



Calculation in accordance with ECE Regulation 13 (10 Series) and EEC Directive 71/320 EEC (2002/78/EC) using Knorr-Bremse Braking System Designer software (level 9.0).
 Results based on vehicle data and components as defined by the Braking System Designer program user.
 No liability assumed by Knorr-Bremse regarding the use of non-Knorr-Bremse product data.

Customer: Fonterra Co-op Ltd
 Vehicle: 7A8H9000297829450
 Project: 4 axle milk collection full trailer

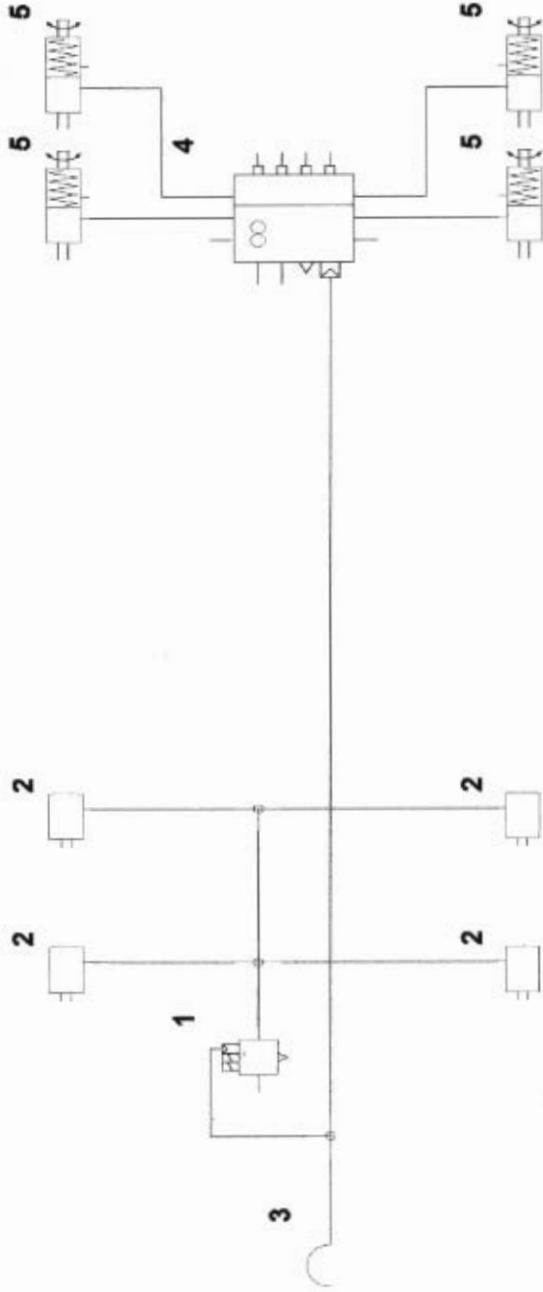
Vehicle

Type	2x2 Drawbar trailer
Calculated effective wheelbase [m]	4.90
Laden (max.) mass [kg]	29000.00
Laden (max.) front axle group load [kg]	14500.00
Laden vertical position of CoG [m]	1.96
Unladen (min.) mass [kg]	6718.00
Unladen (min.) front axle group load [kg]	4048.00
Unladen vertical position of CoG [m]	1.27
Laden/unladen front air spring press. [bar]	-/-
Laden/unladen rear air spring press. [bar]	4.50/0.50

Axles	Axle 1	Axle 2	Axle 3	Axle 4
Type	MERITOR (ROR) 361-0022-02-FBKV	MERITOR (ROR) 361-0022-02-FBKV	MERITOR (ROR) 361-0022-02-FBKV	MERITOR (ROR) 361-0022-02-FBKV
Tyre size	265/70 R 19.5	265/70 R 19.5	265/70 R 19.5	265/70 R 19.5
Dyn. tyre radius [mm]	421	421	421	421
Stat. tyre radius [mm]	401	401	401	401
Brake type	Disc Elsa195 LE	Disc Elsa195 LE	Disc Elsa195 LE	Disc Elsa195 LE
Brake size [mm] or drum/disc radius [mm]	340x200	340x200	340x200	340x200
Actuator size	16	16	16/24	16/24
Actuator force at 6,5 bar [N]	6590	6590	6260	6260
Slack adjuster length [mm]	-	-	-	-
Thresh.mom.[Nm] or force[N]	81.00	81.00	81.00	81.00
Brake Factor by Annex 19	20.3	20.3	20.3	20.3
Discbrake lever length [mm]	74	74	74	74
Internal brake factor (C*)	-	-	-	-
Mechanical efficiency (Eta)	-	-	-	-
Internal brake factor x	-	-	-	-
Mech. efficiency (C* x Eta)	-	-	-	-
S-Cam radius [mm] or mech.ratio or wedge angle[-]	-	-	-	-
Friction material	ROR 8616 AF	ROR 8616 AF	ROR 8616 AF	ROR 8616 AF

Calculation pressure [bar]: 6.5

Warning! This brake calculation has been produced using information from a source not controlled by Knorr-Bremse. The results produced by this calculation are therefore dependent upon the accuracy of this information and Knorr-Bremse does not take responsibility for any resulting errors.



Part list

No.	Name	Type	Characteristics	Qty.
1	ABS Modulator	BR9234	-	1
2	Brake Chamber	ROR	-	4
3	Coupling head - brake	KU1400	-	1
4	Trailer EBS ECU	ES20..	-	1
5	Spring Brake Actuator	ROR	-	4

Calculation pressure [bar]: 6.5

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Company: Genese Ltd
Author: Chris Clarke

Created: 20/09/2008
Modified: 20/09/2008

Document: 7A8H9000297829450
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Database version: 9.0.13

Laden vehicle

	Intact system	Front circuit only	Rear circuit only	Calculation press.
Deceleration [m/s ²]	6.08	-	-	5.55
Pressure [bar]	8.50	-	-	6.50

Unladen vehicle

	Intact system	Front circuit only	Rear circuit only	Calculation press.
Deceleration [m/s ²]	15.03	-	-	15.03
Pressure [bar]	8.50	-	-	6.50

Calculation pressure [bar]: 6.5

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Miscellaneous

Coupling head pressure where z = 22.5% (laden case)

Pressure [bar] : 2.90

Brake chamber pressure [bar] where z = 22.5% (laden case)

Axle1 : 2.76 Axle2 : 2.76 Axle3 : 2.58 Axle4 : 2.58

Automatic braking performance (at 6.0 [bar], laden case)

Deceleration [m/s²] : 3.46

Braking rate [%] 35.2

Vehicle performance in case of a load sensing device control failure (at 6.5 [bar], laden case)

Front axle group	Rear axle group
Deceleration [m/s ²] : -	Deceleration [m/s ²] : 5.70
Braking rate [%] -	Braking rate [%] 58.1

Parking brake

	Laden vehicle		Unladen vehicle	
	Up	Down	Up	Down
Max.slope [%] (must be > 18%)	-40.99	31.05	-41.38	27.16
(max.spring force = 7120 N at 30 mm strok)				
Required spring force at 18% slope				
Axle 1 [N]	-	-	-	-
Axle 2 [N]	-	-	-	-
Axle 3 [N]	3264	820	820	820
Axle 4 [N]	3264	820	820	820



Trailer EBS parameters

Number of axles: 4
 Number of teeth: 90
 Dynamic tyre radius [cm]: 42.1
 Inshot pressure [bar]: 0.56
 Coupling head pressure [bar]: 0.70
 Pressure compensation (at 1.6 bar) [bar]: 0.20
 Output pressure (at 6.5 bar) [bar]

Laden: 5.60
 Unladen: 1.40

Air spring pressure [bar]

Laden : 4.50
 Unladen : 0.50

Axle boogie load [kg]

Laden: 14500
 Unladen: 2670

Pressure limitation [bar]

5.30

Slip differential [%]

-0.20

Corresponding sheet on the PC Diagnostic tool (ECU Talk)

Coupling head pressure [bar]	Brake chamber pressure [bar]	
	Unladen	Laden
0.70	0.56	
1.6	0.74	1.54
6.5	1.40	5.60

Brake pressure compensation at 1.6 bar coupling head pressure [bar]
0.20

Air spring pressure [bar]	Laden :	
	Unladen :	Laden :
	0.50	4.50

Axle boogie load [kg]	Laden	
	Unladen	Laden
	2670	14500

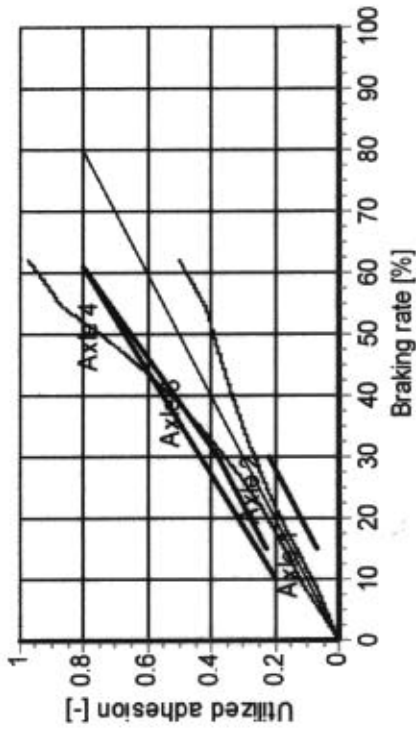


Load sensing valve settings at 6.5 bar on rear axle group. Type: ES20..

Gross weight [kg]	Axle load [kg]	Air spring pressure [bar]	LSV ratio [-]	LSV Output pressure [bar]	
				input:6,5bar	6.5 bar
29000	7250	4.50	1.23	5.3	5.3
28000	7000	4.33	1.23	5.3	5.3
27000	6750	4.16	1.24	5.2	5.2
26000	6500	3.99	1.28	5.1	5.1
25000	6250	3.82	1.33	4.9	4.9
24000	6000	3.65	1.38	4.7	4.7
23000	5750	3.49	1.43	4.5	4.5
12718	2835	1.51	2.64	2.5	2.5
11718	2585	1.35	2.84	2.3	2.3
10718	2335	1.18	3.08	2.1	2.1
9718	2085	1.01	3.36	1.9	1.9
8718	1835	0.84	3.70	1.8	1.8
7718	1585	0.67	4.12	1.6	1.6
6718	1335	0.50	4.64	1.4	1.4

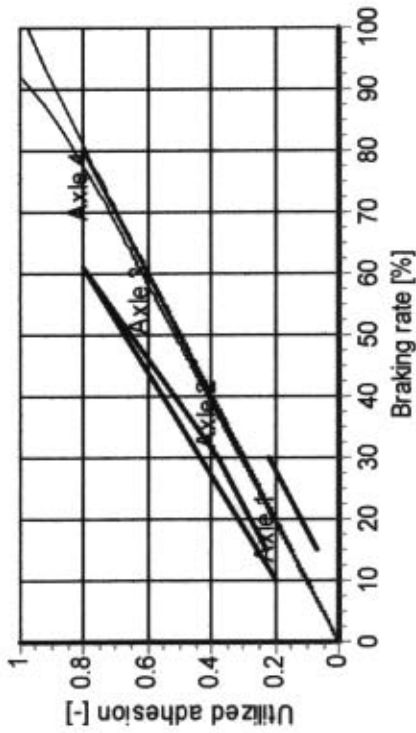


Laden vehicle - adhesion utilisation



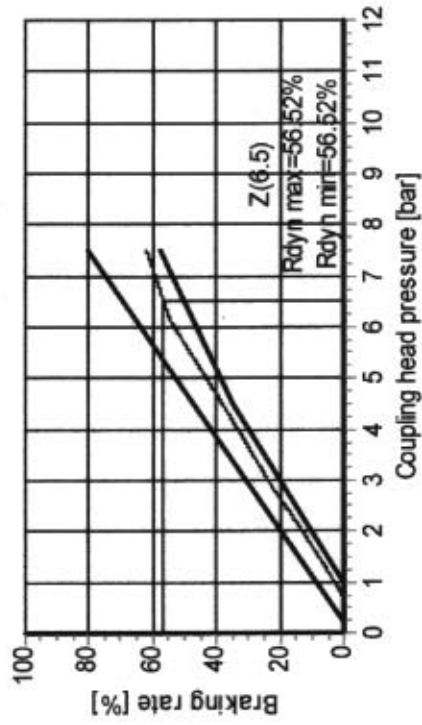
(With anti-lock system the adhesion requirements do not have to be fulfilled.)

Unladen vehicle - adhesion utilisation



(With anti-lock system the adhesion requirements do not have to be fulfilled.)

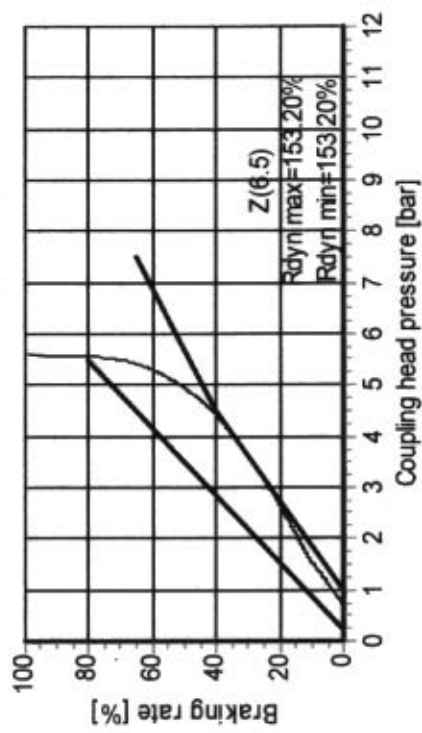
Laden vehicle - compatibility



Calculation pressure [bar]: 6.5

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Unladen vehicle - compatibility





KNORR-BREMSE

ECUtalk V.3.3.1.10

EOL PROTOCOL REPORT

SYSTEM	Trailer EBS	MATCH CODE	ES 2053
PRODUCTION DATE	week 51 in 2007	SERIAL NUMBER	226
PART NUMBER	II 39782	VIN	7A8H9000297829450
MANUFACTURER	Domett Trailers	BRAKE CALCULATION NO.	7A8H9000297829450
TYPE	Full trailer	FORMER PIN	30 32 4D 52
		ACTUAL PIN	30 32 4D 52

DIFFERENTIAL SLIP [%]	AUX1	OFF	IN A	Disabled		SOFTWARE VERSION	521.17	AXLE	BRAKE CHAMBER SIZE	LEVER LENGTH	
	AUX2	OFF	IN B	Disabled		ISS INVERTED	-	1	18	-	
	AUX3	OFF	IN C	Disabled		RSP	St 2	2	18	-	
	AUX4	ON	IN D	-		ABS CONFIGURATION	4S/3M	3	1824	-	
	AUX5	-		POLE WHEEL TEETH SR, SL		DYN.TYRE DIAMETER [MM]	840	4	1824	-	
-0.2				90			5	-	-	COMPENSATION AT 1.6 BAR	0.2
				POLE WHEEL TEETH SAR, SAL	90						

REAR AXLE PRESSURE LIMIT [BAR]	5.3	CONTROLL PRESSURE [BAR]	6.5	CONTROLL PRESSURE [BAR]	0.7	1.6	6.5
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AXLE	AXLE LOAD UNLADEN [KG]	SUSP.PRESS.UNL. [BAR]	BRAKE PRESS.UNL. [BAR]	AXLE LOAD LADEN [KG]	SUSP.PRESS.LADEN [BAR]	BRAKE PRESS.LADEN [BAR]			
1	2024	0	-	7250	0	-	-	-	-
2	2024	0	-	7250	0	-	-	-	-
3	1335	0.5	1.4	7250	4.5	0.56	1.5	5.6	
4	1335	0.5	1.4	7250	4.5	0.56	1.5	5.6	
5	-	-	-	-	-	-	-	-	-

KILOMETER COUNTER [KM]	0	NEXT SERVICE [KM]	800000	ECU SUPPLY VOLTAGE [V]	21.8	VALVE SUPPLY VOLTAGE [V]	21.4
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AIR GAP SPEED SL [KM/H]	5.4	AIR GAP SPEED SR [KM/H]	2.5	AIR GAP SPEED SAL [KM/H]	1.0	AIR GAP SPEED SAR [KM/H]	4.4
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EOL TEST RESULTS

System pressure test	Succeeded	-	-
Warning lamp test	Succeeded	-	-
LSF test	Succeeded	-	-
SL wheel speed sensor test	Succeeded	-	-
SR wheel speed sensor test	Succeeded	-	-
Axle modulator test	Succeeded	-	-
RSP installation test	Succeeded	-	-
Active faults in the system	No	-	-

TESTER NAME	Chris Clarke	SIGNATURE
LOCATION	Genese Ltd	
DATE	20/09/2008	
ADDITIONAL INFORMATION	Fonterra 2982	