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2024-05-29

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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		
<input type="checkbox"/>	DTR3-PROCE-14	LEVELLING, WEIGHTING AND BALANCING M CAR	FT1140	1	1	1	1		PRA.FT1140.04	YES
<input type="checkbox"/>	DTR3-PROCE-14	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	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
TS 232	TC2	Pratig	29/06/24	SI.FT1140.52	01/08

	<h1>SELF INSPECTION INDUSTRIAL QUALITY</h1>	Rev:09	Project: PRASA	SI.FT1140.52
		Date: 5/31/2022		

Car:	NOR:	Work Station FT1140
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Safety Related

I - Document and Instrument Control

I.1 - Documents control									
Document	TC1	NY	NC	NS	NS	TC2	Revision	Remarks	Signature/Date
PRA.FT1140.04									
PRA.FT1140.05						K			
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	G1BTA 0276					26/10/23-26/10/24		✓	
Venier Calliper	G1BUR 0050					06/08/23-06/08/24		✓	
Torque Wrench 520 N.m	A9650053					19/12/23-19/12/24		✓	
Torque Wrench 320 N.m	A9690019					19/12/23-19/12/24		✓	
Torque Wrench 150 N.m	B7217566					21/12/23-21/12/24		✓	
Torque Wrench 35 N.m	D2811023					21/12/23-21/12/24		✓	
Torque Wrench 17 N.m	D2861617					19/12/23-19/12/24		✓	





SELF INSPECTION INDUSTRIAL QUALITY

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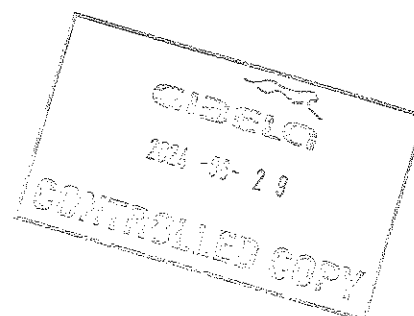
Project:
PRASA

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II - Self Inspection - Items to Check

II.1 - Items to Check

N.1 - Items to Check																
Item	Picture/Sketch	Description	Critical/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		✓		 28/06/24										
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>2.9</u> bar Final pressure (FP): <u>2.4</u> bar FP - IP = <u>0.5</u> bar APPROVAL CRITERIA: After 5 minutes the pressure cannot drops more than 0,2 bar	✓		 28/06/24										
03		Movement performed at least 50m to shudder the car. And position on the leveled load cell, with wheels on the center.		✓		 29/06/24										
04		Measurement inspection was done with car on condition AWD and the rail levelled. (The load cells system must be levelled and calibrated)	Calibration Validation Date <u>19/12/2023</u>	✓		 29/06/24										
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><tr><th>EQUIPMENT DESCRIPTION</th><th>WEIGHT (kg)</th></tr><tr><td><u>Driver Seat</u></td><td><u>60</u></td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr></table>	EQUIPMENT DESCRIPTION	WEIGHT (kg)	<u>Driver Seat</u>	<u>60</u>							✓		 29/06/24
EQUIPMENT DESCRIPTION	WEIGHT (kg)															
<u>Driver Seat</u>	<u>60</u>															
06		The pressure difference between air spring on each bogie when raise the pressure was maintained < 0.3 bar.		✓		 29/06/24										
07		Measuremet recorded with empty suspension and loaded are on conformity with tolerances of the project.		✓		 29/06/24										
08		All levelling measurements are according to the reference. (Values out of reference must be recorded on "Description of defects")		✓		 29/06/24										





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Item	Picture/Sketch	Description	Criteria/Record	OK	Signature/Date
09		Check that the leveling rods are torqued and have torque marker.		✓	 29/06/24
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).		✓	 29/06/24
11		Remove the car, move back onto the load cells and repeat the step 09. Confirm if both are in the tolerance of $\leq 4\%$.		✓	 29/06/24
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 0	✓	 29/06/24
13		Pivot fixation	1- M20 x 90 screws with application of torque according to PRA.FT1140.04 / 05	✓	 29/06/24
14		FOR TC CARS F= Height of the center of Automatic coupler F = 895mm (+5 / -10mm) (Using levelled rail)	TC CAB #1= 896 mm	✓	 29/06/24
15		FOR TC CARS Height of Eurobalise Antenna = 205mm(+/-10mm) (Using levelled rail)	TC CAB #1= 195 mm	✓	 29/06/24
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. -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	✓	 29/06/24

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

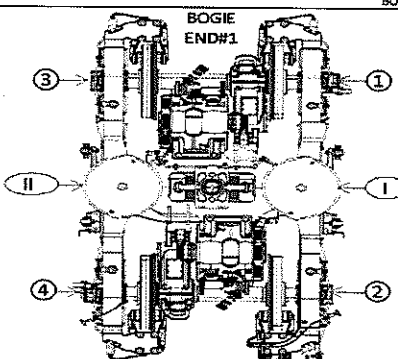
DESCRIPTION	TOLERANCE	LEFT SIDE						RIGHT SIDE						
		6	5	4	3	2	1	1	2	3	4	5	6	
AIR SPRING HEIGHT (EMPTY)	N/A	A ^{II}											A ^I	
AIR SPRING HEIGHT (FULL)	min 254 max 261	A ^{II}				256	256	253	254	255	255		A ^I	
FLOOR COVERING HEIGHT	min 1096 max 1116	E ^{II}				1109	1109	1105	1100	1100	1100		E ^I	
AIR SPRING PRESSURE	≤ 0.3 (Ci - Cj)	C ^{II}				3,60	3,54	3,51	3,65	3,63	3,56		C ^I	
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ³											D ¹	
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ⁴											D ²	
PIVOT VERTICAL GAP	min 25 max 32	K ^{II}											K ^I	
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (Ji - Jj)	J ^{II}											J ^I	
QTY OF TURNS OF LEVELLING ROD	N/A	X ^{II}						1 1/4	3/4				X ^I	
SHIMS OF ANTI-ROLL BAR	N/A	Y ^{II}											Y ^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}					255	255	253	252	254	256		A ^{IV}
FLOOR COVERING HEIGHT	min 1096 max 1116	E ^{III}					1108	1108	1106	1106	1108	1108		E ^{IV}
AIR SPRING PRESSURE	≤ 0.3 (Civ - Cjv)	C ^{III}					290	296	295	274	278	295		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 (Jiv - Jjv)	J ^{III}												J ^{IV}
QTY OF TURNS OF LEVELLING ROD	N/A	X ^{III}						1 1/4	1 1/4	3/4				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
✓	↓	↑

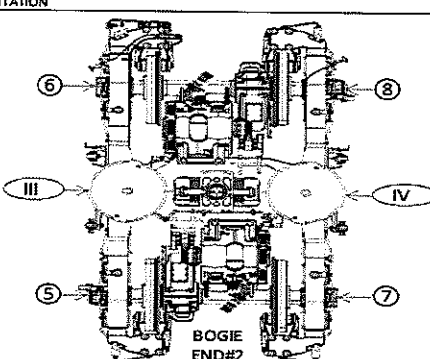
WEIGHT COMPENSATION	
EQUIPMENT	
WEIGHT	
EQUIPMENT	
WEIGHT	

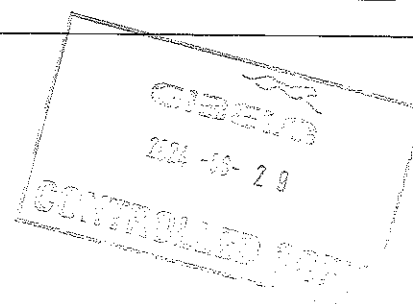
SECONDARY MEASUREMENTS (ONLY TC CARS)	
AUTOMATIC COUPLER HEIGHT	
ANTENNA HEIGHT	

BOGIE END#1



BOGIE END#2







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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	A ^{II}											A ^I
FLOOR COVERING HEIGHT	min 1096 max 1116	E ^{II}											E ^I
AIR SPRING PRESSURE	≤ 0.3 (Q _{II} - Q)	C ^{II}											C ^I
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₃											D ₁
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₄											D ₂
PIVOT VERTICAL GAP	min 25 max 32	K ^{II}											K ^I
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (A _{II} - A)	J ^{II}											J ^I
QTY OF TURNS OF LEVELLING ROD	N/A	X ^{II}											X ^I
SHIMS OF ANTI-ROLL BAR	N/A	Y ^{II}											Y ^I
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 _{IV} - 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 (A _{IV} - A _{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 TC CARS)		
AUTOMATIC COUPLER HEIGHT		
ANTENNA HEIGHT		

BOGIE END#1

BOGIE END#2

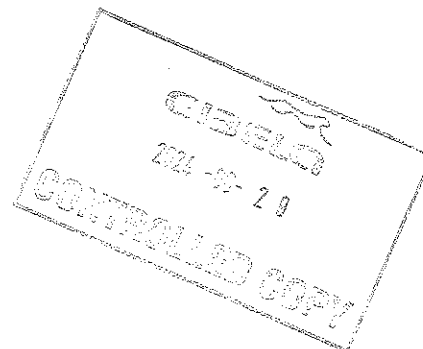


Table 1 - Reference Values and Measurement Tolerances for the Car Levelling.

ITEM		THEORETICAL VALUES											
		TCL CAR		M4 CAR		M3 CAR		M2 CAR		M1 CAR		TCL CAR	
		TBext	TBint	M01	M02	M01	M02	M01	M02	M01	M02	TBext	TBint
Pivot lateral stop gap difference [mm]	Fig. 4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4
Air Spring height [mm]	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
Air spring pressure at AWO [bar]	Fig. 5	3,76 (Ref.)	2,82 (Ref.)	2,87 (Ref.)	2,91 (Ref.)	3,02 (Ref.)	2,83 (Ref.)	2,85 (Ref.)	3,07 (Ref.)	2,83 (Ref.)	2,87 (Ref.)	2,83 (Ref.)	3,76 (Ref.)
Primary Suspension gaps [mm]	Fig. 6	0,3 Máx.	0,3 Máx.	0,3 Máx.	0,3 Máx.	0,3 Máx.	0,3 Máx.	0,3 Máx.	0,3 Máx.	0,3 Máx.	0,3 Máx.	0,3 Máx.	0,3 Máx.
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	1106 ⁺¹⁰ ₋₁₀
Boiler height [mm]	Fig. 7	850 ⁺⁵ ₋₇	850 ⁺⁵ ₋₇	850 ⁺⁵ ₋₇	850 ⁺⁵ ₋₇	850 ⁺⁵ ₋₇	850 ⁺⁵ ₋₇	850 ⁺⁵ ₋₇	850 ⁺⁵ ₋₇	850 ⁺⁵ ₋₇	850 ⁺⁵ ₋₇	850 ⁺⁵ ₋₇	850 ⁺⁵ ₋₇
Coupling End height [mm]	Fig. 8	895 (Ref.)	760 (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 ⁺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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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

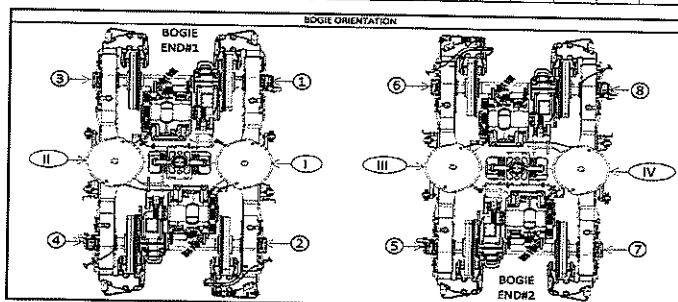
Jn Pivot Lateral stop gaps difference

Item	Reference [mm]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
A'n	N/A	A'i 235	A'lt 230	A'lii 240	A'liv 241
An	254 to 261	Ai 255	Alt 255	Aii 255	Aiv 256
Bn = An - A'n	N/A	Bi 20	Blt 25	Bii 15	Biv 15
En	1105 ±10 mm	Ei 1100	Elt 1109	Eii 1108	Eiv 1108
Item	Reference [bar]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
Cn	Table 02 (*)	Ci 3.57	Clt 3.56	Cii 2.89	Civ 2.83
Cn - Ci	Difference ≤ 0,3	Ci - Cii 0.01	Clt - Cii 0.06	Cii - Cii	Civ - Cii
Gauge serial number	N/A	91B05873	91B05873	91B05873	91B05873
Item	Reference [mm]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
Dn	Table 01 (*)	D1 41.82	D2 42.64	D3 43.20	D4 43.53
		D5 43.46	D6 41.91	D7 42.58	D8 43.72
Kn	25 to 45	Ki 32.56	Klt 32.92	Kii 32.92	Kiv 32.92
Jn=J1-J2+1	Difference ≤ 4	Ji 25.50	Jlt 26.91	Jii 24.54	Jiv 26.95

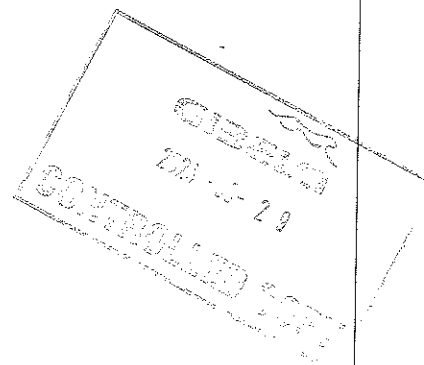
(*) Reference, only include values, isn't approval criteria.

Table 01 D Theoretical Values	TC1		M4		M1		M2		M3		TC2	
	Tbex	TBin	Mb1	Mb1	Mb1	Mb2	Mb2	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	Mb2	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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 NOV-17-19
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TRAIN SET 232	REF: GIB0000001672_JO PRASA WEIGHT BALANCE EN
	PC09 WEIGHING REPORT

TC2	Balance across front and rear bogies	Front Bogie [Tons]	Rear Bogie [Tons]	Longitudinal Imbalance [%]	Criteria Longitudinal Imbalance ≤ 10%
		18.49	15.61	8.45%	PASS
	Weight Measured vs Predicted	Weight Measured [Tons]	Weight Predicted [Tons]	Weight Difference [%]	Tolerance [%]
		34.10	34.42	0.94%	1.62% PASS

Participant			
Name	Company	Department	Date
Thabo Masi	Gibela	EOC	29/06/24