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2024-02-25

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PRASA PROJECT

SELF INSPECTION SHEET

CONFIDENTIAL INFORMATION

This document and the information contemplated therein have to be considered as Confidential Information pursuant to the provisions of Clause 25 of the MSA, and treated as such.

APPLICATION REFERENCE

MOUNTING	DESCRIPTION	STATION	CAR TYPE						WORK INSTRUCTION	SAFETY ? 
			TC1	M4	M1	M2	M3	TC2		
☐	DTR3-PROCE-14	LEVELLING, WEIGHTING AND BALANCING M CAR	FT1140	1	1	1	1		PRA.FT1140.04	YES
☐	DTR3-PROCE-14	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	✓ 1				1	PRA.FT1140.05	YES
☐	DTR3-PROCE-17	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	1	1	1	1	1	PRA.FT1140.05	YES
☐	DTR3-PROCE-17	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	1	1	1	1	1	PRA.FT1140.05	YES
☐										
☐										
☐										
☐										

REV	DATE	MODIFICATION CONTENT	RESPONSIBLE	NAME	DATE
7	2020/02/11	UPDATE OF AIR TIGHTNESS TEST TIME FROM 4 MIN TO 5 MIN. ADD PANTOGRAPH AIR TIGHTNESS.	APPROVER	GIVEN SILOWA	2020/02/11
			CHECKER	SIMON MOKOENA	2020/02/11
			COMPILER	COMFORT MALATJI	2020/02/11
8	2021/09/13	ADDING GAUGE MEASUREMENT CHECK ON THE SI.	APPROVER	MAKOFANE LUCY	2021/09/13
			CHECKER	RATAU EDISON	2021/09/13
			COMPILER	TSAKANI KHOSA	2021/09/13
9	2022/05/31	pressure valve (APV) Isolation	APPROVER	MAKHURUPETJI THABANG	2022/05/31
			CHECKER	HAZEL MGIBA	2022/05/31
			COMPILER	RATAU EDISON	2021/05/31

TUE	CAR	OPERATOR NAME	DATE	SELF INSPECTION NUMBER	PAGES
15 210	TC1	P. Seisa	25/02/24	SI.FT1140.52	01/08



SELF INSPECTION INDUSTRIAL QUALITY

Rev:09

Date:

2022/05/31

Project:
PRASA

SI.FT1140.52

Garc:

NGR:

Work Station

FT1140



Safety Related

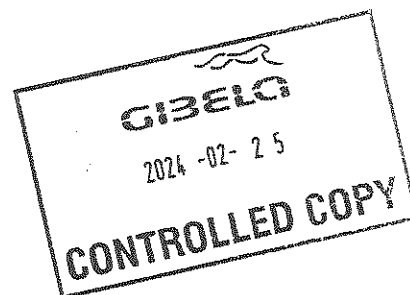
I - Document and Instrument Control

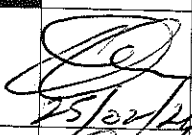
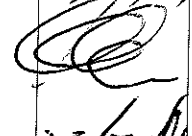
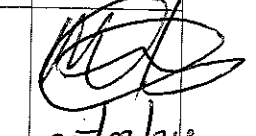
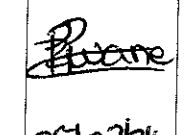
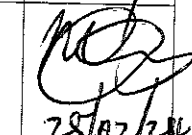
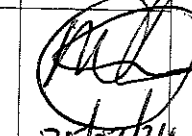
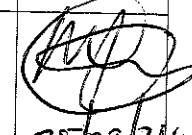
I.1 - Documents control

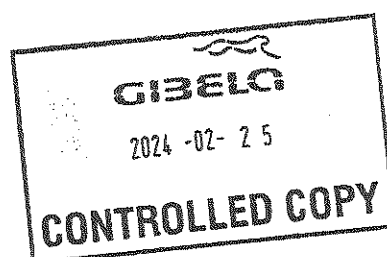
Document	TC1	M1	M2	M3	M4	TC2	Revision	Remark	OK	Signature/Date
PRA.FT1140.04	K								✓	
PRA.FT1140.05										
PRA.FT1140.05										

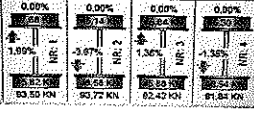
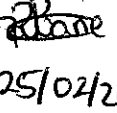
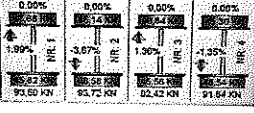
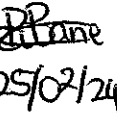
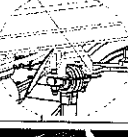
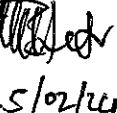
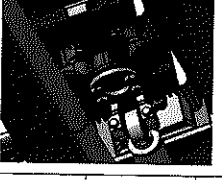
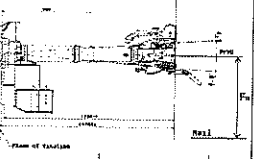
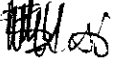
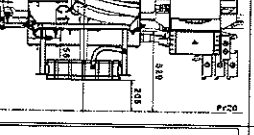
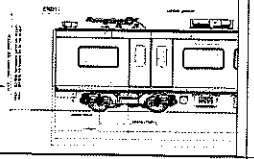
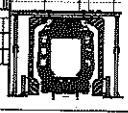
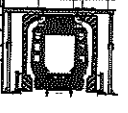
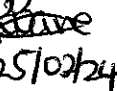
I.2 - Instruments Control - Monitoring and Measuring Instrument Control (Used for all instrument with calibration needed)

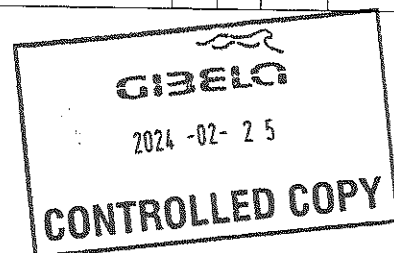
Instruments description	Serial number	Calibration or Verification Validation Date	OK	Signature/Date
Measuring Tape	GIBTA 0276	26/10/23-26/10/23	✓	
Vernier Caliper	GIBVR 0056	06/06/23-06/06/24	✓	
Torque Wrench 17 N.m	D2861617	19/12/23-19/12/24	✓	
Torque Wrench 35 N.m	D2511023	19/12/23-19/12/24	✓	
Torque Wrench 150 N.m	D28622009	19/12/23-12/12/24	✓	
Torque Wrench 320 N.m	A9650027	21/12/23-21/12/24	✓	
Torque Wrench 530 N.m	A9630053	21/12/23-21/12/24	✓	



		SELF INSPECTION INDUSTRIAL QUALITY		Rev:09			Project: PRASA	SI.FT1140.52										
		Date:	2022/05/31															
II - Self Inspection - Items to Check																		
II.1 - Items to Check																		
Item	Picture/Sketch	Description	Criterial/Record	OK	NO	Signature/Date												
01		Ensure that the average pressure valve (APV) is isolated by capping the two input pipes at the fittings installing the blanking fitting on the pipes highlighted		✓		 25/02/24												
02		Check underframe pipe system Air tightness. Test performance according to WI PRA.FT1130.15.	The test was performed and no leak was observed. Initial pressure (IP): 0.2 bar Final pressure (FP): 0.2 bar FP - IP = 0.0 bar APPROVAL CRITERIA: After 5 minutes the pressure cannot drops more than 0,2 bar	✓		 25/02/24												
03		Movement performed at least 50m to shudder the car. And position on the leveled load cell, with wheels on the center.		✓		 25/02/24												
04		Measurement inspection was done with car on condition AW0 and the rail leveled. (The load cells system must be levelled and calibrated)	Calibration Validation Date 19/12/2023	✓		 25/02/24												
05		In case of the equipments not installed, equivalent weight of the item should be added in the same place to simulate the equipment. (Any simulated weight, add on pending list)	<table border="1"> <thead> <tr> <th>EQUIPMENT DESCRIPTION</th> <th>WEIGHT (kg)</th> </tr> </thead> <tbody> <tr> <td>Driver Seat</td> <td>60</td> </tr> <tr> <td>Front display</td> <td></td> </tr> <tr> <td>Wiper motor</td> <td></td> </tr> <tr> <td>Wipe blade</td> <td></td> </tr> </tbody> </table>	EQUIPMENT DESCRIPTION	WEIGHT (kg)	Driver Seat	60	Front display		Wiper motor		Wipe blade		✓		 25/02/24		
EQUIPMENT DESCRIPTION	WEIGHT (kg)																	
Driver Seat	60																	
Front display																		
Wiper motor																		
Wipe blade																		
06		The pressure difference between air spring on each bogie when raise the pressure was maintained < 0.3 bar.		✓		 25/02/24												
07		Measurement recorded with empty suspension and loaded are on conformity with tolerances of the project.		✓		 25/02/24												
08		All levelling measurements are according to the reference. (Values out of reference must be recorded on "Description of defects")		✓		 25/02/24												



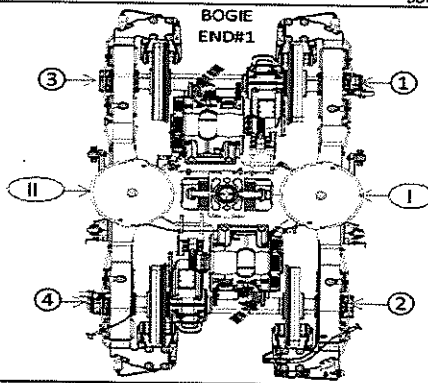
		SELF INSPECTION INDUSTRIAL QUALITY		Rev:09		Project: PRASA	SI.FT1140.52
				Date: 2022/05/31			
Item	Picture/Sketch	Description	Criteria/Record	✓	✗	Signature/Date	
09		Check that the levelling rods are torqued and have torque marker.		✓		 25/01/24	
10		The difference of weight between the left and right wheels of each axis, must be $\leq 4\%$. (Verify on the T&C equipment if all arrows are in green).		✓		 25/02/24	
11		Removes the car, move back onto the load cells and repeat the step 09. Confirm if both are in the tolerance of $\leq 4\%$.		✓		 25/02/24	
12		1 - Record shims thickness used on rod. 2 - All screws were torqued and have torque marker.	THICKNESS (mm) I 0 II 0 III 0 IV 6	✓		 25/02/24	
13		Pivot fixation	1- M20 x 90 screws with application of torque according to PRA.FT1140.04 / 05	✓		 25/02/24	
14		FOR TC CARS F = Height of the center of Automatic coupler F = 895mm (+5 / -10mm) (Using levelled rail)	TC CAB #1 = 897 mm	✓		 25/02/24	
15		FOR TC CARS Height of Eurobalise Antenna = 205mm(+/-10mm) (Using levelled rail)	TC CAB #1 = 204 mm	✓		 25/02/24	
16		Check pantograph piping air tightness. Test performance according to VII PRA.FT1140.17.	The test was performed and no leak was observed. -Roof piping connection fittings. -Room piping connection fittings(Roof arch and door trimming)			N/A	
17		Pantograph does not come in contact with the higher height gauge when passing through.	No Contact with Pantograph and Gauge -GO Contact with Pantograph and Gauge - NO GO			N/A	
18		Car does not come into contact with the gauge.	No Contact with Car and Gauge -GO Contact with Car and Gauge - NO GO	✓		 25/02/24	



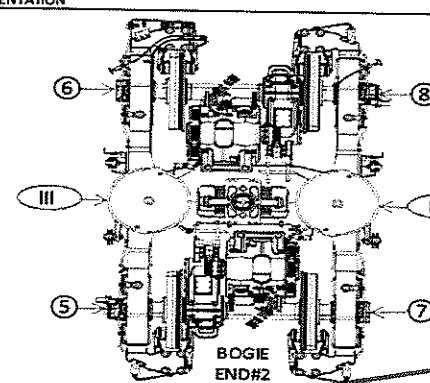
DRAFT TO MEASUREMENTS DURING LEVELLING (ALL UNITS MUST BE IN mm/bar/kg)

		END#1											
		LEFT SIDE						RIGHT SIDE					
DESCRIPTION	TOLERANCE	6	5	4	3	2	1	1	2	3	4	5	6
AIR SPRING HEIGHT (EMPTY)	N/A	A ¹ _{II}											
AIR SPRING HEIGHT (FULL)	min 254 max 261	A ¹ _{II}					256	258					A ¹ _I
FLOOR COVERING HEIGHT	min 1096 max 1116	E ¹ _{II}					1102	1105					E ¹ _I
AIR SPRING PRESSURE	≤ 0.3 (C _{II} - C _I)	C ¹ _{II}					3,63	3,67					C ¹ _I
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ¹ ₃											D ¹ ₁
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ¹ ₄											D ¹ ₂
PIVOT VERTICAL GAP	min 25 max 32	K ¹ _{II}											K ¹ _I
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (J _{II} - J _I)	J ¹ _{II}											J ¹ _I
QTY OF TURNS OF LEVELLING ROD	N/A	X ¹ _{II}											X ¹ _I
SHIMS OF ANTI-ROLL BAR	N/A	Y ¹ _{II}											Y ¹ _I
DESCRIPTION	TOLERANCE	6	5	4	3	2	1	1	2	3	4	5	6
AIR SPRING HEIGHT (EMPTY)	N/A	A ¹ _{III}											A ¹ _{IV}
AIR SPRING HEIGHT (FULL)	min 254 max 261	A ¹ _{III}					255	257					A ¹ _{IV}
FLOOR COVERING HEIGHT	min 1096 max 1116	E ¹ _{III}					1105	1105					E ¹ _{IV}
AIR SPRING PRESSURE	≤ 0.3 (C _{IV} - C _{III})	C ¹ _{III}					2,78	2,83					C ¹ _{IV}
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ¹ ₅											D ¹ ₇
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ¹ ₆											D ¹ ₈
PIVOT VERTICAL GAP	min 25 max 32	K ¹ _{III}											K ¹ _{IV}
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (J _{IV} - J _{III})	J ¹ _{III}											J ¹ _{IV}
QTY OF TURNS OF LEVELLING ROD	N/A	X ¹ _{III}											X ¹ _{IV}
SHIMS OF ANTI-ROLL BAR	N/A	Y ¹ _{III}											Y ¹ _{IV}

COMPARE EACH TENTATIVE WITH THE TOLERANCE AND IDENTIFY EACH MEASURE AS BELOW:		
GOOD	LOWER	HIGHER
✓	↓	↑
WEIGHT COMPENSATION		
EQUIPMENT		
WEIGHT		
EQUIPMENT		
WEIGHT		
SECONDARY MEASUREMENTS (ONLY TO CARS)		
AUTOMATIC COUPLER HEIGHT		
ANTENNA HEIGHT		



BOGIE
END#1



BOGIE
END#2



SELF INSPECTION INDUSTRIAL QUALITY

Rev:09

Date:

2022/05/31

Project:
PRASA

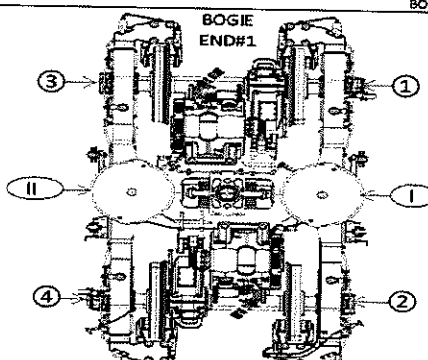
SI.FT1140.52

DRAFT TO MEASUREMENTS DURING LEVELLING (ALL UNITS MUST BE IN mm/bar/kg)

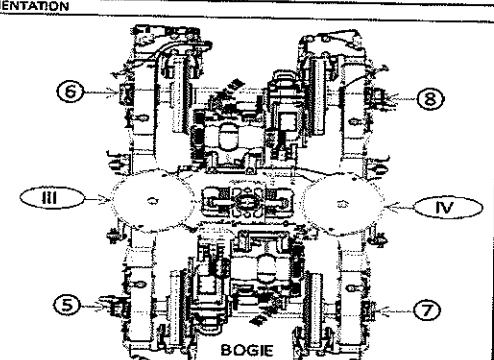
DESCRIPTION	TOLERANCE	LEFT SIDE						RIGHT SIDE							
		6	5	4	3	2	1	1	2	3	4	5	6		
AIR SPRING HEIGHT (EMPTY)	N/A	A ^{II}													
AIR SPRING HEIGHT (FULL)	min 254 max 261	A ^{II}											A ^I		
FLOOR COVERING HEIGHT	min 1096 max 1116	E ^{II}											A ^I		
AIR SPRING PRESSURE	≤ 0.3 (Q _I - Q)	C ^{II}											E ^I		
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₃											C ^I		
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₄											D ₁		
PIVOT VERTICAL GAP	min 25 max 32	K ^{II}											D ₂		
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (J ^I - J)	J ^{II}											K ^I		
QTY OF TURNS OF LEVELLING ROD	N/A	X ^{II}											J ^I		
SHIMS OF ANTI-ROLL BAR	N/A	Y ^{II}											X ^I		
DESCRIPTION	TOLERANCE		6	5	4	3	2	1		1	2	3	4	5	6
AIR SPRING HEIGHT (EMPTY)	N/A	A ^{III}													A ^{IV}
AIR SPRING HEIGHT (FULL)	min 254 max 261	A ^{III}													A ^{IV}
FLOOR COVERING HEIGHT	min 1096 max 1116	E ^{III}													E ^{IV}
AIR SPRING PRESSURE	≤ 0.3 (Q _V - Q _{II})	C ^{III}													C ^{IV}
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₅													D ₇
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₆													D ₈
PIVOT VERTICAL GAP	min 25 max 32	K ^{III}													K ^{IV}
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (J _V - J _{II})	J ^{III}													J ^{IV}
QTY OF TURNS OF LEVELLING ROD	N/A	X ^{III}													X ^{IV}
SHIMS OF ANTI-ROLL BAR	N/A	Y ^{III}													Y ^{IV}

COMPARE EACH TENTATIVE WITH THE TOLERANCE AND IDENTIFY EACH MEASURE AS BELOW		
GOOD	LOWER	HIGHER
✓	↓	↑
WEIGHT COMPENSATION		
EQUIPMENT		
WEIGHT		
EQUIPMENT		
WEIGHT		
SECONDARY MEASUREMENTS (ONLY TO CARS)		
AUTOMATIC COUPLER HEIGHT		
ANTENNA HEIGHT		

BOGIE END#1



BOGIE END#2



GIBELQ

2024-02-25

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SELF INSPECTION INDUSTRIAL QUALITY

Rev:09

Date:

2022/05/31

Projet:
PRASA

SI.FT1140.52

Table 1 - Reference Values and Measurement Tolerances for the Car Levelling.

ITEM		THEORETICAL VALUES															
		TC1 CAR		M4 CAR		M1 CAR		M2 CAR		M3 CAR		M5 CAR		TC2 CAR			
		TBext	TBint	M81	M82	M81	M82	M81	M82	M81	M82	M81	M82	TBint	TBext		
Pivot lateral stop gaps difference [mm]	$J_n - J_{n+1}$ (1=10)	Fig. 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4		
Air Spring height [mm]	A_n (1=10)	Fig. 5	255^{+6}_{-1}	255^{+6}_{-1}	255^{+6}_{-1}	255^{+6}_{-1}	255^{+6}_{-1}	255^{+6}_{-1}	255^{+6}_{-1}	255^{+6}_{-1}	255^{+6}_{-1}	255^{+6}_{-1}	255^{+6}_{-1}	255^{+6}_{-1}	255^{+6}_{-1}		
Air spring pressure at AWO [Bar]	C_n (1=10) $C_{II} - C_{IV}$	Fig. 5	3,76 [Ref.]	2,82 [Ref.]	2,87 [Ref.]	2,83 [Ref.]	3,02 [Ref.]	2,91 [Ref.]	3,07 [Ref.]	2,85 [Ref.]	2,83 [Ref.]	2,87 [Ref.]	2,83 [Ref.]	2,87 [Ref.]	3,76 [Ref.]		
Primary Suspension gaps [mm]	$D_{11} - D_{12}$ $D_{21} - D_{22}$ $D_{31} - D_{32}$ $D_{41} - D_{42}$	Fig. 6	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}		
Carbody Floor height [mm]	E_n (1=10)	Fig. 7	1105^{+10}_{-10}	1105^{+10}_{-10}	1105^{+10}_{-10}	1105^{+10}_{-10}	1105^{+10}_{-10}	1105^{+10}_{-10}	1105^{+10}_{-10}	1105^{+10}_{-10}	1105^{+10}_{-10}	1105^{+10}_{-10}	1105^{+10}_{-10}	1105^{+10}_{-10}	1105^{+10}_{-10}		
Bolster height [mm]	N_n (1=10)	Fig. 7	850^{+15}_{-7}	850^{+15}_{-7}	850^{+15}_{-7}	850^{+15}_{-7}	850^{+15}_{-7}	850^{+15}_{-7}	850^{+15}_{-7}	850^{+15}_{-7}	850^{+15}_{-7}	850^{+15}_{-7}	850^{+15}_{-7}	850^{+15}_{-7}	850^{+15}_{-7}		
Coupling End height [mm]	F_1 F_2	Fig. 8 Fig. 9	895 [Ref.]	760 [Ref.]	760 [Ref.]	760 [Ref.]	760 [Ref.]	760 [Ref.]	760 [Ref.]	760 [Ref.]	760 [Ref.]	760 [Ref.]	760 [Ref.]	760 [Ref.]	895 [Ref.]		
Pivot Vertical gap [mm]	K_n	Fig. 10	30^{+15}_{-5}	30^{+15}_{-5}	30^{+15}_{-5}	30^{+15}_{-5}	30^{+15}_{-5}	30^{+15}_{-5}	30^{+15}_{-5}	30^{+15}_{-5}	30^{+15}_{-5}	30^{+15}_{-5}	30^{+15}_{-5}	30^{+15}_{-5}	30^{+15}_{-5}		



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SI.FT1140.52

Leveling report from Production (Final measurements after Levelling and Weighting fine)

References for secondary suspension empty

A'n Air spring height empty

References for secondary suspension full

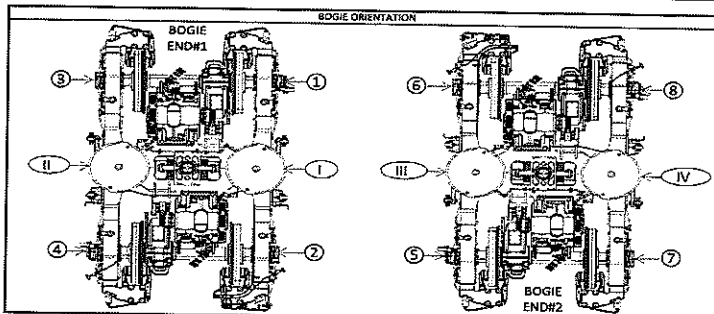
An Air spring height
Bn Difference between measurement A'n and An
En Floor covering height
Cn Air spring pressure
Dn Primary suspension
Kn Pivot Vertical gap
Jn Pivot Lateral stop gaps difference

Item	Reference [mm]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
A'n	N/A	A'i 235	A'ii 235	A'iii 242	A'iv 242
An	254 to 261	Ai 259	Aii 259	Aiii 257	Aiv 258
Bn = An - A'n	N/A	Bi 24	Bii 24	Biii 15	Biv 16
En	1106 ±10 mm	Ei 1105	Eii 1102	Eiii 1105	Eiv 1105
Item	Reference [bar]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
Cn	Table 02 (*)	Ci 3.64	Cii 3.61	Ciii 2.76	Civ 2.82
Cn - Cn+1	Difference ≤ 0,3	Ci - Cii 0,03		Ciii - Cii 0,06	
Gauge serial number	N/A	G1B05874	G1B05874	G1B05874	G1B05874
Item	Reference [mm]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
Dn	Table 01 (*)	D1 44.01	D3 43.89	D6 45.14	D8 43.87
		D2 45.48	D4 43.82	D5 44.51	D7 44.67
Kn	25 to 45	Ki 30.85		Kii 36.81	
Jn	Difference ≤ 4	Ji 25.51	Jii 25.54	Jiii 25.39	Jiv 25.93

(*) Reference, only include values, isn't approval criteria.

Table 01 D Theoretical Values	TC1		M4		M1		M2		M3		TC2	
	Tbex	TBin	Mb1	Mb1	Mb1	Mb2	Mb1	Mb1	Mb1	Mb1	Tbin	Tbex
D=	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}	35^{+12}_{-5}

Table 02 C Theoretical Values	TC1		M4		M1		M2		M3		TC2	
	Tbex	TBin	Mb1	Mb1	Mb1	Mb2	Mb1	Mb1	Mb1	Mb1	Tbin	Tbex
C=	3,76	2,82	2,87	2,83	3,02	2,91	3,07	2,85	2,83	2,87	2,83	3,76



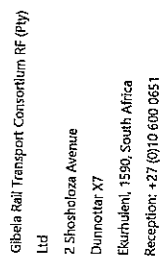
Weighting report from Test and Commissioning (Final measurements after Levelling and Weighting fine)



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TRAIN SET 210	REF: G80000001672_J0 PRASA WEIGHT BALANCE IN
	PC09 WEIGHING REPORT

	Front Bogie [Tons]	Rear Bogie [Tons]	Longitudinal Imbalance (%)	Criteria Longitudinal Imbalance < 10%
TC1	18.54	15.60	8.61%	PASS
	Weight Measured [Tons]	Weight Predicted [Tons]	Weight Difference (%)	Criteria MinDiffMax
	34.14	34.42	0.83%	1.62% PASS

[illegible]