TEST REPORT

Concerning the braking system of certain vehicle categories in accordance with the Council Directive 71/320/EEC as last amended by the Commission Directive 2006/96/EC and ECE Regulation R13.11.

Test report number		:	**RDW-13R-0514**
0.1.	Make	:	Carnehl
0.2.	Type	:	CCS/HS-40 Brake type :SBS 2220 Ho TDB 0843 (26.02.1010)
0.4.	Category of vehicle	:	O4
0.5.	Name and address of the manufacturer	:	SAF-HOLLAND GmbH Hauptstraβe 26 63856 Bessenbach Germany

General : The braking system complies with the requirements laid down in:
- paragraph 2 of Annex I of above-mentioned Directive
- paragraph 5 of above-mentioned Regulation.

See brake calculation: WDE 73380S /TDB 0843 26/02/2010 and 27/05/2010
vehicle drawing dated: 30-07-2020

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

Conclusion : The type of braking system complies with the requirements and there are no objections to granting the approval under the above-mentioned Directive and Regulation.

Tests conducted on : 02/03/04-08-2010

By : W.Hartman

Zoetermeer, 29-10-2010
The test engineer,

Invoice number: VR192985

RDW
W.R. Hartman

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8218 NX Lelystad
The Netherlands

Vehicle Approval and Information

List of contents

List of attached diagrams

Subject	Diagram number

Reason for testing

New vehicle type.

Used test equipment

Item	Identification number (make and type)	Calibration papers available
Scale	OPT 08	yes/~~not checked~~
Pressure meter	MAN 85	yes/~~not checked~~
Speed meas equipment	Vijf 70/GPS 04	yes/~~not checked~~
Deceleration meter	Vijf 70/GPS 04	yes/~~not checked~~
Temperature meter	TEM 43	yes/~~not checked~~
Tyre-pressure meter	MAN 43	yes/~~not checked~~
Force meas equipment	KRA 21	yes/~~not checked~~
Reaction-time equipment	-	yes/~~not checked~~
Brake test bench	-	yes/not checked
Recorder	RCH 12	yes/~~not checked~~
Amplifier	MVS 33	yes/~~not checked~~
Filter	-	yes/not checked

Remarks

…

General information

Make and type of the vehicle	Carnehl Container chassis CCS/HS-40
Vehicle category	O4
Vehicle Identification Number	W09400339APC09021
Test conducted by	W.Hartman
Place	Lelystad
Date	02/03/04-08-2010

Environmental information

Date	03-08-2010
Road surface	Asphalt
Weather condition	Dry
Temperature	20 ºC
Wind direction	SWS
Wind speed	2. m/s
Ambient pressure	1020 mbar
Relative humidity	76 %

Static measurements:

Maximum allowed weights (mass):			Weights ~~laden/unladen~~ (1) including - persons.		
king pin	14.000	kg	King pin	*	kg
Axle 1	9.000	kg	Axle 1	*	kg
Axle 2	9.000	kg	Axle 2	*	kg
Axle 3	9.000	kg	Axle 3	*	kg
Total	41.000	kg	Total	*	kg
Tyre size(s)	385/65 R 22,5				
Tyre pressure	9.0	10^2kPa	Load Index	160 K	
Brake schedule	-				
Brake cylinders			Brake levers		
Axle number 1	16/24	inch	Axle number 1	76	mm
Axle number 2	16/24	inch	Axle number 2	76	mm
Axle number 3	16/24	inch	Axle number 3	76	mm

Tests:				
Pressure after air supply line fracture (2.2.3.1. Annex II)	≥7,5	10^2kPa	Brake performance	Agreed/~~not agreed~~
Pressure after air supply line fracture and a deflation speed of at least 1 bar/s (2.2.1.18.4.2. Annex I)	≥7,5	10^2kPa	Brake performance	Agreed/~~not agreed~~

3 - axle's (lining SAF 437)

Parking brake (2.2.2.1. Annex II)			**Reaction time** (2.3. Annex II and 3. Annex III)		
Brake force forward	5.000	daN	Make test equipment	Wabco	
Brake force rearward	4.500	daN	Feed line pressure	6,5	10^2kPa
Control force	-	daN	t_{sS}		s
Lever length	76	mm	$t_{aP} + t_{sA}$ axle 3	See below	s
Remarks Test done on 1 axle only ! Landing legs not used during test			$t_{aP} + t_{sA}$ axle 2	-	s
			$t_{aP} + t_{sA}$ axle 1(Pneumatic)	-	s
			$t_{aP} + t_{sA}$ axle 1(CAN)	-	s
Mass of the combination	38.470	kg	Capacity of the air reservoirs		
Unladen weight under axles	4.195	kg	Volume air reservoirs	80	dm^3
Maximum weight under axles	9.000	kg	Maximum pressure P_0	8,5	10^2kPa
Rolling resistance combination	0,01	m/s^2	Rolling resistance trailer	0,01	m/s^2
Calculation factor for deceleration (acc. 1.3. Annex IV)					
Laden	1,424		Pressure in reservoir after 1x braking P_1	-	10^2kPa
Unladen	3.06		Pressure in reservoir after 9x braking P_9	-	10^2kPa

Additional tests according Directive 75/524/EEC (Appendix to Annex II check diagram 2 and 4B)

Command line pressure (10^2kPa)		Brake cylinder pressure (10^2kPa)		Deceleration combination (m/s^2)		Diagram number		Deceleration calculated for trailer (m/s^2)		Remarks	
up	down	up	Down	up	down			up	Down	Up	Down
2,0	2,0	1,9	1,9	1,03	1,07	1	11	1,42	1,49	laden	laden
3,0	3,0	2,8	2,9	1,84	1,84	2	10	2,58	2,58	laden	laden
4,0	4,0	3,9	3,9	2,55	2,62	3	9	3,61	3,71	laden	laden
5,0	5,0	5,1	5,1	3,27	3,36	4	8	4,63	4,74	laden	laden
6,2	6,2	6,2	6,2	3,89	3,89	5	7	5,44	5,44	laden	laden
6,5	-	6,5	-	3,87	-	6		5,47	-	laden	-
-	-	1,5	1,6	1,78	2,07	1e	2e	5,19	6,14	unlad.	unlad.

LSD failure (6. Appendix to Annex II) — Agreed/~~not agreed/N.A.~~ (1)

Remarks: Wheel base : 7.443 mm

Weights of combination under test conditions

Un Laden			Laden			Tractor unit solo		
Axle 1	5.770	kg	Axle 1	6.035	kg	Axle 1	5.305	kg
Axle 2	2.875	kg	Axle 2	5.195	kg	Axle 2	2.015	kg
Axle 3	1.420	kg	Axle 3	8.920	kg			
Axle 4	1.400	kg	Axle 4	8.875	kg			
Axle 5	1.375	kg	Axle 5	9.445	kg			
Total	12.840	kg	Total	38.470	kg	Total	7.320	kg

2 – axles (axle 1 lifted lining SAF 437)

Parking brake (2.2.2.1. Annex II)			**Reaction time** (2.3. Annex II and 3. Annex III)		
Brake force forward	-	daN	Make test equipment	Wabco Westinghouse	
Brake force rearward	-	daN	Feed line pressure	6,5	10^2kPa
Control force	-	daN	t_{sS}	-	S
Lever length	-	mm	$t_{aP} + t_{sA}$ axle 3	-	S
Remarks Landing legs not used during test			$t_{aP} + t_{sA}$ axle 2	-	S
			$t_{aP} + t_{sA}$ axle 1(Pneumatic)	-	S
			$t_{aP} + t_{sA}$ axle 1(CAN)	-	S
Mass of the combination	29.505	kg	Capacity of the air reservoirs		
Unladen weight under axles	8.860	kg	Volume air reservoirs	-	dm^3
Maximum weight under axles	9.000	kg	Maximum pressure P_0	8,5	10^2kPa
Rolling resistance combination	0,01	m/s^2	Rolling resistance trailer	0,01	m/s^2

Calculation factor for deceleration (acc. 1.3. Annex IV)				
Laden	1,639	Pressure in reservoir after 1x braking P_1	-	10^2kPa
Unladen	3,32	Pressure in reservoir after 9x braking P_9	-	10^2kPa

Additional tests according Directive 75/524/EEC (Appendix to Annex II check diagram 2 and 4B)

Command line pressure (10^2kPa)		Brake cylinder pressure (10^2kPa)		Deceleration combination (m/s^2)		Diagram number		Deceleration calculated for trailer (m/s^2)		Remarks	
up	down	up	Down	up	down			up	Down	Up	Down
2,0	2,0	1,8	1,8	0,92	0,92	1a	10a	1,45	1,44	laden	laden
3,0	3,0	2,9	2,9	1,65	1,61	2a	9a	2,64	2,57	laden	laden
4,0	4,0	3,9	4,0	2,29	2,36	2a	8a	3,70	3,82	laden	laden
5,0	5,0	4,9	4,9	2,92	2,96	4a	7a	4,72	4,79	laden	laden
6,0	6,0	5,9	5,8	3,31	3,20	5a	6a	5,36	5,18	laden	laden
-	-	1,8	1,8	1,64	1,68	1f	2f	5,22	5,37	unlad.	unlad.

LSD failure (6. Appendix to Annex II)	Agreed/~~not agreed/N.A.~~ (1)

Remarks: wheelbase : 8.148 mm

Weights of combination under test conditions

Un Laden			Laden			Tractor unit solo		
Axle 1	5.820	kg	Axle 1	5.930	kg	Axle 1	5.305	kg
Axle 2	3.155	kg	Axle 2	5.235	kg	Axle 2	2.015	kg
Axle 3	Lifted		Axle 3	Lifted				
Axle 4	1.950		Axle 4	8.930				
Axle 5	1.905		Axle 5	9.410				
Total	12.830	kg	Total	29.505	kg	Total	7.320	kg

2 – axles (axle 3 lifted lining SAF 437)

Parking brake (2.2.2.1. Annex II)			**Reaction time** (2.3. Annex II and 3. Annex III)		
Brake force forward	-	daN	Make test equipment	Wabco Westinghouse	
Brake force rearward	-	daN	Feed line pressure	6,5	10^2kPa
Control force	-	daN	t_{sS}	-	S
Lever length	-	mm	$t_{aP} + t_{sA}$ axle 3	-	S
Remarks Landing legs not used during test			$t_{aP} + t_{sA}$ axle 2	-	S
			$t_{aP} + t_{sA}$ axle 1(Pneumatic)	-	S
			$t_{aP} + t_{sA}$ axle 1(CAN)	-	S
Mass of the combination	26.565	kg	Capacity of the air reservoirs		
Unladen weight under axles	4.625	kg	Volume air reservoirs	-	dm^3
Maximum weight under axles	9.000	kg	Maximum pressure P_0	8,5	10^2kPa
Rolling resistance combination	0,01	m/s^2	Rolling resistance trailer	0,01	m/s^2
Calculation factor for deceleration (acc. 1.3. Annex IV)					
Laden	1,478		Pressure in reservoir after 1x braking P_1	-	10^2kPa
Unladen	2,75		Pressure in reservoir after 9x braking P_9	-	10^2kPa

Additional tests according Directive 75/524/EEC (Appendix to Annex II check diagram 2 and 4B)

Command line pressure (10^2kPa)		Brake cylinder pressure (10^2kPa)		Deceleration combination (m/s^2)		Diagram number		Deceleration calculated for trailer (m/s^2)		Remarks	
up	down	up	Down	up	down			up	Down	Up	Down
2,0	2,0	1,9	1,9	0,96	1.06	1b	7b	1,37	1,52	laden	laden
4,0	4,0	3,9	3,9	2,37	2,56	2b	6b	3,46	3,73	laden	laden
6,0	6,0	6,1	6,1	3,64	3,81	3b	5b	5,33	5,58	laden	laden
6,5	-	6,4	-	3,91	-	4b	-	5,73	-	laden	-
-	-	2,1	2,1	2,21	2,21	1d	2d	5,9	5,9	unlad.	unlad.

LSD failure (6. Appendix to Annex II)	Agreed/~~not agreed~~/~~N.A.~~ (1)

Remarks: wheelbase :6.788 mm

Weights of combination under test conditions

Un Laden			Laden			Tractor unit solo		
Axle 1	5.615	kg	Axle 1	5.560	kg	Axle 1	5.305	kg
Axle 2	2.510	kg	Axle 2	2.620	kg	Axle 2	2.015	kg
Axle 3	2.325		Axle 3	9.105				
Axle 4	2.300		Axle 4	9.280				
Axle 5	Lifted		Axle 5	Lifted				
Total	12.750	kg	Total	26.565	kg	Total	7.320	kg

2 – axles (axle 2 lifted lining SAF 437)

Parking brake (2.2.2.1. Annex II)			**Reaction time** (2.3. Annex II and 3. Annex III)		
Brake force forward	-	daN	Make test equipment	Wabco Westinghouse	
Brake force rearward	-	daN	Feed line pressure	6,5	10^2kPa
Control force	-	daN	t_{sS}	-	S
Lever length	-	mm	$t_{aP} + t_{sA}$ axle 3	-	S
Remarks Landing legs not used during test			$t_{aP} + t_{sA}$ axle 2	-	S
			$t_{aP} + t_{sA}$ axle 1(Pneumatic)	-	S
			$t_{aP} + t_{sA}$ axle 1(CAN)	-	S
Mass of the combination	30.720	kg	Capacity of the air reservoirs		
Unladen weight under axles	4.245	kg	Volume air reservoirs	-	dm^3
Maximum weight under axles	**10.000**	kg	Maximum pressure P_0	8,5	10^2kPa
Rolling resistance combination	0,01	m/s^2	Rolling resistance trailer	0,01	m/s^2
Calculation factor for deceleration (acc. 1.3. Annex IV)					
Laden	1,536		Pressure in reservoir after 1x braking P_1	-	10^2kPa
Unladen	2,96		Pressure in reservoir after 9x braking P_9	-	10^2kPa

Additional tests according Directive 75/524/EEC (Appendix to Annex II check diagram 2 and 4B)

Command line pressure (10^2kPa)		Brake cylinder pressure (10^2kPa)		Deceleration combination (m/s^2)		Diagram number		Deceleration calculated for trailer (m/s^2)		Remarks	
up	down	up	Down	up	down			up	Down	Up	Down
2,0	2,0	1,9	1,9	0,91	0,94	1c	7c	1,35	1,40	laden	laden
4,0	4,0	3,9	3,9	2,15	2,20	2c	6c	3,25	3,33	laden	laden
6,0	-	6,1	-	3,19	-	3c	-	4,85	-	laden	-
6,5	6,5	6,4	6,4	3,48	3,29	4c	5c	5,09	5,00	laden	laden
-	-	1,8	1,95	1,70	1,90	1g	2g	4,85	5,44	un.lad	un.lad
-	-	1,95	-	1,88	-	3g	-	5,37	-	unlad.	-

LSD failure (6. Appendix to Annex II) Agreed/~~not agreed/N.A.~~ (1)

Remarks: wheelbase : 7.443 mm

Weights of combination under test conditions

Un Laden			Laden			Tractor unit solo		
Axle 1	5.505	kg	Axle 1	5.870	kg	Axle 1	5.305	kg
Axle 2	2.830	kg	Axle 2	4.165	kg	Axle 2	2.015	kg
Axle 3	2.285		Axle 3	9.760				
Axle 4	Lifted		Axle 4	Lifted				
Axle 5	1.960		Axle 5	10.925				
Total	12.580	kg	Total	30.720	kg	Total	7.320	kg

1 – axle (axle 1+3 lifted lining SAF 437)

Parking brake (2.2.2.1. Annex II)			**Reaction time** (2.3. Annex II and 3. Annex III)		
Brake force forward	-	daN	Make test equipment	Wabco Westinghouse	
Brake force rearward	-	daN	Feed line pressure	6,5	10^2kPa
Control force	-	daN	t_{sS}	-	s
Lever length	-	mm	$t_{aP} + t_{sA}$ axle 3	-	s
Remarks Landing legs not used during test			$t_{aP} + t_{sA}$ axle 2	-	s
			$t_{aP} + t_{sA}$ axle 1(Pneumatic)	-	s
			$t_{aP} + t_{sA}$ axle 1(CAN)	-	s
Mass of the combination	30.720	kg	Capacity of the air reservoirs		
Unladen weight under axles	4.220	kg	Volume air reservoirs	-	dm^3
Maximum weight under axles	10.000	kg	Maximum pressure P_0	8,5	10^2kPa
Rolling resistance combination	0,01	m/s^2	Rolling resistance trailer	0,01	m/s^2
Calculation factor for deceleration (acc. 1.3. Annex IV)					
Laden	2,026		Pressure in reservoir after 1x braking P_1	-	10^2kPa
Unladen	2,98		Pressure in reservoir after 9x braking P_9	-	10^2kPa

Additional tests according Directive 75/524/EEC (Appendix to Annex II check diagram 2 and 4B)

Command line pressure (10^2kPa)		Brake cylinder pressure (10^2kPa)		Deceleration combination (m/s^2)		Diagram number		Deceleration calculated for trailer (m/s^2)		Remarks	
up	down	up	Down	up	down			up	Down	Up	Down
2,0	2,0	1,9	1,9	0,73	0,65	1h	7h	1,38	1,22	laden	laden
4,0	4,0	3,9	3,9	1,66	1,71	2h	6h	3,27	3,38	laden	laden
6,0	6,0	6,1	6,1	2,38	2,44	3h	5h	4,70	4,86	laden	laden
6,5	-	6,5	-	2,48	-	4h	-	4,92	-	laden	-
-	-	1,8	3,2	0,83	1,74	1i	2i	2,29	5,01	unlad.	unlad.
-	-	3,2	-	1,79	-	3i	-	5,13	-	unlad.	unlad.

LSD failure (6. Appendix to Annex II) Agreed/~~not agreed/N.A.~~ (1)

Remarks: wheelbase : 7.443 mm

Weights of combination under test conditions

Un Laden			Laden			Tractor unit solo		
Axle 1	5.505	kg	Axle 1	5.870	kg	Axle 1	5.305	kg
Axle 2	2.870	kg	Axle 2	4.325	kg	Axle 2	2.015	kg
Axle 3	Lifted		Axle 3	Lifted				
Axle 4	4.220		Axle 4	10.065				
Axle 5	Lifted		Axle 5	Lifted				
Total	12.595	kg	Total	20.260	kg	Total	7.320	kg

1 – axle (See below: a/b , only unladen tests lining SAF 437)

Parking brake (2.2.2.1. Annex II)			**Reaction time** (2.3. Annex II and 3. Annex III)		
Brake force forward	-	daN	Make test equipment	Wabco Westinghouse	
Brake force rearward	-	daN	Feed line pressure	6,5	10^2kPa
Control force	-	daN	t_{sS}	-	s
Lever length	-	mm	$t_{aP} + t_{sA}$ axle 3	-	s
Remarks Landing legs not used during test			$t_{aP} + t_{sA}$ axle 2	-	s
			$t_{aP} + t_{sA}$ axle 1(Pneumatic)	-	s
			$t_{aP} + t_{sA}$ axle 1(CAN)	-	s
Mass of the combination	-	kg	Capacity of the air reservoirs		
Unladen weight under axles	-	kg	Volume air reservoirs	-	dm^3
Maximum weight under axles	-	kg	Maximum pressure P_0	8,5	10^2kPa
Rolling resistance combination	0,01	m/s^2	Rolling resistance trailer	0,01	m/s^2
Calculation factor for deceleration (acc. 1.3. Annex IV)					
Unladen (a)	2,49		Pressure in reservoir after 1x braking P_1	-	10^2kPa
Unladen (b)	3,57		Pressure in reservoir after 9x braking P_9	-	10^2kPa

Additional tests according Directive 75/524/EEC (Appendix to Annex II check diagram 2 and 4B)

Command line pressure (10^2kPa)		Brake cylinder pressure (10^2kPa)		Deceleration combination (m/s^2)		Diagram number		Deceleration calculated for trailer (m/s^2)		Remarks	
up	down	up	Down	up	down			up	Down	Up	Down
-	-	3,7	3,9	0,2	2,35	1j	2J	4,83	5,70	**Un laden (a)**	**Un laden (a)**
-	-	2,6	3,2	1,19	1,55	1k	2k	4,02	5,30	**Un laden (b)**	**Un laden (b)**
-	-	3,2	-	1,67	-	3k	-	5,73	-	**Un laden (b)**	-

LSD failure (6. Appendix to Annex II)	Agreed/~~not agreed/N.A.~~ (1)

Remarks: wheelbase : a= 6.133 mm / b= 8.853 mm

Weights of combination under test conditions

Un Laden (a)			Un.Laden (b)			Tractor unit solo		
Axle 1	5.540	kg	Axle 1	5.725	kg	Axle 1	5.305	kg
Axle 2	2.105	kg	Axle 2	3.430	kg	Axle 2	2.015	kg
Axle 3	5.130		Axle 3	Lifted				
Axle 4	Lifted		Axle 4	Lifted				
Axle 5	Lifted		Axle 5	3.550				
Total	12.775	kg	Total	12.705	kg	Total	7.320	kg

3 - axle's (lining SAF 527)

Parking brake (2.2.2.1. Annex II)			**Reaction time** (2.3. Annex II and 3. Annex III)		
Brake force forward	5.200	daN	Make test equipment	Wabco	
Brake force rearward	4.500	daN	Feed line pressure	6,5	10^2kPa
Control force	-	daN	t_{sS}		s
Lever length	76	mm	$t_{aP} + t_{sA}$ axle 3	See below	s
Remarks Test done on 1 axle only ! Landing legs not used during test			$t_{aP} + t_{sA}$ axle 2	-	s
			$t_{aP} + t_{sA}$ axle 1(Pneumatic)	-	s
			$t_{aP} + t_{sA}$ axle 1(CAN)	-	s
Mass of the combination	38.590	kg	Capacity of the air reservoirs		
Unladen weight under axles	4.095	kg	Volume air reservoirs	80	dm^3
Maximum weight under axles	9.000	kg	Maximum pressure P_0	8,5	10^2kPa
Rolling resistance combination	0,01	m/s^2	Rolling resistance trailer	0,01	m/s^2

Calculation factor for deceleration (acc. 1.3. Annex IV)				
Laden	1,429	Pressure in reservoir after 1x braking P_1	-	10^2kPa
Unladen	3.07	Pressure in reservoir after 9x braking P_9	-	10^2kPa

Additional tests according Directive 75/524/EEC (Appendix to Annex II check diagram 2 and 4B)

Command line pressure (10^2kPa)		Brake cylinder pressure (10^2kPa)		Deceleration combination (m/s^2)		Diagram number		Deceleration calculated for trailer (m/s^2)		Remarks	
up	down	up	Down	up	down			up	Down	Up	Down
2,0	2,0	1,8	2,0	1,04	1,03	1l	6l	`1,44	1,43	laden	laden
4,0	4,0	3,9	3,9	2,43	2,53	2l	5l	3,43	3,57	laden	laden
6,0	6,0	6,1	6,1	3,70	3,72	3l	4l	5,24	5,28	laden	laden
C											
2,0	-	0,8	-	0,95	-	3m	-	2,73	-	unlad.	-
4,0	4,0	1,4	1,4	1,81	1,91	1m	2m	5,36	5,67	unlad.	unlad.

LSD failure (6. Appendix to Annex II)	Agreed/~~not agreed~~/~~N.A~~. (1)

Remarks: Wheel base : 7.443 mm

Weights of combination under test conditions

Un Laden			Laden			Tractor unit solo		
Axle 1	5.615	kg	Axle 1	6.040	kg	Axle 1	5.305	kg
Axle 2	2.865	kg	Axle 2	5.195	kg	Axle 2	2.015	kg
Axle 3	1.340	kg	Axle 3	9.000	kg			
Axle 4	1.325	kg	Axle 4	8.965	kg			
Axle 5	1.430	kg	Axle 5	9.390	kg			
Total	12.575	kg	Total	38.590	kg	Total	7.320	kg

2 - axle's (axle 1 lifted lining SAF 527)

Parking brake (2.2.2.1. Annex II)			**Reaction time** (2.3. Annex II and 3. Annex III)		
Brake force forward	-	daN	Make test equipment	Wabco	
Brake force rearward	-	daN	Feed line pressure	6,5	10^2kPa
Control force	-	daN	t_{sS}		s
Lever length	-	mm	$t_{aP} + t_{sA}$ axle 3	See below	s
Remarks -			$t_{aP} + t_{sA}$ axle 2	-	s
-			$t_{aP} + t_{sA}$ axle 1(Pneumatic)	-	s
			$t_{aP} + t_{sA}$ axle 1(CAN)	-	s
Mass of the combination	30.600	kg	Capacity of the air reservoirs		
Unladen weight under axles	3.845	kg	Volume air reservoirs	80	dm^3
Maximum weight under axles	9.000	kg	Maximum pressure P_0	8,5	10^2kPa
Rolling resistance combination	0,01	m/s^2	Rolling resistance trailer	0,01	m/s^2
Calculation factor for deceleration (acc. 1.3. Annex IV)					
Laden	1,7		Pressure in reservoir after 1x braking P_1	-	10^2kPa
Unladen	3,30		Pressure in reservoir after 9x braking P_9	-	10^2kPa

Additional tests according Directive 75/524/EEC (Appendix to Annex II check diagram 2 and 4B)

Command line pressure (10^2kPa)		Brake cylinder pressure (10^2kPa)		Deceleration combination (m/s^2)		Diagram number		Deceleration calculated for trailer (m/s^2)		Remarks	
up	down	up	Down	Up	down			up	Down	Up	Down
2,0	2,0	1,8	2,0	0,9	0,80	1n	7n	1,48	1,36	laden	laden
4,0	4,0	3,9	3,9	2,14	2,15	2n	6n	3,57	3,60	laden	laden
6,0	6,0	6,1	6,1	3,15	3,16	3n	5n	5,30	5,31	laden	laden
6,5	-	6,4	-	3,26	-	4n	-	5,48	-	laden	-
2,0	4,0	0,9	1,6	0,74	1,54	1p	2p	2,23	4,86	unlad.	un lad
4,8	4,8	1,9	1,9	1,90	1,91	3p	4p	6,0	6,09	unlad.	unlad.

LSD failure (6. Appendix to Annex II) — Agreed/~~not agreed/N.A.~~ (1)

Remarks: wheelbase : 8.148 mm

Weights of combination under test conditions

Un Laden			Laden			Tractor unit solo		
Axle 1	5.695	kg	Axle 1	6.225	kg	Axle 1	5.305	kg
Axle 2	3.165	kg	Axle 2	6.390	kg	Axle 2	2.015	kg
Axle 3	Lifted	kg	Axle 3	Lifted	kg			
Axle 4	1.920	kg	Axle 4	8.925	kg			
Axle 5	1.925	kg	Axle 5	9.060	kg			
Total	12.705	kg	Total	30.600	kg	Total	7.320	kg

2 - axle's (axle 3 lifted lining SAF 527)

Parking brake (2.2.2.1. Annex II)			**Reaction time** (2.3. Annex II and 3. Annex III)		
Brake force forward	-	daN	Make test equipment	Wabco	
Brake force rearward	-	daN	Feed line pressure	6,5	10^2kPa
Control force	-	daN	t_{sS}		s
Lever length	-	mm	$t_{aP} + t_{sA}$ axle 3	See below	s
Remarks -			$t_{aP} + t_{sA}$ axle 2	-	s
-			$t_{aP} + t_{sA}$ axle 1(Pneumatic)	-	s
			$t_{aP} + t_{sA}$ axle 1(CAN)	-	s
Mass of the combination	28.450	kg	Capacity of the air reservoirs		
Unladen weight under axles	4.630	kg	Volume air reservoirs	80	dm^3
Maximum weight under axles	9.000	kg	Maximum pressure P_0	8,5	10^2kPa
Rolling resistance combination	0,01	m/s^2	Rolling resistance trailer	0,01	m/s^2
Calculation factor for deceleration (acc. 1.3. Annex IV)					
Laden	1,58		Pressure in reservoir after 1x braking P_1	-	10^2kPa
Unladen	2,74		Pressure in reservoir after 9x braking P_9	-	10^2kPa

Additional tests according Directive 75/524/EEC (Appendix to Annex II check diagram 2 and 4B)

Command line pressure (10^2kPa)		Brake cylinder pressure (10^2kPa)		Deceleration combination (m/s^2)		Diagram number		Deceleration calculated for trailer (m/s^2)		Remarks	
up	down	up	Down	Up	down			up	Down	Up	Down
2,0	2,0	1,8	1,8	0,9	0,8	1q	7q	1,39	1,35	laden	laden
4,0	4,0	3,9	3,9	2,28	2,34	2q	6q	3,55	3,64	laden	laden
6,0	6,0	6,1	6,1	3,49	3,55	3q	5q	5,45	5,55	laden	laden
6,4	-	6,4	-	3,63		4q		5,68	-	laden	-
2,0	4,0	0,9	1,8	0,7	1,76	1r	2r	1,98	4,66	unlad.	un lad
5,0	5,0	2,1	2,1	2,31	2,29	3r	4r	6,16	6,11	unlad.	unlad.

LSD failure (6. Appendix to Annex II) — Agreed/~~not agreed/N.A.~~ (1)

Remarks: wheelbase : 6.788 mm

Weights of combination under test conditions

Un Laden			Laden			Tractor unit solo		
Axle 1	5.560	kg	Axle 1	5.770	kg	Axle 1	5.305	kg
Axle 2	2.505	kg	Axle 2	3.885	kg	Axle 2	2.015	kg
Axle 3	2.315	kg	Axle 3	9.520	kg			
Axle 4	2.315	kg	Axle 4	9.275	kg			
Axle 5	Lifted	kg	Axle 5	Lifted	kg			
Total	12.695	kg	Total	28.450	kg	Total	7.320	kg

Distribution of braking force amoung the axles of the vehicle and requirements for compatibility between towing vehicles.

The vehicle fulfils the requirements of paragraph 1.3.2 of Annex 4 in conjuction with Annex 10 — Yes/ ~~No~~

Validation of development of braking force according to Annex 10 paragraph 1.3

	Unladen		Laden	
	Left 10^2kPa	Right 10^2kPa	Left 10^2kPa	Right 10^2kPa
Axle nr 1	0,8	0,8	0,7	0,7
Axle nr 2	0,8	0,8	0,7	0,7
Axle nr 3	0,8	0,8	0,7	0,7

5.1.4. Provisions for the periodic technical inspection of braking systems

5.1.4.5. Data for braking systems

The data of the compressed-air braking system for the functional and efficiency test must be specified at the vehicle in a visible position in indelible form, or made freely available in another way (e.g. handbook, electronic data recorder) — Sticker on the ~~vehicle/Internet~~/Handbook

5.1.4.6. Reference braking forces

The reference of the brake force will be given on the trailer and/or into the manuel instruction of the trailer or on the internet — Sticker on the vehicle/~~Internet/Handbook~~

5.2.2. VEHICLES OF CATEGORY O

The vehicle fulfils the requirements of paragraph 5.2.2.8.2. of the Regulation. — Through inspection holes at the vehicle

Definition of the method by which wear may be assessed and definition of the maximum acceptable wear limit in accordance to 5.2.2.8.2.2. of the Regulation. — See Inspection instruction: SAF (Will be made freely available)

Mandatory provisions for vehicles equipped with a vehicle stability function

The vehicle fulfils the requirements of paragraph 5.2.2.23. of the Regulation. — pass/~~fail/N/A~~

Does the position of the EBS module comply with the mounting instructions of the manufacturer? — pass/~~fail/N/A~~

Verification of components and installation — pass/~~fail/N/A~~

Is the RSS function in the parameter EOL fields switched on? (only for trailers till 3 axles) — pass/~~fail/N/A~~

Brake schedule:	~~Full trailer~~/Semi trailer (1)								
Brake calculation no	WDE 73380S			VIN			W09400339APC09021		
Make and type	Carnehl			Wheelbase (E_r)			7.443		mm
Axles:									
Make and type	SAF SBS 2243-10*			Code			TDB 0843		
Brakes:									
Make and type	SAF SBS 2220			Lining make and type			SAF 437/SAF 527		
Bogie:									
Make and type	SAF air			Security cable			~~Agreed/not agreed~~/N.A. (1)		
Tyres:									
Tyre size	Fulda 385/65 R 22,5								
Brake specification:									
Axle number	1	2	3	4	5	6	7	8	9
Brake cylinder(s)	16/24	16/24	16/24	-	-	-	-	-	-
Brake lever length (mm)	76	76	76	-	-	-	-	-	-
Suspension:									
Type	~~Mechanical~~/pneumatic (1)								
Make	SAF air								
Dimensions	-								
Parking brake:									
Make	SAF								
Type	16/24 TLD (BC 0044)								
On axle number	2+3								
Brake lever length	76								
Support legs	Not used during test								
LSD settings:									
LSD plate	Agreed/~~not agreed~~ (1)			Test connections			Agreed/~~not agreed~~ (1)		
P_m	6,5	bar	Suspension travel/suspension pressure		P_{out} LSD		Mass (kg)		LSD lever length
Position	Front	Rear	Front	Rear	Front	Rear	Total	Front	- mm
Unladen	-	-	-	1,6	-	1.200	-	Rear	- mm
Laden	-	-	-	6,5	-	9.000	-		
Reaction time test:									
Axle number	T1 (s)	T2 (s)	T1 (s)	T2 (s)	T1 (s)	T2 (s)	T1 (s)	T2 (s)	
3 (pneumatic)	-	-	-	-	-	-	-	-	
3 (can only)	-	-	-	-	-	-	-	-	
Air reservoir capacity test:									
$P_9 \geq 0,5\ P_1$	Agreed/~~not agreed~~			Volume		80		dm^3	
$P_0(10^2kPa)$	$P_1(10^2kPa)$	$P_2(10^2kPa)$	$P_3(10^2kPa)$	$P_4(10^2kPa)$	$P_5(10^2kPa$	$P_6(10^2kPa)$	$P_7(10^2kPa)$	$P_8(10^2kPa)$	$P_9(10^2kPa)$
-	-	-	-	-	-	-	-	-	-
Additional tests according to R13 10 sup. 5 paragraph 5.2.2.16 and 5.2.2.16.1									
At which pressure does the red **and** yellow warning light , light up					4,5			10^2kPa	
$P_0(10^2kPa)$	$P_1(10^2kPa)$	$P_2(10^2kPa)$	$P_3(10^2kPa)$	$P_4(10^2kPa)$	Deceleration $\geq 2,25\ m/s^2$			Yes/~~No~~	
-	-	-	-	-					
$P_0(10^2kPa)$	$P_1(10^2kPa)$	$P_2(10^2kPa)$	$P_3(10^2kPa)$						
-	-	-	-						
Parking brake releases after 3 applications			Yes/~~no~~ (1)						
Parking brake operating pressure			-	10^2kPa					
Remarks:									

ABS test of full trailer:

- $V_{initial}$ = 50 km/h
- ABS inoperative
- Condition of the vehicle: unladen

Annex X section 6.2. (Appendix 2 ad 2.2.)

Determination of the coefficient of adhesion with the front axle(s) braked (k_f)

Braking test	$k_H = \pm 0,8$			
	$V_{initial}$ (km/h)	t_{40-20} (sec.)	$P_{cylinder}$ ($(10^2 kPa)$)	Diagr. Number
number 1				
number 2				
number 3				
number 4				
t_{min} =				
t_m or t_{min} = (1)				
$z_{Cmax} = 0,566/t_m$ or t_{min} (2)				

$F_{bRmaxi} = z_{Cmaxi} \times (F_M + F_R) - 0,010 \times F_{cnd} - 0,015 \times F_{cd}$	
$F_{idyn} = F_i + \frac{z_{Cmaxi} \times (F_M \times h_D + g \times P \times h_R) - F_{wM} \times h_D}{E}$	
$k_f = \frac{F_{bRmaxi}}{F_{idyn}}$	

Determination of the coefficient of adhesion with the rear axle(s) braked (k_r)

Braking test	$k_H = \pm 0,8$			
	$V_{initial}$ (km/h)	t_{40-20} (sec.)	$P_{cylinder}$ ($(10^2 kPa)$)	Diagr. Number
number 1				
number 2				
number 3				
number 4				
t_{min} =				
t_m or t_{min} = (1)				
$z_{Cmax} = 0,566/t_m$ or t_{min} (2)				

$F_{bRmaxi} = z_{Cmaxi} \times (F_M + F_R) - 0,010 \times F_{cnd} - 0,015 \times F_{cd}$	
$F_{idyn} = F_i - \frac{z_{Cmaxi} \times (F_M \times h_D + g \times P \times h_R) - F_{wM} \times h_D}{E}$	
$k_r = \frac{F_{bRmaxi}}{F_{idyn}}$	

ABS test of semi-trailer or centre-axle trailer:				
- $V_{initial}$ = 50 km/h				
- ABS inoperative				
- Condition of the vehicle: unladen				
- Wheels fitted to only one axle, the wheels on the other axle(s) are removed.				
Annex X section 6.2. (Appendix 2 ad 2.3.)				
Determination of the coefficient of adhesion (k)				
Braking test	$k_H = \pm 0,8$			
	$V_{initial}$ (km/h)	t_{40-20} (sec.)	$P_{cylinder}$ ($(10^2 kPa)$)	Diagr. Number
number 1				
number 2				
number 3				
number 4				
t_{min} =				
t_m or t_{min} = (1)				
$z_{Cmax} = 0,566/t_m$ or t_{min} (2)				
$F_{bRmax} = z_{Cmax} \times (F_M + F_R) - 0,010 \times F_{cnd} - 0,015 \times F_{cd}$				
$F_{Rdyn} = F_R - \frac{F_{bRmax} \times h_K + z_C \times g \times P \times (h_R - h_K)}{E_R}$				
$k = \frac{F_{bRmax}}{F_{Rdyn}}$				

ABS test, determination of the maximum braking rate (z_{RAL}) and calculation of k_R and ε.

- $V_{initial}$ = 50 km/h
- ABS in operation
- Condition of the vehicle: unladen
- For a semi-trailer all wheels are fitted.

Annex X section 6.2. (Appendix 2 ad 2.2. and 2.3.)

Full trailer

Braking test	$k_L = \leq 0,3$ (1)				$k_H = \pm 0,8$			
	$V_{initial}$ (km/h)	t_{40-20} (sec.)	$P_{cylinder}$ (10^2kPa)	Diagr. number	$V_{initial}$ (km/h)	t_{40-20} (sec.)	$P_{cylinder}$ (10^2kPa)	Diagr. number
number 1								
number 2								
number 3								
number 4								
t_{min} =								
t_m or t_{min} = (2)								
$z_{CAL} = 0,566/t_m$ or t_{min} (3)								
$k_R = \frac{k_f \times F_{fdyn} + k_r \times F_{rdyn}}{P \times g}$								
$z_{RAL} = \frac{z_{CAL} \times (F_M + F_R) - 0,010 \times F_{cnd} - 0,015 \times F_{cd}}{F_R}$								
$\varepsilon = \frac{z_{RAL}}{k_R}$ (rounded to 2 decimals)								

Semi-trailer or centre-axle trailer

Braking test	$k_L = \leq 0,3$ (1)				$k_H = \pm 0,8$			
	$V_{initial}$ (km/h)	t_{40-20} (sec.)	$P_{cylinder}$ (10^2kPa)	Diagr. number	$V_{initial}$ (km/h)	t_{40-20} (sec.)	$P_{cylinder}$ (10^2kPa)	Diagr. number
number 1								
number 2								
number 3								
number 4								
t_{min} =								
t_m or t_{min} = (2)								
$z_{CAL} = 0,566/t_m$ or t_{min} (3)								
$F_{bRAL} = z_{CAL} \times (F_M + F_R) - 0,010 \times F_{cnd} - 0,015 \times F_{cd}$								
$F_{Rdyn} = F_R - \frac{F_{bRAL} \times h_K + z_{CAL} \times g \times P \times (h_R - h_K)}{E_R}$								
$z_{RAL} = \frac{F_{bRAL}}{F_{Rdyn}}$								
$\varepsilon = \frac{z_{RAL}}{k}$ (rounded to 2 decimals)								

ABS test, energy consumption k > 0,5.

- V = minimum 30 km/h
- capacity of reservoirs: 80 dm^3
- ABS in operation
- Condition of the vehicle: unladen with LSD set to the laden position.
- Initial energy level in the energy storage device shall be 8,0 10^2kPa.

Annex X section 6.1.

V_{max} = km/h

- t = 15 seconds
- Maximum pressure stated by manufacturer : 10^2kPa
- Pressure of the reservoir before braking : 10^2kPa

Speed (km/h)	Braking time (s)	Diagram number

- Pressure in the reservoir after 15 seconds = 10^2kPa

- Pressure in the reservoir after 4 times fully actuating the brakes (at standing position):

	Front axle (10^2kPa)	Rear axle (10^2kPa)	Air reservoir (10^2kPa)
number 1			
number 2			
number 3			
number 4			
number 5			

- Pressure necessary for secondary braking: 3,0 10^2kPa

Static energy consumption test according to Annex XIV section 6.2

$P1_{(10^2kPa)}$	$P2_{(10^2kPa)}$	$P3_{(10^2kPa)}$	$P4_{(10^2kPa)}$	$P5_{(10^2kPa)}$	$P6_{(10^2kPa)}$	$P7_{(10^2kPa)}$	$P8_{(10^2kPa)}$	$P9_{(10^2kPa)}$	$P10_{(10^2kPa)}$
-	-	-	-	-	-	-	-	-	-

$P11_{(10^2kPa)}$	$P12_{(10^2kPa)}$	$P13_{(10^2kPa)}$	$P14_{(10^2kPa)}$	$P15_{(10^2kPa)}$	$P16_{(10^2kPa)}$				
-	-	-	-	-	-				

Remarks :

ABS test, road behaviour tests (additional checks paragraph 6.3.)		
- Maximum braking		
- ABS in operation		
- Condition of the vehicle: unladen		
Road behaviour on k_H (ad 6.3.1.)		
Speed	Results	Diagram no
40 km/h		
80 km/h		

- V = 50 km/h		
- Maximum braking		
- ABS in operation		
- LSD is set to cycling pressure.		
- Category ABS: A		
Split μ (k_L/k_H) (2) (ad 6.3.2. and 6.3.3.)		
Speed km/h	Results	Diagram no
	Locking behaviour	

Determination of the braking rate z_{RALS} (additional checks paragraph 6.3.2. and Appendix 3)			
- V = 50 km/h			
- Maximum braking			
- ABS in operation			
- Category ABS: A			
- Condition of the vehicle: unladen			
Braking test split μ	Results		
	$V_{initial}$ (km/h)	$t_{40\text{-}20}$ (s)	Diagram number
number 1			
number 2			
number 3			
$z_{RALS} = 0{,}566/t$			
$\frac{0{,}75}{\varepsilon_H} \times \frac{4 \times z_{RALL} + z_{RALH}}{5}$ (3)			
$z_{RALS} \geq \frac{0{,}75}{\varepsilon_H} \times \frac{4 \times z_{RALL} + z_{RALH}}{5}$ and $z_{RALS} > \frac{z_{RALL}}{\varepsilon_H}$			OK/not OK

4.	<u>General requirements.</u>	
4.1.	Is any electrical failure (supply, wiring) or sensor anomaly signalled to the driver by a specific optical warning signal?	: Yes/~~no~~
4.1.1.	Does the warning signal light up when the ABS-system is energised?	: Yes/~~no~~
	Does the warning signal only extinguish if none of the in 4.1. mentioned defects are present?	: Yes/~~no~~
4.1.2.	Does the static sensor check verify that a sensor was not functioning the last time that the vehicle was at a greater speed than 10 km/h? The warning signal may light up again while the vehicle is stationary, provided that it is extinguished before the vehicle reaches 10 km/h when no defect is present.	: Yes/~~no/N.A~~.
	Does the electrically controlled pneumatic modulator cycle at least once during the above mentioned verification phase?	: Yes/~~no/N.A~~.
4.4.	Does the electrical connection between the trailer and the towing vehicle conform to ISO Standard 7638-1985 or ISO/DIS Standard 7638-1996? (not for vehicles of category O1 and O2) The wiring specification of point 6.2 of ISO 7638-1985 or point 5.4. of ISO/DIS 7638-1996 for the trailer may only be reduced if the trailer is equipped with its own independent fuse. The rating of the fuse shall be such that the current rating of the conductors is not exceeded. With the exception of vehicles of categories N3 and O4, and until a uniform international standard has been agreed, the electrical connection between towing vehicles and trailers equipped with a 12 volt electrical system shall conform with DIN standard 72570, Part 4.	: Yes/~~no/N.A~~.
4.5.	Is the residual braking performance in the event of a defect in the anti-lock braking system (according to point 4.1. of this Annex) at least 80% of the laden prescribed performance for the service braking system?	: Yes/~~no~~
4.6.	The operation of the anti-lock system shall not be adversely affected by magnetic or electrical fields. This shall be demonstrated by compliance with Regulation No. 10, 02 series of amendments.	: Yes/~~no~~
4.7.	Is there no manual device to disconnect the ABS or to change the control mode of the ABS? Only allowed on N2 and N3 OFF-ROAD vehicles under special conditions, see item 4.7.1. - 4.7.5. of Annex X.	: ~~Yes~~/no/N.A.
Annex XVIII	Is the vehicle complying with the requirements of Annex 18 concerning complex electronics? See report EB 123.8E, EB 124.4E	: Yes/~~no/N.A~~.