




**PRASA PROJECT**



**CONFIDENTIAL INFORMATION**



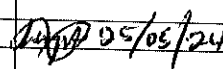

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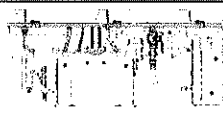
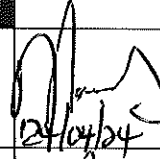
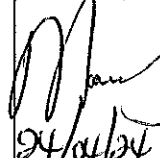

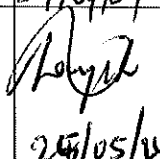

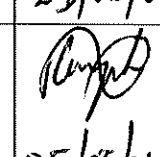

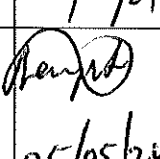

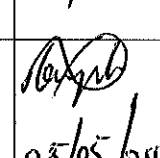

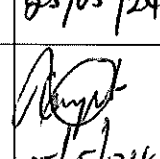

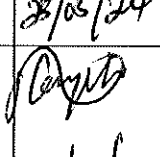
**APPLICATION REFERENCE**



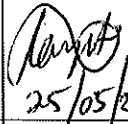
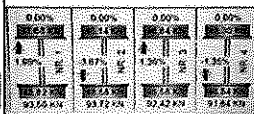
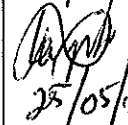
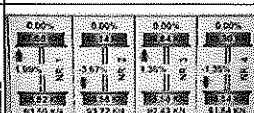
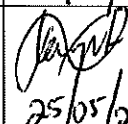

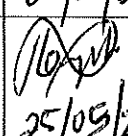

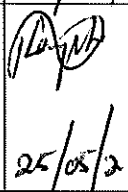

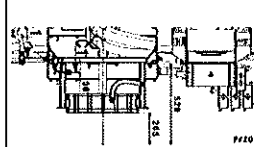
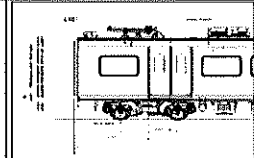
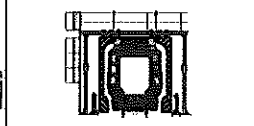
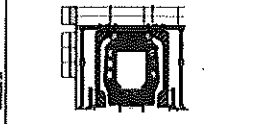
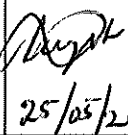
MOUNTING	DESCRIPTION	STATION	CAR TYPE						WORK INSTRUCTION	SAFETY ? 
			TC1	M4	M1	M2	M3	TC2		
<input type="checkbox"/>	DTR3-PROCE-14	LEVELLING, WEIGHTING AND BALANCING M CAR	FT1140	1	1	1	<input checked="" type="checkbox"/>		PRA.FT1140.04	YES
<input type="checkbox"/>	DTR3-PROCE-14	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	1				1	PRA.FT1140.05	YES
<input type="checkbox"/>	DTR3-PROCE-17	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	1	1	1	1	1	PRA.FT1140.05	YES
<input type="checkbox"/>	DTR3-PROCE-17	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	1	1	1	1	1	PRA.FT1140.05	YES
<input type="checkbox"/>										
<input type="checkbox"/>										
<input type="checkbox"/>										

REV	DATE	MODIFICATION CONTENT	RESPONSIBLE	NAME	DATE
7	2/11/2020	UPDATE OF AIR TIGHTNESS TEST TIME FROM 4 MIN TO 5 MIN. ADD PANTOGRAPH AIR TIGHTNESS.	APPROVER	GIVEN SILOWA	2/11/2020
			CHECKER	SIMON MOKOENA	2/11/2020
			COMPILER	COMFORT MALATJI	2/11/2020
8	9/13/2021	ADDING GAUGE MEASUREMENT CHECK ON THE SI.	APPROVER	MAKOFANE LUCY	9/13/2021
			CHECKER	RATAU EDISON	9/13/2021
			COMPILER	TSAKANI KHOSA	9/13/2021
9	5/31/2022	pressure valve (APV) Isolation	APPROVER	MAKHURUPETJI THABANG	5/31/2022
			CHECKER	HAZEL MGIBA	5/31/2022
			COMPILER	RATAU EDISON	5/31/2021

TUE	CAR	OPERATOR NAME	DATE	SELF INSPECTION NUMBER	PAGES
TS225	M3	Andrew	24/05/24	SI.FT1140.52	01/08

	SELF INSPECTION INDUSTRIAL QUALITY		Rev:09	Project: PRASA	SI.FT1140.52						
			Date: 5/31/2022								
Car:	NCR:		Work Station FT1140								
 Safety Related											
I - Document and Instrument Control											
I.1 - Documents control											
Document	TC1	M1	M2	M3	M4	TC2	Revision	Remarks	OK	NOK	Signature/Date
PRA.FT1140.04											
PRA.FT1140.05				✓							
PRA.FT1140.05									✓		25/05/24 
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	NOK	Signature/Date				
Measuring tape	GIBTA 0276		26/10/23 - 26/10/24		✓						
Vernier Caliper	GIBVR 0056		06/06/23 - 06/06/24		✓		25/05/24 				
Torque Wrench 35 N.m	D2511023		09/12/23 - 19/12/24		✓						
Torque wrench 150 N.m	D28622009		19/12/23 - 19/12/24		✓						
Torque Wrench 320 N.m	A9650027		21/12/23 - 21/12/24		✓						

	<h1 style="text-align: center;">SELF INSPECTION INDUSTRIAL QUALITY</h1>		Rev:09	Projet: PRASA	SI.FT1140.52									
			Date:  5/31/2022											
II - Self Inspection - Items to Check														
II.1 - Items to Check														
Item	Picture/Sketch	Description	Crité/ia/Record	OK	Not OK	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		L		 24/04/24								
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): <u>10.11</u> bar Final pressure (FP): <u>10.10</u> bar FP - IP = <u>0.03</u> bar  APPROVAL CRITERIA: After 5 minutes the pressure cannot drops more than 0.2 bar	L		 24/04/24								
03		Movement performed at least 50m to shudder the car. And position on the leveled load cell, with wheels on the center.		✓		 25/05/24								
04		Measurement inspection was done with car on condition AW0 and the rail leveled. (The load cells system must be leveled and calibrated)	Calibration Validation Date <u>19/12/2023</u>	✓		 25/05/24								
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" style="width: 100%;"> <tr> <th>EQUIPMENT DESCRIPTION</th> <th>WEIGHT (kg)</th> </tr> <tr> <td><u>CHARLYCOARY</u></td> <td><u>360</u></td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	EQUIPMENT DESCRIPTION	WEIGHT (kg)	<u>CHARLYCOARY</u>	<u>360</u>					✓		 25/05/24
EQUIPMENT DESCRIPTION	WEIGHT (kg)													
<u>CHARLYCOARY</u>	<u>360</u>													
06		The pressure difference between air spring on each bogie when raise the pressure was maintained < 0.3 bar.		✓		 25/05/24								
07		Measurement recorded with empty suspension and loaded are on conformity with tolerances of the project.		✓		 25/05/24								
08		All leveling measurements are according to the reference. (Values out of reference must be recorded on "Description of defects")		✓		 25/05/24								

		<h1>SELF INSPECTION INDUSTRIAL QUALITY</h1>		Rev:09		Projet: PRASA	SI.FT1140.52
				Date:  5/31/2022			
Item	Picture/Sketch	Description	Criteria/Record	OK	NO	Signature/Date	
09		Check that the leveling rods are torqued and have torque marker.		✓		 25/05/24	
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).		✓		 25/05/24	
11		Remove the car, move back onto the load cells and repeat the step 09. Confirm if both are in the tolerance of $\leq 4\%$ .		✓		 25/05/24	
12		1 - Record shims thickness used on rod.  2 - All screws were torqued and have torque marker.	THICKNESS (mm) I _____ II _____ III _____ IV _____	✓		 25/05/24	
13		Pivot fixation	1- M20 x 90 screws with application of torque according to PRA.FT1140.04 / 05	✓		 25/05/24	
14		FOR TC CARS F= Height of the center of Automatic coupler F = 895mm (+5/-10mm) (Using levelled rail)	TC CAB #1= _____ mm			N/A	
15		FOR TC CARS Height of Eurobase Antenna = 205mm(+/-10mm) (Using levelled rail)	TC CAB #1= _____ mm			N/A	
16		Check pantograph piping air tightness. Test performance according to WI.PRA.FT1140.17.	The test was performed and no leak was observed. -Roof piping connection fittings -Roof piping connection fittings(Roof arch and door timing)			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	✓		 25/05/24	



# SELF INSPECTION INDUSTRIAL QUALITY

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## 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											A'I
AIR SPRING HEIGHT (FULL)	min 254 max 261	AII				256	253	258	258				AI
FLOOR COVERING HEIGHT	min 1096 max 1116	EII											EI
AIR SPRING PRESSURE	≤ 0.3 (Ci - Ci)	CII					2.87	2.79					CI
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D3											D1
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D4											D2
PIVOT VERTICAL GAP	min 25 max 32	KII											KI
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (Ai - Aj)	JII											JI
QTY OF TURNS OF LEVELLING ROD	N/A	XII											XI
SHIMS OF ANTI-ROLL BAR	N/A	YII					91	0					YI
AIR SPRING HEIGHT (EMPTY)	N/A	A'III											A'IV
AIR SPRING HEIGHT (FULL)	min 254 max 261	AIII				256	253	256	257				AIV
FLOOR COVERING HEIGHT	min 1096 max 1116	EIII											EIV
AIR SPRING PRESSURE	≤ 0.3 (Civ - Cii)	CIII					2.87	2.69					CIV
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D5											D7
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D6											D8
PIVOT VERTICAL GAP	min 25 max 32	KIII											KIV
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (Av - An)	JIII											JIV
QTY OF TURNS OF LEVELLING ROD	N/A	XIII											XIV
SHIMS OF ANTI-ROLL BAR	N/A	YIII					91	91					YIV

COMPARE EACH TENTATIVE WITH THE TOLERANCE AND IDENTIFY EACH MEASURE AS BELOW

GOOD LOWER HIGHER

✓ ↓ ↑

WEIGHT COMPENSATION

EQUIPMENT

WEIGHT

EQUIPMENT

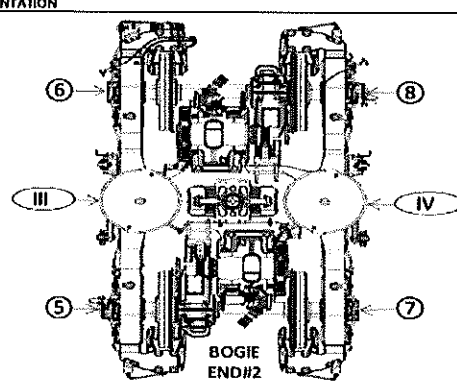
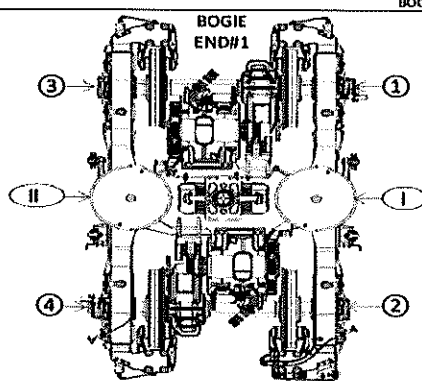
WEIGHT

SECONDARY MEASUREMENTS (ONLY TO CARS)

AUTOMATIC COUPLER

HEIGHT

ANTENNA HEIGHT





# SELF INSPECTION INDUSTRIAL QUALITY

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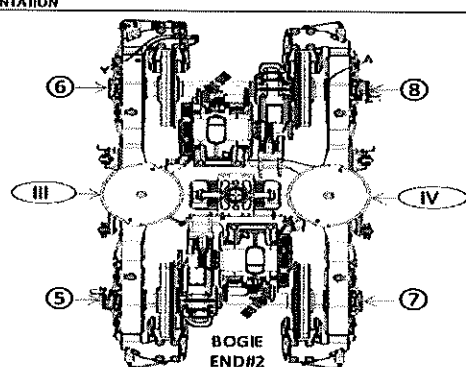
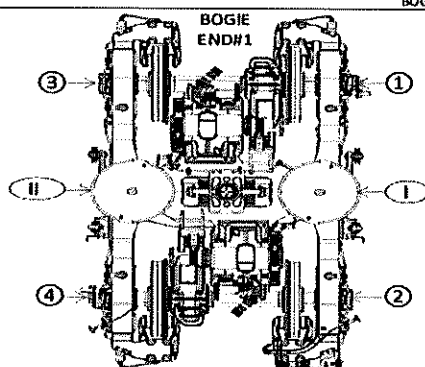
Projct:  
PRASA

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

		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`II														A`I
AIR SPRING HEIGHT (FULL)	min 254 max 261	AII														AI
FLOOR COVERING HEIGHT	min 1096 max 1116	EII														EI
AIR SPRING PRESSURE	≤ 0.3 (QI - Q)	CII														CI
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D3														D1
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D4														D2
PIVOT VERTICAL GAP	min 25 max 32	KII														KI
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (AI - A)	JII														JI
QTY OF TURNS OF LEVELLING ROD	N/A	XII														XI
SHIMS OF ANTI-ROLL BAR	N/A	YII														YI
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	AIII														AIV
FLOOR COVERING HEIGHT	min 1096 max 1116	EIII														EIV
AIR SPRING PRESSURE	≤ 0.3 (QIV - QII)	CIII														CIV
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D5														D7
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D6														D8
PIVOT VERTICAL GAP	min 25 max 32	KIII														KIV
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (AIV - AI)	JIII														JIV
QTY OF TURNS OF LEVELLING ROD	N/A	XIII														XIV
SHIMS OF ANTI-ROLL BAR	N/A	YIII														YIV
		LEFT SIDE						RIGHT SIDE								

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





# SELF INSPECTION INDUSTRIAL QUALITY

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

ITEM	THEORETICAL VALUES											
	TCL CAR		M4 CAR		M1 CAR		M2 CAR		M3 CAR		TCL CAR	
	TBox	TBox	MR1	MR1	MR1	MR1	MR2	MR2	MR1	MR1	TBox	TBox
Pivot lateral stop gap difference [mm]	Fig. 4	$\leq 4$	$\leq 4$	$\leq 4$	$\leq 4$	$\leq 4$	$\leq 4$	$\leq 4$	$\leq 4$	$\leq 4$	$\leq 4$	$\leq 4$
Air Spring height [mm]	Fig. 5	$255^{+5}_{-1}$	$255^{+5}_{-1}$	$255^{+5}_{-1}$	$255^{+5}_{-1}$	$255^{+5}_{-1}$	$255^{+5}_{-1}$	$255^{+5}_{-1}$	$255^{+5}_{-1}$	$255^{+5}_{-1}$	$255^{+5}_{-1}$	$255^{+5}_{-1}$
Air spring pressure at AWD [Bar]	Fig. 5	3,76 (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.)	3,76 (Ref.)
Primary Suspension gap [mm]	Fig. 6	$35^{+3}_{-1}$	$35^{+3}_{-1}$	$35^{+3}_{-1}$	$35^{+3}_{-1}$	$35^{+3}_{-1}$	$35^{+3}_{-1}$	$35^{+3}_{-1}$	$35^{+3}_{-1}$	$35^{+3}_{-1}$	$35^{+3}_{-1}$	$35^{+3}_{-1}$
Carbody floor height [mm]	Fig. 7	$1106^{+10}_{-10}$	$1106^{+10}_{-10}$	$1106^{+10}_{-10}$	$1106^{+10}_{-10}$	$1106^{+10}_{-10}$	$1106^{+10}_{-10}$	$1106^{+10}_{-10}$	$1106^{+10}_{-10}$	$1106^{+10}_{-10}$	$1106^{+10}_{-10}$	$1106^{+10}_{-10}$
Bolster height [mm]	Fig. 7	$850^{+5}_{-5}$	$850^{+5}_{-5}$	$850^{+5}_{-5}$	$850^{+5}_{-5}$	$850^{+5}_{-5}$	$850^{+5}_{-5}$	$850^{+5}_{-5}$	$850^{+5}_{-5}$	$850^{+5}_{-5}$	$850^{+5}_{-5}$	$850^{+5}_{-5}$
Coupling End height [mm]	Fig. 8	895 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	760 (Ref.)	895 (Ref.)	760 (Ref.)
Pivot Vertical gap [mm]	Fig. 10	$30^{+3}_{-3}$	$30^{+3}_{-3}$	$30^{+3}_{-3}$	$30^{+3}_{-3}$	$30^{+3}_{-3}$	$30^{+3}_{-3}$	$30^{+3}_{-3}$	$30^{+3}_{-3}$	$30^{+3}_{-3}$	$30^{+3}_{-3}$	$30^{+3}_{-3}$



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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

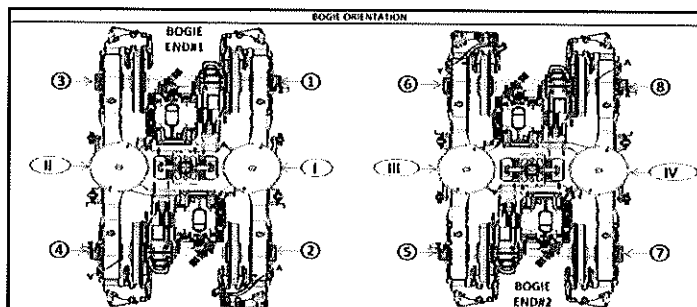
A'n Air spring height  
B'n Difference between measurement A'n and An  
En Floor covering height  
C'n Air spring pressure  
D'n Primary suspension  
Kn Pivot Vertical gap  
Jn Pivot Lateral stop gaps difference

Item	Reference [mm]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
A'n	N/A	A'i 242	A'ii 241	A'ia 238	A'iv 241
An	254 to 261	Ai 258	Aii 256	Aia 256	Aiv 257
Bn = An - A'n	N/A	Bi 16	Bii 15	Bia 18	Biv 16
En	1106 ±10 mm	Ei 1110	Eii 1108	Eia 1114	Eiv 1107
Item	Reference [bar]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
Cn	Table 02 (*)	Ci 2,76	Cii 2,72	Cia 2,84	Civ 2,73
Cn - Cn+1	Difference ≤ 0,3	Ci - Cii 0,04		Cia - Civ 0,11	
Gauge serial number	N/A	GIB05873	GIB05873	GIB05873	GIB05873
Item	Reference [mm]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
Dn	Table 01 (*)	D1 45,74	D3 46,18	D5 44,96	D6 46,0
		D2 45,90	D4 46,51	D5 44,82	D7 45,92
Kn	25 to 45	Ki 37,41		Ka 34,14	
Jn	Difference ≤ 4	Ji 25,14	Jii 25,64	Jia 25,06	Jiv 25,46

(\*) 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 <sup>+12</sup> <sub>-5</sub>	35 <sup>+12</sup> <sub>-5</sub>	35 <sup>+12</sup> <sub>-5</sub>	35 <sup>+12</sup> <sub>-5</sub>	35 <sup>+12</sup> <sub>-5</sub>	35 <sup>+12</sup> <sub>-5</sub>	35 <sup>+12</sup> <sub>-5</sub>	35 <sup>+12</sup> <sub>-5</sub>	35 <sup>+12</sup> <sub>-5</sub>	35 <sup>+12</sup> <sub>-5</sub>	35 <sup>+12</sup> <sub>-5</sub>	35 <sup>+12</sup> <sub>-5</sub>

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 225	REF: GIB0000001672 JD PRASA WEIGHT BALANCE EN
PC09 WEIGHING REPORT	

M3	Balance across front and rear bogies	Front Bogie [Tons]	Rear Bogie [Tons]	Longitudinal Imbalance [%]	Criteria Longitudinal Imbalance $\leq 3\%$
		17.81	17.85	0.11%	PASS
	Weight Measured vs Predicted	Weight Measured [Tons]	Weight Predicted [Tons]	Weight Difference [%]	Tolerance [%]
		35.66	35.90	0.67%	1.96%
					Criteria Min/Diffs/Max
					PASS

Test Participants				Date
Name	Company	Department	Signature	
Thabo Mushi	GIBELA	EOC		28/10/2024