



INFRASTRUCTURE MAINTENANCE

SPECIFICATION

Specification For A Hydraulic Rail Drill

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1. General Requirements

- 1.1 This specification outlines the requirements of a heavy-duty, hydraulically operated automatic feed rail drill.

2. Operating Conditions

- 2.1 Machines will be operated in all weather conditions at altitudes varying from sea level to 1850 m above sea level, relative humidity 10% to 90% and atmospheric conditions which vary from heavily saline to dry and dusty.
- 2.2 Ambient air temperatures ranging from -5°C to 45°C .

3. Qualifications

- 3.1 The design of the machine is to be that of the manufacturer, but must be of robust construction in order to meet the sustained heavy-duty demands of railway infrastructure maintenance.
- 3.2 A “no-tool” adjustment machine is preferred.
- 3.3 Machines will be acceptable in standard factory production finish and colour. Details to be furnished.
- 3.4 Only products proven in service will be considered. A list of users, both South African and international, is to be submitted.

4. Performance

- 4.1 A service life of not less than 7 years is expected from each machine. The actual design life of the machines is to be stated.
- 4.2 The machines are to be easily and economically maintained with standard workshop tools and equipment.
- 4.3 The rail drill must be compatible with hydraulic oil of viscosity grades 46 and 68 – details as per SANS 1218:2005 (Hydraulic Oil – Anti-wear Type).

5. General Requirements

- 5.1 This specification outlines the requirements of a heavy-duty hydraulically operated automatic feed rail drilling machine that will be used to drill holes in webs of rail sizes as outlined in this specification.
- 5.2 The machine must be complete with index bar, rail templates, tool holders and coolant supply vessel.

6. Detailed Requirements

6.1 Preferred Mass

- 6.1.1 The mass of the rail drill (including whip hoses) must not exceed 30kg.

6.2 Hydraulic System Requirements

- 6.2.1 The machine must comply to HTMA standards for hydraulic tool operation.
- 6.2.2 The machine must operate on the "Open Centre Circuit" hydraulic system.
- 6.2.3 The hydraulic supply will meet the requirements of HTMA Type RR System and the rail drill must operate effectively on this standard.
- 6.2.4 The rail drill must be equipped with 12mm ($\frac{1}{2}$ "") hydraulic whip hoses that comply to DIN EN 853 - 2SN (Rubber Hoses and Hose Assemblies - Wire Braid Reinforced Hydraulic Type).
- 6.2.5 The whip hoses must be 400mm long.
- 6.2.6 The whip hoses must be fitted with 12mm ($\frac{1}{2}$ "") fixed male and female quick release flat-face fittings that comply to HTMA standards. The quick release fittings must be fitted with dust caps.
- 6.2.7 Hose connections must be placed in a position that would assist in the balance of the machine and make it easy for the operator to handle and move the machine.
- 6.2.8 Coupling points are to indicate whether they are supply or return points.

6.3 Rail Profiles and Hole Sizes

- 6.3.1 A complete set of drawings depicting the various rail profiles i.e. 30kg/m, 40kg/m, 48kg/m, 57kg/m, S-60-SAR, UIC-60 and 60E1 is provided in Annexure A.
- 6.3.2 The hole sizes and hole distances for the various rail joints, except 60E1 which will be advised are also indicated in Annexure A.

6.4 Tool Holders and Drill Bits

- 6.4.1 Tool holders and carbide bits must be readily available in South Africa.
- 6.4.2 The tool holders must accommodate standard carbide bits.
- 6.4.3 The supplier must indicate the most suitable bit to be used and suitable alternatives.
- 6.4.4 The rail drills will also be used in the drilling of 13.5mm holes for rail bonding kits in any of the rail profiles mentioned in 6.3.1. Therefore the operation of the rail drill must be suitable for the drilling of these too.

6.5 Cutting Tip Cooling System

- 6.5.1 A well designed cooling system that operates through the tool holder is required.
- 6.5.2 The cooling-lubricant storage vessel should not be less than 6 litres in capacity.
- 6.5.3 Once pressurised to its maximum, the pressure in the cooling-lubricant storage vessel must be more than sufficient to provide cooling for at least one complete hole.

6.6 Spindle Speed

- 6.6.1 The speed of the rail drill must be optimised for the rail material and cutting bits recommended by the supplier.
- 6.6.2 The speed of the rail drill must be variable from 0 to maximum.

6.7 Rail Clamps

- 6.7.1 Notwithstanding the requirements of 6.8, the rail clamps of the rail drill are to be provided with an absolutely positive type(s) of clamping device(s) in order to ensure that no movement will be possible during operation of the rail drills.
- 6.7.2 The clamping must be rigid and square to the rail.

6.8 Rail Drill Templates

- 6.8.1 It is required that the templates for the following rail sizes be configured as below:

- 30 kg/metre and 40 kg/metre templates combined in one set
- 48 kg/metre and 57 kg/metre templates combined in one set
- 60 kg/metre and 60E1 templates combined in one set
- S60 in one set of templates

- 6.8.2 The hardness of the templates must be such as to resist deformation and damage while in service.
- 6.8.3 The templates must be clearly marked.
- 6.8.4 The templates must be such that the drilled hole will be as called for on the rail profile drawings.

6.9 Index Bar

- 6.9.1 An index bar will be used to position the rail drill in a number of positions relative to a rail joint to drill a number of holes in the rail, accurately located relative to each other.
- 6.9.2 A single index bar must be provided to position the rail drill for the drilling of holes for the various rail profiles as per 6.3.
- 6.9.3 The index bar must be clearly marked with the necessary dimensions required to position the rail drill.

6.10 Component Markings

- 6.10.1 The drill is to be clearly marked in respect of hydraulic oil flow required.
- 6.10.2 Coupling points are also to indicate whether they are supply or return points.

6.11 Body

- 6.11.1 The frame and components of the machine must be robust.
- 6.11.2 The machine must be well protected against rust.
- 6.11.3 The grip on the handles must have a non-slip surface.
- 6.11.4 The machines will be accepted in standard factory finish and colour.
Due cognisance must be given to the life requirement of the machine.

6.12 Ergonomics

- 6.12.1 The tool must be ergonomically designed for maximum operator productivity, safety and transportability.

6.13 Accessories

- 6.13.1 The following accessories must be supplied with the rail drill:

- a.) 13.5 mm tool holder
- b.) 26 mm tool holder
- c.) 32 mm tool holder
- d.) 35 mm tool holder
- e.) Set of templates as per 6.8
- f.) Index bar as per 6.9
- g.) Coolant supply vessel
- h.) A storage box for 6.13.1a-e and 6.13.2a-d.

- 6.13.2 The following accessories must be quoted for separately:

- a.) Carbide bit for 13.5 mm tool holder
- b.) Carbide bit for 26 mm tool holder
- c.) Carbide bit for 32 mm tool holder
- d.) Carbide bit for 35 mm tool holder

6.14 Optional Extras

- 6.14.1 A de-burring tool, as per drawing BBB2066, must be offered as an optional extra.
- 6.14.2 The de-burring tool and its components must be able to resist deformation while in service.

7. Quality Control

- 7.1 All machines must be manufactured in an environment that complies to the latest ISO 9000 to ISO 9004 or similar quality control standards. Details must be furnished.
- 7.2 Machines will be subject to a technical evaluation and the final decision will, amongst others, be based on these findings.

8. Legal and Operational

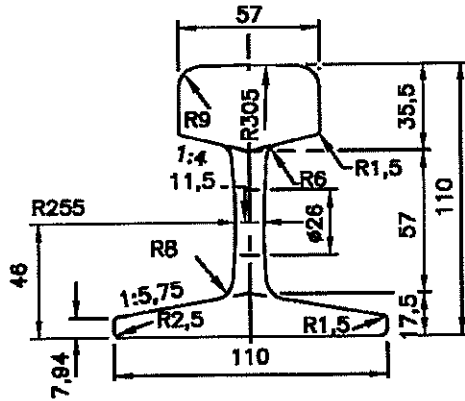
- 8.1 All machines must comply with the requirements of the Machinery and Occupational Safety Act, (Act 85 of 1993 – General Machinery Regulations) and The Machinery Directive 98/37/EC.
- 8.2 The rail drill must be completely assembled and filled with lubricants and ready for service in all respects.
- 8.3 Where grease nipples are fitted these are to be to DIN 71412 in easily accessible positions. Full details of lubrication applicable to machines on offer to be submitted.
- 8.4 An operator's handbook, service manual and spare parts list must be supplied with each machine in order to ensure that the machine is operated in accordance to the manufacturer's instructions.
- 8.5 All machines and equipment must be supplied complete with essential tools such as allen keys, spanners etc. in order to make essential adjustments as well as to fit or remove consumable items.
- 8.6 Suppliers of hydraulic machinery will be required to stock a full range of readily available spare parts required for the maintenance of these machines throughout their life span. Full details of service organisation is to be submitted.
- 8.7 Consumable items must be available locally and must be of standardised format in order to be used on equipment of more than one supplier.
- 8.8 All machines and equipment is to be guaranteed for a minimum period of 12 months against faulty material and workmanship - fair wear and tear excluded. Full details of guarantee is to be submitted.
- 8.9 The information as requested by the various clauses in this specification are to be supplied in the form of technical data, pamphlets and/or drawings. If this is not complied to, offers may be overlooked.
- 8.10 Each machine purchased will be issued with a project number consisting of 20 characters which must be stamped or engraved directly onto the machine or on the manufacturer's data plate or a separate riveted plate on the particular machine.
- 8.11 Sufficient training must be given to all operators of these machines.

8.12 Machines not already in service with Transnet Freight Rail must be made available for testing/evaluation during the adjudication of the tender. Technical improvements on existing machines/equipment is to be substantiated by physical examples.

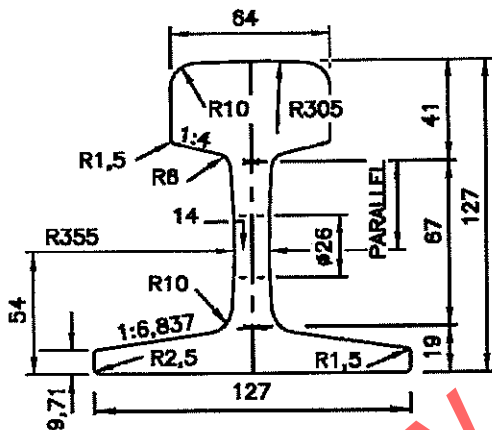
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Annexure A

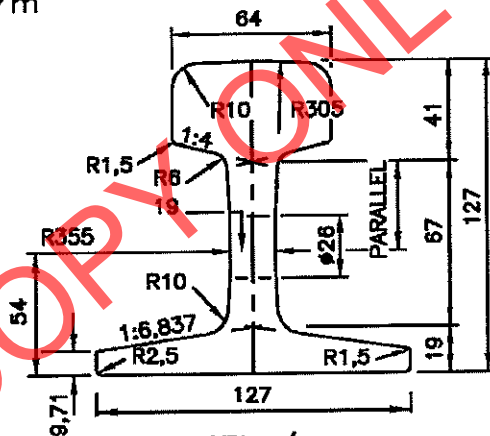
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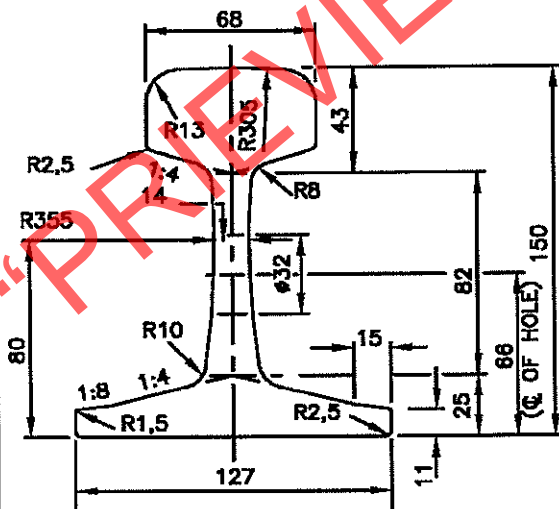
30kg/m



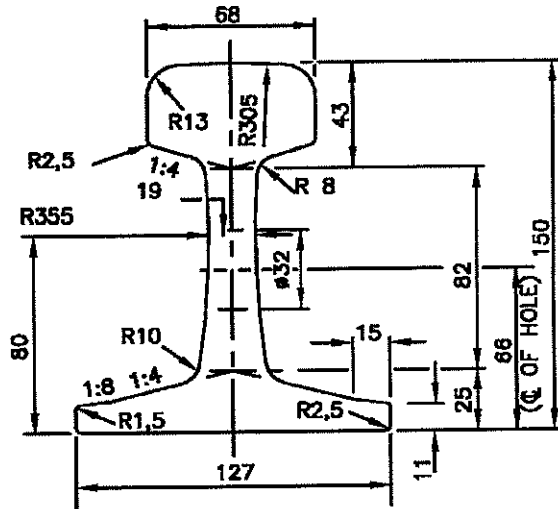
40kg/m



43kg/m
(HARBOUR AREAS)

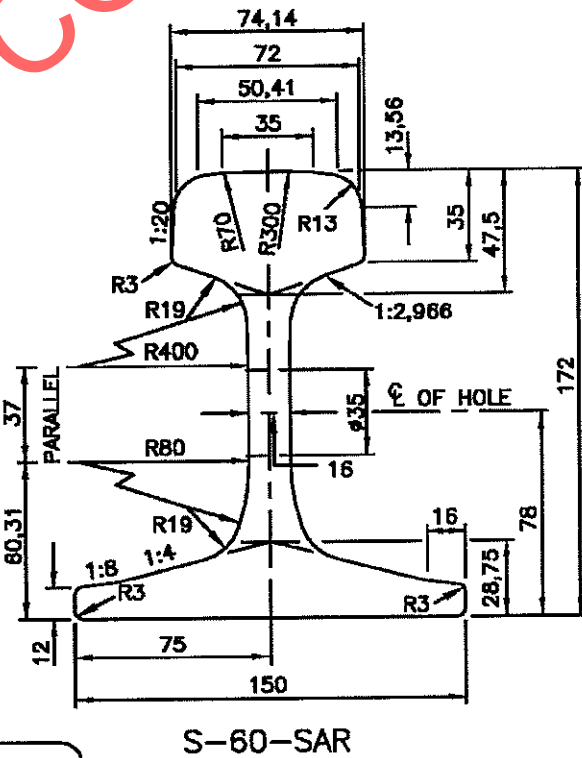
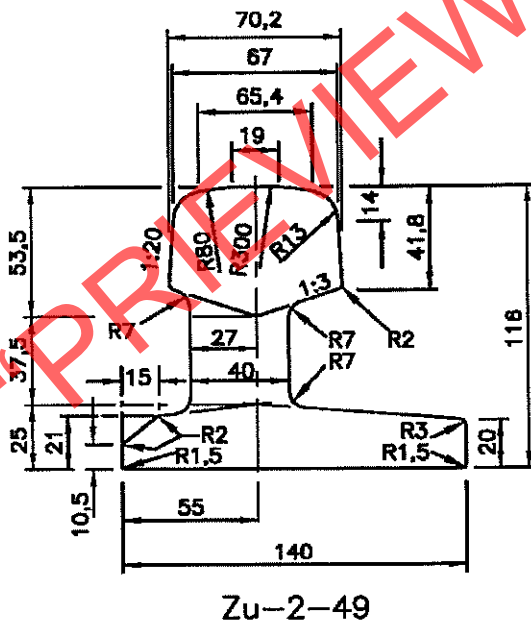
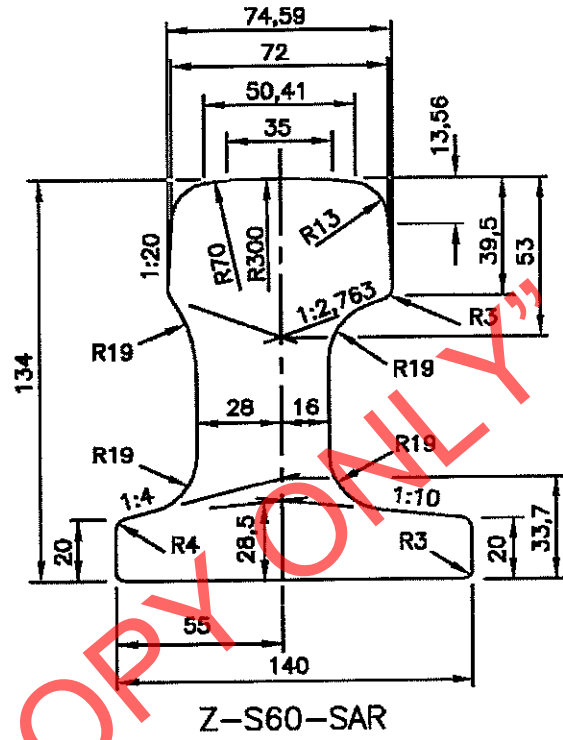
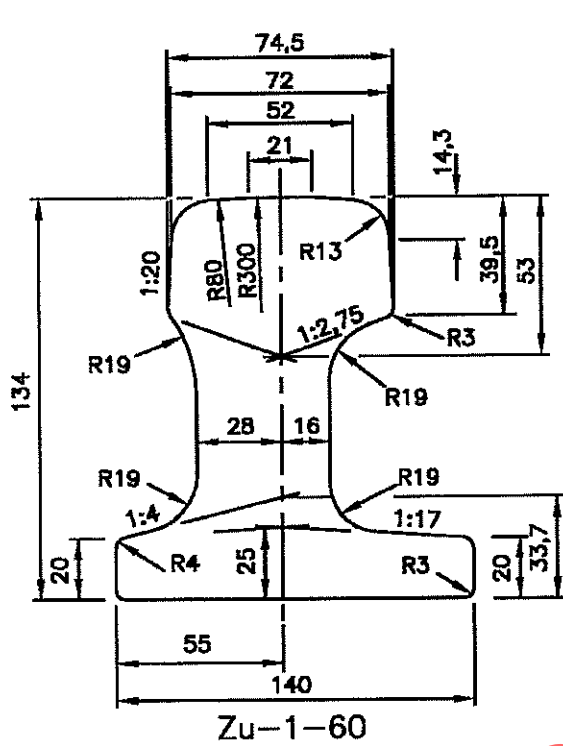


48kg/m



51kg/m
(FLEXIBLE POINTS BLADE
AND UNDERCUT STOCK RAIL)

REMARKS :
1. FOR PROPERTIES AND ROLL MARKS SEE
ANNEXURE 14 SHEETS 4 TO 6

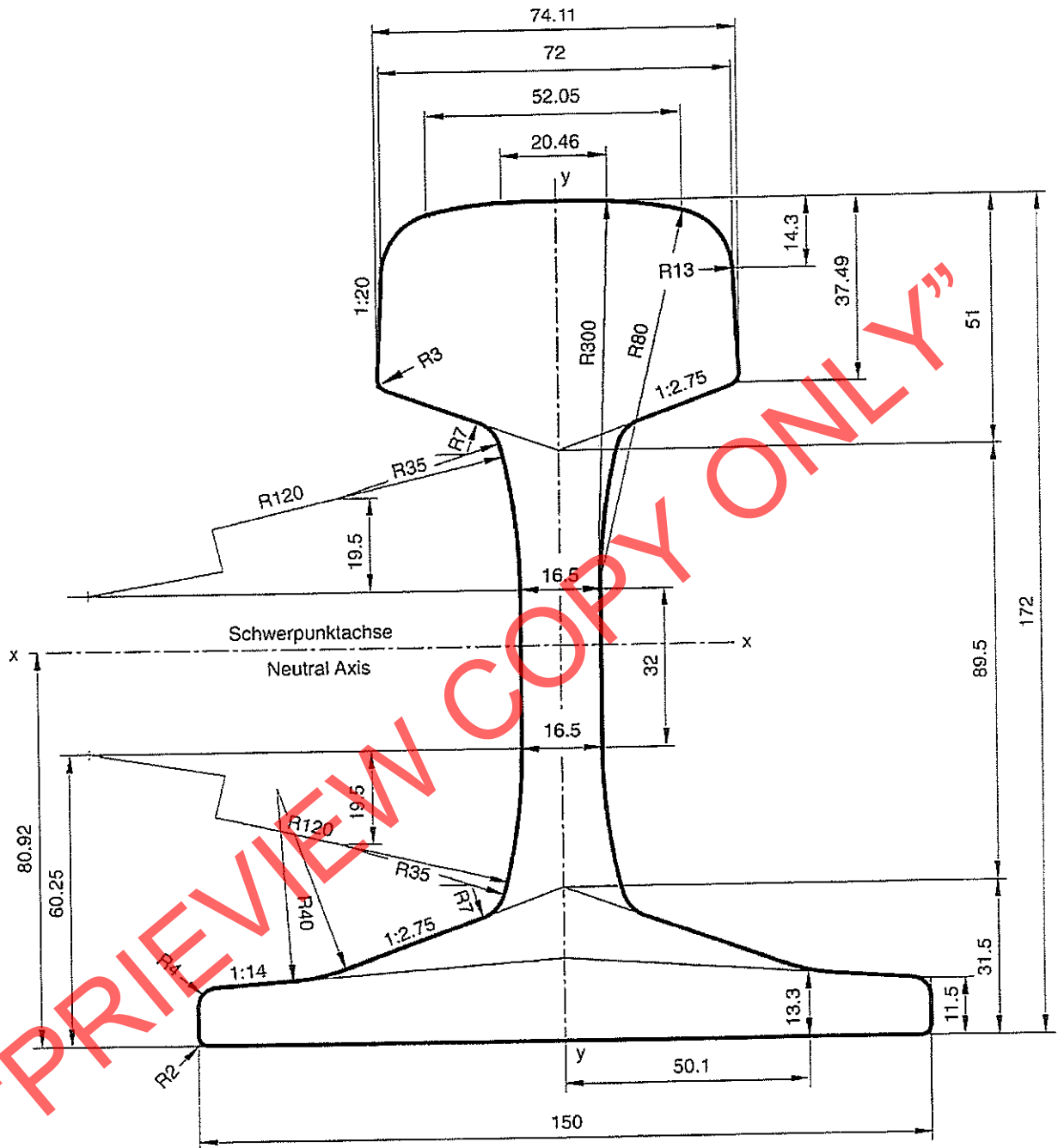


REMARKS :
1. FOR PROPERTIES AND ROLL MARKS SEE
ANNEXURE 14 SHEETS 4 TO 6



60E1

VIGNOLSCHIENE, FLAT BOTTOM RAIL, RAIL VIGNOLE

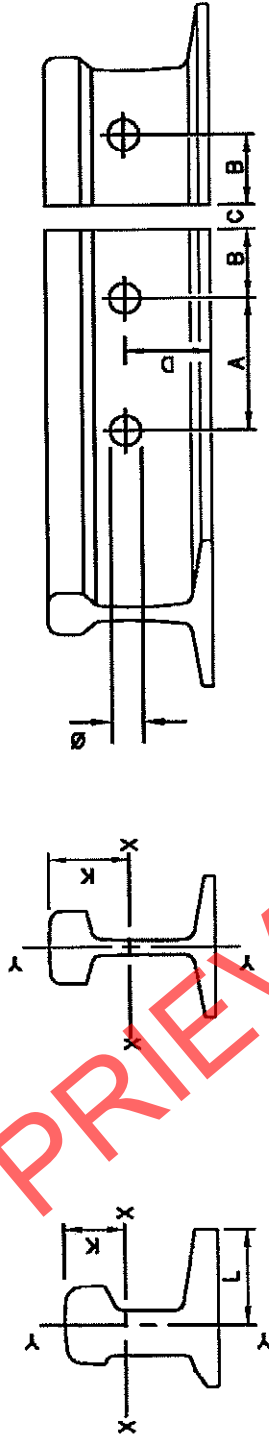


$A = 76.7 \text{ cm}^2$
 $G = 60.21 \text{ kg/m}$
 $I_x = 3038.3 \text{ cm}^4$
 $W_x = 333.6 \text{ cm}^3$

Scale: 1 : 1.25
 Edition: 8/97



RAIL PROPERTIES



RAIL	MASS (kg/m)	HOLING						AREAS				PROPERTIES				DRAWING	
		A	B	C	D	Ø	NUMBER	HEAD (%)	WEB (%)	FLANGE (%)	SECTION (cm ²)	I (cm ⁴)	Z (cm ³)	K (mm)	L (mm)		
		X-X	Y-Y														
30kg	30	100	47	6	46	26	4	45,11	18,87	36,02	38,537	826,89	158,18	110,94	56,36	-	E-192M
40kg	40	100	47	6	54	26	4	44,86	19,44	35,70	51,715	1 115,38	281,56	169,20	65,92	-	E-346
43kg	43	100	47	6	54	26	4	42,42	24,03	33,55	55,230	1 129,00	280,30	170,10	66,35	-	E-3215M
48kg	48	100	67	6	66	32	4	41,55	22,85	35,80	60,180	1 822,00	318,04	234,18	78,50	-	E-358M
51kg	51	100	67	6	66	32	4	39,00	27,80	33,20	64,850	1 844,00	320,50	234,60	78,60	-	E-358M
57kg	57	100	67	6	70	35	4	41,55	23,02	35,43	73,240	2 650,80	442,00	336,48	86,21	-	E-3232M
60kg	60	100	67	6	70	35	4	40,14	25,89	34,17	76,125	2 703,27	445,39	343,97	86,41	-	E-3232M
S-60-SAR	60,34	100	67	6	78	35	4	37,53	24,02	38,45	77,020	3 097,82	550,40	395,63	93,70	-	E-3326
Z-S60-SAR	72,83	-	-	-	-	-	-	34,88	30,63	34,47	92,880	1 734,40	748,94	282,98	74,80	82,70	-
UIC-60	60,34	100	67	6	76,25	35	4	40,22	22,55	37,23	76,860	3 055,00	512,80	335,50	91,05	-	700-E-736
Zu-1-60	73,00	-	-	-	-	-	-	-	-	-	93,000	1 728,00	743,50	228,80	75,15	82,24	-
S-49	49,43	100	67	6	62,5	35	4	47,45	17,56	34,99	62,970	1 189,00	320,00	240,00	75,70	-	700-E-722
Zu-2-49	62,20	-	-	-	-	-	-	-	-	-	79,280	1 075,00	700,00	162,00	66,30	81,00	-