



Company: Genese Ltd
Author: Chris Clarke

Created: 21/09/2009
Modified: 21/09/2009

Document: 7A8H9000296112725
Page: 1 / 7
Database version: 9.0.13

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.
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Customer: Fonterra Co-operative Dairies Ltd

Vehicle: 7A8H9000296112725

Project: 4 axle full trailer

Vehicle

Type 2x2 Drawbar trailer

Calculated effective wheelbase [m] 4.85
Laden (max.) mass [kg] 26000.00
Laden (max.) front axle group load [kg] 13000.00
Laden vertical position of CoG [m] 1.80
Unladen (min.) mass [kg] 5820.00
Unladen (min.) front axle group load [kg] 2960.00
Unladen vertical position of CoG [m] 1.20
Laden/unladen front air spring press. [bar] -/-
Laden/unladen rear air spring press. [bar] 4.03/0.54

Axles

Type	Axle 1	Axle 2	Axle 3	Axle 4
MERTOR (ROR)	MERTOR (ROR)	MERTOR (ROR)	MERTOR (ROR)	MERTOR (ROR)
361-0071-04-FBKV	361-0071-04-FBKV	361-0071-04-FBKV	361-0071-04-FBKV	361-0071-04-FBKV
Tyre size	305/70 R 22.5	305/70 R 22.5	305/70 R 22.5	305/70 R 22.5

Dyn. tyre radius [mm]	485	485	485	485
Stat. tyre radius [mm]	462	462	462	462
Brake type	Disc	Disc	Disc	Disc
	Eisa195 LE	Eisa195 LE	Eisa195 LE	Eisa195 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	6588	6588
Stack 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

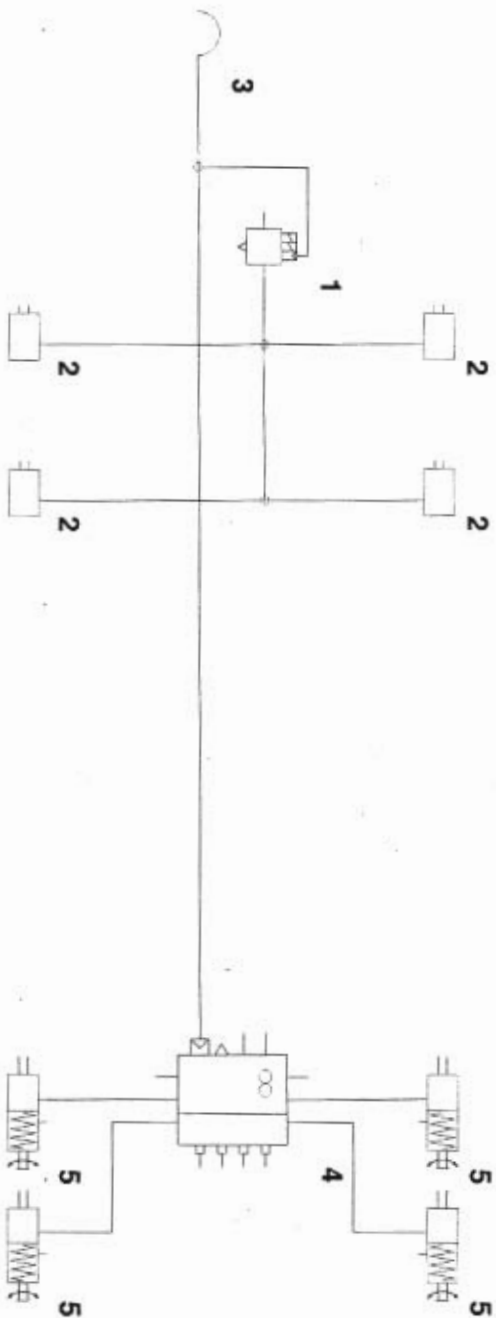
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Company: Genese Ltd
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Created: 21/09/2009 Document: 7A8H9000296112725
Modified: 21/09/2009 Page: 2 / 7

Database version: 9.0.13



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

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Author: Chris Clarke Modified: 21/09/2009 Page: 3 / 7

System components

No.	Name	Type	Characteristics
1	ABS Modulator	BR9234	Sensors on axle 2
2	Brake Chamber 16" stroke: 64	ROR	BZ 122.1 15/09/2000
3	Brake Chamber 16" stroke: 64	ROR	BZ 122.1 15/09/2000
4	Brake Chamber 16" stroke: 64	ROR	BZ 122.1 15/09/2000
5	Brake Chamber 16" stroke: 64	ROR	BZ 122.1 15/09/2000
6	Coupling head - brake	KU1400	-
7	Trailer EBS ECU	ES20..	Sensors on axle 4
8	Spring Brake Actuator 16/24" stroke: 64/64	ROR	BZ 119.6 01/02/2001
9	Spring Brake Actuator 16/24" stroke: 64/64	ROR	BZ 119.6 01/02/2001
10	Spring Brake Actuator 16/24" stroke: 64/64	ROR	BZ 119.6 01/02/2001
11	Spring Brake Actuator 16/24" stroke: 64/64	ROR	BZ 119.6 01/02/2001

Calculation pressure [bar]: 6.5

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Company: Genese Ltd
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Created: 21/09/2009
Modified: 21/09/2009
Document: 7A8H9000296112725
Page: 4 / 7

Database version: 9.0.13

Laden vehicle

	Intact system	Front circuit only	Rear circuit only	Calculation press.
Deceleration [m/s ²]	6.57	-	-	5.53
Pressure [bar]	8.50	-	-	6.50

Calculation pressure [bar]: 6.5

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Created: 21/09/2009
Modified: 21/09/2009
Document: 7A8H9000296112725
Page: 5 / 7

Database version: 9.0.13

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 : 2.46 Axle4 : 2.46

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

Deceleration [m/s²] : 3.58

Braking rate [%] 36.5

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

Front axle group

Deceleration [m/s²] : -

Braking rate [%] -

Rear axle group

Deceleration [m/s²] : 5.53

Braking rate [%] 56.4

Calculation pressure [bar] : 6.5

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Created: 21/09/2009 Document: 7A8H9000296112725
 Modified: 21/09/2009 Page: 6 / 7

Database version: 9.0.13

Trailer EBS parameters

Number of axles: 4
 Number of teeth: 90
 Dynamic tyre radius [cm]: 48.5
 Inshot pressure [bar]: 0.48
 Coupling head pressure [bar]: 0.70
 Pressure compensation (at 1.6 bar) [bar]: 0.20
 Output pressure (at 6.5 bar) [bar]
 Laden: 5.40
 Unladen: 1.60
 Air spring pressure [bar]
 Laden : 4.03
 Unladen : 0.54
 Axle boogie load [kg]
 Laden: 13000
 Unladen: 2860
 Pressure limitation [bar] 5.40
 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		0.48
1.6	0.71	1.44
6.5	1.60	5.40

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

Air spring pressure [bar]	Unladen :		Laden :	
	Unladen	Laden	Unladen	Laden
0.54			4.03	
2860			13000	

Calculation pressure [bar]: 6.5

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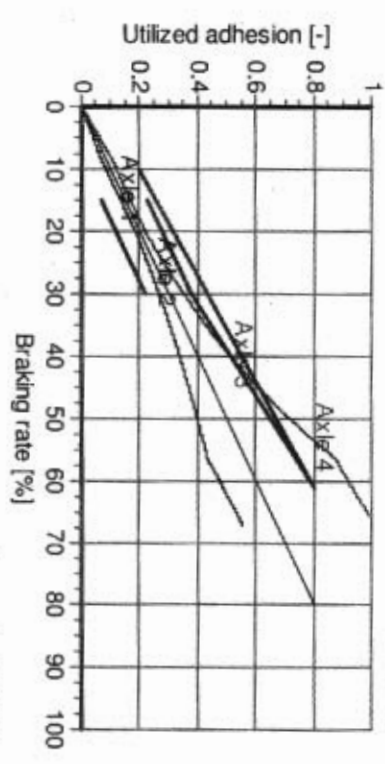
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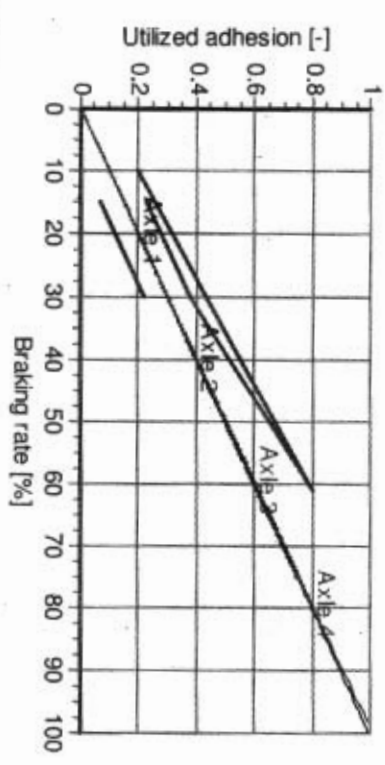
Document: 7A8H9000296112725
Page: 7 / 7

Database version: 9.0.13

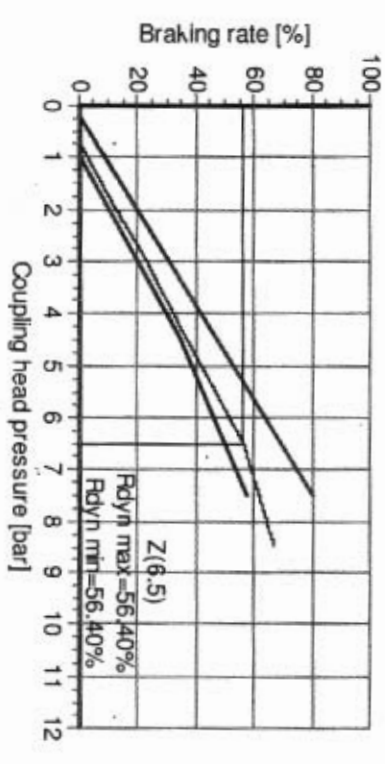
Laden vehicle - adhesion utilisation



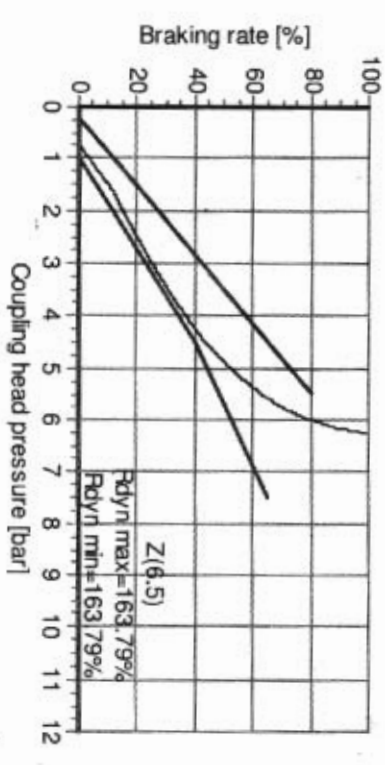
Unladen vehicle - adhesion utilisation



Laden vehicle - compatibility



Unladen vehicle - compatibility



Calculation pressure [bar]: 6.5

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