RDW

TEST REPORT

JE MAINTIENDRAI

TESTING
RvA L 121

Concerning the braking system of certain categories of motor vehicles corresponding the Directive of the Council 71/320/EEC as last amended by the Commission Directive 2002/78/EC ~~and ECE Regulation no. 13.09 / 10.~~

0.1.	Make	: JMR
0.2.	Type	: 2 axle semi trailer with electric– hydraulic braking system (DEXTER disc)
	Variety	: 2 axle semi trailer / centre axle trailer
0.4.	Category of vehicle	: O2
0.5.	Name and address of the manufacturer	: JMR Trading B.V. Staalstraat 1 2984 AJ Ridderkerk The Netherlands
	Tests conducted by order of	: JMR Trading B.V. Staalstraat 1 2984 AJ Ridderkerk The Netherlands

Tests : The tests have been conducted according to Annex I, II, ~~III, IV, V, VI,~~ VII~~, VIII, X~~, XI, ~~XII, XIII, XIV and XV~~ of the above mentioned Directive ~~and/or Annex IV, V, VI, VII, VIII, IX, XI, XII, XIII, XIV and XV of the above mentioned Regulation.~~

Documentation : Drawing 91006, system description and TDB0842 (total of 14 pages).

Conclusion : The type of ~~motor~~ vehicle does/~~does not~~* comply with the requirements mentioned in above mentioned Directives ~~and Regulations~~.
Braking system does not comply to definition for electrical braking systems, see remark on page 2 of this report.

Test date(s) : 19-11-2008 / 06 and 17-02-2009 / 11 and 12-08-2009 / 23-12-2009

By : B.v.d.Grift / L. Vellekoop

Lelystad, 04 January 2010
Manager Test Centre,

Agreed : Technical specialist tests,

H. de Rouwersen

RDW Test Centre Lelystad
Talingweg 76
8218 NX Lelystad
the Netherlands

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Additional information :

According 71/320/EEC-2008/78/EC :
Electrical brakes are service braking systems consisting of a control device, an electromechanical transmission device, and friction brakes.

The braking system JMR as tested in this report does not fully comply with above mentioned definition. The JMR braking system consists of a control device, electric transmission, hydraulic energy source (pump), hydraulic transmission and a friction brake.

Tests
The electric-hydraulic braking system JMR was tested according all relevant precriptions mentioned in Annex I, II, VII and XI of Directive 71/320/EEC – 2002/78/EC.

Conclusion:
The electric-hydraulic braking system JMR as tested in this report does comply with all relevant prescriptions mentioned in Annex I, II and XI of Directive 71/320/EEC – 2002/78/EC except the definition for electrical braking system (item 1.1 Annex XI).
Because of this exeption it is not possible to issue a type approval certificate according Directive 71/320 Annex IX.

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Test vehicle specifications				
Brake schedule:	~~Full trailer~~/Semi trailer *			
Make and type	E.Pagenkopf MS4	VIN	W09SAH2057BP13337	
Brake schedule number	91006	Wheelbase (E_r)	5000+900	mm
Maximum allowed weight(mass):				
King pin	1500	kg		
Axle 1	1750	kg		
Axle 2	1750	kg		
Axle 3	--	kg		
Axle 4	--	kg		
Total	5000	kg		
Axles:				
Make and type	Dexter axle USA	Code	Torflex	
Tyres:				
Axle number	Make and type	Tyre Size	Tyre Pressure	
Axle 1	Barum Vanis	225/70R15	3,5 bar	
Axle 2	Barum Vanis	225/70R15	3,5 bar	
Axle 3				
Axle 4				
Brakes:				
Make and type	Kodiak 225	Lining make and type	D289	
Brake specification:				
Axle number	1	2	3	4
Brake cylinder(s)	Ø 54	Ø 54	--	--
Disc/drum diameter	Ø 309	Ø 309	--	--
Volume of the air reservoirs	--	dm^3		
Suspension:				
Type	Mechanical ~~/ Pneumatic / Hydraulic *~~*			
Make	Dexter Rubber torsion			
Dimensions	--			
Parking brake:				
Make	Herman Peters in combination with Kodiac			
Type	090.000-00 + 225P (D289)			
On axle number	1 or 2 or 1 and 2			
Brake lever length	control : 200 mm			
Support legs	not used during the test			
ABS or EBS System:	Not applicable			
Make and type	--			
Category ABS	--			
If applicable, reportnumber for Annex XIV / Annex 19	Not applicable			

LSD settings:			**Not applicable**								
LSD plate			Pass / Fail *		Test connections			Pass / Fail *			
P_m		bar	Suspension travel/suspension pressure		P_{out} LSD		Mass (kg)			LSD lever length	
Position			Front	Rear	Front	Rear	Front	Rear	Total	Front	--	mm
Unladen			--	--	--	--	--	--	--	Rear	--	mm
Laden			--	--	--	--	--	--	--			

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Test weight (mass) for type 0 brake tests (2.2 Annex II)							
	Combination weight laden		Combination weight unladen		Tractor weight		
Axle 1	1765	kg	1560	kg	1530	kg	
Axle 2	1500	kg	1420	kg	970	kg	
Axle 3	1720	kg	540	kg		kg	
Axle 4	1800	kg	500	kg		kg	
Axle 5		kg		kg			
Axle 6		kg		kg			
Axle 7		kg		kg			
Total	6785	kg	3480	kg	2500	kg	
Rolling resistance combination	0,1	m/s^2	Rolling resistance trailer	0,1	m/s^2		
Calculation factor for deceleration							
Laden	1,928						
Unladen	3,865						

Brake performance (2.2 Annex II) / **Compatibility** (3.4 Annex XI) **LADEN**									
Deceleration [m/s^2] (combination is braked by brake pedal of tractor)	measured deceleration in jmr braking-system	Deceleration combination (only trailer is braked with external computer)		Brake pressure [bar]		Deceleration calculated for trailer T_R/P_R		Diagram number	
		up	down	up	down	up	down	up	down
1,06	0,122	0,006	0,068	12,5	11,6	0,101	0,122	16	24
2,07	0,213	0,100	--	25,7	--	0,183	--	17	--
3,03	0,310	0,132	0,158	32,8	35,3	0,244	0,295	18	23
3,90	0,405	0,191	--	47,2	--	0,358	--	19	--
4,96	0,522	0,242	--	60,6	--	0,457	--	20	--
5,83	0,600	0,283	0,273	70,5	70,7	0,536	0,518	21	22

Brake performance (2.2 Annex II) / **Compatibility** (3.4 Annex XI) **UNLADEN**									
Deceleration [m/s^2] (combination is braked by brake pedal of tractor)	measured deceleration in jmr braking-system	Deceleration combination (only trailer is braked with external computer)		Brake pressure [bar]		Deceleration calculated for trailer T_R/P_R		Diagram number	
		up	down	up	down	up	down	Up	down
1,06	0,122	0,047	0,044	5,2	5,0	0,151	0,122	25	33
2,07	0,213	0,054	--	8,5	--	0,181	--	26	--
3,03	0,310	0,079	0,095	11,4	13,2	0,278	0,337	27	32
3,90	0,405	0,111	--	16,6	--	0,399	--	28	--
4,96	0,522	0,136	--	21,7	--	0,499	--	29	--
5,83	0,600	0,164	0,169	26,6		0,604	0,626	30	31

Parking brake (2.2.2.1. Annex II)					
Simulated slope test (on axle 1 or 2)			**Simulated slope test (on axle 1 and 2)**		
Brake Force forewards	9400	daN	Brake Force forewards	9650	daN
Brake Force rearwards	9200	daN	Brake Force rearwards	9300	daN
Control force	10	daN	Control force	40	daN
Diagram	I/III		Diagram	II / IV	
Brake force required	8829	daN	Brake force required	8829	
Test result parking brake : Pass/~~fail~~			Test result parking brake : Pass/~~fail~~*		

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* Strike out what doesn't apply

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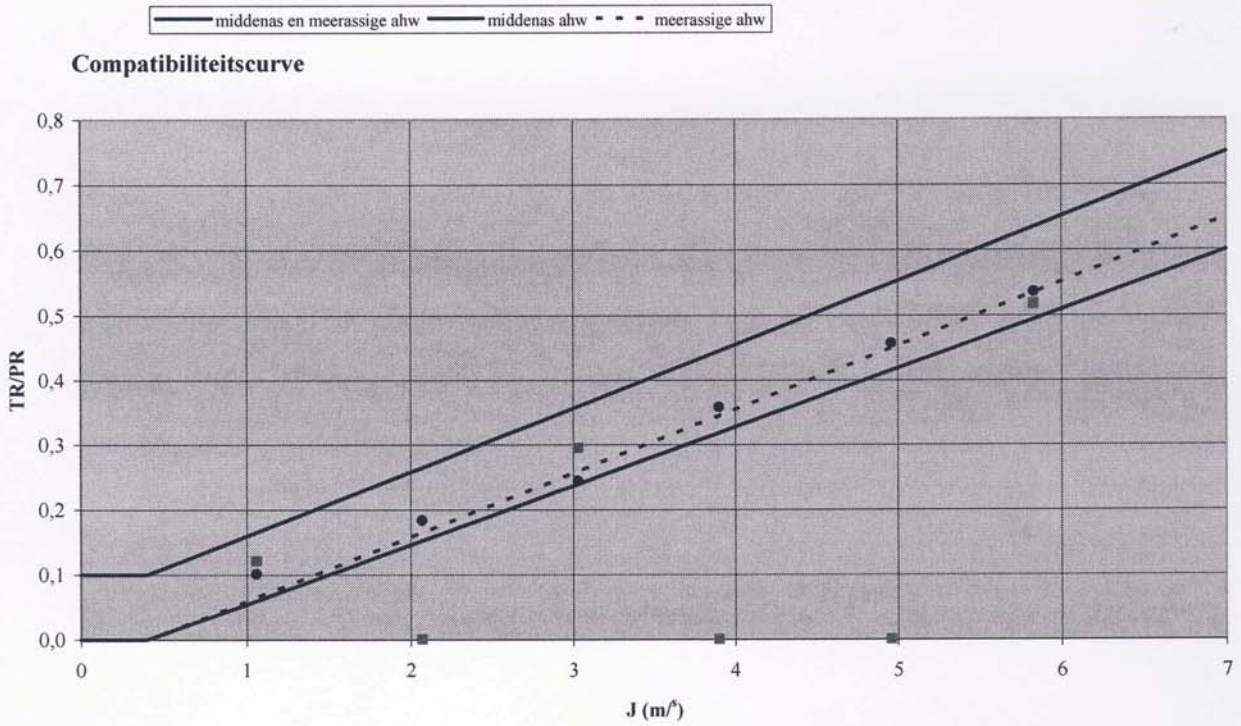
LADEN :



Deceleration tractor/trailer combination J m/s²	T_R/P_R	T_R/P_R
1,06	0,101	0,122
2,07	0,183	--
3,03	0,244	0,295
3,90	0,358	--
4,96	0,457	--
5,83	0,536	0,518

Potentiometer setting laden : 13,2 kΩ
ECU software program : S108(12-08-2009)

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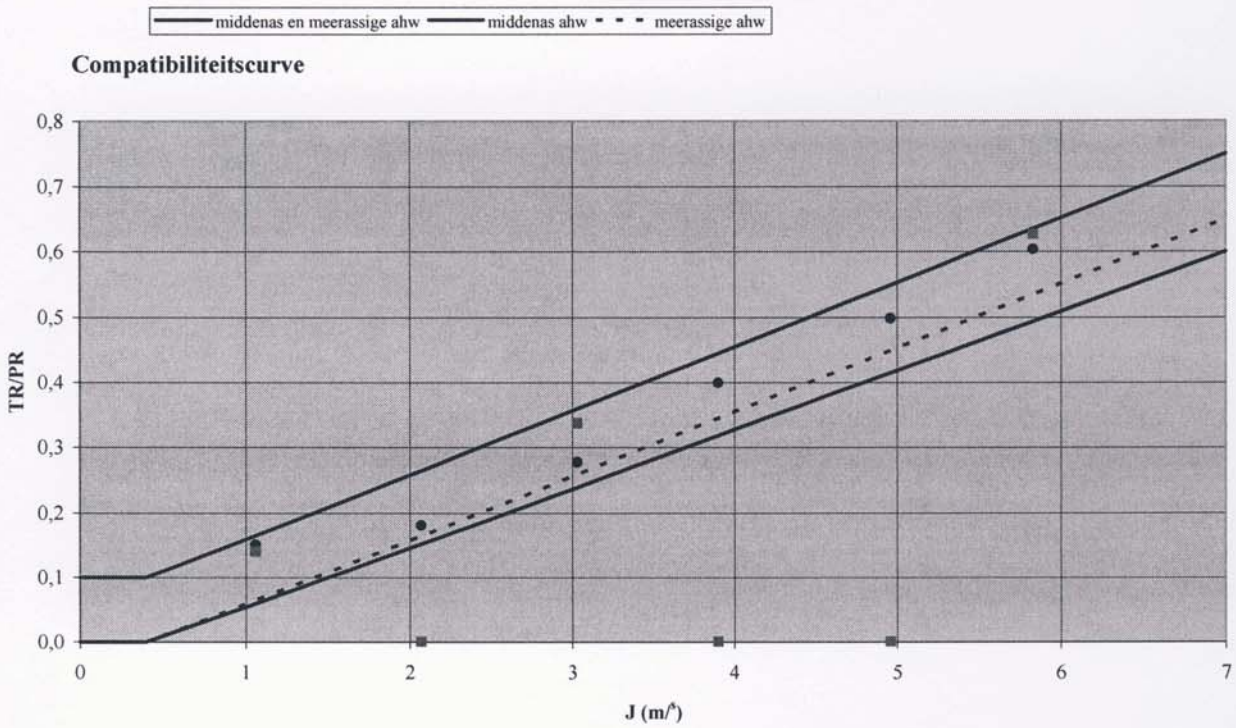
UNLADEN :



Deceleration tractor/trailer combination J m/s^2	T_R/P_R	T_R/P_R
1,06	0,151	0,140
2,07	0,181	--
3,03	0,278	0,337
3,90	0,399	--
4,96	0,499	--
5,83	0,604	0,626

Potentiometer setting unladen : 10,4 kΩ
ECU software program : S108(12-08-2009)

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Annex I Constructional demands		
2.2.2.2.	Braking system O2 continuous or semi continuous or inertia. Electical braking system conforming Annex XI shall permitted	See remark on page 2. Braking system is electric-hydraulic.
2.2.2.4.	The service braking shall act on all wheels of the trailer	PASS / ~~FAIL~~
2.2.2.5.	The action of the service braking system shall suitably distributed among the axles	PASS / ~~FAIL~~
2.2.2.6	Action of braking symmetrically to longitudinal median plane of the vehicle.	PASS / ~~FAIL~~
2.2.2.7.	Braking surfaces in constant contact with the wheels.	PASS / ~~FAIL~~
2.2.2.8.	wear of brakes shall be easily compensated	PASS / ~~FAIL~~
2.2.2.8.1.	wear adjustment shall be automatic. optional for O2	PASS / ~~FAIL~~
2.2.2.8.2.	Possible to easily check wear	PASS / ~~FAIL~~
2.2.2.9.	Trailer is stopped automatically if coupling separates	PASS / ~~FAIL~~
2.2.2.10	Parking braking when trailer is separated from towing vehicle. Actuating by a person standing on the ground	PASS / ~~FAIL~~
Annex II		
2.3.3.	Reaction time	≤ 0.6 PASS / ~~FAIL~~
Annex VII		
4.1	Varification of components	PASS / ~~FAIL~~ See TDB0842
4.3	Verification of performance	PASS / ~~FAIL~~
Annev XI		
1.1	Contol device on the trailer?	PASS / ~~FAIL~~
1.2	Elektrical energy supplied to the trailer by the motor vehicle	PASS / ~~FAIL~~
1.3	Actuated by the operating of the service brake of the motorvehicle	PASS / ~~FAIL~~
1.4	Nominal voltage rating 12 V	PASS / ~~FAIL~~
1.5	Max. current consumption not higher than 15 A	PASS / ~~FAIL~~ See page 9 of this report
1.6	The connection: - special connector - not fit the lighting connect -plug and cable shall be on the trailer	PASS / ~~FAIL~~
2.1	If there is a battery on trailer it must be separated during service braking of the trailer	PASS / ~~FAIL~~; On the test vehicle there was not a extra battery. If there is an extra auxilary battery this should be connected through a relay which separate this battery during braking.
2.2	Min. mass less that 75% of max Mass a load sensing device is mandatory	PASS / ~~FAIL~~

* Strike out what doesn't apply

2.3	When the connection line is reduced to 7 V 20% braking effect of the max laden weight shall be mantained	PASS / ~~FAIL~~ 7V gives a hydraulic pressure of 45 bar.
2.4	-It must be possible to adjust manualy the position of the deceleration indicator. -The device shall clearly indicate the horizontal position	PASS / ~~FAIL~~
2.5	The relay for actuating the braking current shall be positioned on the trailer	PASS / ~~FAIL~~
2.6	Is there a dummy socket for the plug	PASS / ~~FAIL~~
2.7	There shall be a tell-tale: -lighting up with every application -indication the proper functioning of the electrical braking system	PASS / ~~FAIL~~ by pressure sensor
3.1	Does brake system respond at combination deceleration of not more than 0,4 m/s2	PASS / ~~FAIL~~
3.2	Initial brake pressure not higher than10% of the max.stat. axle load and 13% of the unladen axle load	PASS / ~~FAIL~~
3.3	is the brake force increased by steps than it should fulfil these demands	Not applicable
3.4	the minimum braking force of 50% shall be be attained at not more that 5,9 m/s2 combination deceleration	PASS / ~~FAIL~~
3.6	When coupling is seperated while it is in motion minimal performance is 25% for minimal 15 minutes	PASS / ~~FAIL~~ 15 min pressure drops from 50 to 44 bar.

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Annex XI 1.5

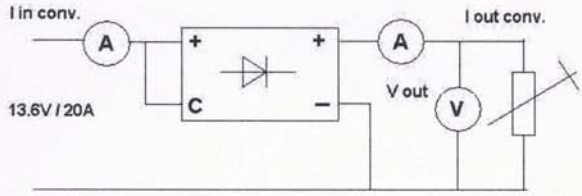
Device under test

JMR Current Regulator EH15-001

Make:	JMR Trading
Type:	Jaco EH 015-001
Rev:	1.0
Serialnr.	2009510001

The current regulator prevents the towing vehicle against an electric output current greater than 15A.
The current regulator was tested under following conditions.

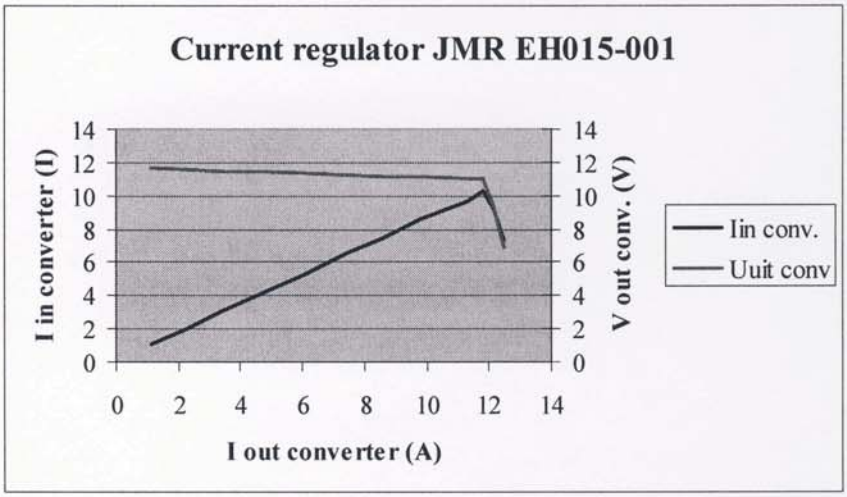
Testcircuit



Testresult

I out conv.	I in conv.	V out conv
1.11 A	1.01 A	11.62 V
2.31 A	2.04 A	11.55 V
3.44 A	3.03 A	11.49 V
4.70 A	4.12 A	11.42 V
6.08 A	5.31 A	11.32 V
7.45 A	6.53 A	11.25 V
8.54 A	7.47 A	11.18 V
9.81 A	8.56 A	11.10 V
11.29 A	9.66 A	11.00 V
11.81 A	10.32 A	10.99 V
12.15 A	9.25 A	9.31 V
12.50 A	7.27 A	6.94 V

Diagram



The maximum measured current into the input of the regulator : 10.32A.

Conclusion

This current regulator fulfils the requirements of 1.5 annex XI

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Meteorlogical conditions

Date:	12-09-2009	Location of test track:	RDW Test Centre Lelystad
Barometric pressure	1016 mbar	Weather conditions	dry
Winddirection	W	Relative humidity	85 %
Temperature	19 °C	Wind speed	4 m/s

Used testequipment

Description	**Required accuracy**	**Registration number**
Pressure (manometer)	± 1 % of 16 bar	DRU 94
(registration; pressure transducer)	(± 2,5% of 10 bar)	
Speed- / distance	± 1 %	GPS05 VYF74
ABS test equipment		--
Temperature (0 – 700°C)	± 10°C	TEM43
Weighing installation	± 10 kg per plate	OPS08
Time (test type I,II)	± 5 s	--
Wabco simulator	± 1 % of 16 bar	--
Recorder		RCH10
Force	± 3%	KRA21
Amplifier		MVS31/33/76/73/79
Current I out conv.		unv26/unv23
Current I in conv.		unv25/unv22
Voltage V out conv		unv24
Voltage V in conv		unv19
Power supply		sup37
Electrical load		rbw01
Order nr.: VR164056		

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date: 19-11-2008 up to 23-12-2009

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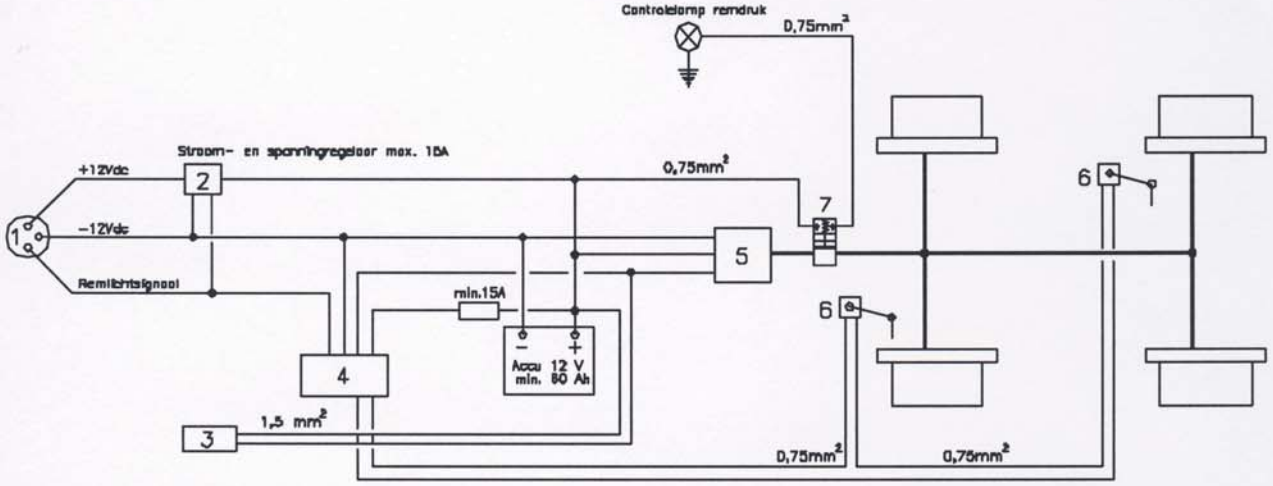
Testreport nr.: RDW-71/320-1462



** Alle niet nader genoemde aansluitdraden min. 2,5 mm²

** Indien er een accesoire-accu aanwezig is moet deze geschakeld zijn middels een scheidingsrelais.

	Voertuiggewichten:			
	Oplegger		Middenasaanhangwagen	
	Max. massa	Min. massa	Max. massa	Min. massa
Totaal	5000 kg	1290 kg	3850 kg	990 kg
Koppeling	1500 kg	300 kg	350 kg	50 kg
As nr. 1	1750 kg	495 kg	1750 kg	495 kg
As nr. 2	1750 kg	495 kg	1750 kg	495 kg

1. Steker, minimaal 3-polig.
2. Stroom- en spanningregelaar max. 15A.
   merk: JMR , type EH15
3. Losbreekrem
4. Remregeling: Merk: JMR Trading B.V.
   Type: JACO Brake Controller SP 012-..
5. Elektrische oliepomp
   Merk: JMR
   Type: EH105
6. Remkrachtregelaar
   KNORR, 0504002113100 (2,6-7,4 kOhm). Aantal: 1 of 2 stuks, afh. van assteltype.
   Per weerstand de waarde bij beladen- ca. 1 kOhm hoger afstellen dan bij onbeladen voertuig.
   Alternatief: JACO 90901, Hallsensor 4-20 mA. aantal: 1 of 2 stuks, afh. van assteltype.
   Alternatief: JACO 90902, luchtdruksensor 4-20 mA. Aantal: 1 stuks.
7. Oliedrukschakelaar ca. 0,3-1,5 bar.

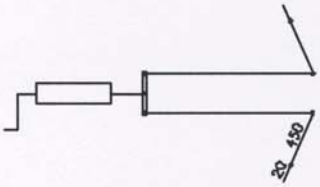
Dynamische bandenstraal: 336 mm ± 5%

Wielremmen:

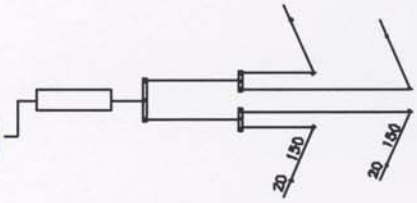
Merk: Kodiak
Type: 225
Remschijfdiameter: 309 mm.
Zuigerdiameter: 54 mm.
Remvoering: Kodiak, D 289
Goedkeuringsnr.: TDB 0842

Handrem:

Merk: Herman Peters
Type: 090.000-00 alt. 090.001-00
Goedkeuringsnr.: Dekra 2008 19534
Handremklauw: Kodiak 225P
Werkend op één as, hefboomlengte 450 mm.



Of: werkend op 2 assen, hefboomlengte 150 mm.



Fabrikant: JMR Trading B.V.
Staalstraat 1
2984 AJ Ridderkerk
Tel. ++311804 27292
Fax. ++311804 31302

Datum: 09-10-2009	Get: J.Mama	Wijz. B

Benaming:

Lastafhankelijke elektrische reminstallatie voor oplegger of middenasaanhangwagen met hydraulische schijfremmen.

Tekeningnr.: 91006

Beschrijving elektrisch hydraulisch remsysteem vlgs. tek. 91006

Het remsysteem is middels de **steker (1)** elektrisch verbonden met het trekkende voertuig. De steker heeft minstens 3 contacten: 2 stuks (+/-12V) om de boordaccu te laden, en één contact welke verbonden is met het remlichtsignaal van de voorwagen.
Het remlichtsignaal zorgt ervoor dat remregeling (4) en de oliepomp((5) geactiveerd worden.

De **regelaar (2)** dient om de laadstroom in de verbindingsleidingen naar de rem-accu van de aanhangwagen te begrenzen tot een maximum van 15 Ampère, zoals bepaald is in de remmenrichtlijn. Ook wordt er geen spanning meer doorgelaten als de spanning van de accu van de motorwagen lager is dan 11,5 Volt. Dit is zo gedaan om ervoor te zorgen dat de accu van de aanhangwagen die van de motorwagen niet kan ontladen als b.v. de combinatie langdurig wordt geparkeerd. Tevens is de regelaar verbonden met het remlichtsignaal van de motorwagen ter beveiliging van de remwerking van de aanhanger. Mocht de spanning van de rem-accu van de aanhangwagen lager worden dan 7 Volt, dan zorgt het remlichtsignaal ervoor dat tijdens de remming de regelaar weer voedingspanning gaat doorlaten van de motorwagen naar de accu van de aanhangwagen.

De **remregeling (4)** en de **oliepomp (5)** worden geactiveerd door het remlichtsignaal van het trekkende voertuig. In de remregeling is een vertragingsopnemer opgenomen, welke de remvertraging van de combinatie registreert en afhankelijk hiervan een hydraulische regelschuif op de pomp bedient welke de pompdruk regelt.

De maximaal te bereiken oliedruk/remkracht wordt afhankelijk van de asdruk automatisch geregeld door de **remkrachtregelaars (6)** welke de remregeling aansturen. Als het voertuig inveert als gevolg van ladingtoename zal de stand van de regelaar veranderen waardoor de maximaal uitgestuurde spanning van de remregeling (en remkracht) zal toenemen.Er zijn 2 remkrachtregelaars diagonaal gemonteerd, één op de voorste as en één op de achterste as, en ze zijn in serie met elkaar verbonden. Dit is zo gedaan om bij onafhankelijk geveerde wielen (torsie-assen) eventuele scheefstand van het voertuig te compenseren. Tijdens veerbewegingen zal de waarde van de remkrachtregelaars telkens veranderen, maar de remregeling regelt af op een waarde welke minstens 10 seconden achtereen aanwezig is, b.v. bij stilstand voor een verkeerslicht. De remkrachtregelaars kunnen bij mechanische vering zijn uitgevoerd als regelbare weerstanden (2,7-7,4 kOhm) of Hallsensoren (4-20 mA) . Als regelbare weerstanden worden gebruikt moet het verschil in waarde per weerstand tussen onbeladen en beladen minstens 1 kOhm zijn. Richtwaardes voor de afstelling zijn ca. 5,7 kOhm het onbeladen- en 6,7 kOhm voor het beladen voertuig. Bij luchtvering wordt gebruik gemaakt van een luchtdruksensor (4-20 mA), welke de druk in de luchtveerbalgen meet.
Omdat bij luchtvering meestal gebruik wordt gemaakt van starre assen en één luchtveerventiel om de rijhoogte te controleren en bovendien de luchtbalgen links en recht rechtstreeks met elkaar zijn doorverbonden, kan hier worden volstaan met één luchtdruksensor.

In de olieleiding naar de remmen is een **drukschakelaar (7)** gemonteerd (0,3- 1,5 bar) welke over de steker (1) een controlelamp aanstuurt op het dashboard van de voorwagen zodra er remdruk is, en welke bij iedere remming gaat branden.
Het is ook mogelijk om deze controlelamp links – of rechtsvoor op de kop van de aanhangwagen te monteren, zodat deze vanuit de cabine te zien is in de achteruitkijkspiegel.

Optioneel is het ook mogelijk om in de cabine een accuspanningcontole voor de accu van de aanhangwagen te monteren in de vorm van een buzzer of accuspanningsmeter.

Er is een **losbreekschakelaar (3)** gemonteerd, welke een uittrekbare pen heeft die met een staalkabel en clip verbonden is met het trekkende voertuig. Zodra tijdens de rit de aanhanger losbreekt van het trekkende voertuig, wordt de pen uit de schakelaar getrokken en wordt rechtstreeks uit de boordaccu 12 Volt naar de pomp gevoerd en gaat de oplegger remmen.

30-12-2009 J. I.

Test Report
/Prüfprotokoll/
/Procès-Verbal d'Essai/
/Verbale di Prova/

Nr. TDB 0842 dated /vom /du /de 12.02.2009

for application of Annex 11, ECE Regulation No. 13

/zur Anwendung von Anhang 11, ECE Regelung Nr. 13/
/en application de l'Annexe 11 du ECE règlement 13/
/in applicazione dell'Allegato 11 della ECE regolazione 13/

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Harald Reutter

1 IDENTIFICATION
/IDENTIFIZIERUNGSMERKMALE
/IDENTIFICATION
/IDENTIFICAZIONE

1.1 Axle
/Achse
/Essieu
/Assale

Manufacturer: */Hersteller* */Fabricant* */Fabbricante*	JMR Trading B.V. NL-2984 AJ Ridderkerk
Make: */Fabrikmarke* */Marque* */Marc*	Dexter axle USA
Type: */Typ* */Type* */Tipo*	Rubber torsion
Model: */Ausführung* */Modèle* */Modello*	Torflex
Technically permissible axle load P_e [1]: */Technisch zulässige Achslast P_e [1]* */Charge techniquement admissible par essieu P_e [1]* */Massa per assale tecnicamente ammessa P_e [1]*	1717 daN (≙ 1750 kg)

1.2 Brake
/Bremse
/Frein
/Freno

Manufacturer: */Hersteller* */Fabricant* */Fabbricante*	see 1.1 */siehe 1.1* */voir 1.1* */vedi 1.1*

[1] Calculation with / *Berechnung mit / Calcul avec / Calcolo con*: g = 9,81 m/s²

Make: /Fabrikmarke /Marque /Marca	KODIAK USA
Type: /Typ /Type /Tipo	12''
Model: /Ausführung /Modèle /Modello	Disc
Caliper: /Bremssattel /Étrier de frein /Pinza freno	
- Manufacturer: /Hersteller /Fabricant /Fabbricante	KODIAK USA
- Make: /Fabrikmarke /Marque /Marca	KODIAK USA
- Type: /Typ /Type /Tipo	12''
- Variant: /Ausführungen /Modèle /Modello	225
- Method of construction: /Funktionsprinzip: /Principe de fonctionnement: /Principio di funzionamento:	Floating caliper brake (hydraulic) /Schwimmsattelscheibenbremse (hydraulisch) /Frein à disque à étrier flottant (hydraulique) /Pinza scorrevole freno a disco(idraulico)
- Piston diameter: /Kolbendurchmesser /Diamètre du piston /Diametro dello stantuffo	54 mm
- max. hydraulic pressure: /Höchstzulässiger Hydraulikdruck /Pression hydraulique maximale admissible /Pressione idraulico massima ammissibile	120 bar
Automatic brake adjustment device: /Automatische Nachstelleinrichtung der Bremse: /Dispositif de réglage automatique de frein: /Dispositivo di registrazione automatico del freno:	integrated /integriert /intégré /integrato

Brake disc:
/Bremsscheibe
/Disque de frein
/Disco del freno

- Manufacturer: /Hersteller /Fabricant /Fabbricante	KODIAK USA
- Make: /Fabrikmarke /Marque /Marca	KODIAK USA
- Type: /Typ /Type /Tipo	12''
- Variant: /Ausführung /Modèle /Modello	integral
- Outside diameter: /Außendurchmesser /Diamètre extérieur /Diametro esterno	309 mm
- Effective radius r_e: /Halbmesser r_e, wirksam /Rayon effective r_e /Raggio effettivo r_e	133 mm
- Thickness x_e: /Dicke x_e /Épaisseur x_e /Spessore x_e	24 mm
- Mass: /Masse /Masse /Massa	12,532 kg
- Material: /Werkstoff: /Matériau: /Materiale:	Cast iron (grey cast iron) /Gusseisen (Grauguss) /Fonte (fonte grise) /Ghisa (ghisa grigia)
- Method of construction: /Bauweise: /Mode du construction: /Modo di costruzione:	ventilated brake disc /belüftete Bremsscheibe /Disque de frein ventilé /Disco del freno ventilato

Brake pad:
/Bremsbelag
/Garniture du frein
/Guarnizione frenante

- Manufacturer: /Hersteller /Fabricant /Fabbricante	KODIAK USA.

1.4 Tyres

/Reifen
/Pneus
/Pneumatici

Dynamic rolling radius R_e
at reference load P_e: 336 mm

/Dynamischer Rollradius R_e bei Achslast P_e
/Rayon de roulement R_e à la masse de référence P_e
/Raggio di rotolamento R_e corrispondente alla reazione di riferimento P_e

1.5 Actuation

/Betätigungseinrichtung
/Commande de frein
/Azionamento

Brake actuator:
/Bremszylinder
/Cylindre de frein
/Cilindro del freno

- Manufacturer: HERION
  /Hersteller
  /Fabricant
  /Fabbricante
- Type: LHZ 44812510075
  /Typ:
  /Type:
  /Tipo:

Master cylinder:
/Hauptzylinder
/Maitre-Cylindre de frein
/Cilindro principale del freno

- Manufacturer: FTE
  /Hersteller
  /Fabricant
  /Fabbricante
- Type: hydraulic master cylinder
  /Typ: */hydraulischer Geberzylinder*
  /Type: */maître cylindre hydraulique*
  /Tipo: */pompa comando idraulico*
- Model: H2692.02
  /Ausführung
  /Modèle
  /Modello
- Dimension: Ø 26,99 mm x 78,5 mm
  /Abmessungen
  /Dimensions
  /Dimensioni

Brake line:
/ *Bremsleitung*
/ *Tuyau de frein*
/ *Tubazione del freno*

- Make: /*Fabrikmarke* /*Fabricant* /*Fabbricante*	HITEC
- Material: /*Werkstoff:* /*Matériau:* /*Materiale:*	Copper /*Kupfer* /*Cuivre* /*Rame*
- Model: /*Ausführung* /*Modèle* /*Modello*	RL 50025 [2]
- Dimension: /*Abmessungen* /*Dimensions* /*Dimensioni*	5 mm x 1 mm

Brake fluide: DOT 4 [3]
/*Bremsflüssigkeit*
/*Liquide de frein*
/*Liquido frenante*

1.6 Automatic brake adjustment device: not applicable (see 1.2)
/Automatische Nachstelleinrichtung der Bremse: */nicht anwendbar (siehe 1.2)*
/Dispositif de réglage automatique de frein: */non applicable (voir 1.2)*
/Dispositivo di registrazione automatico del freno: */non applicabile (vedi 1.2)*

2 RECORD OF TEST RESULTS [4]

/AUFZEICHNUNG DER PRÜFERGEBNISSE [4]
/RÉSULTATS D'ESSAI [4]
/REGISTRAZIONE DEI RISULTATI DI PROVA [4]
(corrected to take account of rolling resistance ≙ 0,01 P_d)
/(unter Berücksichtigung des Rollwiderstands ≙ 0,01P_d)
/(corrigés pour tenir compte de la résistance au roulement ≙ 0,01P_d)
/(corretti per tener conto della resistenza al rotolamento ≙ 0,01P_d)

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[2] Delivery standard SA1 / nach Liefernorm SA1 / norme de livraison SA1 / normativa della consegna SA1
[3] in acc. to / *gemäß / selon / secondo:* SAE J1703-FM VSS571.116
[4] Inertia dynamometer test, / *Prüfung auf dem Schwungmassenprüfstand,* / *Essai sur le dynamométrique par inertie.* *Prova su dinamometro a inerzia,*

2.1 In the case of vehicles of categories O_2 and O_3

/Bei Fahrzeugen der Klassen O_2 und O_3/Pour des véhicules des catégories O_2 et O_3 /Per i veicoli delle categorie O_2 e O_3

Test type: /Bremsprüfung Typ /Type d'essai /Tipo di prova		0	I	
Annex 11, Appendix 2 point: /Anhang 11, Anlage 2, Punkt /Annexe 11, appendice 2, point /Allegato11, appendice 2, punto		3.5.1.2.	3.5.2.2./3.	3.5.2.4.
Test speed /Prüfgeschwindigkeit /Vitesse d'essai /Velocità di prova	[km/h]	40	40	40
Hydraulic brake caliper pressure /Druck im Bremssattel /Pression hydraulique dans l'étrier /Pressione idraulica nella pinza	$p_{H,e}$ [10^2 kPa]	106		106
Braking time /Bremsdauer /Durée de freinage /Durata di frenatura	[min]	-	2,55	-
Brake force developed /Ermittelte Bremskraft /Force de freinage développée /Forza di frenatura	T_e [daN]	995	120	1076
Brake efficiency /Abbremsung /Efficacité du freinage /Efficienza di frenatura	T_e/P_e [-]	0,58	0,07	0,63
Required brake fluid volume /Benötigtes Bremsflüssigkeitsvolumen /Volume nécessaire de liquide de frein /Volume necessario di liquido frenante	V_e [cm^3]	8,20 [5)]	-	8,64 [5)]
Hydraulic thershold pressuere /Hydraulischer Ansprechdruck /Pression de réponse hydraulique /Pressione di azionamento idraulico	$p_{H,0,e}$	2,0		2,0

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[5)] The brake chamber stroke has to be multiplied with the number of axles.
Der Hub des Bremszylinders ist mit der Anzahl der Achsen zu multiplizieren.
La course de récepteur doit être multiplié avec le nombre d'essieux
La corsa dell' attivetore devo essere moltiplicate con il numero di assali

2.2 In case of vehicles of category O_4

/Bei Fahrzeugen der Klasse O_4/Pour des véhicules de catégorie O_4 / Per i veicoli della categoria O_4

not applicable
/nicht anwendbar
/non applicable
/non applicabile

2.3 This item is to be completed only when the brake has been subject to this procedure defined in paragraph 4, annex 19 to verify the cold performance characteristics of the brake by means of the brake factor (B_F). Where the brake factor is defined as input to output amplification ratio of the brake.

/Dieser Abschnitt ist nur erfüllt, wenn die Bremse den Vorgaben definiert in Paragraph 4, Anhang 19 unterworfen wurde und die Kaltbremswirkung mittels des Bremsenfaktors (B_F) überprüft wurden. Der Bremsenfaktor ist definiert als Eingangs- zu Ausgangs Verstärkungsverhältnis der Bremse.

/Cet article doit être accompli après les normes pour le frein selon paragraphe 4, annexe 19 pour vérifier les caractéristiques du freinage à froid à moyen de coefficient de freinage (B_F). Le coefficient de frein est défini comme rapport d'amplification entre entrée et sortie.

/Quest'articolo deve essere eseguito secondo i vantaggi per il freno secondo paragrafo 4,l'annesso 19 per verificare le caratteristiche di prestazioni fredde del freno mediante il coefficiente del freno (B_F). Il coefficiente del freno è definito come rapporto d'amplificazione d' ingresso e uscita.

2.3.1 Brake factor B_F:

The brake factor (B_F) as defined in annex 19 is not applicable for the brake described in this test report. That's why, alternative the cold performance characteristic of the brake is verified by the value $\eta_a C^*$. Where this value $\eta_a C^*$ is defined in the following formula:

/Bremsenfaktor BF
Ein Bremsfaktor(B_F), wie er in Anhang 19 definiert ist, ist für die in diesem Prüfbericht beschriebene Bremse nicht anwendbar. Daher wird alternative die Kaltbremswirkung der Bremse mittels dem Wert $\eta_a C^*$ überprüft. Der Wert $\eta_a C^*$ ist nach folgender Formel definiert:

/Coefficient du frein B_F
Le Coefficient du frein B_F selon la définition du annexe 19 n'est pas applicable pour le frein décrit dans cette procès-verbal. De là on a vérifié alternativement l'efficacité du frein à froid au moyen de valeur $\eta_a C^*$. Cette valeur est définiée dans la formule suivante :

/Coefficiente del freno B_F
Il coefficiente del freno B_F secondo la definizione d'allegato19 non è applicabile per il freno descritto nel presente verbale di prova. Per questo si è verificato alternativamente l'efficienza al modo freddo mediante valore $\eta_a C^*$. Questo valore è stato definito dalla formula seguente:_

$$\eta_a C^* = \frac{M_B}{r_e \, A_K \, (p_{H,e} - p_{H,0,e})}$$

M_B : Brake torque
/Bremsmoment
/Couple de freinage
/Coppia della frenatura

r_e : Effective radius of the brake disc
/Wirksamer Halbmesser der Bremscheibe
/Rayon effective de disque de frein
/Raggio effectivo del disco del freno

A_K : One piston surface of the caliper
/Eine Kolbenfläche des Bremsattels
/Superficie d'un piston dans l'étrier de frein
/Superficie di un stantuffo nella pinza freno

$p_{H,e}$: Hydraulic pressure
/Hydraulischer Druck
/Pression hydraulique
/Pressione idraulico

$p_{H,0,e}$: Hydraulic thershold pressure
/Hydraulischer Anlegedruck
/Pression d'appliquer hydraulique
/ Pressione di azionamento idraulico

$$\eta_a C^* = 0{,}555$$

2.4 This item is to be completed only if use is made of the alternative procedure laid down in paragraph 1.2.1 of ECE Regulation No. 13 supplement 00 to the 11 series and supplement 05 to the 10 series of amendments

/Dieser Abschnitt ist nur zu erfüllen, wenn von dem Alternativverfahren festgeschrieben in Paragraph 1.2.1 der ECE Regelung Nr.13 Ergänzung 00 der 11. Änderungsserie und Ergänzung 05 der 10. Änderungsserie gebraucht gemacht wird.

/Cet article doit être accompli seulement quand la procédure alternative, fixé dans le paragraphe 1.2.1 de règlement ECE N°13 complément 00 aux 11 séries d'amendements et complément 05 aux 10 séries d'amendements est usé.

/Questo articolo deve essere eseguito solamente, quando la procedura alternativa fissata nell'paragrafo 1.2.1 della regolazione n° 13 dell'ECE, supplemento 00 alle 11 serie delle correzioni e supplemento 05 alle 10 serie delle correzioni è applicabile.

2.4.1 Reference Test Report: **not applicable**
/Bezugsprüfbericht *nicht anwendbar*
/Procès-verbal d'essai de référence *non applicable*
/Verbale di Prova di referenza *non applicabile*

3 PERFORMANCE OF THE AUTOMATIC BRAKE ADJUSTMENT DEVICE

/Funktion der automatischen Nachstelleinrichtung
/Fonctionnement de Dispositif de réglage automatique de frein
/Funzionamento Dispositivo di registrazione automatico del freno

3.1 Free running according to paragraph 3.6.1 and 3.6.3.
of Annex 11, Appendix 2: yes
/Freigängigkeit nach Paragraph 3.6.1. und 3.6.3 von Anhang 11,Anlage 2 *ja*
/Roue libre selon paragraphe. 3.6.1. e 3.6.3 de l'annexe 11,appendice 2 *oui*
/Ruota libera seconda paragrafo 3.6.1 è 3.6.3 d'allegato 11,appendice 2 *si*

4 NAME OF TECHNICAL SERVICE CONDUCTING THE TEST

/NAME DES TECHNISCHEN DIENSTES, DER DIE PRÜFUNGEN DURCHGEFÜHRT HAT
/NOM DU SERVICE TECHNIQUE EFFECTUANT L'ESSAI
/NOME DEL SERVIZIO TECNICO INCARICATO DELLA PROVA

TÜV Nord Mobilität GmbH & Co KG
Technischer Dienst für Bremsanlagen
D-45307 Essen

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5 DATE OF TEST: 27.11.2008

/PRÜFDATUM
/DATE DE L'ESSAI
/DATA DELLA PROVA

6 This test has been carried out and the result reported in accordance with ECE Regulation No. 13, supplement 00 to the 11 series and supplement 05 to the 10 series of amendments, paragraph 4 and Annex 11, Appendix 2.

/Diese Prüfungen und die Ergebnisse wurden durchgeführt und protokolliert in Übereinstimmung mit der ECE-Regelung Nr.13 Ergänzung 00 zur 11. Änderungsserie und Ergänzung 05 zur 10. Änderungsserie Paragraph 4 und Anhang 11, Anlage 2.

/Cet essai a été effectué et les résultats ont été rapportés selon le règlement ECE N°13, complément 00 aux 11 séries d'amendements et complément 05 aux 10 séries d'amendements, paragraphe 4 et Annexe11, appendice 2.

/Questa prova è stata effettuata ed i risultati sono stato riferito in conformità con la regolazione n° 13 dell'ECE, supplemento 00 alle 11 serie delle correzioni e supplemento 05 alle 10 serie delle correzioni il paragrafo 4 e Allegato 11, l'appendice 2.

7 At the end of test defined in paragraph 3.6 of Annex 11, Appendix 2 of the requirements of paragraph 5.2.2.8.1 of ECE Regulation No. 13 supplement 00 to the 11 series and supplement 05 to the 10 series of amendments were deemed to be fulfilled.

/Nach Beendigung der Prüfung definiert in Paragraph 3.6 des Anhangs 11, Anlage 2 wurden die Anforderungen nach Punkt 5.2.2.8.1 der ECE Regelung Nr. 13 Ergänzung 00 zur 11. Änderungsserie und Ergänzung 05 zur 10. Änderungsserie erfüllt.

/Après l'achèvement de l'examen selon paragraphe 3.6 de l'annexe 11, appendice 2, les exigences selon point 5.2.2.8.1 de la ECE le règlement N° 13 complément 00 aux 11 séries d'amendements et complément 05 aux 10 séries d'amendement sont exécuté.

/Dopo il completamento della prova secondo il paragrafo 3.6 dell'appendice 11,appendice 2, le esigenze secondo l'articolo 5.2.2.8.1dell'ECE il regolamento N°13 supplemento 00 alle 11 serie delle correzioni e supplemento 05 alle 10 serie delle correzioni sono adempiti.

Essen, 12.02.2009
Art -83924-

Dipl.-Ing. Artelt

TÜV NORD Mobilität GmbH & Co. KG
Institut für Fahrzeugtechnik und Mobilität
Adlerstr. 7, 45307 Essen

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Accredited by the accreditation authority of the Kraftfahrt-Bundesamt
Bundesrepublik Deutschland - *Federal Republic of Germany*
DAR-Registrier-Nr. - *DAR-registration-number* KBA-P 00004-96

8 **APPROVAL AUTHORITY, IF DIFFERENT FROM TECHNICAL SERVICE**

/Typgenehmigungsbehörde, falls sie nicht Prüfstelle ist
/Autorité Compétente en matière de réception, si elle est différente du service technique
/Autorità che rilascia l'omologazione, se diversa dal servizio tecnico

Flensburg, 25. FEB. 2009

i. A.

Kraftfahrt-Bundesamt 44

9 **TEST DOCUMENTS**

/PRÜFUNTERLAGEN
/DOCUMENTS D'ESSAI
/DOCUMENTI DELLA PROVA

Appendix 1: Dimensions brake / wheel / tyre (1 sheets)

/Anlage 1: Abmessungen Bremse / Rad / Reifen (1 Seiten)
/Annexe 1: Dimensions frein / roue / pneu (1 feuilles)
/Allegato 1: Dimensioni freno / route / pneumatici (1 foglie)

Appendix 2: Schematic representation of brake (1 sheet)

/Anlage 2: Schematische Darstellung der Bremse (1 Seite)
/Annexe 2: Géométrie de frein (1 feuille)
/Allegato 2: Geometria del freno (1 foglio)

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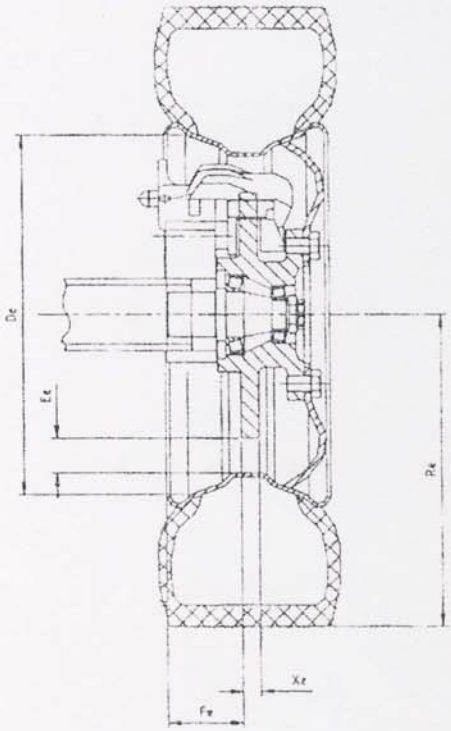
Test Report No. /*Prüfprotokoll Nr. /Procès-Verbal d'essai N° /Verbale di Prova n°*	:	TDB 0842
Appendix /*Anlage /Annexe /Allegato*	:	1
Sheet /*Blatt /Feuille /Foglio*	:	1 / 1
Date /*Datum /Date /Data*	:	12.02.2009
Manufacturer /*Hersteller /Fabricant /Fabbricante*	:	JMR Trading B.V.
Type of axle /*Typ der Achse /Type d'essieu /Tipo di assale*	:	Rubber torsion

TÜV NORD

Test Conditions :

/Prüfbedingungen
/Conditions de l'essai
/Condizioni della prova

X_e	:	24	mm
P_e	:	1717 1750	daN kg
B_e		---	mm
R_e	:	336	mm
D_e	:	381	mm
E_e	:	31	mm
F_e	:	21	mm
Brake disc mass */Bremsscheibenlmasse* */Masse disque de fein* */Massa disco del freno*	:	12,532	kg
Tyre (mounted) */Reifen(montiert)* */Pneu (monté)* */Pneumatico (montato)*	:	225/70 R 15 C (S)	
Rim (mounted) */Felge(montiert)* */Jante (monté)* */Cerchione (montato)*	:	T15 x 6 (S)	



Brake disc /*Bremsscheiben* /*Disque de freinage* /*Disco del freno* width /breite /largeur /larghezza x (mm)	mass /masse /masse /massa (kg)	Axle load /Achslast /charge par essieu /massa per assale P (daN)	(kg)	Tyre /Reifen /Pneu /Pneumatico	Rim /Felge /Jante /Cerchione	B	R	D	E	F
						(mm)				
24,0	12,532	1717	1750	225/70 R 15 C	T15 x 6	--	336	381	31	21

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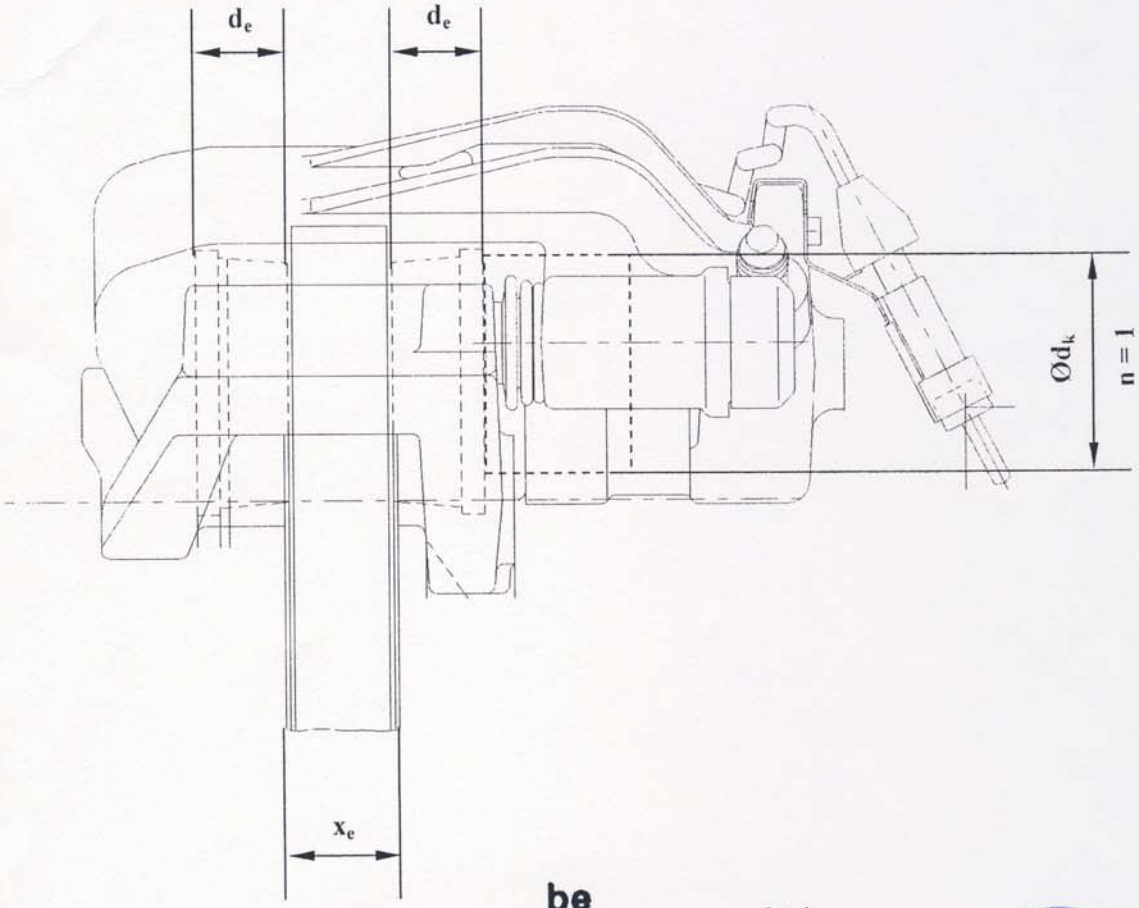

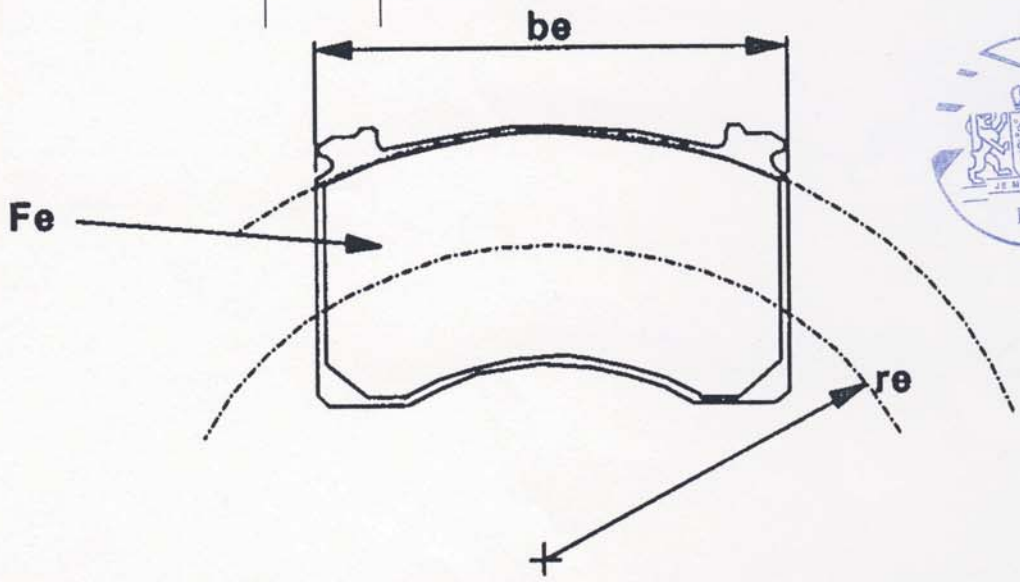

d_k (mm)	d_e (mm)	x_e (mm)	r_e (mm)	b_e (mm)	F_e (cm^2)
54	16,9 / 11,2	24	133	122,5 / 111,0	45,4 + 39,0