RWTÜV

Ein Unternehmen der
TÜV Mitte Gruppe

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Test Report

No. TDB 0455 dated 14.06.99

for application of Annex VII Directive 71/320/EEC

1 IDENTIFICATION

1.1 Axle

Manufacturer:	OTTO SAUER Achsenfabrik Keilberg D-63854 Bessenbach
Make:	SAF
Type:	SNK 4220-13S
Model:	-
Technically permissible axle load P_e [1]:	See appendix 1 dated 11.11.98

1.2 Brake

Manufacturer:		See 1.1
Make:		SAF
Type:		SNK 420x200
Model:		-
Technically permissible camshaft input torque $C_{max,e}$:		2800 Nm (for calculation: 2250 Nm at 6,5 bar)
Brake drum	- Internal diameter:	420 mm
	- Mass:	49 kg
	- Material:	Cast iron (grey cast iron)
Brake lining	- Manufacturer:	BREMSKERL-Reibbelagwerke Emmerling GmbH & Co. KG D-31629 Estorf
	- Type:	BREMSKERL 6386
	- Identification:	Type indication at front
	- Width:	200 mm
	- Thickness:	13...20,2 mm (sickle-shaped)
	- Surface area:	1474 cm²
	- Method of attachment:	Rivited
Brake geometry:		See appendix 1 dated 11.11.98 See appendix 2 dated 11.11.98

1.3 Wheel (Single)

Rim diameter D_e:	See appendix 1 dated 11.11.98
Dimensions:	See appendix 1 dated 11.11.98

[1] See sheet 3/3

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Manufacturer : SAF
Type of axle : SNK 4220-13S

1.4 Tyres

Dynamic rolling radius R_e
at reference load P_e: See appendix 1 dated 11.11.98

1.5 Actuation

Brake actuator	-Manufacturer:	DeWe [3]	GRAU [4]
	- Type:	Diaphragm brake actuator	Diaphragm brake actuator
	- Model:	30 (231 0 007 201)	30 (120 361 101)
Lever length l_e:		150 mm	152 mm

2 RECORD OF TEST RESULTS [2]

(corrected to take account of rolling resistance $\hat{=}$ 0,01P_e)

2.1 In the case of vehicles of categories O_2 and O_3 [3]

Test type:		**0**	**I**	
Annex VII, Appendix 1, point:		3.5.1.2	3.5.2.2/3	3.5.2.4
Test speed	km/h	40	40	40
Brake actuator pressure p_e	bar	6,0	-	6,0
Braking time	min	-	2,55	-
Brake force developed T_e	daN	7539	915	6927
Brake efficiency T_e/P_e	-	0,58	0,07	0,53
Actuator stroke s_e	mm	32	-	51
Camshaft input torque C_e	Nm	1698	-	1698
$C_{o,e}$	Nm	30	-	30

2.2 In the case of vehicles of category O_4 [4]

Test type:		**0**	**III**	
Annex VII, Appendix 1, point:		3.5.1.2	3.5.3.1.2	3.5.3.2
Test speed				
initial	km/h	60	60	60
final	km/h	0	30	0
Brake actuator pressure p_e	bar	6,5	-	6,5
Number of brake applications	-	-	20	-
Duration of braking cycle	s	-	60	-
Brake force developed T_e	daN	7650	3921	6302
Brake efficiency T_e/P_e	-	0,59	0,30	0,48
Actuator stroke s_e	mm	41	-	54
Camshaft input torque C_e	Nm	1877	-	1877
$C_{o,e}$	Nm	30	-	30

[2] [3] [4] See sheet 3/3

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Manufacturer : SAF
Type of axle : SNK 4220-13S

3 NAME OF TECHNICAL SERVICE CONDUCTING THE TEST

RWTÜV Fahrzeug GmbH
Technischer Dienst für Bremsanlagen
D-45307 Essen

4 DATE OF TEST: 30.06.94 and 04.06.98

5 This test has been carried out and the result reported in accordance with Directive 71/320/EEC as last amended by Directive 98/12/EC and Annex VII, Appendix 1.

Essen, 14.06.99

Dipl.-Ing. Kaesler

LABORATORY FOR VEHICLE TECHNOLOGY
Testing Laboratory for Braking Systems
according to Directive 71/320/EEC in the
version of Directive 98/12/EC

6 APPROVAL AUTHORITY, if different from the technical service

Flensburg, 24. JUNI 1999

i. A.

Kraftfahrt-Bundesamt 44

7 TEST DOCUMENTS

/ Appendix 1: Dimensions brake drum/wheel/tyre (2 sheet)
/ Appendix 2: Brake geometry

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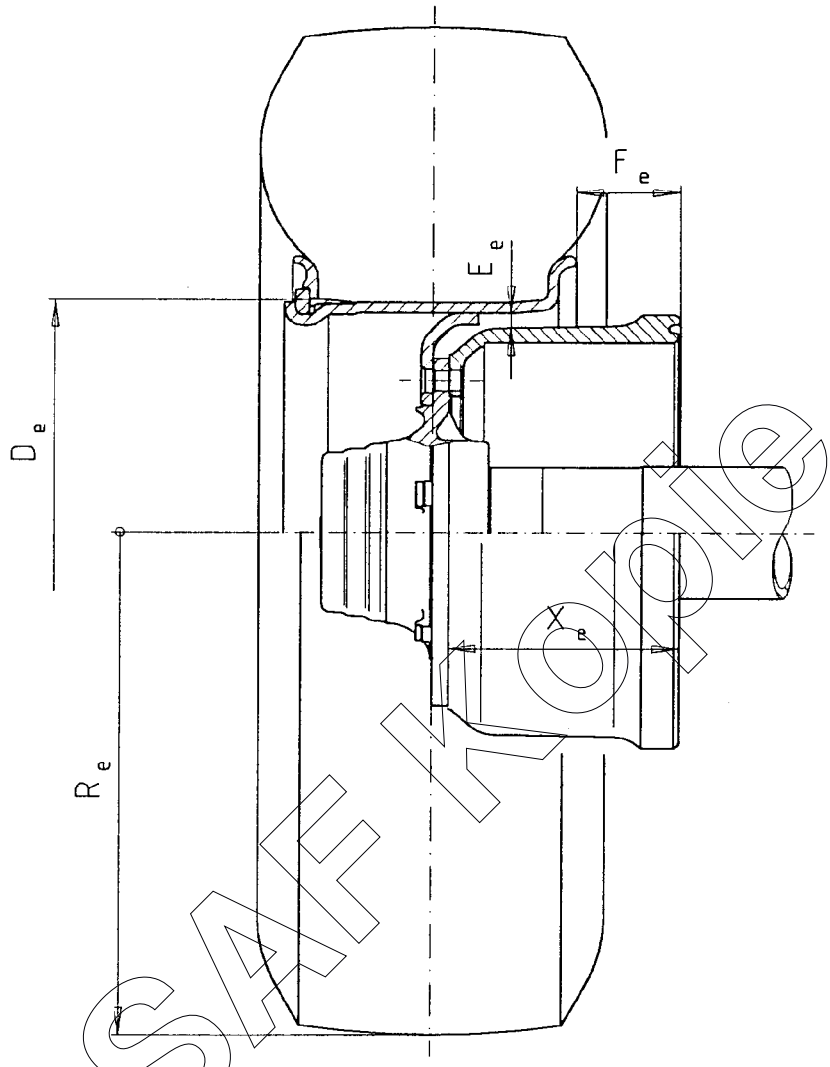
1) Calculation with g = 10 m/s²
2) P_e = 13000 daN, R_e = 555 mm
3) Rolling road dynamometer test
4) Inertia dynamometer test

Anlage 1 zum Prüfprotokoll Nr.: TDB 0455

Annex 1 to brake test record:
Annexe 1 au procès verbal:
Allegato 1 al verbale di Omologazione Nr.:

SAF OTTO SAUER ACHSENFABRIK KEILBERG D - 63854 BESSENBACH GERMANY

Bremse: brake: frein: Freno: SNK 420 × 200	Grundtyp: basis type: modèle de base: Modello di base: SNK 4220 - 13S	Zeichn. Nr.: 6 077 9113 00	Blatt: 1
		Datum: 11.11.1998	Name: Roth



Bremse Brake Tambour Freno: Breite width largeur Largh. X_e (mm)	Bremse: Masse weight masse Peso kg	Achslast Axle capacity Charge de l'essieu Portata assale P_e (daN)	Reifen Tyre Pneu Pneumatico	Felge Rim Jante Cerchio	B_e (mm)	R_e (mm)	D_e (mm)	E_e (mm)	F_e (mm)
256	49	8 600	12,00 R 20	8,5 - 20	-	545	508	16	+139

Anlage 1 zum Prüfprotokoll Nr.: TDB 0455

Annex 1 to brake test record:
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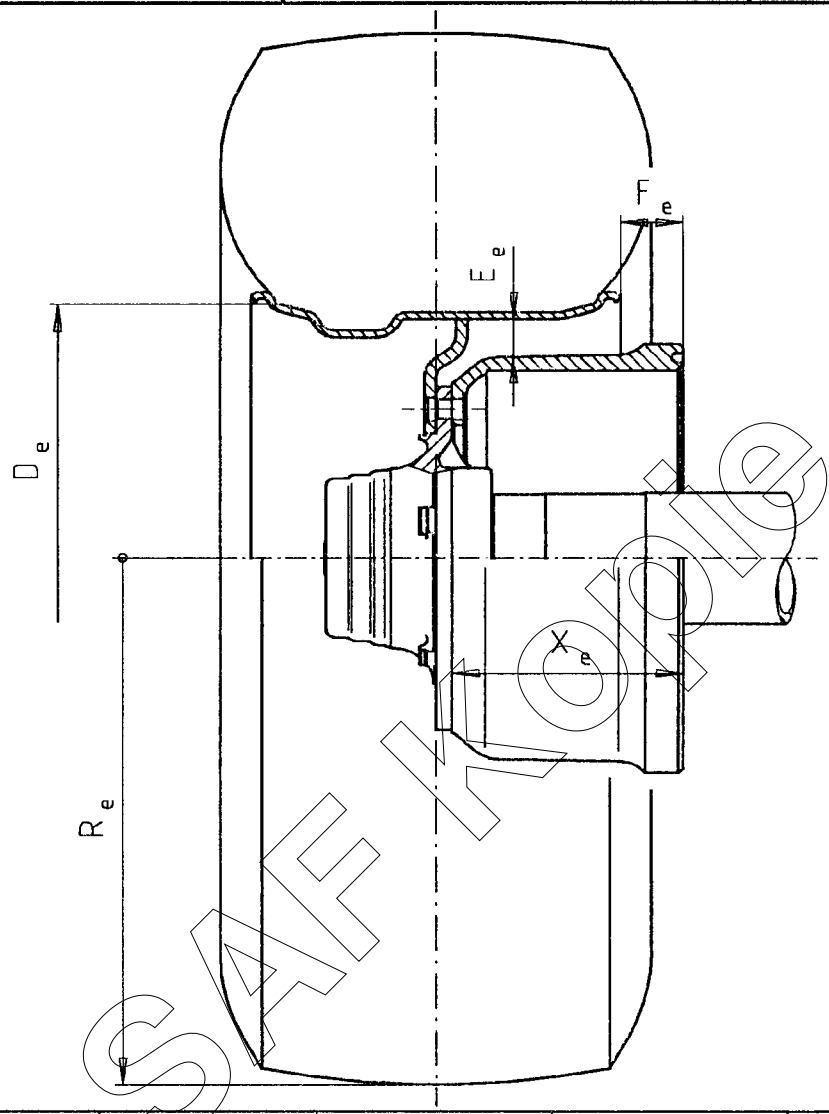
Allegato 1 al verbale di Omologazione Nr.:

SAF OTTO SAUER ACHSENFABRIK KEILBERG D - 63854 BESSENBACH GERMANY

Bremse: brake: frein: Freno: SNK 420 × 200	Grundtyp: basis type: modèle de base: Modello di base: SNK 4220 - 13S	Zeichn. Nr.: 6 077 9112 00	Blatt: 2
		Datum: 11.11.1998	Name: Roth



Bremse Brake Tambour Freno: Breite width largeur Largh. X_e (mm)	Masse weight masse Peso kg	Achslast Axle capacity Charge de l'essieu Portata assale P_e (daN)	Reifen Tyre Pneu Pneumatico	Felge Rim Jante Cerchio	B_e (mm)	R_e (mm)	D_e (mm)	E_e (mm)	F_e (mm)
256	49	13 000	445/65 R 22,5	22,5 × 14,00	–	555	571	36	+76
256	49	11 800	425/65 R 22,5	22,5 × 13,00	–	542	571	36	+88

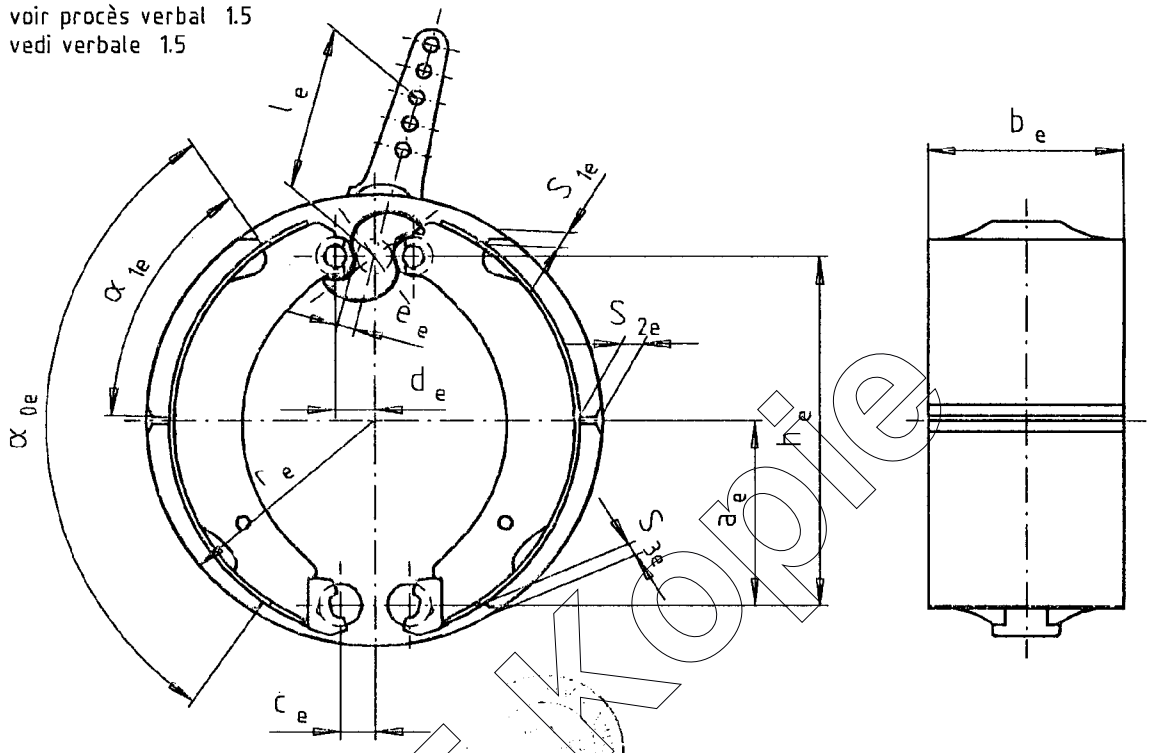
Anlage 2 zum Prüfprotokoll Nr. TDB 0455

Annex 2 to brake test record
Annexe 2 au procès verbal
Allegato 2 al verbale di Omologazione Nr.

SAF OTTO SAUER ACHSENFABRIK KEILBERG D - 63854 BESSENBACH GERMANY

Zeichn. Nr.:	6 077 90B9 01	Blatt:	1
Datum:	11.11.1998	Name:	Roth

l_e : siehe Prüfprotokoll 1.5
see brake test record 1.5
voir procès verbal 1.5
vedi verbale 1.5



* F_e : wirksame Bremsfläche pro Bremse (cm^2)
Efficient braking area (cm^2)
Zone de freinage active (cm^2)
Zona di frenatura attiva (cm^2)

Bremsen-Typ Brake-type Type de frein Type de freno	a_e	h_e	c_e	d_e	e_e	α_{0e}	α_{1e}	b_e	r_e	* F_e	S_{1e}	S_{2e}	S_{3e}
SNK 420 × 150	171,5	323,9	31,75	36	13,2	110°	53°20'	150	210	1086	17,4	20,2	13
SNK 420 × 180	171,5	323,9	31,75	36	13,2	110°	53°20'	180	210	1322	17,4	20,2	13
SNK 420 × 200	171,5	323,9	31,75	36	13,2	110°	53°20'	200	210	1474	17,4	20,2	13
SNK 367 × 150	145	273	31,75	36	13,2	104°30'	57°	150	183,5	1007	17,2	20,2	12,2
SNK 367 × 180	145	273	31,75	36	13,2	104°30'	57°	180	183,5	1226	17,2	20,2	12,2
SNK 367 × 200	145	273	31,75	36	13,2	104°30'	57°	200	183,5	1370	17,2	20,2	12,2
SNK 300 × 150	113	225	25	29,75	13,2	111°	55°30'	150	150	760	13	16	8,5
SNK 300 × 200	113	225	25	29,75	13,2	111°	55°30'	200	150	1025	13	16	8,5