

# Test Report

No. TDB 0680 dated 08.11.99

for application of Annex VII Directive 71/320/EEC

## 1 IDENTIFICATION

### 1.1 Axle

Manufacturer: BPW Bergische Achsen  
Kommanditgesellschaft  
D-51674 Wiehl

Make: BPW

Type: GS 90

Model: -

Technically permissible axle load  $P_e$ <sup>1)</sup>: 10000 daN

### 1.2 Brake

Manufacturer: See 1.1

Make: BPW

Type: FL 4112

Model: -

Technically permissible camshaft  
input torque  $C_{max,e}$ : 3000 Nm  
(for calculation: 2250 Nm at 6,5 bar)

Brake drum - Internal diameter: 410 mm

- Mass: 32,5 kg

- Material: Cast iron (grey cast iron)

Brake lining - Manufacturer: BBA Friction GmbH  
D-51375 Leverkusen

- Make,- Type: Textar, T 090

- Identification: Type indication at front

- Width: 120 mm

- Thickness: 8,5...12 mm (sickle-shaped)

- Surface area: 887 cm<sup>2</sup>

- Method of attachment: Rivited

Brake geometry: See appendix 1 dated 27.10.99  
See appendix 2 dated 27.10.99

### 1.3 Wheel (Single)

Rim diameter  $D_e$ : See appendix 1 dated 27.10.99

Dimensions: See appendix 1 dated 27.10.99

<sup>1)</sup> See sheet 3/3



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Manufacturer : BPW  
 Type of axle : GS 90

**1.4 Tyres**

Dynamic rolling radius  $R_e$   
 at reference load  $P_e$ : See appendix 1 dated 27.10.99

**1.5 Actuation**

Brake actuator -Manufacturer: GRAU  
 - Type: Diaphragm brake actuator  
 - Model: 30 (120 361 101)  
 Lever length  $l_e$ : 180 mm

**2 RECORD OF TEST RESULTS <sup>2)</sup>**

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

**2.1 In the case of vehicles of categories O<sub>2</sub> and O<sub>3</sub>**

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	5,0	-	5,0
Braking time	min	-	2,55	-
Brake force developed $T_e$	daN	6300	844	6549
Brake efficiency $T_e/P_e$	-	0,63	0,08	0,65
Actuator stroke $s_e$	mm	38	-	67
Camshaft input torque $C_e$	Nm	1694	-	1694
$C_{0,e}$	Nm	30	-	30

**2.2 In the case of vehicles of category O<sub>4</sub>**

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	5,5	-	5,5
Number of brake applications	-	-	20	-
Duration of braking cycle	s	-	60	-
Brake force developed $T_e$	daN	6092	3694	4491
Brake efficiency $T_e/P_e$	-	0,61	0,37	0,45
Actuator stroke $s_e$	mm	43	-	59
Camshaft input torque $C_e$	Nm	1870	-	1870
$C_{0,e}$	Nm	30	-	30

<sup>2)</sup> See sheet 3/3



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Date : 08.11.99

**RWTÜV**

Manufacturer : BPW  
Type of axle : GS 90

**3 NAME OF TECHNICAL SERVICE CONDUCTING THE TEST**

RWTÜV Fahrzeug GmbH  
Technischer Dienst für Bremsanlagen  
D-45307 Essen

**4 DATE OF TEST:** 04. and 05.11.99

**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, 08.11.99



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, 11 0 NOV. 1999

i. A.



**7 TEST DOCUMENTS**

- / Appendix 1: Dimensions brake drum/wheel/tyre (3 sheet)
- / Appendix 2: Brake geometry

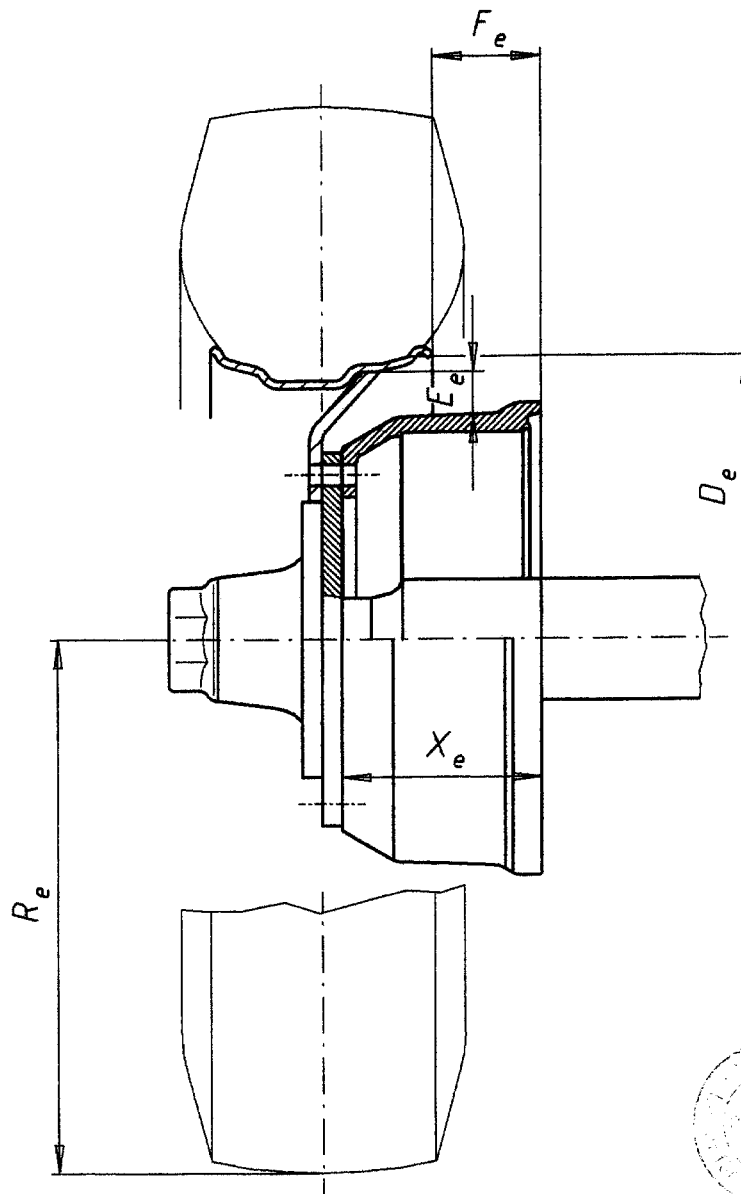
1) Calculation with  $g = 10 \text{ m/s}^2$

2) Inertia dynamometer test;  $R_e = 527 \text{ mm}$



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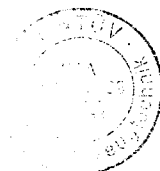
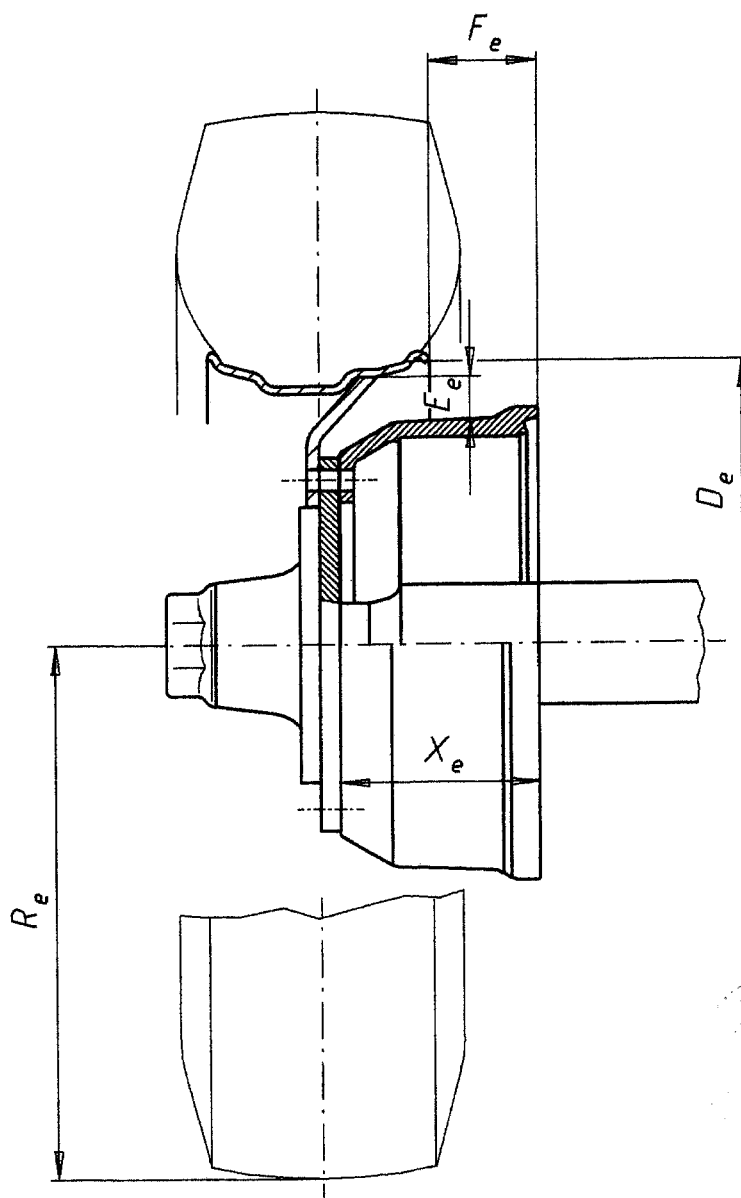
Drum- width $X_e$ (mm)		mass (kg)	Axle load $P_e$ (da N)	Tyre	Rim	$R_e$ (mm)	$D_e$ (mm)	$E_e$ (mm)	$F_e$ (mm)
$\geq 167$	32,5	32,5	10000	400/55-22,5	22,5x11,75	467	572	28,5	+9
$\geq 167$	32,5	32,5	10000	500/45-22,5	22,5x16.00	477	572	28,5	-45
$\geq 167$	32,5	32,5	10000	550/45-22,5	22,5x16.00	497	572	28,5	-45
$\geq 167$	32,5	32,5	10000	15 R 22,5	22,5x11,75	509	572	28,5	+9
$\geq 167$	32,5	32,5	10000	385/65 R 22,5	22,5x11,75	519	572	28,5	+9

Ersatz für  
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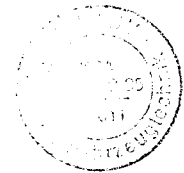
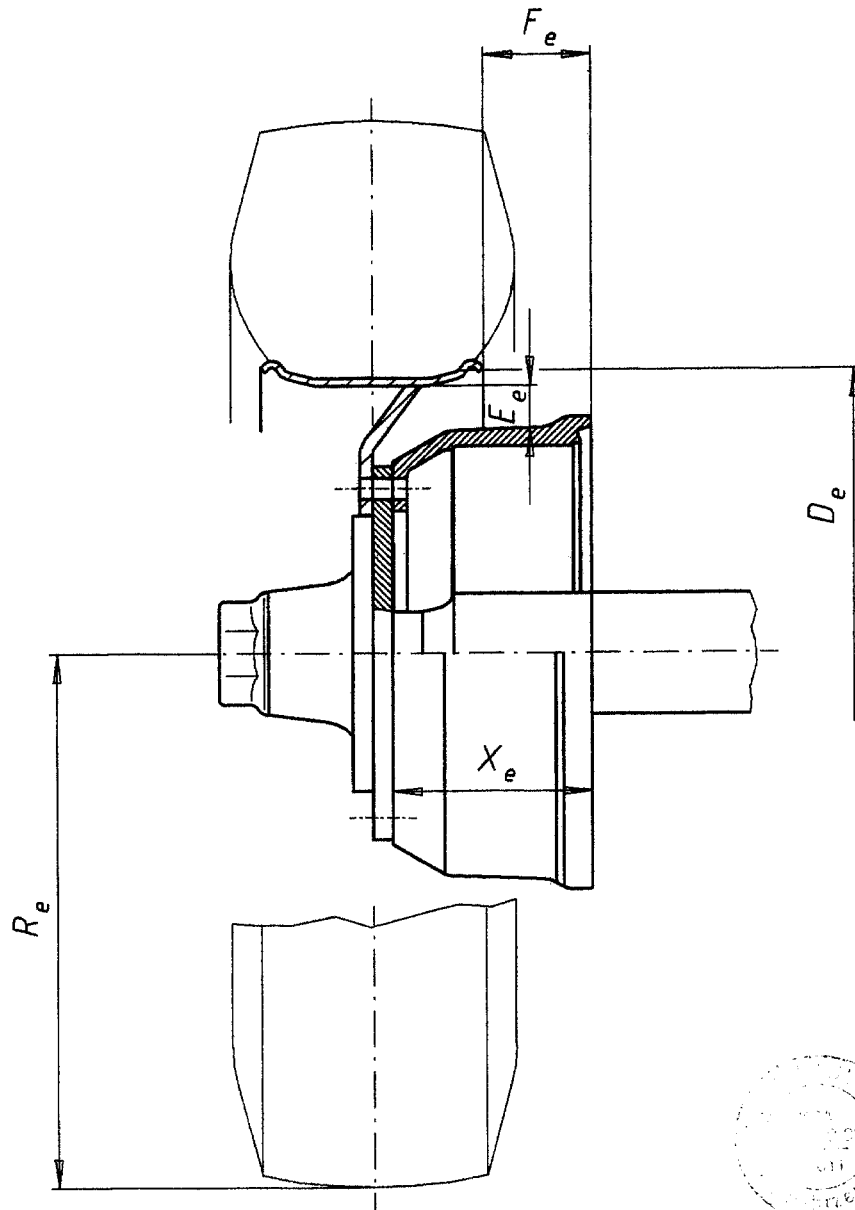
Drum- width $X_e$ (mm)	mass (kg)	Axle load $P_e$ (da N)	Tyre	Rim	$R_e$ (mm)	$D_e$ (mm)	$E_e$ (mm)	$F_e$ (mm)
≥ 167	32,5	10000	500/60-22,5	22,5×16.00	547	572	28,5	-45
≥ 167	32,5	10000	550/60-22,5	22,5×16.00	579	572	28,5	-45
≥ 167	32,5	10000	600/50-22,5	22,5×20.00	546	572	28,5	-96
≥ 167	32,5	10000	600/55-22,5	22,5×20.00	592	572	28,5	-96
≥ 167	32,5	10000	700/40-22,5	22,5×24.00	546	572	28,5	-147
≥ 167	32,5	10000	700/50-22,5	22,5×24.00	594	572	28,5	-147
≥ 167	32,5	10000	600/55-26,5	26,5×20.00	631	673	79,5	-96
≥ 167	32,5	10000	700/50-26,5	26,5×20.00	630	673	79,5	-96
≥ 167	32,5	10000	800/45-26,5	26,5×28.00	632	673	79,5	-198
≥ 167	32,5	10000	420/75 R 28	DW 13x28	641	716	105,5	+6
≥ 167	32,5	10000	14.9 R 28	W 13x28	645	716	105,5	+6
≥ 167	32,5	10000	500/75 R 24	DW 16 Lx24	653	614	54	-34

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Drum- width $X_e$ (mm)	mass (kg)	Axle load $P_e$ (da N)	Tyre	Rim	$R_e$ (mm)	$D_e$ (mm)	$E_e$ (mm)	$F_e$ (mm)
≥ 167	32,5	10000	335/80 R 20	11-20 SDC	491	513	19,5	+34,5
≥ 167	32,5	10000	12,5 R 20	11-20 SDC	497	513	19,5	+34,5
≥ 167	32,5	10000	14,5 R 20	11-20 SDC	527	513	19,5	+34,5
≥ 167	32,5	10000	375/75 R 20	11-20 SDC	505	513	19,5	+34,5

Ersatz für  
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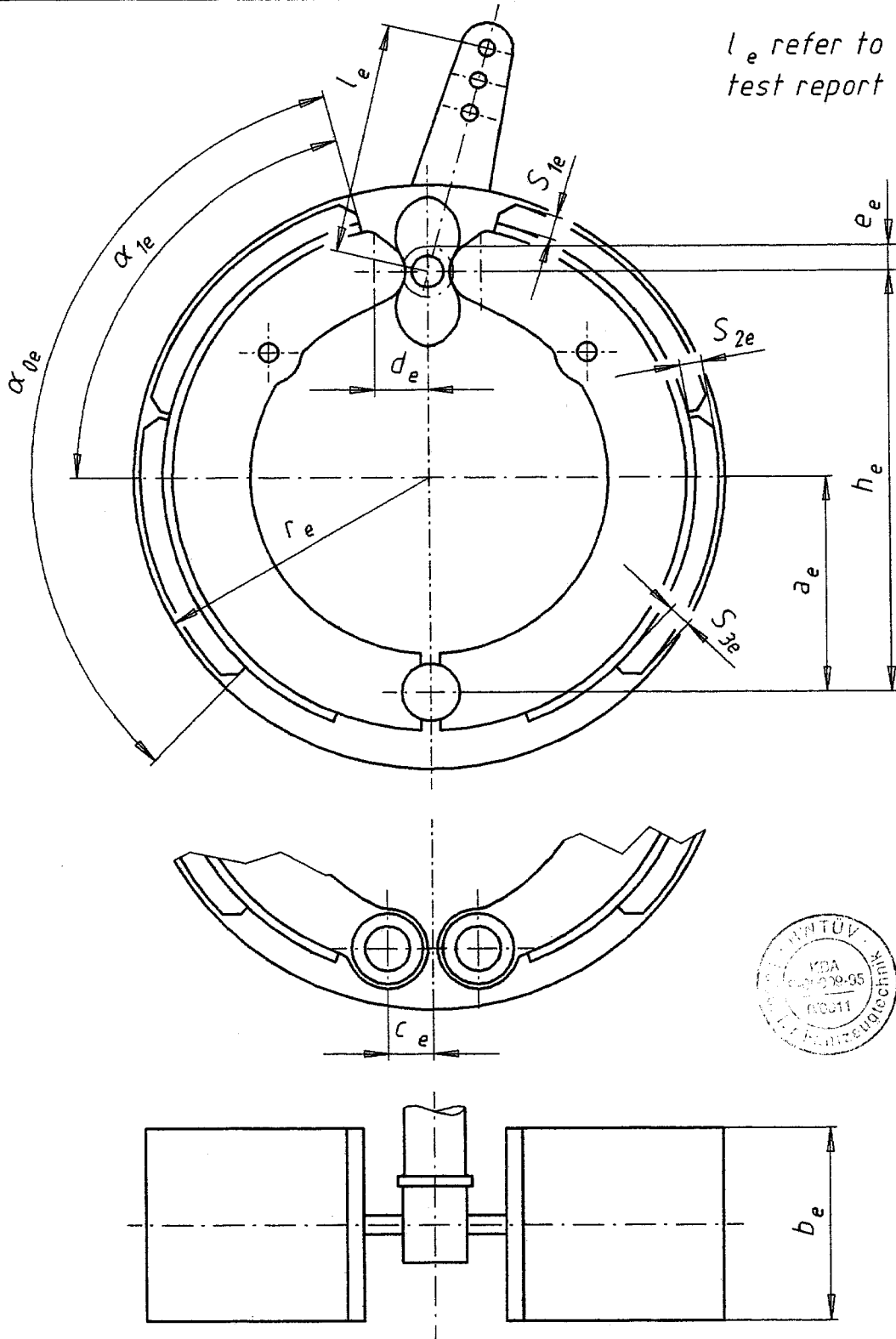


Appendix 2 to  
TEST REPORT NO. TDB 0680

TE-2389.0

4 Blatt Bl.-Nr. 2

$l_e$  refer to No.15. of test report



All dimensions except  $\alpha_{0e}, \alpha_{1e}$  and  $F_e$  in mm.  $F_e$  = braking surface per brake ( $\text{cm}^2$ ).

Type of brake	$a_e$	$h_e$	$c_e$	$d_e$	$e_e$	$\alpha_{0e}$	$\alpha_{1e}$	$b_e$	$r_e$	$F_e$	$S_{1e}$	$S_{2e}$	$S_{3e}$
FL 3008	118	226	0	27,5	17	116°	61°	80	150	480	9	13	9
FL 4112	163,7	317,7	33	43,5	14	115°	70,5°	120	205	887	8,5	12	8,5
FL 4118	163,7	317,7	33	43,5	14	115°	70,5°	180	205	1331	8,5	12	8,5

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