higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1520**(E)**(J28)T

AUGUST EXAMINATION

NATIONAL CERTIFICATE: MULTI-DISCIPLINARY DRAWING OFFICE PRACTICE

STRUCTURAL STEEL DETAILING

(8090225)

28 July 2015 (Y-Paper)
13:00 – 17:00

REQUIREMENTS: A3 drawing paper

Candidates will require drawing instruments.

This question paper consists of 5 pages, 2 diagram sheets and 1 information sheet.

DEPARTEMENT OP HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE: MULTI-DISCIPLINARY
DRAWING OFFICE PRACTICE
STRUCTURAL STEEL DETAILING

TIME: 4 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read the questions carefully.
3. Use both sides of the drawing paper.
4. A balanced layout is very important and candidates will be penalised for bad planning.
5. A 15 mm border must be drawn around the drawing sheet (on both sides).
6. The question numbers must be clearly indicated.
7. ALL drawing work, including candidate information, must be done in pencil.
8. ALL the drawing work must comply with the SABS 10111-1990.
9. Computers may be used as drawings aids.

QUESTION 4: LATTICED GIRDERS

FIGURE 2, DIAGRAM SHEET 2 shows a line diagram of a typical WELDED latticed girder.

Draw, to scale 1 : 5 typical details of the following:

4.1 Detail A

4.2 Detail B

4.3 Detail C

Specifications:

Top and bottom booms: rolled steel angle profiles, 120 x 120 x 10

All internal members: rolled steel angle profiles,90 x 90 x 8

All gusset plates are 10mm thick.

Do not insert any dimensions.

Gusset plate sizes, as well as information not given, are left to your own discretion.

Print a suitable title and scale centrally below the details. **[15]**

QUESTION 5: TRUSSES

5.1 Refer to FIGURE 1, DIAGRAM SHEET 1 and draw to scale 1 : 20 a line diagram of the BOLTED steel roof truss. (6)

5.2 Draw to scale 1 : 5 typical bolted details at A and B.

Use the following specifications:

Top and bottom boom: 100 x 100 x 10 hot rolled steel angle profiles

All internal members: 70 x 70 x 8 hot rolled steel angle profiles
Gusset plates: 10mm thick

Use bolt hole centres of 100mm and edge distances of 35mm.

All bolt holes are drilled on the centre lines of the angles and all bolts are M20.

Insert suitable dimensions. (14)
[20]

DIAGRAM SHEET 1

MULTI–DSCIPLINARY DRAWING OFFICE PRACTICE DIAGRAM SHEET 1
STUCTURAL STEEL DETAILING N5 DIAGRAMVEL 1

MULTIDISSIPLINERE TEKENKANTOORPRAKTYK
STUKTUURSTAALDETAILLERING N5

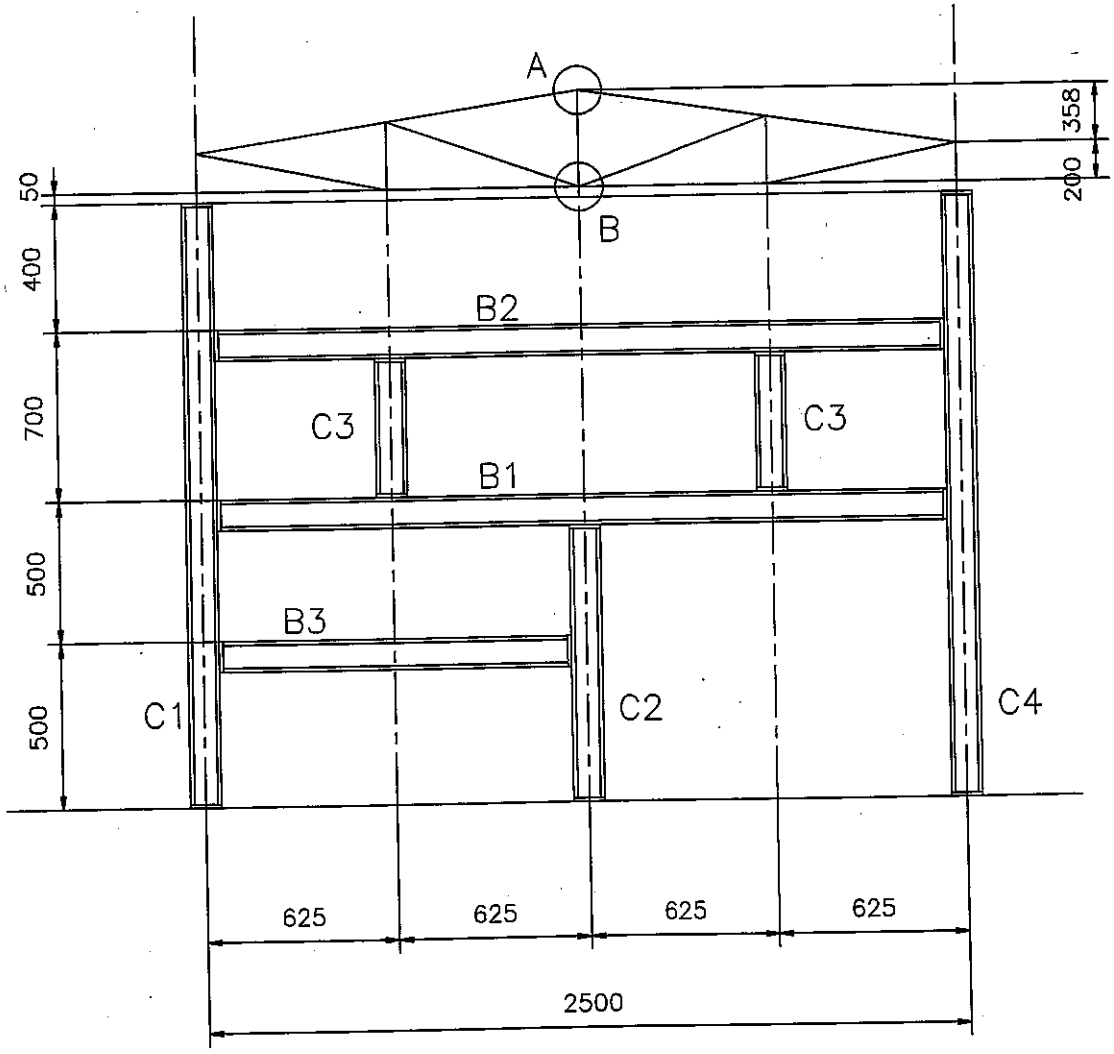


FIGURE 1
FIGUUR 1

B1 – UB 254 x 146 x 31 kg/m
B2 – UB 203 x 133 x 25 kg/m
C1, C2, C4 – UB 203 x 203 x 46 kg/m
C3 – UB 152 x 152 x 23 kg/m
END PLATES – 10 mm WITH 4 x M20 BOLTS
BASE PLATES – 20 mm WITH 2 x M20 BOLTS
ENDPLATE – 10 mm MET 4 x M20 BOUTE
VOETPLATE – 20 mm MET 2 x M20 BOUTE

INFORMATION SHEET

MULTI-DISCIPLINARY DRAWING OFFICE PRACTICE

STRUCTURAL STEEL DETAILING N5

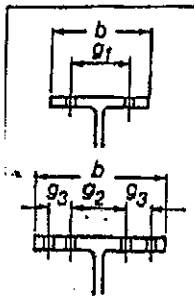
MULTIDISSIPLINÊRE TEKENKANTOORPRAKTYK

STRUKTUURSTAALDETAILLERING N5

information sheet / inligtingsvel

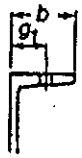
VOORGESTELDE BOUTGATPOSIES

Table 1.12: Recommended gauges and backmarks



Recommended gauges, I and H-sections

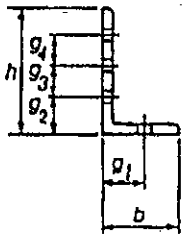
b (mm)	Gauge (mm) g_1	g_2	g_3	ϕ max (mm)
64	32			11
73–82	40			12
89–91	50			12
102	54			16
133–146	70			20
152	90			20
165–191	90			24
203–254	140			24
305	140	120	60	24
368–406	140	140	75	24



Recommended backmarks, channels

BOUTGATPOSISIES KANAALPROFIELE

b (mm)	g_1 (mm)	ϕ max (mm)
38	22	8
45	25	10
50	28	12
54,55	28	16
60	35	16
64,65	35	20
70	40	20
75–85	45	20
90	50	24
95–110	55	24



Recommended backmarks, angles

BOUTGATPOSISIES HOEKPROFIELE

h or b (mm)	Backmark g_1 (mm)	ϕ max. (mm)	h or b (mm)	Backmark (mm) g_1	g_2	g_3	g_4	ϕ max. (mm)
25	15		90	50				24
30	17		100	50				24
35	20		120	60				24
40	33	8	120		45	50	—	16
45	25	10	125	65				24
50	28	12	125		45	50	—	20
60	35	16	150	75				24
65	35	20	150		55	55	—	20
70	40	20	200	—	75	75	—	24
75	45	20	200		55	55	55	20
80	45	20	200					

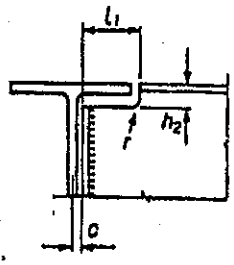
ϕ max. = maximum diameter of bolt or rivet.

ϕ maks = maksimum diameter van bout of klinknael

AFMETINGS VAN BALKKEPE

Table 1.14: Dimensions of Beam Notch

Dimension c is to face of end plate or angle cleat. r = 10 mm minimum. Afmeting c is tot teen endplaat of hoekyster kleo.



Section		c	Notch l_1	Notch h_2
I-sections (parallel flange) I-profiel (parallel flens)	100 × 55 × 8	4	33	15
	120 × 64 × 10	4	37	15
	140 × 73 × 13	4	42	20
	160 × 82 × 16	5	47	20
	180 × 91 × 19	5	51	20
	200 × 100 × 22	5	56	25
	203 × 133 × 25	5	74	20
	30	5	74	20
	254 × 146 × 31	5	81	20
	37	5	81	25
	43	6	81	25
	305 × 102 × 25	5	57	20
	29	5	57	20
	33	5	57	25
	305 × 165 × 41	5	91	25
	46	5	91	25
	54	6	91	25
	356 × 171 × 45	5	94	25
	51	5	94	25
	57	6	94	30
	67	7	94	30
	406 × 140 × 39	5	78	25
	46	5	78	25
	406 × 178 × 54	6	97	25
	60	6	97	30
	67	6	97	30
	457 × 191 × 67	6	103	25
	75	7	103	30
	82	7	103	30
	90	7	103	30
	98	8	103	35