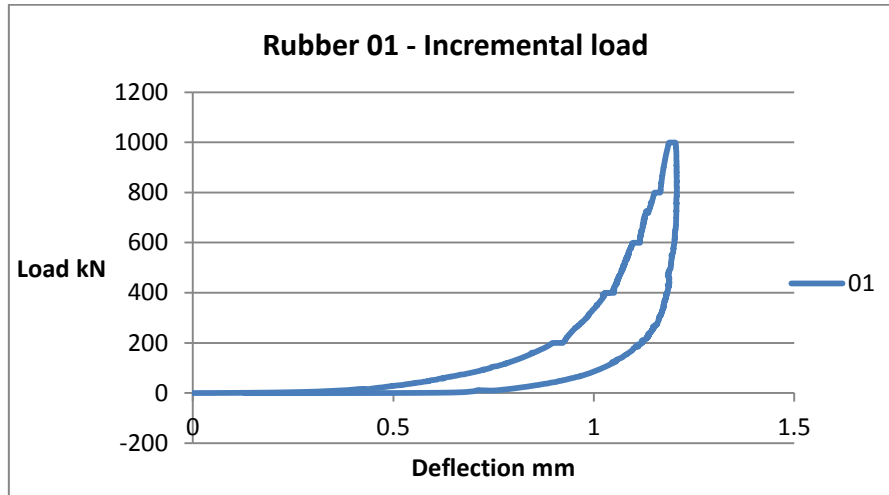
4. Loading Scheme (Level 2 EN 1337-3):

1. Maximum/full load (1000 kN) applied and sustained for 1 minute @ 3 kN/s. Unloading.
2. Reloading in 5 increments @ 3 kN/s. Unloading.

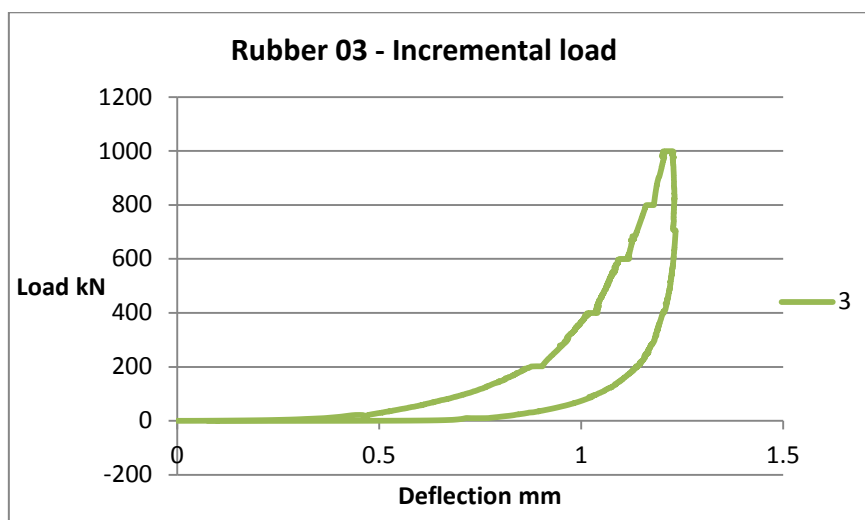
In some specimens sustained load of 1000 kN was applied for one hour.

5. Load – Deflection curves of individual specimens:

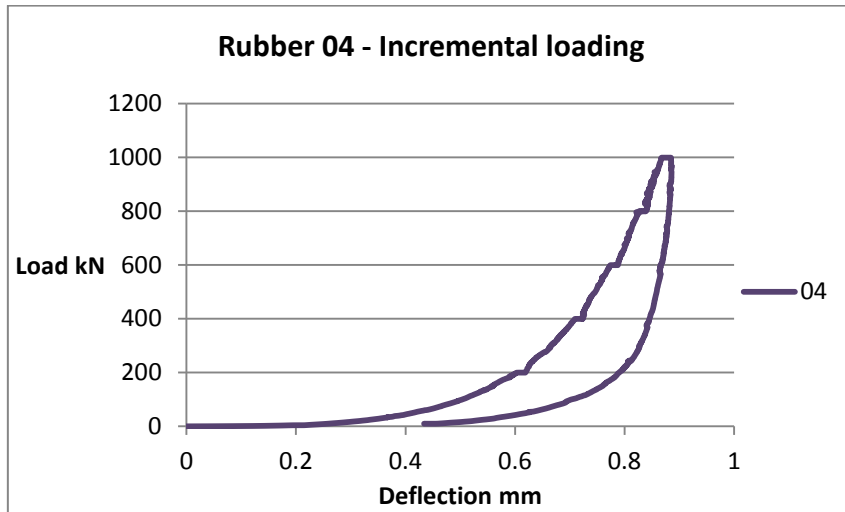
- a. **Specimen 1:** Full load applied at 3 kN/s, sustained for a minute, then removed. Incremental loading applied, sustained for a minute and then removed.



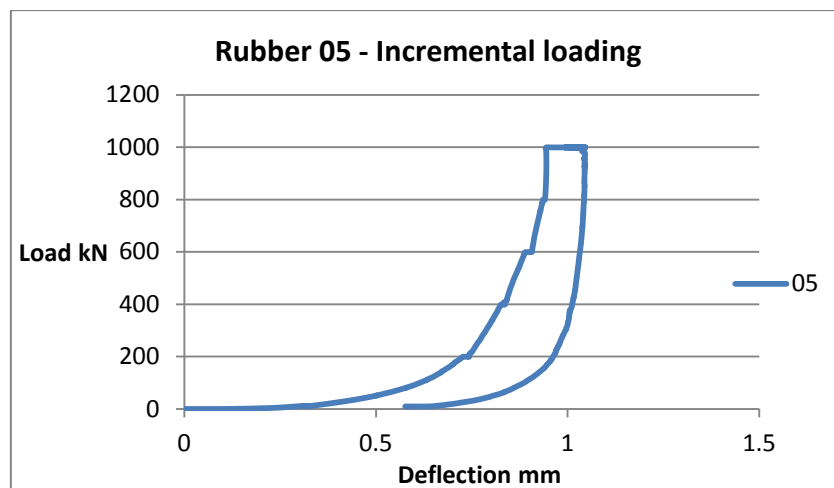
- b. **Specimen 3:** Full load applied at 3 kN/s, sustained for a minute, then removed. Incremental loading applied, sustained for a minute and then removed.



- c. **Specimen 4:** Full load applied at 3 kN/s, sustained for a minute, then removed. Incremental loading applied, sustained for a minute and then removed. Full load applied again at 3kN/s and sustained for an hour, then removed.



- d. **Specimen 5:** Full load applied at 3 kN/s, sustained for a minute, then removed. Incremental loading applied, sustained for an hour and then removed. Full load applied again at 3kN/s and sustained for a minute, then removed.



*Incremental load sustained for an hour after reaching maximum/full load (1000 kN)

6. Test Data:

Specimen	1	3	4	5
T_o (mm)	8.31	8.59	7.9	8.33
V_{z2} (mm)	1.195	1.223	0.884	1.033
V_{z1} (mm)	0.998	0.981	0.681	0.800
ϵ_c	0.14378	0.1424	0.112	0.124
C_c (kN/mm)	3381	2749	3285	2861
Visual Inspection after test	Satisfactory	Satisfactory	Satisfactory	Satisfactory

Where,

Compressive strain, $\epsilon_c = \frac{V_{z2}}{T_o}$

Compressive stiffness, $C_c = \frac{F_{z2} - F_{z1}}{V_{z2} - V_{z1}}$

F_{z2} = Full Load (kN)

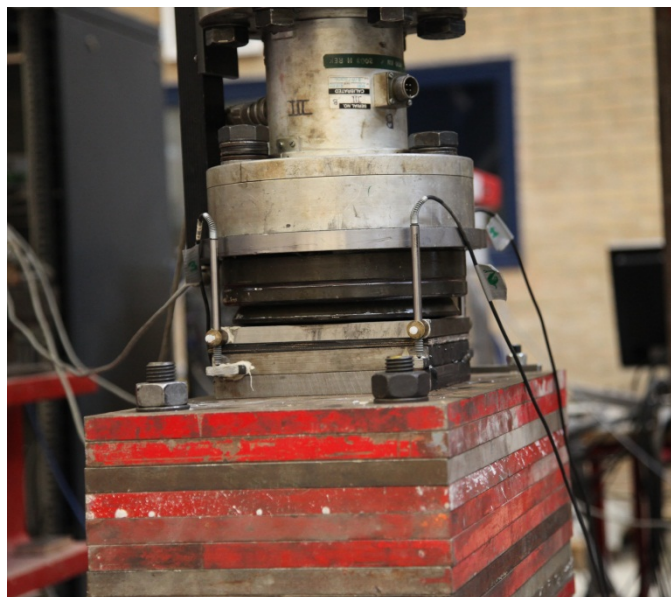
F_{z1} = 1/3 of full load (kN)

T_o = Average initial thickness (mm)

V_{z2} = Average deflection corresponding to F_{z2} (1000 kN)

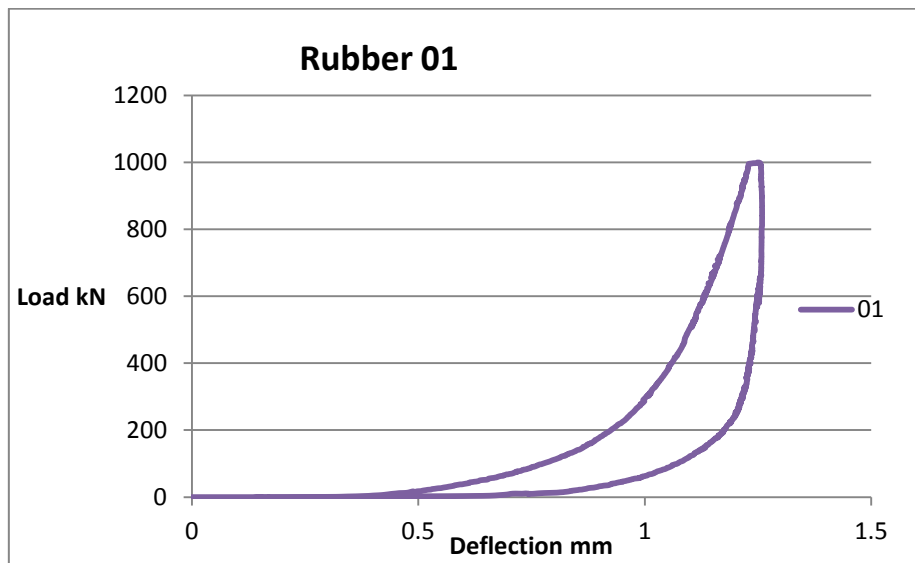
V_{z1} = Average deflection corresponding to F_{z1} (≈333 kN)

NOTE: No visible distortion or cracks observed. Load- Deflection curves for full load are attached in appendix.

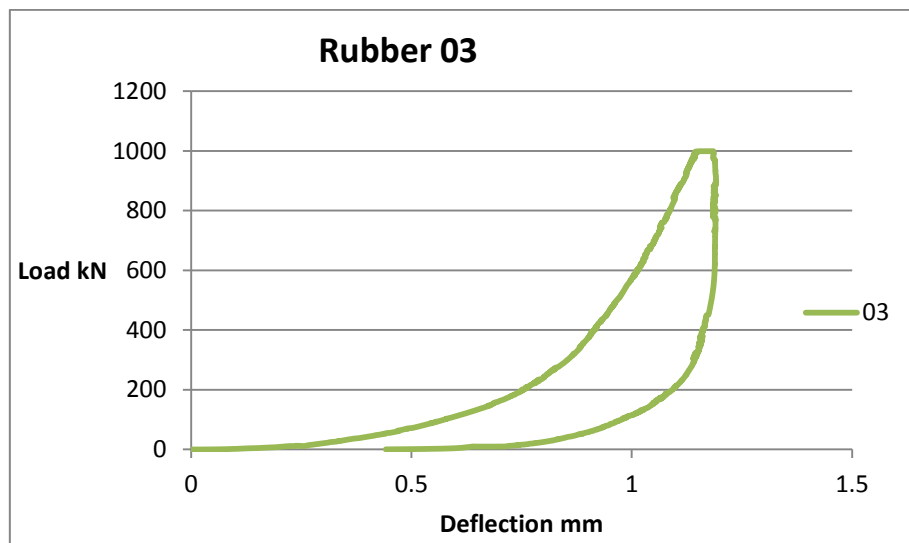


7. Full Load

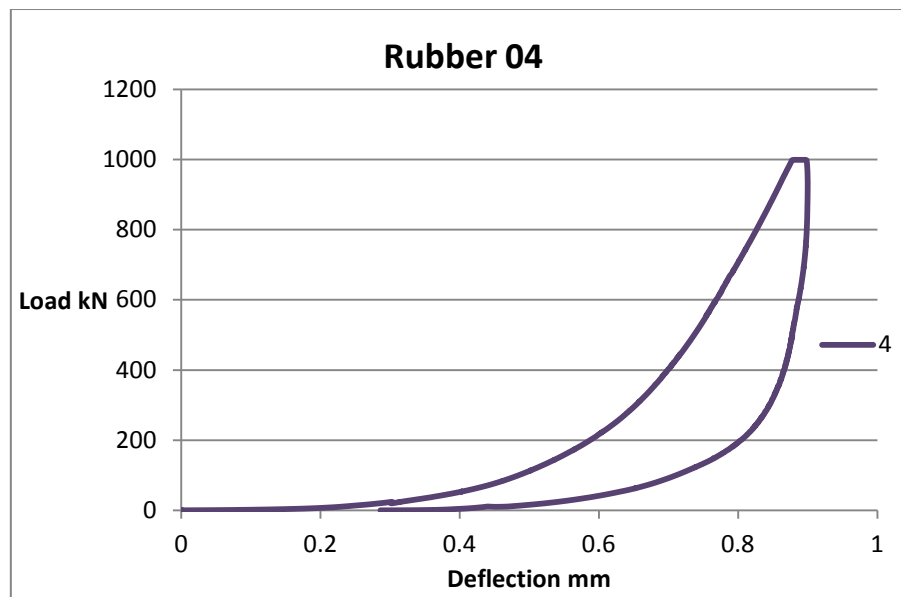
a. Specimen 1



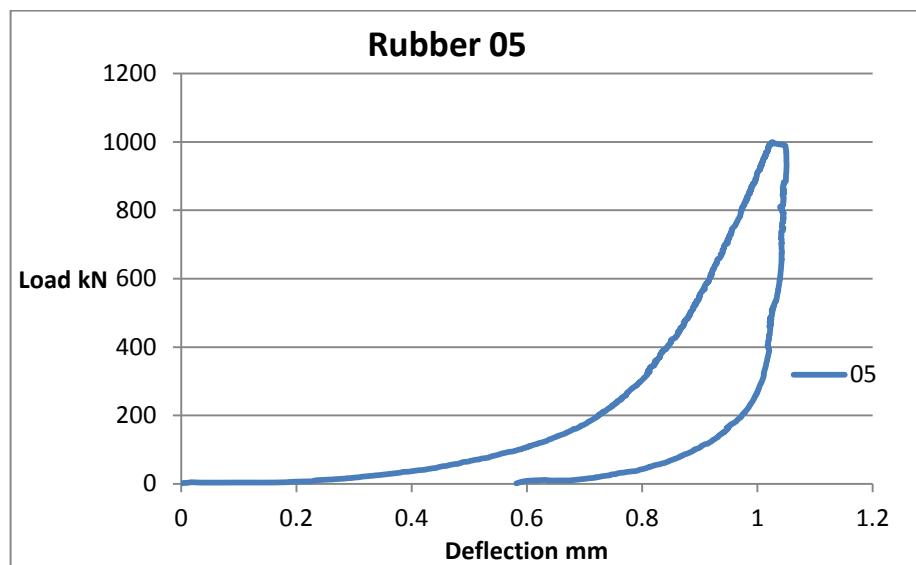
b. Specimen 3



c. Specimen 4



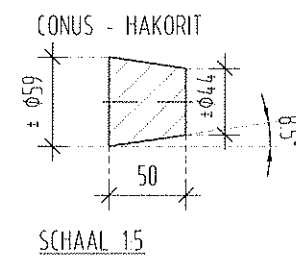
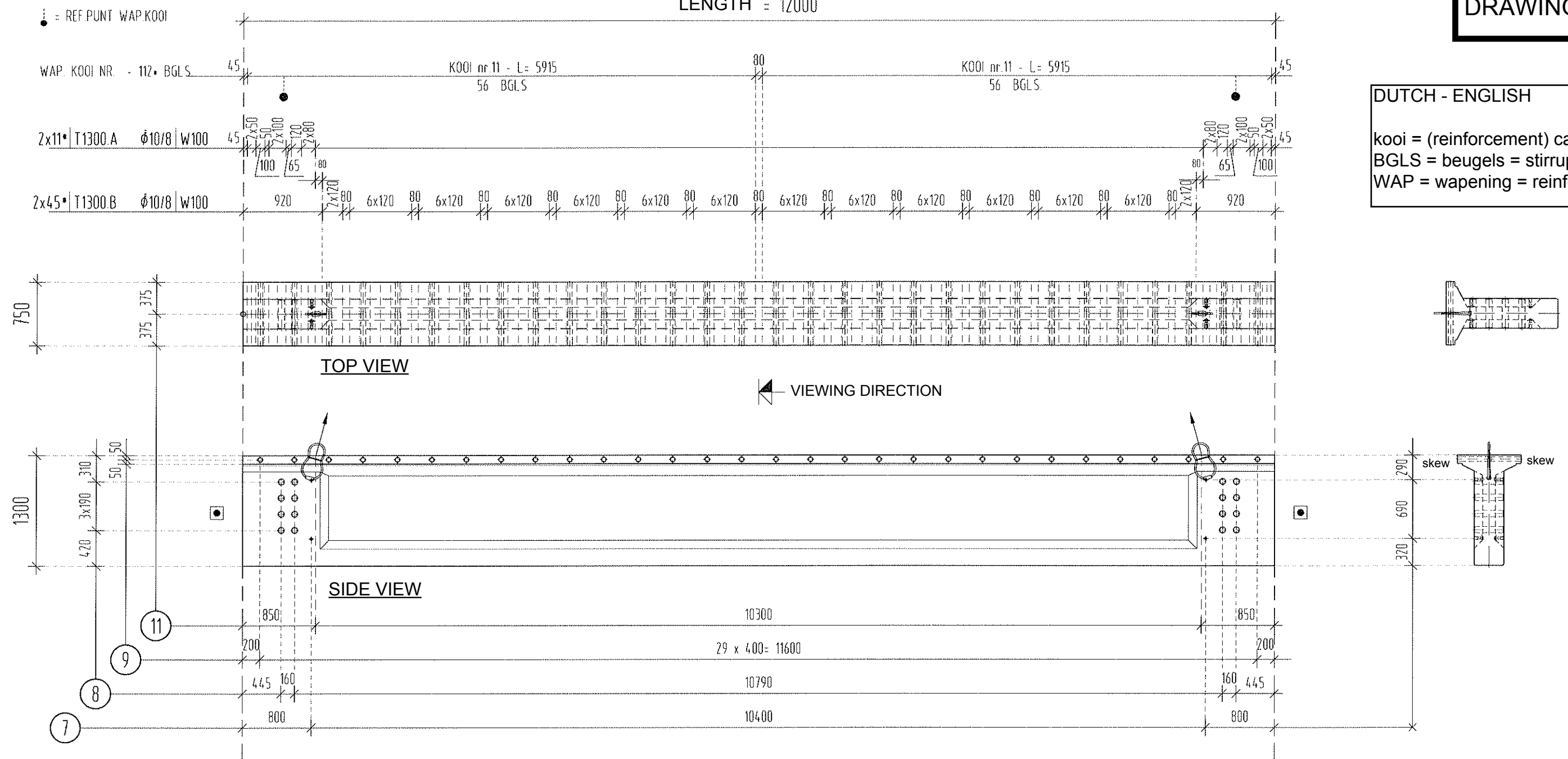
d. Specimen 5



APPENDIX B: GIRDER DRAWINGS

DUTCH - ENGLISH

kooi = (reinforcement) cage
BGLS = beugels = stirrups
WAP = wapening = reinforcement



P11	PH6508	ST	2*	HIJSLUS 8.0 TON THVZ	
P9	- - - - -	ST	30*	KO. BUIS Ø45/51+50/56 - L=695 + CONUSSEN Ø59/44	
P8	PP1772	ST	16*	PVC Ø75x18 - L=328	P8
P7	DA1474	ST	8*	M24X110-1980-P ELVZ	
POS	code	eenheid	aantal	omschrijving	opmerking
					bladnr

General: KIWA kwaliteitssysteemcertificaat ISO 9001 No. K14534
KOMO attest-met-productcertificaat No. K2436
KIWA EG-FPC certificaat No. 0620-CPD-44469/01

Prestressing steel:

Kwaliteit: FeP 1860	Ø5	Ø6,9	Ø9,3	Ø12,5	Ø15,7
Ap in mm²	19,6	29	52	93	150
P _{gem} in kN per streng	0	0	0	0	214
P _{max} in kN per streng	0	0	0	0	221
P _{min} in kN per streng	0	0	0	0	210
σ _p in N/mm²	0	0	0	0	1400

Reinforcement steel: Kwaliteit: B500A (≤Ø6) - B500B (≥Ø8)

Concrete: Kwaliteit: C53/65 (B65)

Minimal strength for removing formwork: 40 N/mm²

Milieuklasse: XF4 (3)

Afstandhouders: kunststof NIET toegestaan (betonnen afstandh. min. kwal B75)

Bijz. eisen: -

Finishing:

CUR aanbeveling 100 zichtzijden (schoonwerk) conform SPANBETON specs.

Overige zijden conform NEN 6722 - Klasse A

Stortzijde:	Malzijde:	Kopvlak:
0 Geen	0 Kleine luchtbell	0 Strengen 0 mm ufsteken
A Vlakken	1 Luchtbell	1 Kopvlak JOTAMASTIC 87
B Spanen	2 Stralen	2 Kopvlak 3mm BETOCHEM 50/50
C Pleisteren	3 Ruw	3 Kopvlak HYDROFOBEREN
E Rollen	4 HYDROFOBEREN	4 Streng JOTAMASTIC 87
F Structuren (fijn)	5 Zichtzijde (schoonwerk)	5 Streng 3mm BETOCHEM 50/50
K Opruwen (grof)		6 Wapening cementeren

Rims:

Kopzijde onder	20 • 20		
Kopzijde rondom	-- • --		
Langszijde	15 • 15		

Cover: 

Stortzijde: 25

Modelzijde alg: 25

Modelbodem 1,0m vanaf kop: 25

Kopzijde: 25

Voorspanstaal: 35

Afw. -5/+10 op gereed product

Tenzij anders aangegeven.

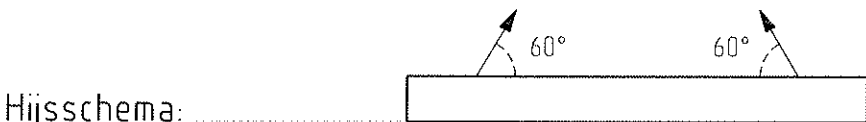
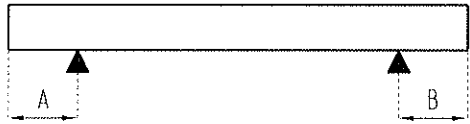
C= 0mm t.p.v. dwarssp. toegestaan.

Brandwerendheid: ** min.

Maatafwijkingen: Volgens NEN 2889 of Spanbeton-norm (±Maat: 10% afwijking ≤ 200)

Storage and transport:

Situatie	A	B
Tasoplegging	1000	1000
Intern transport	1000	1000
Extern transport	1000	1000



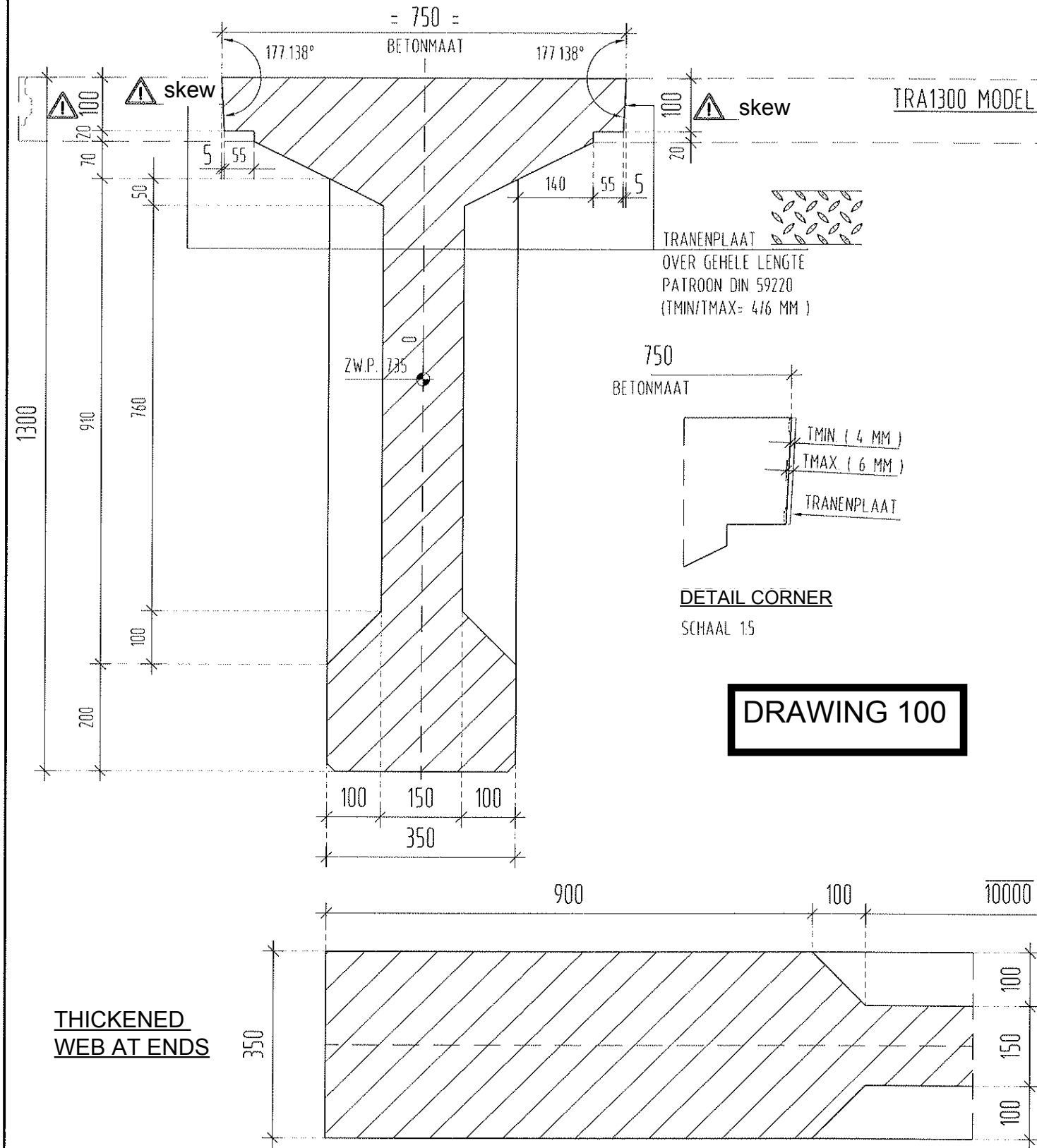
Hijsschema:

Verklaring tekens:

- Meniestip (Indien noodzakelijk, altijd links op element)
- + Voorziening in getekende zijde
- ✕ Voorziening in achtervlak
- ✕ Voorziening in zijvlak
- ✕ Voorziening in voor en achtervlak
- Voorziening in zijvlak

PROFIEL: TUD1300/750

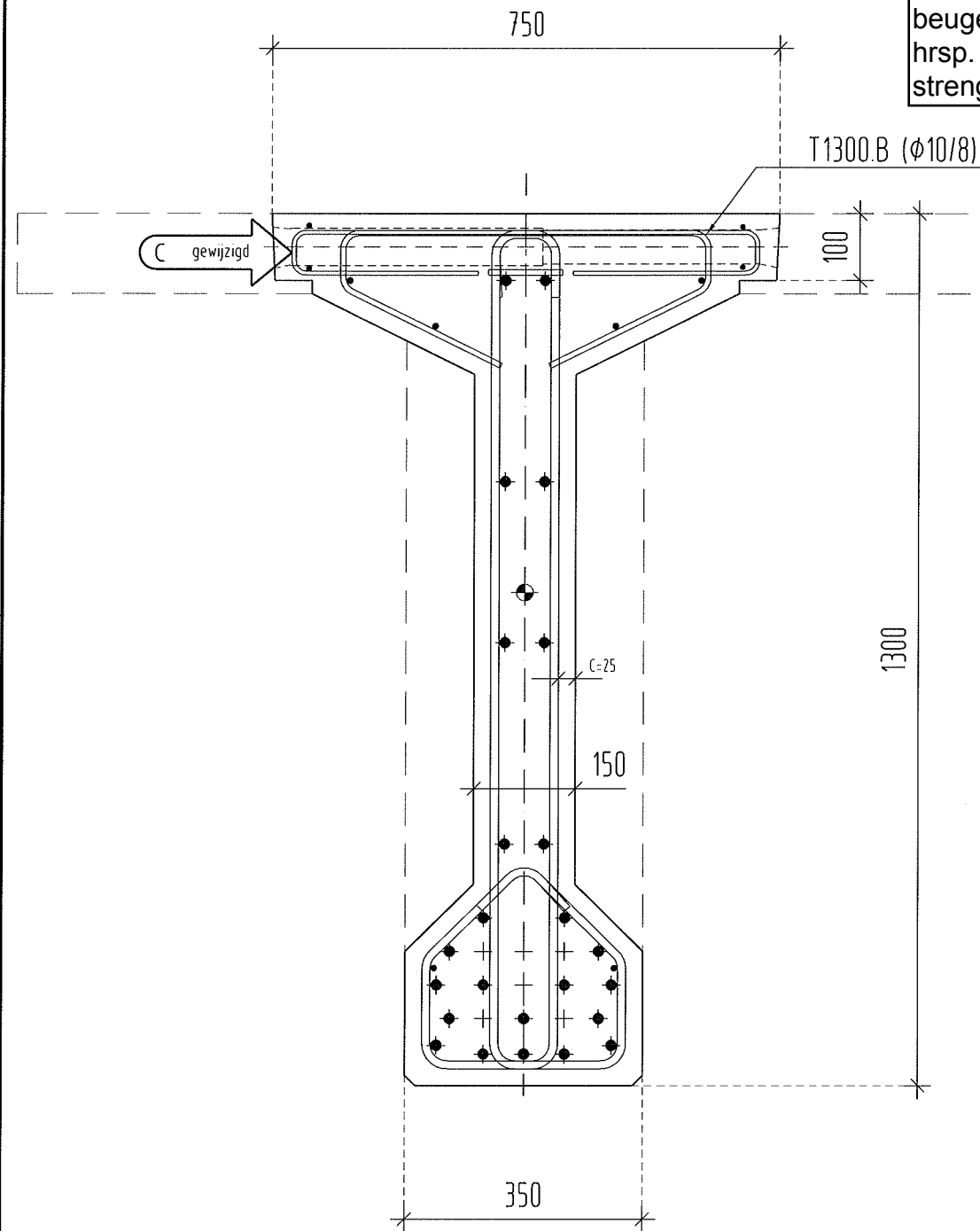
Afwerking stortzijde: 0
Afwering malzijde: 0



LAYOUT OF STRANDS TUD1300/750

DRAWING S100

MID CROSS-SECTION



DUTCH - ENGLISH

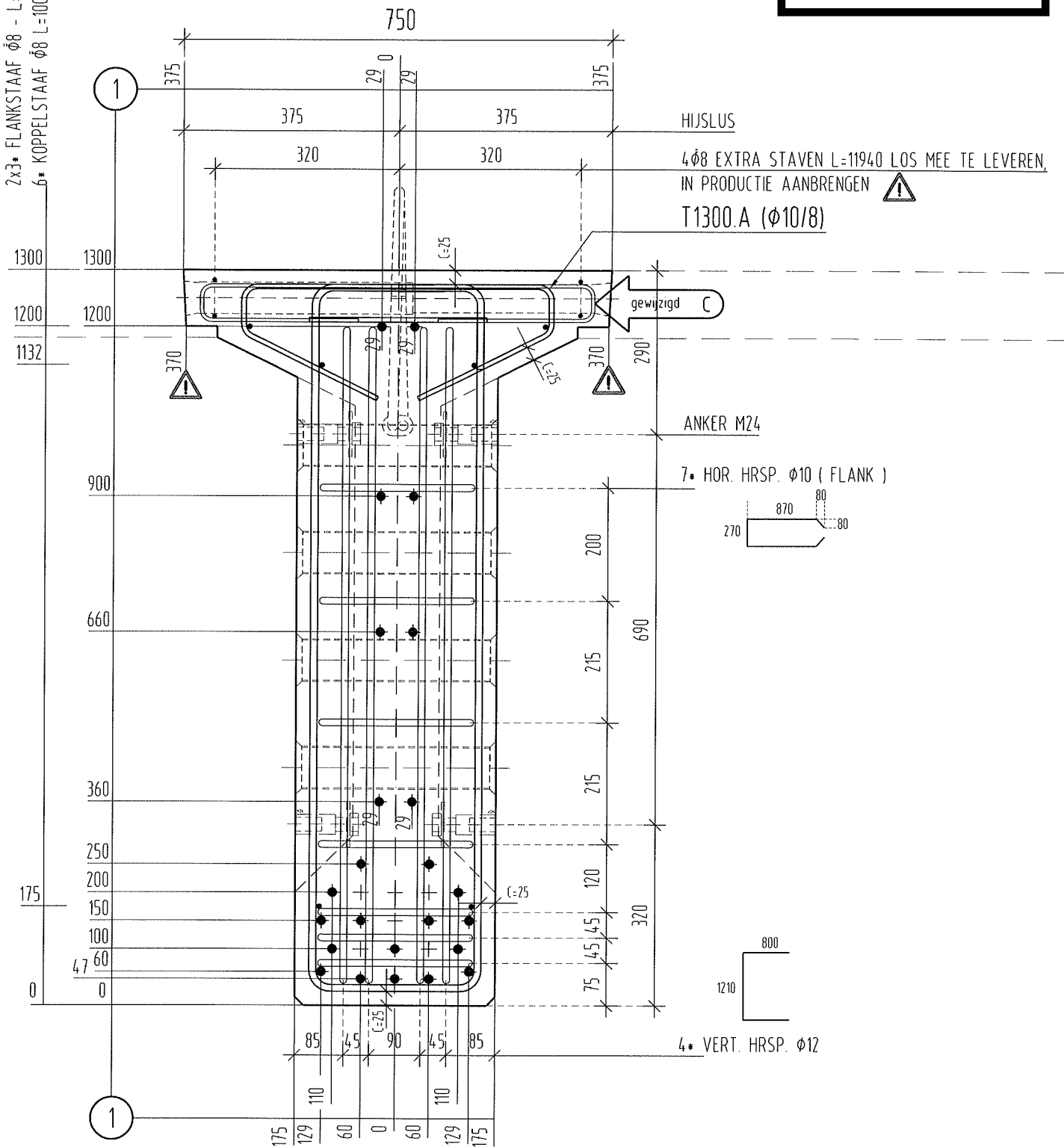
staaf = bar
staven = bars
flankstaaf = side bar
koppelstaaf = connecting bar
langsstaven = longitudinal bars
beugel = (closed) stirrup
hrsp. = open stirrup
streng = strand

LIGGER MET WAPENINGSKOOI:

2x3* FLANKSTAAF Ø8 - L=5920 +
6* KOPPELSTAAF Ø8 L=1000

KOOI HJSEN AAN ONDERSTE LANGSSTAVEN Ø8
VASTLASSEN AAN WEERSZIJDEN IEDERE BEUGEL !

END CROSS-SECTION



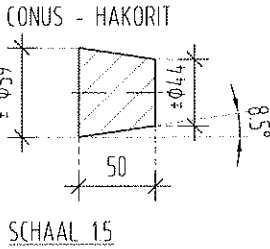
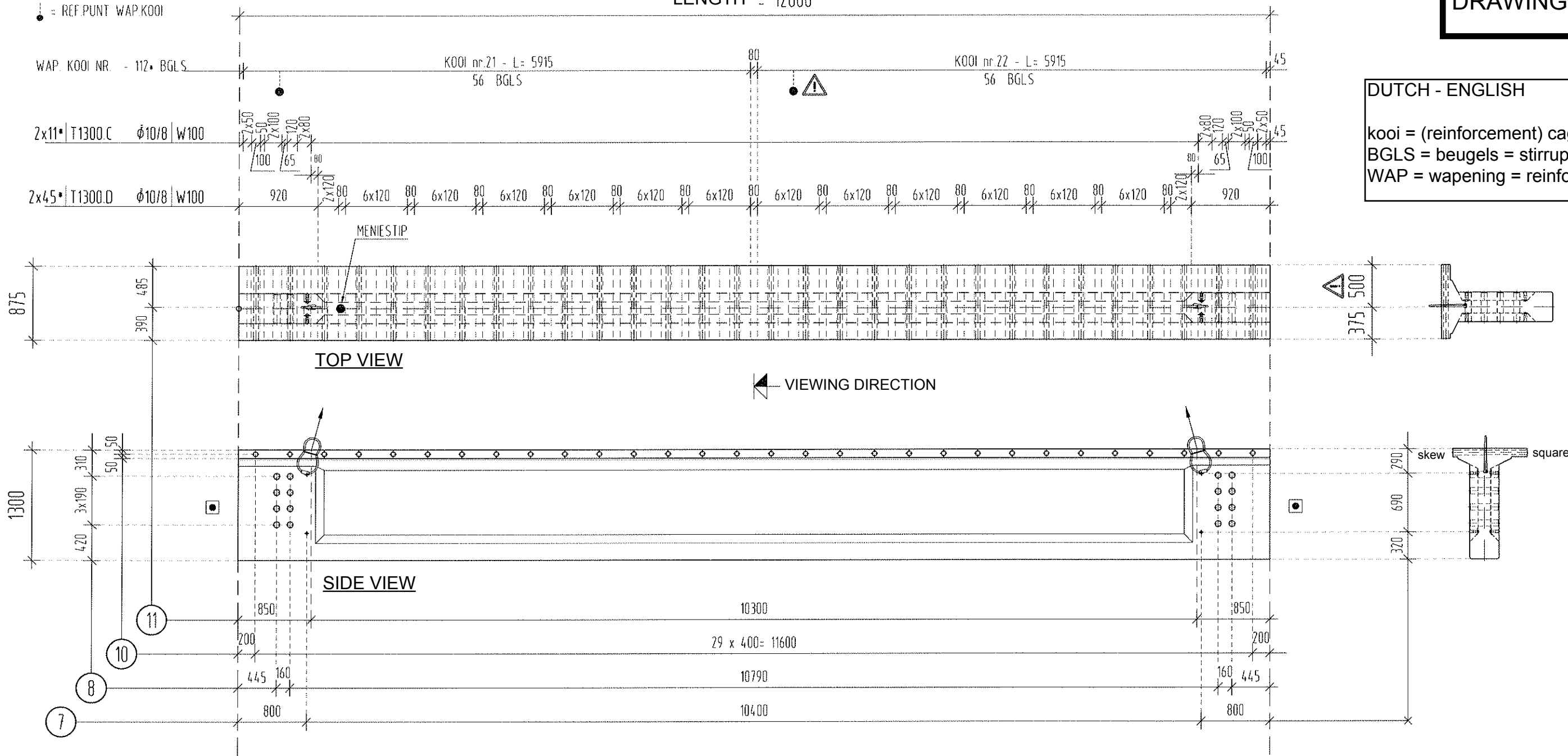
●	P1	24*	VS15S	STRENG Ø15,7 - FEP1860
symp.	POS	aantal	code	omschrijving

LENGTH = 12000

DRAWING 201

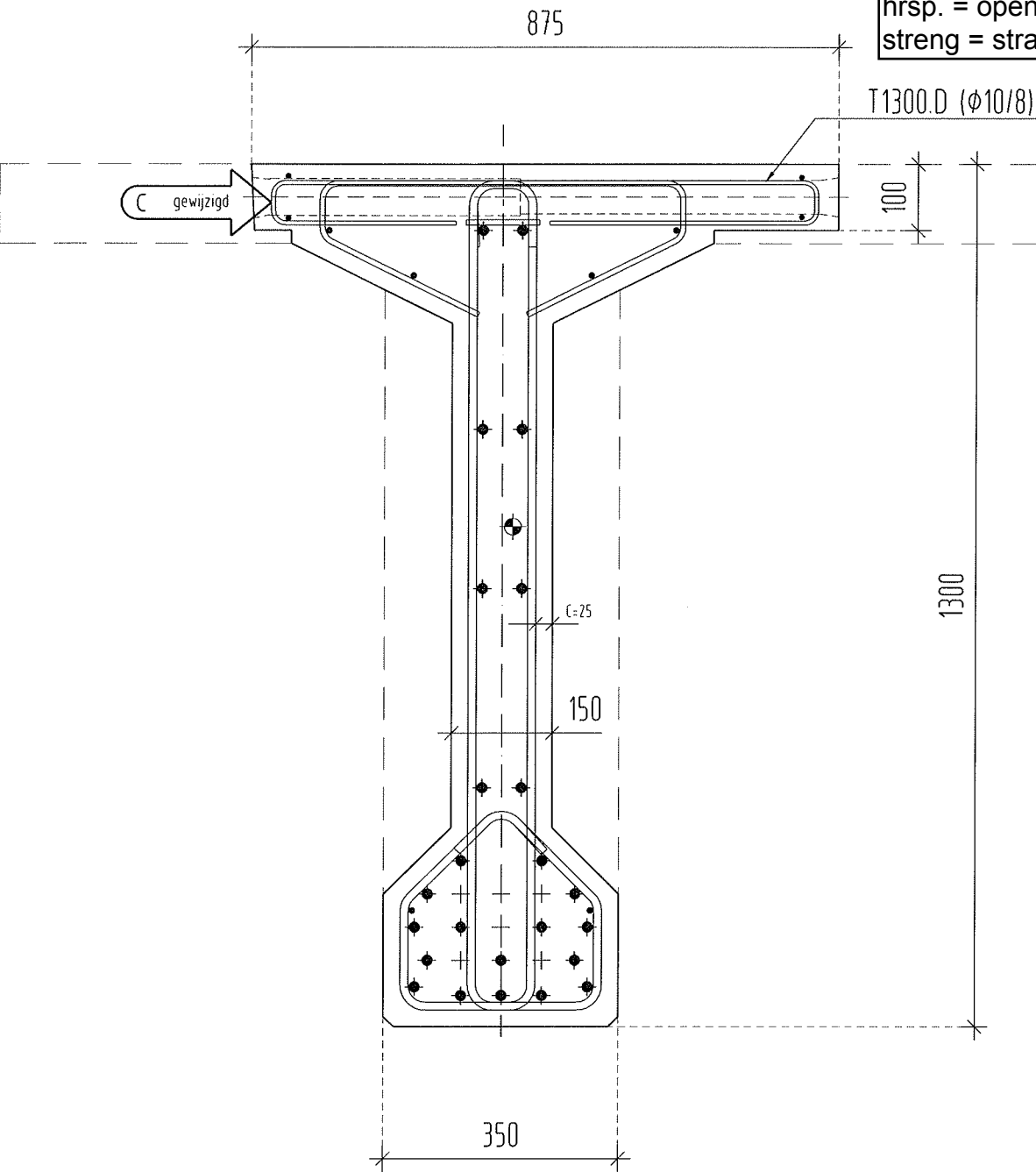
DUTCH - ENGLISH

kooi = (reinforcement) cage
BGLS = beugels = stirrups
WAP = wapening = reinforcement



P11	PH6508	ST	2*	HIJSLUS 8.0 TON THVZ	
P10	- - - - -	ST	30*	KO. BUIS $\phi 45/51+50/56$ - L=820 + CONUSSEN $\phi 59/44$	
P8	PP1772	ST	16*	PVC $\phi 75 \times 1.8$ - L=328	P8
P7	DA1474	ST	8*	M24X110-1980-P ELVZ	
POS	code	eenheid	aantal	omschrijving	opmerking
					bladnr

MID CROSS-SECTION



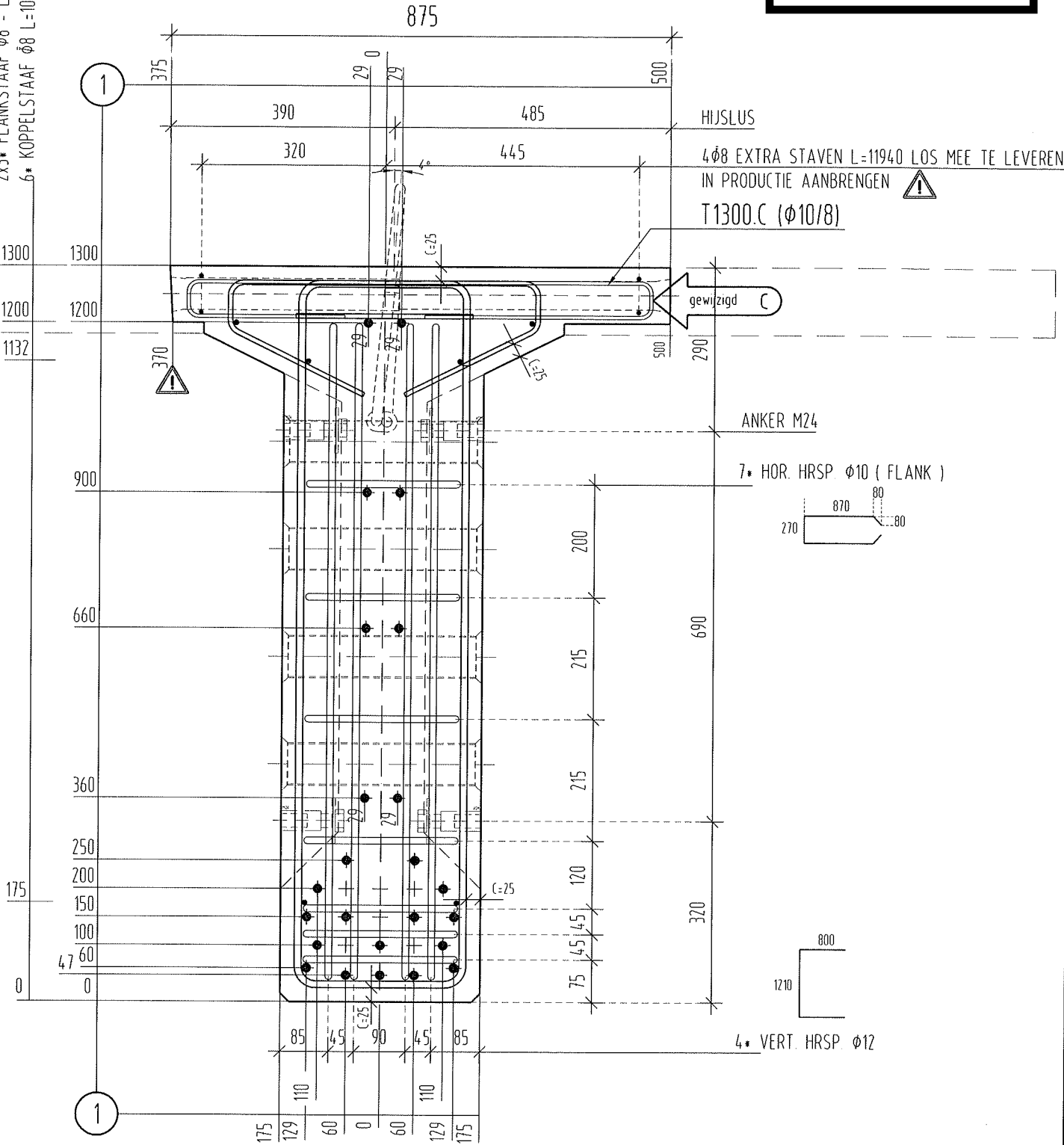
DUTCH - ENGLISH

staaf = bar
staven = bars
flankstaaf = side bar
koppelstaaf = connecting bar
langsstaven = longitudinal bars
beugel = (closed) stirrup
hrsp. = open stirrup
streng = strand

LIGGER MET WAPENINGSKOOL:
2x3* FLANKSTAAF φ8 - L=5920 +
6* KOPPELSTAAF φ8 L=1000

KOOL HIJSEN AAN ONDERSTE LANGSSTAVEN φ8
VASTLASSEN AAN WEERSZIJEN IEDERE BEUGEL !

END CROSS-SECTION



DRAWING S200

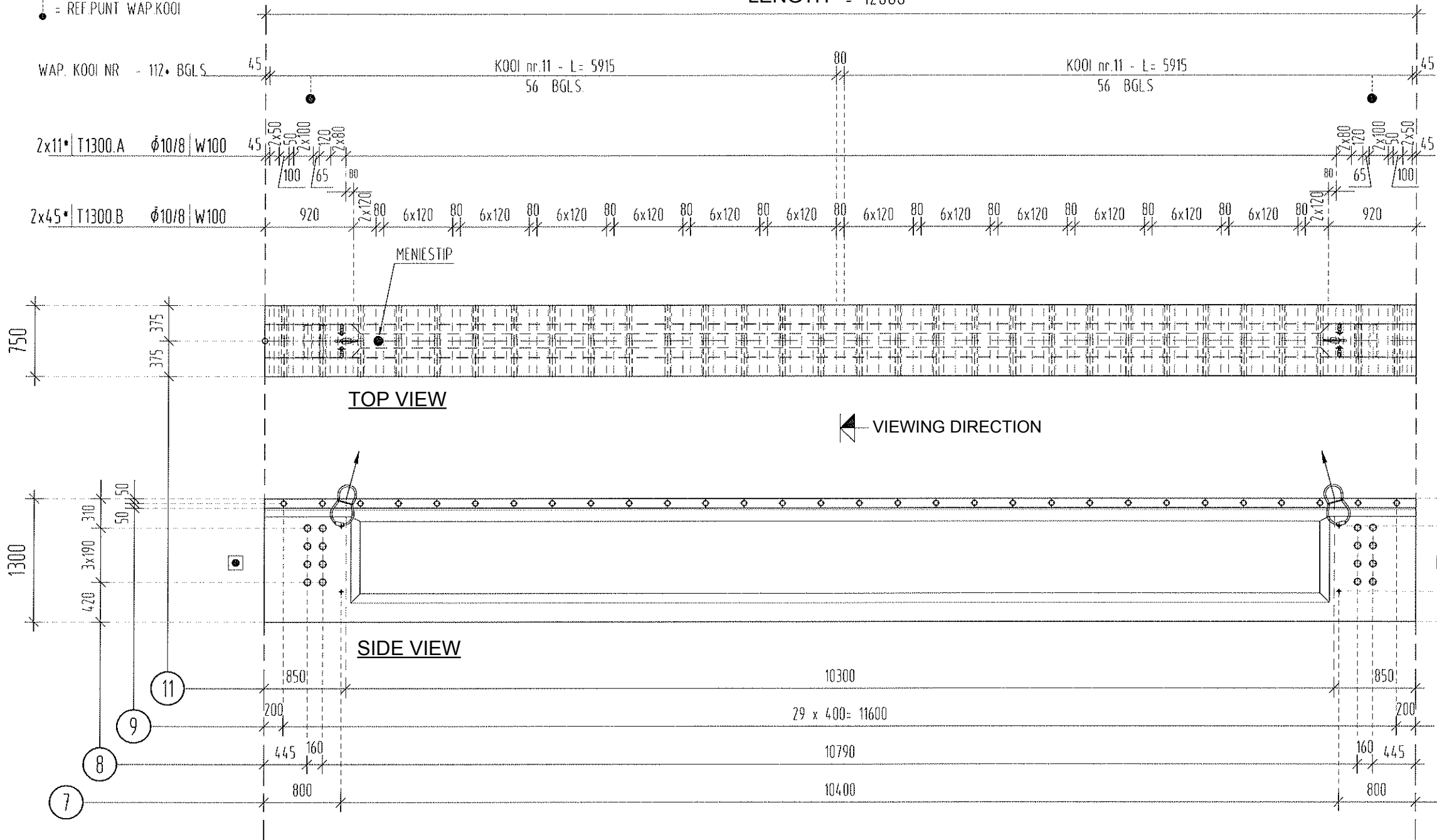
●	P1	24*	VS15S	STRENG Ø15,7 - FEP1860
symp.	POS	aantal	code	omschrijving

LENGTH = 12000

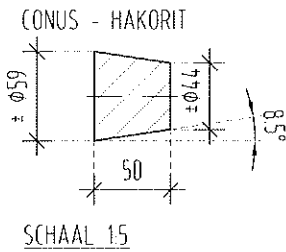
DRAWING 301

DUTCH - ENGLISH

kooi = (reinforcement) cage
BGLS = beugels = stirrups
WAP = wapening = reinforcement



OPMERKING: KOOIEN HETZELFDE ALS MERK 101



P11	PH6508	ST	2•	HIJSLUS 8.0 TON THVZ	
P9	- - - - -	ST	30•	KO. BUIS Ø45/51+50/56 - L=695 + CONUSSEN Ø59/44	
P8	PP1772	ST	16•	PVC Ø75x1.8 - L=328	P8
P7	DA1474	ST	8•	M24X110-1980-P ELVZ	
POS	code	eenheid	aantal	omschrijving	opmerking
					bladnr

General: KIWA kwaliteitssysteemcertificaat ISO 9001 No. K14534
KOMO attest-met-productcertificaat No. K2436
KIWA EG-FPC certificaat No. 0620-CPD-44469/01

Prestressing steel:	Kwaliteit: FeP 1860	Ø5	Ø6,9	Ø9,3	Ø12,5	Ø15,7
	Ap in mm²	19,6	29	52	93	150
	P _{gem} in kN per streng	0	0	0	0	214
	P _{max} in kN per streng	0	0	0	0	221
	P _{min} in kN per streng	0	0	0	0	210
	σ _p in N/mm²	0	0	0	0	1400

Reinforcement steel: Kwaliteit: B500A (≤Ø6) - B500B (≥Ø8)
Concrete: Kwaliteit: C53/65 (B65)
Minimal strength for removing formwork: 40 N/mm²
Milieuklasse: XF4 (3)
Afstandhouders: kunststof NIET toegestaan (betonnen afstandh. min. kwal B75)
Bijz eisen: -

Finishing:

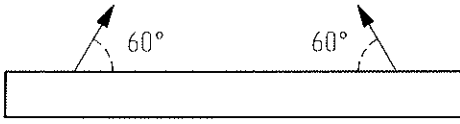
Stortzijde:	Malzijde:	Kopvlak:
Geen	Kleine luchtbell	Strengen 0 mm uitsteken
Vlakken	Luchtbell	Kopvlak JOTAMASTIC 87
Spanen	Stralen	Kopvlak 3mm BETOCHEM 50/50
Pleisteren	Ruw	Kopvlak HYDROFOBEREN
Rollen	HYDROFOBEREN	Streng JOTAMASTIC 87
Structuren (fijn)	Zichtzijde (schoonwerk)	Streng 3mm BETOCHEM 50/50
Opruwen (grof)		Wapening cementeren

Rims:	Kopzijde onder	20 • 20	
	Kopzijde rondom	-- • --	
	Langszijde	15 • 15	

Cover:  Stortzijde: 25
Modelzijde alg: 25
Modelbodem 1,0m vanaf kop: 25
Kopzijde: 25
Voorspanstaal: 35
Tenzij anders aangegeven.
C= 0mm t.p.v. dwarssp. toegestaan
Brandwerendheid: ** min.

Maatafwijkingen: Volgens NEN 2889 of Spanbeton-norm (*Maat - 10% afwijking ≤ 200)

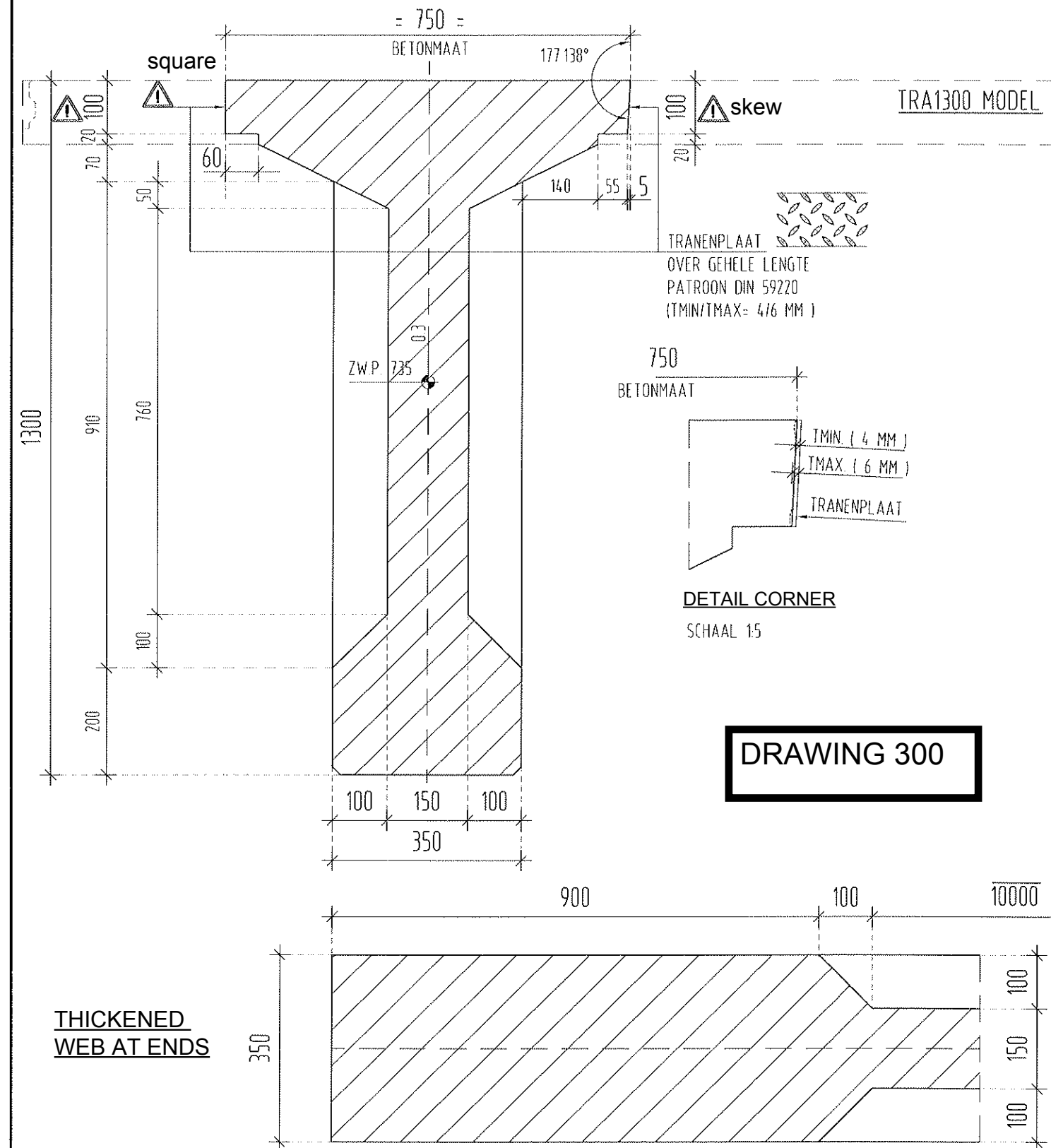
Storage and transport:	Situatie	A	B
	Tasoplegging	1000	1000
	Intern transport	1000	1000
	Extern transport	1000	1000

Hijsschema: 

Verklaring tekens: ● Meniestip (Indien noodzakelijk, altijd links op element)
+ Voorziening in getekende zijde
× Voorziening in achtervlak
— Voorziening in zijvlak

PROFIEL: TUD1300/750

Afwerking stortzijde: 0
Afwerking malzijde: 0

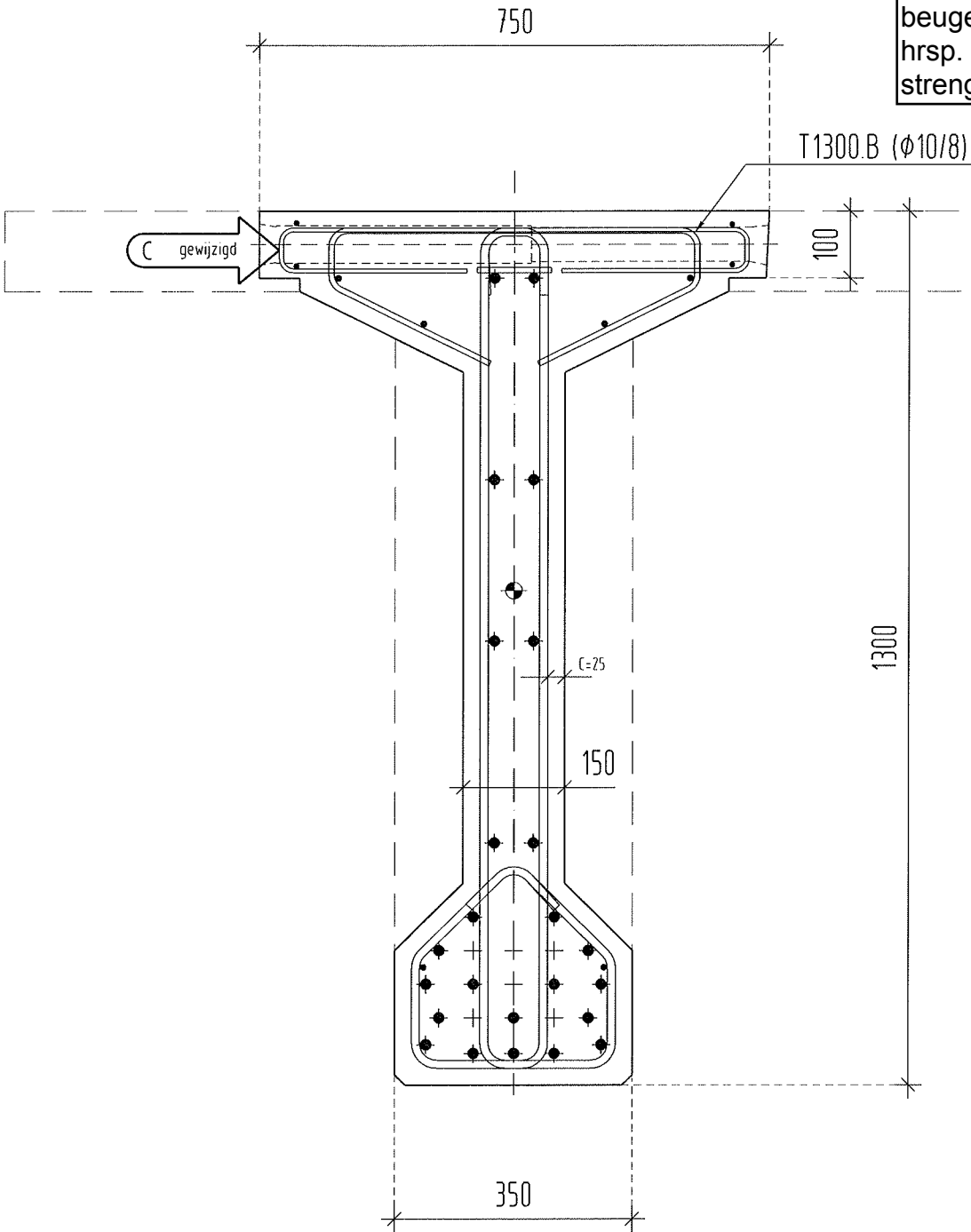


LAYOUT OF STRANDS

TUD1300/750

DRAWING S300

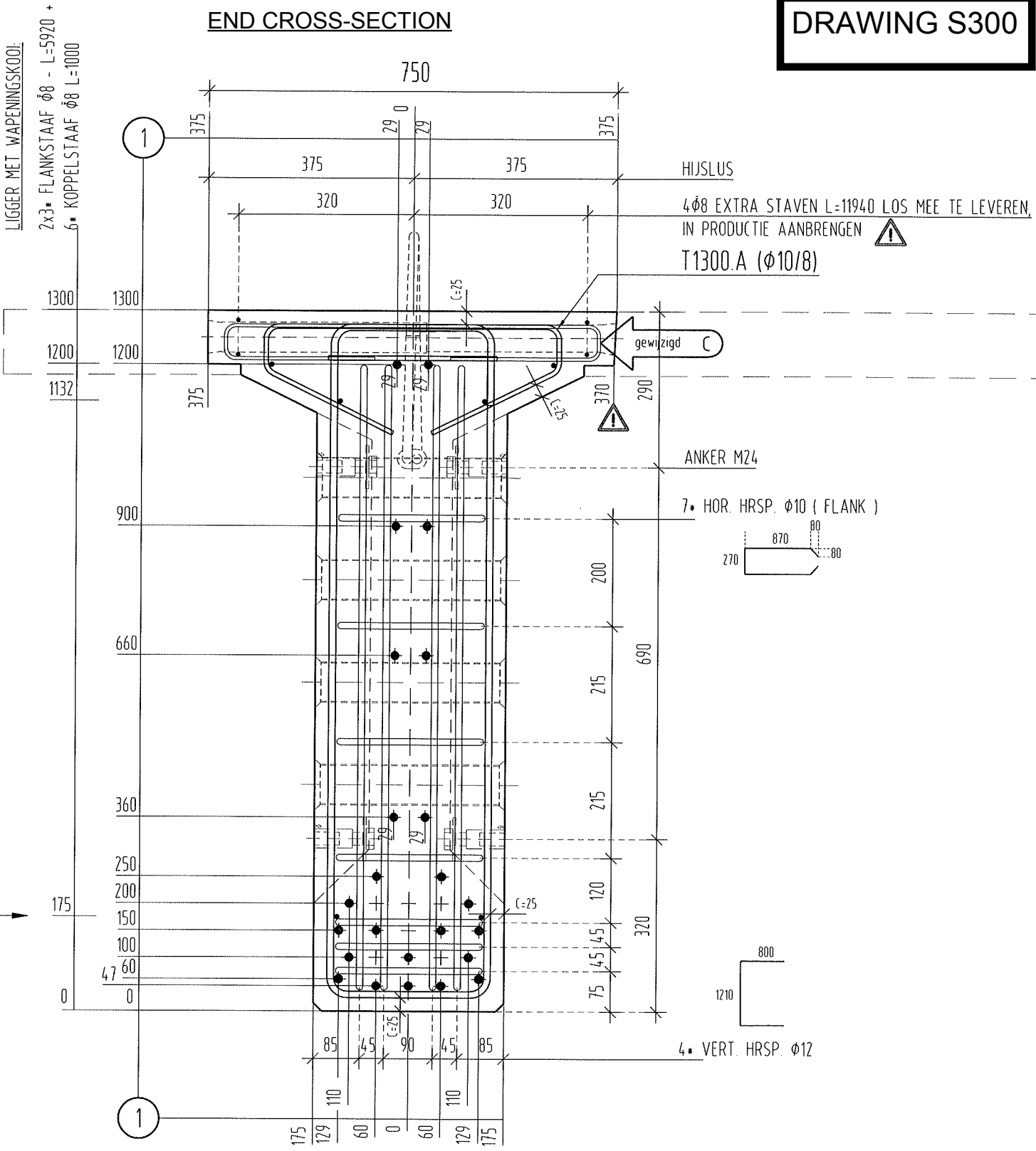
MID CROSS-SECTION



DUTCH - ENGLISH

staaf = bar
staven = bars
flankstaaf = side bar
koppelstaaf = connecting bar
langsstaven = longitudinal bars
beugel = (closed) stirrup
hrsp. = open stirrup
streng = strand

END CROSS-SECTION



KOOI HIJSEN AAN ONDERSTE LANGSSTAVEN Ø8
VASTLASSEN AAN WEERSZIJDEN IEDERE BEUGEL !

LIGGER MET WAPENINGSKOOI:
2x3* FLANKSTAAF Ø8 - L=5920 +
6* KOPPELSTAAF Ø8 L=1000

HIJSLUS
4Ø8 EXTRA STAVEN L=11940 LOS MEE TE LEVEREN.
IN PRODUCTIE AANBRENGEN

ANKER M24
7* HOR. HRSP. Ø10 (FLANK)

4* VERT. HRSP. Ø12

●	P1	24*	VS15S	STRENG Ø15,7 - FEP1860
symp.	POS	aantal	code	omschrijving

LENGTH = 12000

1 = REF.PUNT WAP.KOOI

WAP. KOOI NR. - 112* BGLS.

KOOI nr.21 - L= 5915
56 BGLS

K001 nr.22 - L= 5915
56 BGLS.

2x11* T1300.C Ø10/8 W100

2x45* | T1300.D Ø10/8 | W100

MENESTIP

TOP VIEW

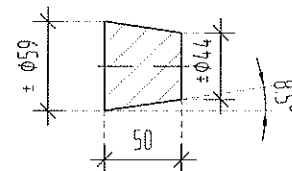


VIEWING DIRECTION

SIDE VIEW

OPMERKING: KOOIEN HETZELFDE ALS MERK 201

CONUS - HAKORIT



SCHAAL 1:5

P11	PH6508	ST	2*	HIJSLUS 8.0 TON THVZ	
P10	- - - - -	ST	30*	K0. BUIS Ø45/51+50/56 - L=820	+ CONUSSEN Ø59/44
P8	PP1772	ST	16*	PVC Ø75x1.8 - L=328	P8
P7	DA1474	ST	8*	M24X110-1980-P ELVZ	
POS	code	eenheid	aantal	omschrijving	opmerking
					bladnr

General: KIWA kwaliteitssysteemcertificaat ISO 9001 No. K14534
KOMO attest-productcertificaat No. K2436
KIWA EG-FPC certificaat No. 0620-CPD-44469/01

Prestressing steel:

Kwaliteit: FeP 1860	Ø5	Ø6,9	Ø9,3	Ø12,5	Ø15,7
Ap in mm²	19,6	29	52	93	150
P _{gem} in kN per streng	0	0	0	0	214
P _{max} in kN per streng	0	0	0	0	221
P _{min} in kN per streng	0	0	0	0	210
σ _p in N/mm²	0	0	0	0	1400

Reinforcement steel: Kwaliteit B500A (≤Ø6) - B500B (≥Ø8)

Concrete: Kwaliteit C53/65 (B65)
Minimal strength for removing formwork: 40 N/mm²
Milieuklasse XF4 (3)
Afstandhouders kunststof NIET toegestaan (betonnen afstandh. min. kwal B75)
Bijz. eisen -

Finishing:

Stortzijde:	Malzijde:	Kopvlak:
0 Geen	0 Kleine luchtbelletjes	0 Strengen 0 mm uitsteken
A Vlakken	1 Luchtbelletjes dichtpoetsen	1 Kopvlak JOTAMASTIC 87
B Spanen	2 Stralen	2 Kopvlak 3mm BETOCHEM 50/50
C Pleisteren	3 Ruw	3 Kopvlak HYDROFOBEREN
E Rollen	4 HYDROFOBEREN	4 Streng JOTAMASTIC 87
F Structuren (fijn)	5 Zichtzijde (schoonwerk)	5 Streng 3mm BETOCHEM 50/50
K Opruwen (grob)		6 Wapening cementeren

CUR aanbeveling 100
zichtzijden (schoonwerk)
conform SPANBETON specs.
Overige zijden conform
NEN 6722 - Klasse A

Rims:

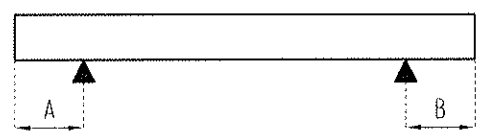
Kopzijde onder	20 • 20		
Kopzijde rondom	-- • --		
Langzijde	15 • 15		

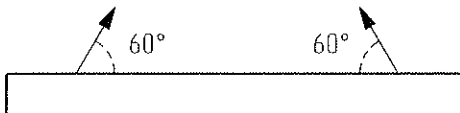
Cover:  Stortzijde 25
Modelzijde alg 25
Modelbodem 1,0m vanaf kop 25
Kopzijde 25
Voorspanstaal 35
Afw. -5/+10 op gereed product
Tenzij anders aangegeven.
C= 0mm t.p.v. dwarssp. toegestaan.
Brandwerendheid ** min.

Maatafwijkingen: Volgens NEN 2889 of Spanbeton-norm (*Maat - 10% afwijking ≤ 200)

Storage and transport:

Situatie	A	B
Tasoplegging	1000	1000
Intern transport	1000	1000
Extern transport	1000	1000

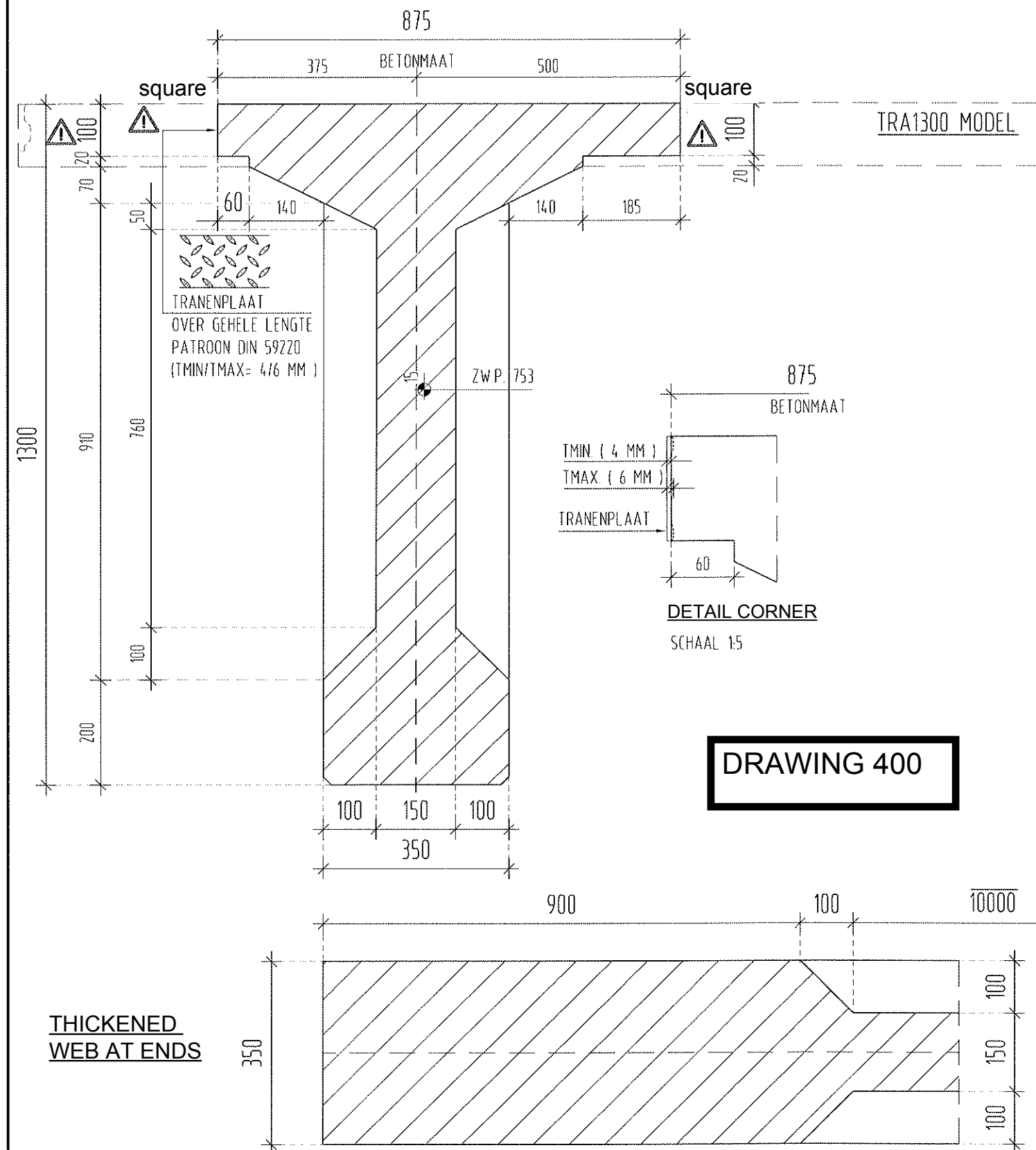


Hijsschema: 

Verklaring tekens:  Meniestip (Indien noodzakelijk, altijd links op element)
 Voorziening in getekende zijde
 Voorziening in achtervlak
 Voorziening in voor en achtervlak
 Voorziening in zijvlak

PROFIEL: TUD1300/875

Afwerking stortzijde: 0
Afwerking malzijde: 0



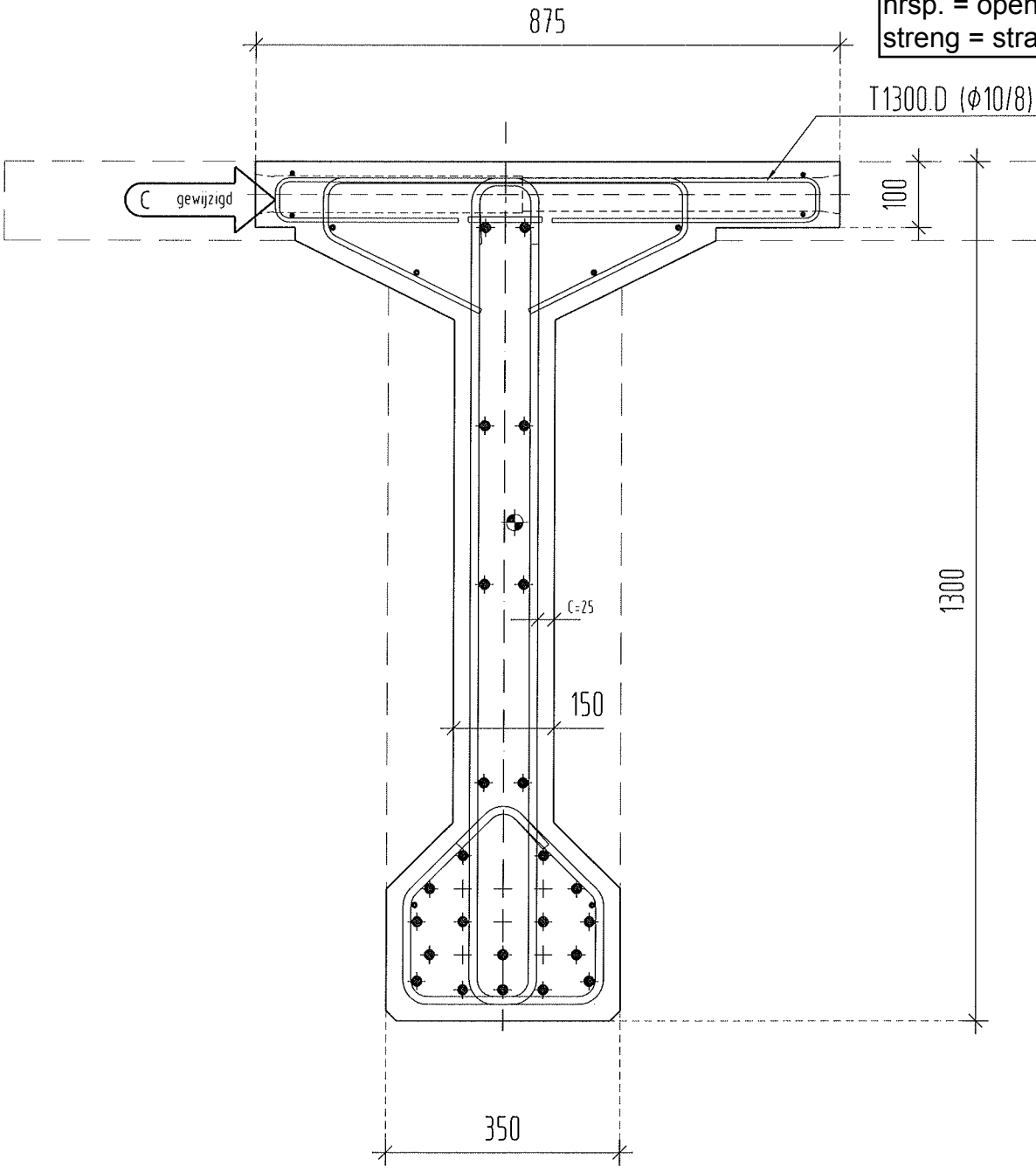
DRAWING 400

LAYOUT OF STRANDS

TUD1300/875

DRAWING S400

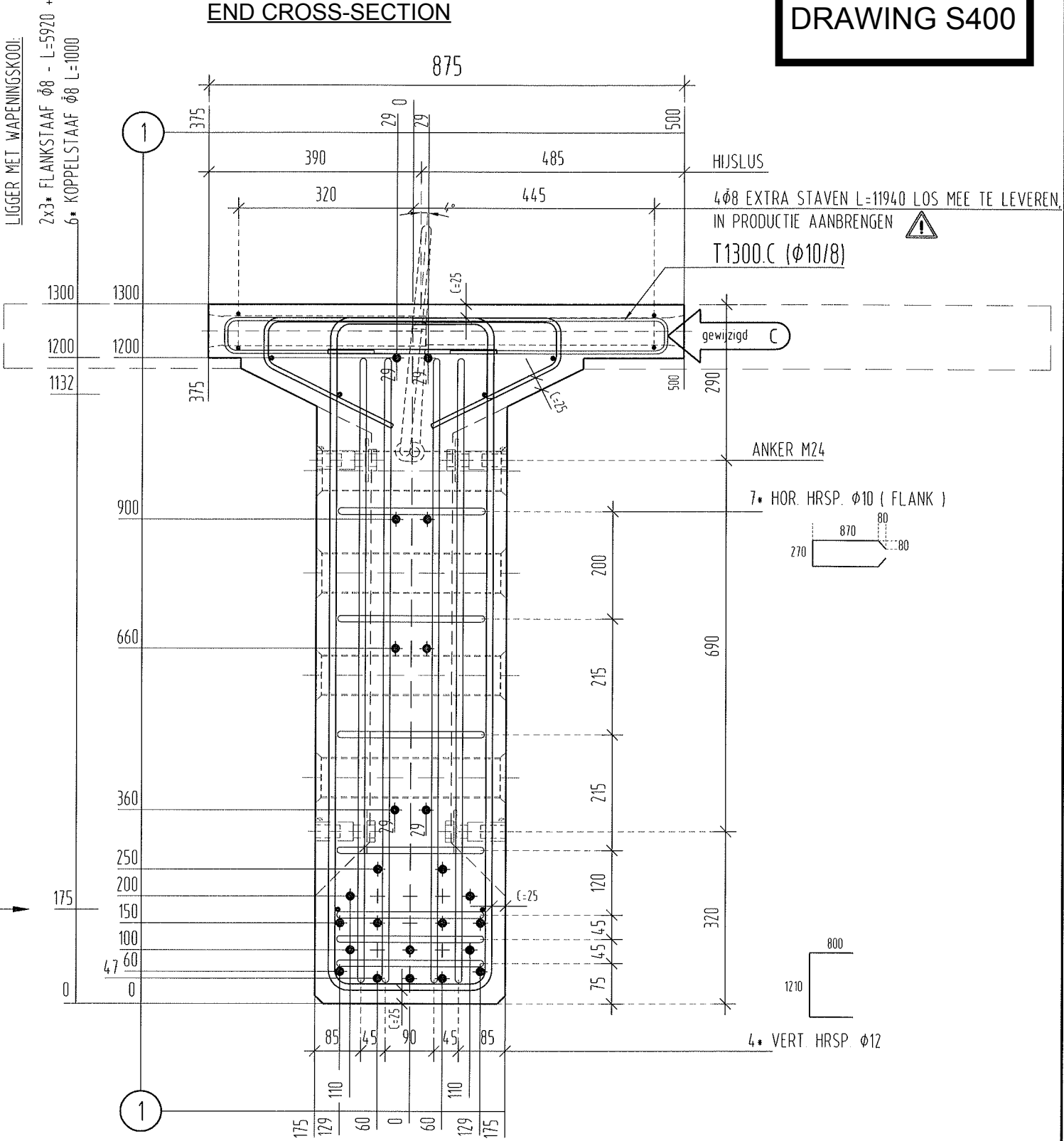
MID CROSS-SECTION



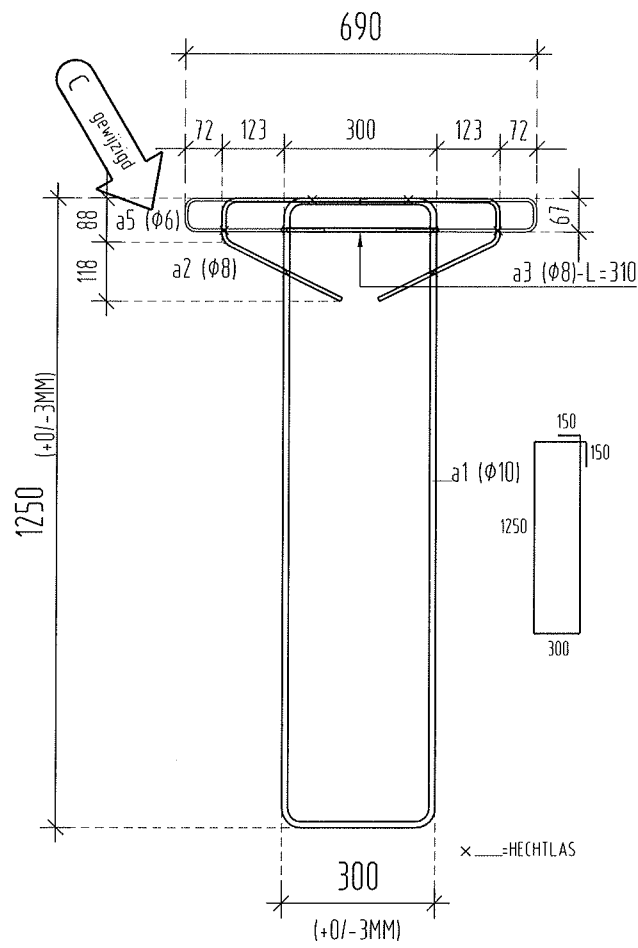
DUTCH - ENGLISH

staaf = bar
staven = bars
flankstaaf = side bar
koppelstaaf = connecting bar
langsstaven = longitudinal bars
beugel = (closed) stirrup
hrsp. = open stirrup
streng = strand

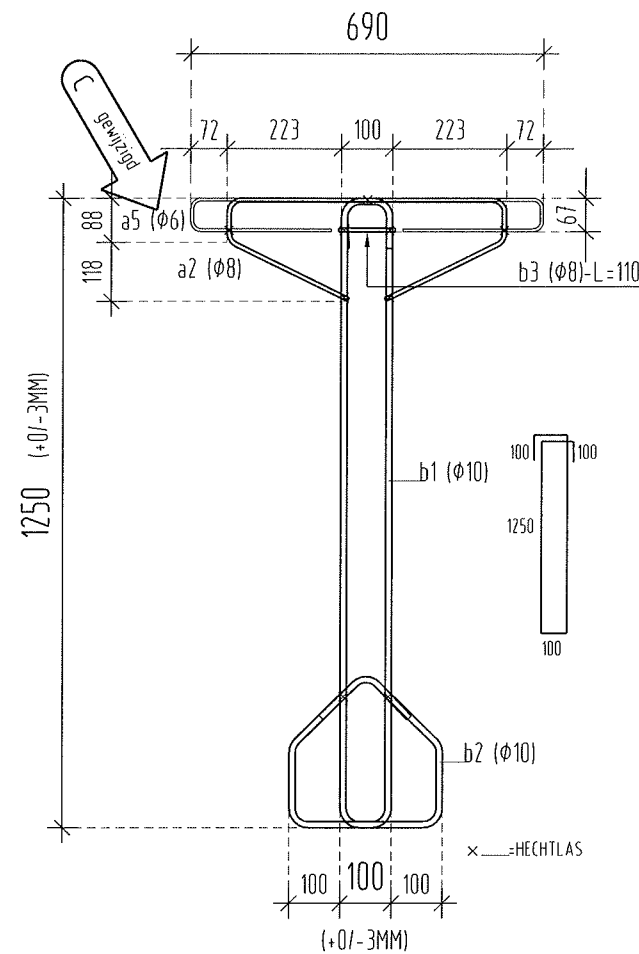
END CROSS-SECTION



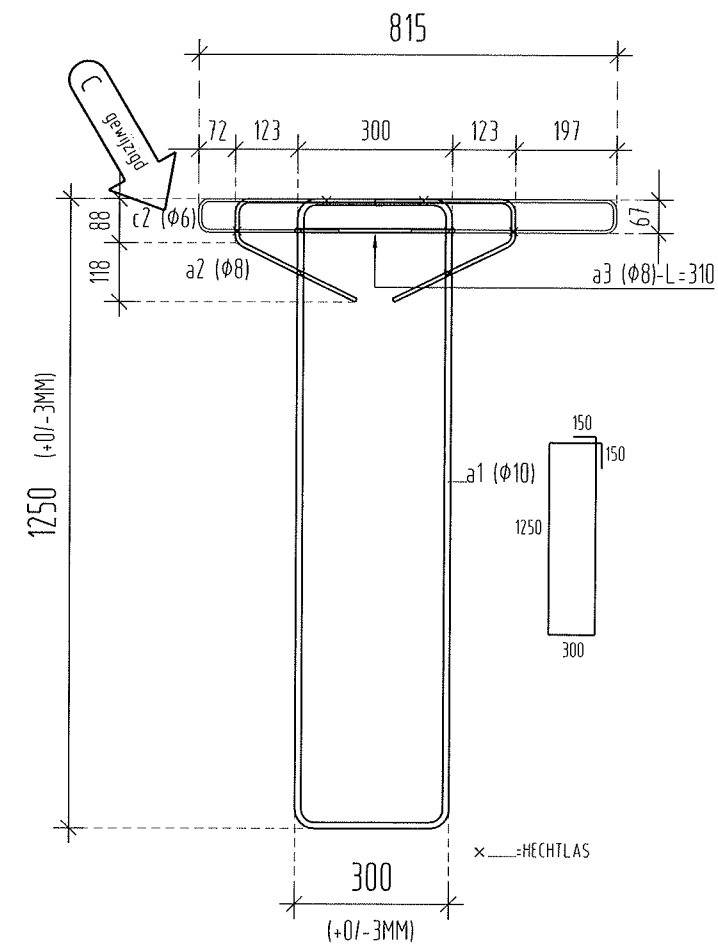
●	P1	24*	VS15S	STRENG Ø15,7 - FEP1860
symp.	POS	aantal	code	omschrijving



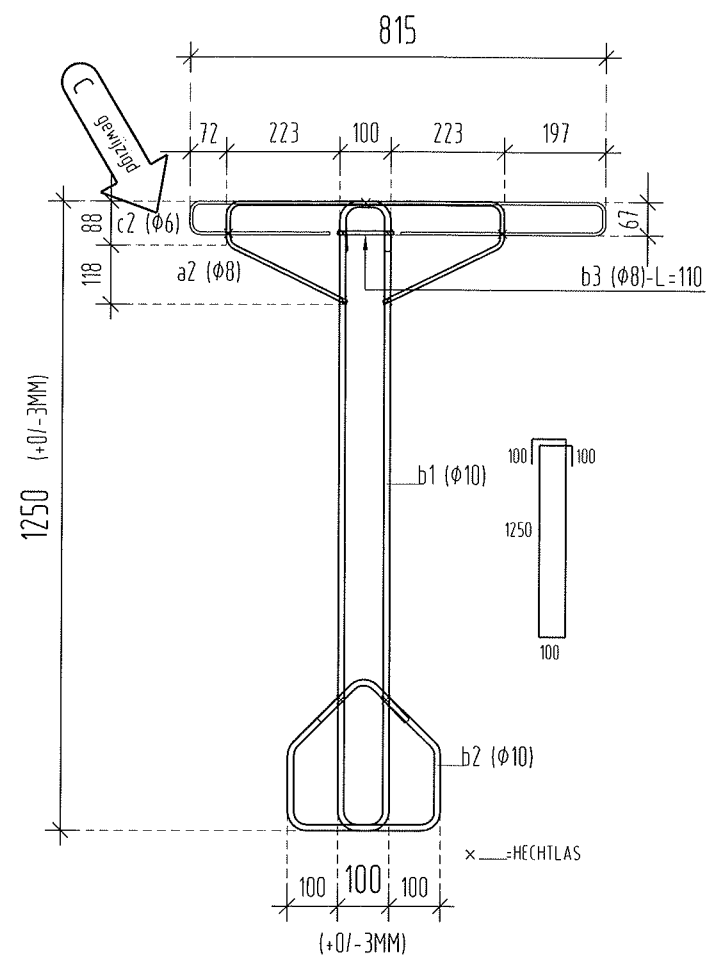
KOPBGL.T1300.A (Φ10/8)



LIJFBGL.T1300.B (Φ10/8)

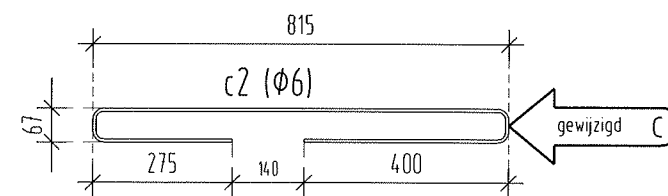
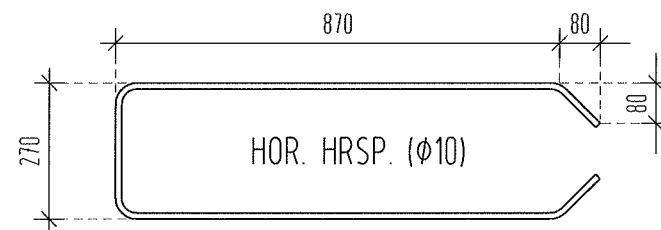
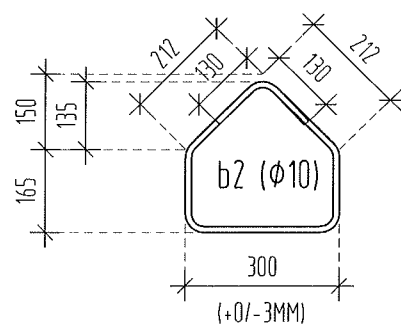
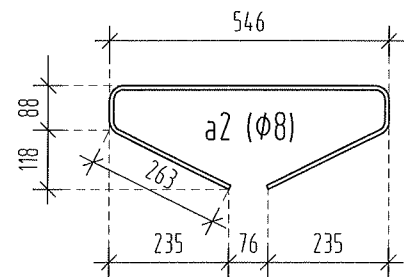
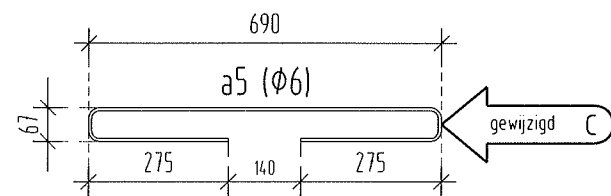


KOPBGL.T1300.C (Φ10/8)



LIJFBGL.T1300.D (Φ10/8)

DRAWING W100



STIRRUPS FOR GIRDER CODES 101 + 201 + 301 EN 401

APPENDIX C: CONCRETE STRENGTH

concrete class C53/65

Proefelementen-TU-Delft

