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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	X					1	PRA.FT1140.05	YES
☐ DTR3-PROCE-17	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	1	1	1	1	1	1	PRA.FT1140.05	YES
☐ DTR3-PROCE-17	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	1	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
TS 211	TC1	P. Sesa	29/07/24	**SI.FT1140.52**	01/08

SELF INSPECTION INDUSTRIAL QUALITY

Rev:09	Projet: PRASA	SI.FT1140.52
Date: 2022/05/31		

Car:

NCR:

Work Station: FT1140

Safety Related

I - Document and Instrument Control

I.1 - Documents control

Document	TC1	M1	M2	M3	M4	TC2	Revision	Remark	OK	NOK	Signature/Date
PRA.FT1140.04	X										
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	NOK	Signature/Date
Measuring tape	GIBTA 0276	26/10/23-26/10/24	✓		
Vernier Calliper	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	19/12/23-19/12/24	✓		
Torque Wrench 320 N.m	A96500027	21/12/23-21/12/24	✓		
Torque Wrench 530 N.m	A9630053	21/12/23-21/12/24	✓		

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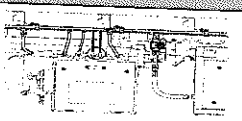
II - Self Inspection - Items to Check

II.1 - Items to Check

Item	Picture/Sketch	Description	Criteria/Record	OK	NOK	N/A	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		✓			29/02/24
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): 9,96 bar Final pressure (FP): 9,929 bar FP - IP = 0,031 bar APPROVAL CRITERIA: After 5 minutes the pressure cannot drops more than 0,2 bar	✓			29/02/24
03		Movement performed at least 50m to shudder the car. And position on the leveled load cell, with wheels on the center.		✓			29/02/24
04		Measurement inspection was done with car on condition AW0 and the rail levelled. (The load cells system must be levelled and calibrated)	Calibration Validation Date 19/12/2023	✓			29/02/24
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)	EQUIPMENT DESCRIPTION / WEIGHT (kg) Driver Seat 60 Wiper motor + Wiper blade 10	✓			29/02/24
06		The pressure difference between air spring on each bogie when raise the pressure was maintened < 0,3 bar.		✓			29/02/24
07		Measuremet recorded with empty suspention and loaded are on conformity with tolerances of the project.		✓			29/02/24
08		All levelling measurements are according to the reference. (Values out of reference must be recorded on "Description of defects")		✓			29/02/24

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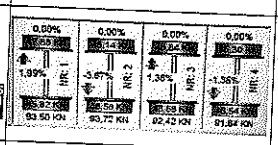
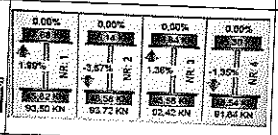
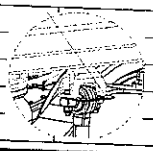
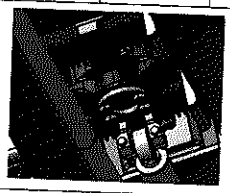
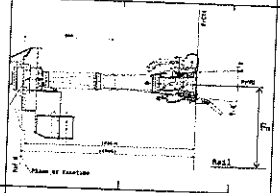
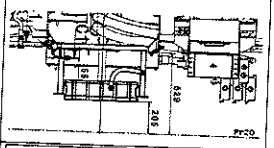
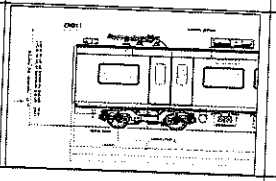
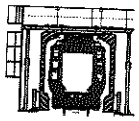
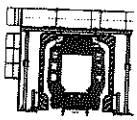
SELF INSPECTION INDUSTRIAL QUALITY

Rev:09	Projet: PRASA	SI.FT1140.52
Date: 2022/05/31		

Item	Picture/Sketch	Description	Criteria/Record	OK			Signature/Date
09		Check that the levelling rods are torqued and have torque marker.		✓			29/02/24
10		The difference of weight between the left and right wheels of each axis, must be ≤ 4%. (Verify on the T&C equipment if all arrows are in green).		✓			29/02/2024
11		Remove the car, move back onto the load cells and repeat the step 09. Confirm if both are in the tolerance of ≤ 4%.		✓			29/02/2024
12		1 - Record shims thicknes used on rod. 2 - All screws were torqued and have torque marker.	THICKNESS (mm) I 8 II 8 III 8 IV 0	✓			29/02/24
13		Pivot fixation	1- M20 x 90 screws with application of torque according to PRA.FT1140.04 / 05	✓			29/02/24
14		FOR TC CARS F= Height of the center of Automatic coupler F = 895mm (+5 / -10mm) (Using levelled rail)	TC CAB #1= 896 mm	✓			29/02/24
15		FOR TC CARS Height of Eurobalise Antenna = 205mm(+/-10mm) (Using levelled rail)	TC CAB #1= 176 mm	✓			29/02/24
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	✓			29/02/24

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

END#1

DESCRIPTION	TOLERANCE		LEFT SIDE 6	5	4	3	2	1	RIGHT SIDE 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		255	256	255	255	251	249	256	253	256	256		AI
FLOOR COVERING HEIGHT	min 1096 max 1116	EII		1102	1105	1103	1101	1096	1102	1109	1109	1109	1100		EI
AIR SPRING PRESSURE	≤ 0.3 (CI - CI)	CII		3,62	3,56	3,60	3,58	3,58	3,48	3,58	3,54	3,60	3,55		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 (JII - JI)	JII													JI
QTY OF TURNS OF LEVELLING ROD	N/A	XII			0	0	0	1/4	2 1/4	0	1/4	0			XI
SHIMS OF ANTI-ROLL BAR	N/A	YII													YI

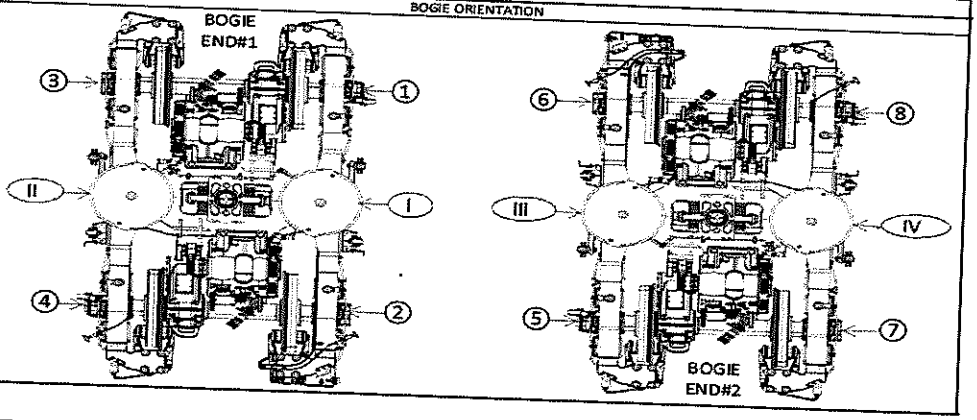
DESCRIPTION	TOLERANCE		6	5	4	3	2	1	1	2	3	4	5	6	
AIR SPRING HEIGHT (EMPTY)	N/A	A`III													A`IV
AIR SPRING HEIGHT (FULL)	min 254 max 261	AIII		256	256	253	250	251	249	250	251	254	255		AIV
FLOOR COVERING HEIGHT	min 1096 max 1116	EIII		1110	1109	1106	1100	1102	1104	1105	1105	1109	1110		EIV
AIR SPRING PRESSURE	≤ 0.3 (CIV - CIII)	CIII		2,86	2,90	2,83	2,83	2,78	2,81	2,75	2,86	2,77	2,83		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 (JIV - JIII)	JIII													JIV
QTY OF TURNS OF LEVELLING ROD	N/A	XIII			0	1/4	1/4	1/4	2 1/4	1/4	1/4	1/2			XIV
SHIMS OF ANTI-ROLL BAR	N/A	YIII													YIV

LEFT SIDE — END#2 — RIGHT SIDE

COMPARE EACH TENTATIVE WITH THE TOLERANCE AND IDENTIFY EACH MEASURE AS BELOW		
GOOD	LOWER	HIGHER
✓	↓	↑

WEIGHT COMPENSATION	
EQUIPMENT	
WEIGHT	
EQUIPMENT	
WEIGHT	
SECUNDARY MEASUREMENTS (ONLY TC CARS)	
AUTOMATIC COUPLER HEIGHT	
ANTENNA HEIGHT	

BOGIE ORIENTATION



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Rev:09			
Date: 2022/05/31	Projet: PRASA	SI.FT1140.52	

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

DESCRIPTION	TOLERANCE		LEFT SIDE 6	5	4	3	2	1	END#1	1	2	3	4	5	6	RIGHT SIDE	
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 (CII - CI)	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 (JII - JI)	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 (CIV - CIII)	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 (JIV - JIII)	JIII															JIV
QTY OF TURNS OF LEVELLING ROD	N/A	XIII															XIV
SHIMS OF ANTI-ROLL BAR	N/A	YIII															YIV
			LEFT SIDE						END#2							RIGHT SIDE	

COMPARE EACH TENTATIVE WITH THE TOLERANCE AND IDENTIFY EACH MEASURE AS BELOW		
GOOD	LOWER	HIGHER
✓	↓	↑

WEIGHT COMPENSATION	
EQUIPMENT	
WEIGHT	
EQUIPMENT	
WEIGHT	
SECUNDARY MEASUREMENTS (ONLY TC CARS)	
AUTOMATIC COUPLER HEIGHT	
ANTENNA HEIGHT	

BOGIE ORIENTATION

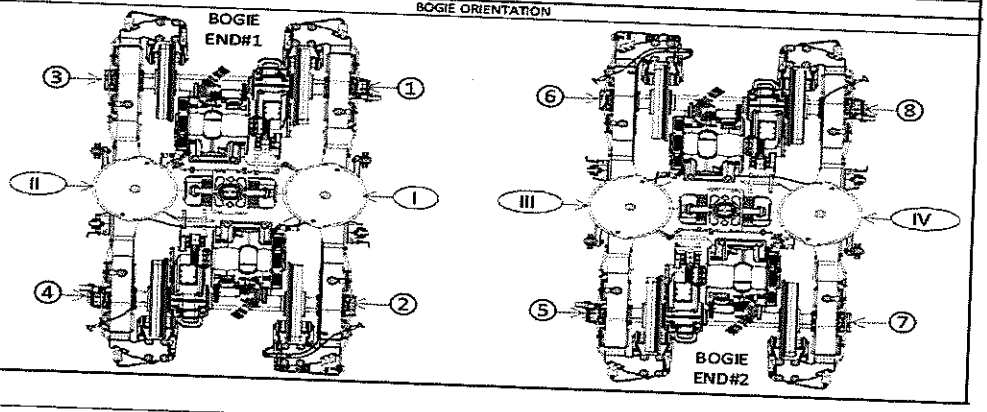

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Table 1 - Reference Values and Measurement Tolerances for the Car Levelling.

ITEM			THEORETICAL VALUES													
			TC1 CAR		M4 CAR		M1 CAR		M2 CAR		M3 CAR		TC2 CAR			
			TBext	TBint	MB1	MB1	MB1	MB2	MB2	MB1	MB1	MB1	TBint	TBext		
Pivot lateral stop gaps difference [mm]	$Jn-Jn+1$ (i ≠ n)	Fig. 4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4		
Air Spring height (mm)	A_n (i ≠ n)	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 AW0 [Bar]	$C_{n\,(i \neq n)}$	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.)	3,76 (Ref.)		
	$C_1 - C_8$		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.		
	$C_{ij} - C_{ij}$															
Primary Suspension gaps [mm]	$D_{1i}\ D_5$	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}		
	$D_{2i}\ D_6$															
	$D_{3i}\ D_7$															
	$D_{4i}\ D_8$															
Carbody Floor height [mm]	$E_{n\,(i \neq n)}$	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}		
Bolster height [mm]	$N_{n\,(i \neq n)}$	Fig. 7	850^{+3}_{-7}	850^{+3}_{-7}	850^{+3}_{-7}	850^{+3}_{-7}	850^{+3}_{-7}	850^{+3}_{-7}	850^{+3}_{-7}	850^{+3}_{-7}	850^{+3}_{-7}	850^{+3}_{-7}	850^{+3}_{-7}	850^{+3}_{-7}		
Coupling End height [mm]	F_1	Fig. 8	895 (Ref.)		760 (Ref.)		760 (Ref.)		760 (Ref.)		760 (Ref.)		895 (Ref.)			
	F_2	Fig. 9	760 (Ref.)		760 (Ref.)		760 (Ref.)		760 (Ref.)		760 (Ref.)		760 (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}		

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

References for secondary suspention empty
A`n Air spring height empty

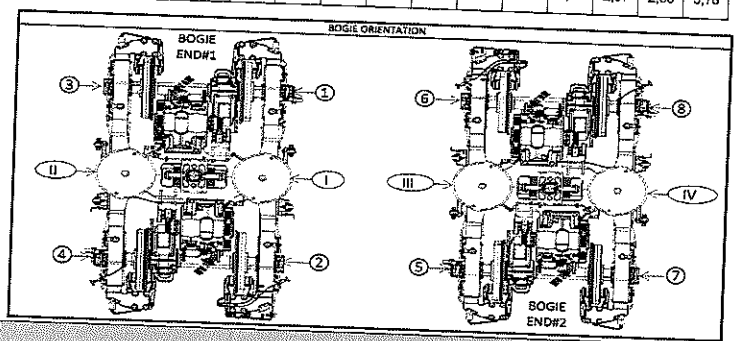
References for secondary suspention full
- **An** Air spring height
- **Bn** Difference between measurement A'n and An
- **En** Floor covering height
- **Cn** Air spring pressure
- **Dn** Primary suspention
- **Kn** Pivot Vertical gap
- **Jn** Pivot Lateral stop gaps difference

Item	Reference [mm]	END#1				END#2			
		Right Side		Left Side		Left Side		Right Side	
A'n	N/A	A'_I	235	A'_{II}	236	A'_{III}	243	A'_{IV}	241
An	254 to 261	A_I	256	A_{II}	255	A_{III}	257	A_{IV}	257
Bn = An - A'n	N/A	B_I	21	B_{II}	19	B_{III}	14	B_{IV}	16
En	1106 ±10 mm	E_I	1109	E_{II}	1104	E_{III}	1108	E_{IV}	1114
Item	Reference [bar]	END#1				END#2			
		Right Side		Left Side		Left Side		Right Side	
Cn	Table 02 (*)	C_I	3.52	C_{II}	3.61	C_{III}	2.86	C_{IV}	2.83
Cn - Cn+1	Diference ≤ 0,3	$C_I - C_{II}$	0,09			$C_{III} - C_{IV}$	0,03		
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 (*)	D_1	43.50	D_3	43.49	D_5	45.33	D_8	46.22
		D_2	44.30	D_4	43.13	D_5	45.22	D_7	45.69
Kn	25 to 45	K_I	32.63			K_{II}	32.02		
Jn	Diference ≤ 4	J_I	26.18	J_{II}	24.65	J_{III}	24.92	J_{IV}	27.26

(*) Reference, only include values, isn`t approval criteria.

Table 01 D Theorethical 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 Theorethical 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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SELF INSPECTION INDUSTRIAL QUALITY

Rev:09	Projet: PRASA	SI.FT1140.52
Date: 2022/05/31		

Item	Description of defect			Signature/Date

IL2 - Check List REX

Check List Items

Item	Picture/Drawing	Description/ Discription	Criteria /Record	OK			Signature/Date
01	N/A	To complete REX	Refer to REX. New defects must be added on the REX	✓			29/04/24

Self Inspection - Final Result

		Is the car good to advance to the next workstation/process? (Approval of Operations Manager/Team Leader and Industrial Quality)	DATE	NAME	SIGNATURE
HOLD POINT		GO: If activities are not complete, the missing activities must not impact the next stage!	29/02/24	Operations Manager	
		GO: Every auto inspection performed conforms to specification or in case of discrepancy the same is approved by the competent party.	29/02/24	Industrial Quality	
		There are activities pendings that impact/stop the activities of the next process Obs: (To describe problems below)		Operations Manager	
		There are non-conformities impact the quality of the product and there is no corrective action defined yet)		Industrial Quality	

In case of "NO GO", describe blocking problems

In case of "NO GO", the operations manager must define below action plan to ensure "GO":

Item	Description	Action	Responsible		Status

Operations Manager / Team Leader

Quality Manager / Team Leader

GIBELO
2024 -02- 29
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GIBELA

Gibela Rail Transport Consortium RF (Pty) Ltd
2 Shosholoza Avenue
Dunnottar X7
Ekurhuleni, 1590, South Africa
Reception: +27 (0)10 600 0651

TRAIN SET 211	REF: GIB0000001672_J0 PRASA WEIGHT BALANCE EN
	PC09 WEIGHING REPORT

TC1	Balance across front and rear bogies	Front Bogie [Tons]	Rear Bogie [Tons]	Longitudinal Imbalance [%]	Criteria Longitudinal Imbalance ≤ 10%	
		18.60	15.62	8.71%	PASS	
	Weight Mesured vs Predicted	Weight Mesured [Tons]	Weight Predicted [Tons]	Weight Difference [%]	Tolerance [%]	Criteria Min≤Diff≤Max
		34.22	34.42	0.59%	1.62%	PASS

Test Participants

Name	Company	Department	Signature	Date
F/W8 [signature]	Gibela	EOS	[signature]	29/02/2024