

Test Report

No. AR 2006 dated 11.05.2001

for a mechanical brake according to
Annex VIII, Appendix 3, Directive 71/320/EEC

- 1 Manufacturer: BPW Bergische Achsen
Kommanditgesellschaft
D-51674 Wiehl
- 2 Make: BPW
- 3 Type: S 2504-7
- 4 Technically permissible maximum
mass per wheel G_{Bo} : a) 900 kg b) 900 kg c) 950 kg d) 1000 kg
- 5 Maximum braking torque M_{max} : 2800 Nm
- 5.1 Tested braking torque: a) 2700 Nm b) 1900 Nm c) 2800 Nm d) 2800 Nm
- 6 Dynamic tyre rolling radius R_{min} : a) 0,27 m b) 0,25 m c) 0,27 m d) 0,27 m
 R_{max} : a) 0,36 m b) 0,269 m c) 0,34 m d) 0,321 m
- 7 Brief description
Simplex brake: Application with expanding lever and brake cable pull 90° or 115° deflection; 2 equal brake shoes with symmetrical linings, brake lining stuck on: Make FERODO BERAL, type 1517 (to $G_{Bo} = 1000$ kg) or 1126 (to $G_{Bo} = 900$ kg ; 1 cylindrical return spring; manual readjustment with adjusting nut on the floating brake shoe support; return system with travel-dependent action.
List of plans and dimensional drawings see appendix 1.
- 8 Main diagram of the brake: See drawing no. TE-1823.0
- 9 Test result
- 9.1 Reduction ratio i_g : $2 \cdot \frac{56,8 \cdot 186}{16 \cdot 93} = 14,2$
- 9.2 Half shoe centre lift s_B : > 1,7 mm
- 9.3 Half minimum shoe centre lift s_B^* : 1,7 mm
- 9.4 Withdrawal force P_o : a) 121 N b) 0 N c) 0 N d) 0 N
- 9.5 Coefficient ρ : a) 0,97 m b) 0,92 m c) 0,98 m d) 0,98 m

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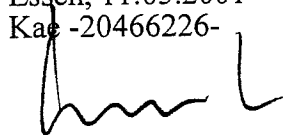
Manufacturer : BPW
Type of brake : S 2504-7

- 9.6 Overload protector according to point 3.6 of Annex VIII: Not provided
- 9.7 Maximum permissible force P_{max} for M_{max} : a) 3210 N b) 2250 N c) 2940 N d) 2940 N

10 Technical service which carried out the test: RWTÜV Fahrzeug GmbH
Technischer Dienst für Bremsanlagen
D-45307 Essen

- 11 The above brake does conform to the requirements of points 3 and 6 of the testing conditions for vehicles fitted with inertia braking described in Annex VIII.
The brake may be used for an inertia braking system without an overload.

Essen, 11.05.2001
Kae -20466226-



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

- 12 Attached test documents
- Appendix 1: List of plans and dimensional drawings
 - Appendix 2: Characteristic diagram
 - Appendix 3: Test of thermal properties
 - Appendix 4: Braking performance with vehicle reversing
- Drawing No. TE-1823.0 dated 02.10.1995
Plans and dimensional drawings acc. to list in appendix 1
Prüfbericht Nr. KO 170.3
Prüfbericht Nr. KO 170.4

- 13 Remarks on appendices 2, 3 and 4
- The test results were determined using a brake pull-cable with 90° deflection (**perpendicular** brake pull-cable connection) and on the basis of a comparative test they are also valid for 115° deflection (**oblique** brake pull-cable connection).

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RWTV

Manufacturer : BPW
Type of brake : S 2504-7

List of plans and dimensional drawings

Description (Benennung)	Number (Nummer)	Date (Datum)
Spreizhebelbremse, links	C-06.360.15.01.0	06.04.01
Spreizhebelbremse, links	C-06.360.15.13.0	06.04.01
Spreizhebelbremse (Stückliste), links	C-06.360.15.01.0	06.04.01
Spreizhebelbremse, rechts	C-06.360.15.02.0	06.04.01
Spreizhebelbremse, rechts	C-06.360.15.18.0	06.04.01
Spreizhebelbremse (Stückliste), rechts	C-06.360.15.02.0	06.04.01
Bremsschildgruppe (links)	D-06 00 225 857	06.01.95
Bremsschildgruppe (rechts)	D-06 00 225 858	06.01.95
Bremsschild	C-06 00 225 859	06.01.95
Flansch	E-06.150.12.24.0	26.09.94
Schlauchführung	E-06 00 225 218	28.06.94
Bremsschildgruppe (links)	D-06.100.12.95.0	12.02.97
Bremsschildgruppe (rechts)	D-06.100.19.01.0	06.02.97
Bremsschild, links	C-06 00 227 125	18.12.96
Bremsschild, rechts	C-06 00 227 126	19.12.96
Vierkantrrohr	E-06.391.09.35.0	18.12.96
Schlauchführung	E-06.338.05.06.0	18.12.96
Bremsschildgruppe (links)	D-06.100.12.83.0	28.11.96
Bremsschildgruppe (rechts)	D-06.100.12.84.0	04.12.96
Bremsschildgruppe (links)	D-06 00 226 201	28.11.96
Bremsschildgruppe (rechts)	D-06 00 226 200	28.11.96
Bremsschild, links	C-06.099.20.04.0	27.11.96
Bremsschild, rechts	C-06.099.20.06.0	28.11.96
Flansch	E-06 00 226 191	23.08.95
Schlauchführung	E-06.338.05.04.0	22.12.94
Lager	E-06 00 115 778	03.01.95
Stopfen	E-06 00 225 420	28.06.94
Schild	E-06.325.01.01.0	28.06.94
Schild	E-06.325.01.02.0	28.06.94
Formteil (links)	E-06 00 115 783	03.01.95
Formteil (links)	E-06.001.14.81.0	17.08.00
Formteil (rechts)	E-06 00 115 784	03.01.95
Formteil (rechts)	E-06.001.14.80.0	17.08.00
Bolzen	E-06 00 115 780	03.01.95
Bolzen	E-06.084.52.39.0	04.11.98
Nachstellbolzen	E-06.276.11.04.0	27.11.96
Nachstellbolzen	E-06 00 229 937	17.08.00
Sicherungsscheibe	E-06 00 227 063	27.11.96
Nachstellmutter	E-06 00 115 782	03.01.95
Schraube	E-06 00 225 221	23.08.95
Schraube	E-06.341.01.12.0	04.11.98
Sicherungsklammer	E-06 00 115 800	29.06.94
Sicherungsklammer	E-06.350.20.12.0	04.11.98
Zugfeder	E-06 00 115 785	02.01.95
Zugfeder	E-06.397.10.03.0	04.11.98
Bremsbackengruppe	D-06.091.05.48.0	01.09.95
Bremsbelag	D-06.092.05.18.0	09.10.95

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Manufacturer : BPW
Type of brake : S 2504-7

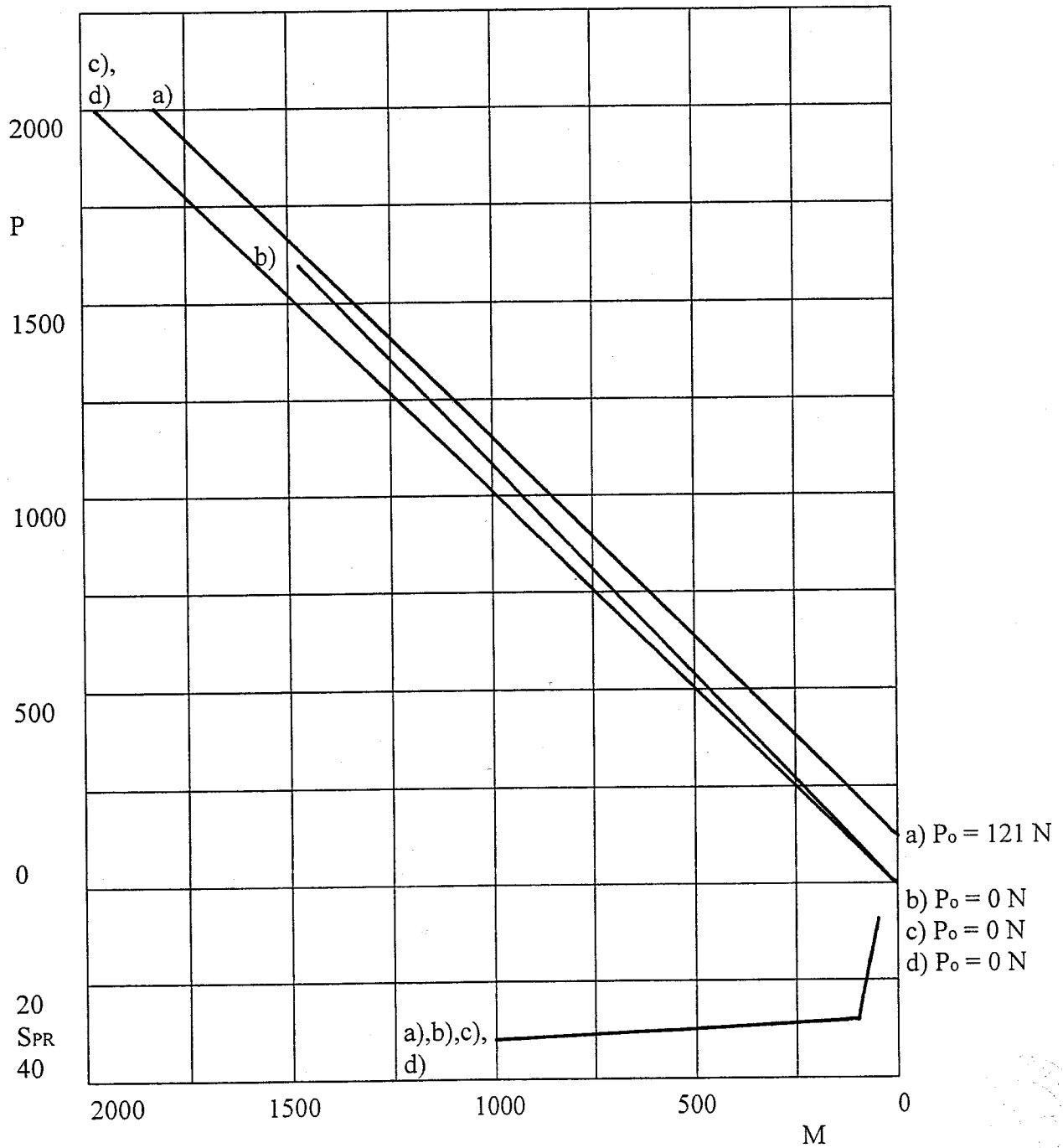
Description (Benennung)	Number (Nummer)	Date (Datum)
Bremsbacke	D-06.090.05.15.0	01.09.95
Backensegment	D-06.078.00.32.0	01.09.95
Backensteg	D-06.079.00.59.0	01.09.95
Zugfeder	E-06 00 115 789	29.06.94
Spannstift	E-06 00 115 857	03.01.95
Spannfeder	E-06 00 115 790	03.01.95
Spreizschloß	E-06.359.02.06.0	18.12.96
Spreizhebel	E-06.358.03.10.0	18.12.96
Spreizschloß	E-06 00 115 791	31.08.95
Spreizhebel	E-06 00 115 794	29.06.94
Bolzen	E-06 00 115 796	29.06.94
Spreizbügelplatte	D-06 00 115 792	30.08.95
Spreizbügelplatte	D-06 00 115 793	30.08.95
Zugbügel	D-06 00 225 128	29.06.94
Zugbügel	E-06.396.12.02.0	22.12.94
Trommelnabe	C-06.274.08.98.0	13.12.94
Trommelnabe	C-06 00 225 834	14.12.94
Trommelnabe	C-06.274.08.68.0	28.09.95
Trommelnabe	C-06 00 226 210	22.09.95
Bremsseilzug	D-06 00 225 446	28.06.94
Bremsseilzug	D-06.089.33.73/97.0	22.12.94
Typschild	E-06.386.16.60.0	06.04.01

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Manufacturer : BPW
 Type of brake : S 2504-7

Characteristic diagram

- M Braking torque in Nm
 P Force on brake cable pull in N
 SPR Application travel at brake cable pull with vehicle reversing
 ρ a) $1823 \text{ Nm} / (2000\text{N}-121\text{N}) = 0,97 \text{ m}$
 b) $1473 \text{ Nm} / (1600\text{N}-0\text{N}) = 0,92 \text{ m}$
 c) $1960 \text{ Nm} / (2000\text{N}-0\text{N}) = 0,98 \text{ m}$
 d) $1960 \text{ Nm} / (2000\text{N}-0\text{N}) = 0,98 \text{ m}$



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Manufacturer : BPW
Type of brake : S 2504-7

Test of thermal properties

A specimen of the brakes was examined according to Annex II Directive 71/320/EEC on an inertia dynamometer:


1	Brake test type 0	a)	b)	c)	d)
	Test speed:	40 km/h	40 km/h	40 km/h	40 km/h
	Braking ratio:	60 %	66 %	62 %	61 %
	Force on brake cable pull:	2000 N	1500 N	1920 N	1900 N
2	Brake test type I				
	Test speed:	40 km/h	40 km/h	40 km/h	40 km/h
	Sustained braking ratio:	7 %	7 %	7 %	7 %
	Braking time:	153 s	153 s	153 s	153 s
	Hot performance:	45 % ^{a)}	56 % ^{b)}	45 % ^{c)}	41 % ^{d)}
	Force on brake cable pull:	2000 N	1500 N	1920 N	1900 N
	Temperature attained at brake drum:	400 °C	320 °C	420 °C	440 °C

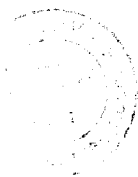
The rolling resistance of 1 % of the allowable mass per wheel has been taken into account.

Overall result

The brake meets the requirements of Annex II, Appendix 1.3.3, Directive 71/320/EEC in the version of 27.01.98.

Essen, 11.05.2000
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- a) $\hat{=}$ 75 % of brake test type 0
b) $\hat{=}$ 85 % of brake test type 0
c) $\hat{=}$ 73 % of brake test type 0
d) $\hat{=}$ 67 % of brake test type 0

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Manufacturer : BPW
Type of brake : S 2504-7

Braking performance with vehicle reversing


The following applies for the direction of rotation with reverse travel

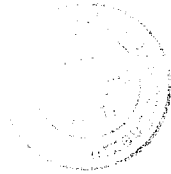
Reversing braking torque MR: 100 Nm (incl. rolling resistance $\hat{=} 0,01 \text{ GBo}$)
With an application travel SPR
at brake cable pull: Up to 28 mm
Necessary application travel
at brake cable pull for the
parking brake: $\geq 32 \text{ mm}$

The travel condition (reversing)
for the inertia (overrun) braking
system is:

$$s'/iH \leq \text{SPR}$$

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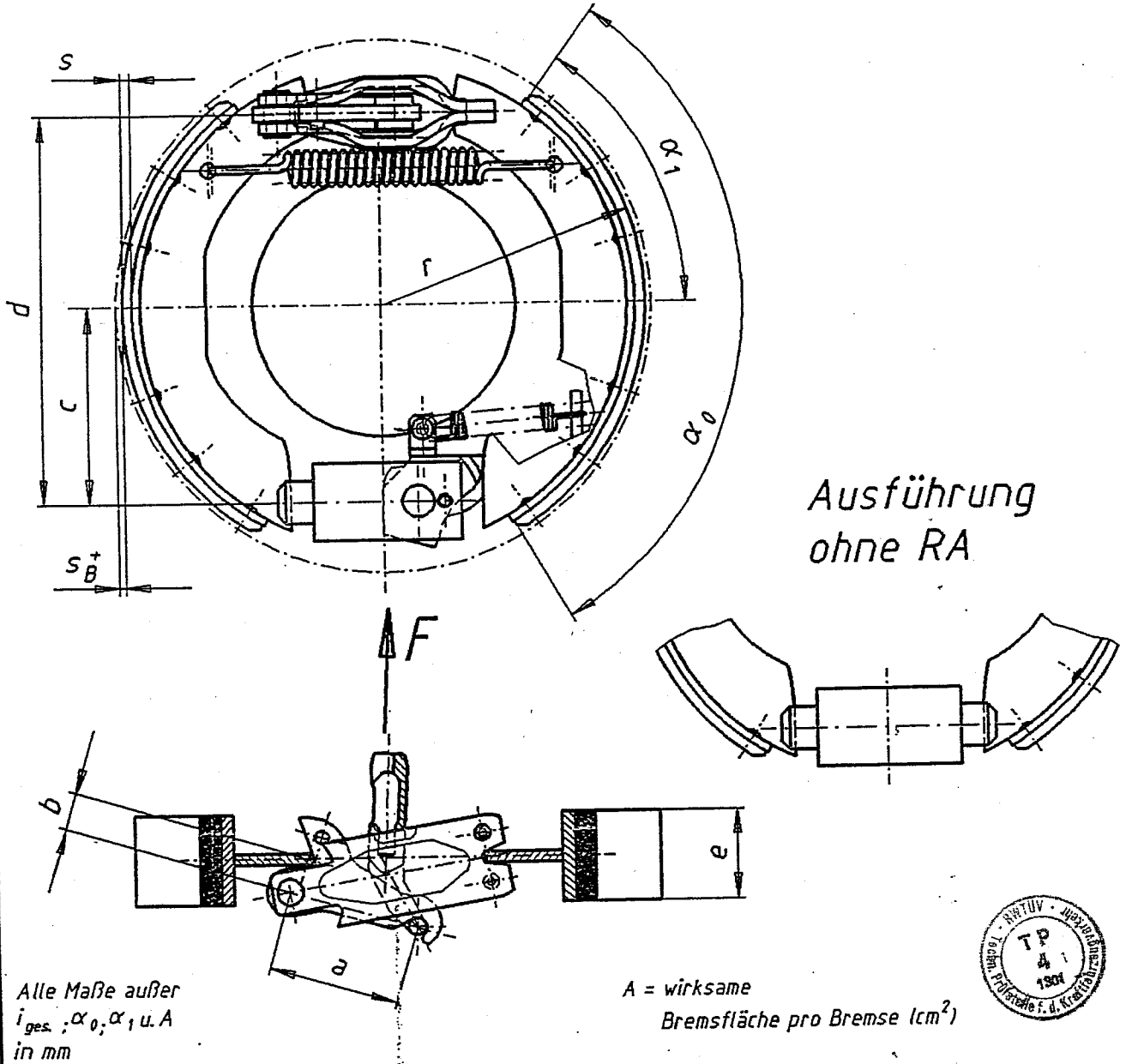


Schemazeichnung Spreizhebelbremse

TE-1823.0

1 Blatt Bl.-Nr. 1

BPW BERGISCHE ACHSEN Kommanditgesellschaft D-51674 WIEHL



Bremsen-Größe	c	d	$i_{ges.}$	s_B^+	a	b	r	e	s	A	α_0	α_1
S 2035-7 RA	75	149	14,1	1,6	49,7	14	100	35	4	136,5	114°	54°3'
S 2035-7												
S 2304-7 RA	84	166	14,0	1,66	56,8	16	115	40	4	192	122°	61'
S 2304-7												
S 2504-7 RA	93	186	14,2	1,7	56,8	16	125	40	5	200	117°	58'
S 2504-7												
S 3006-7 RA	112,5	217	13,7	1,8	70	19,6	150	60	5	348	115°	57'
S 3006-7												

1	02.10.95	Datum 30.06.94 Name Bode	Datum 30.06.94 Name Mollerus
Revision	Datum	Erstellt	Genehmigt

CAD-erste