



PRASA PROJECT


SELF INSPECTION SHEET

CONFIDENTIAL INFORMATION



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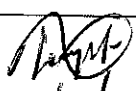








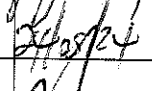

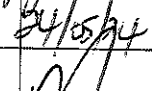


APPLICATION REFERENCE



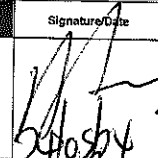
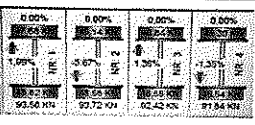
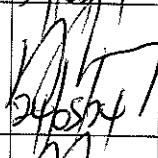
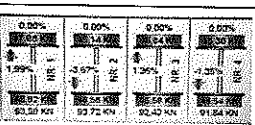
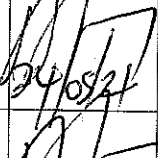
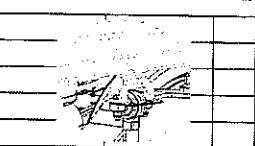




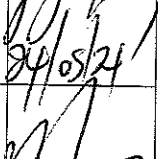
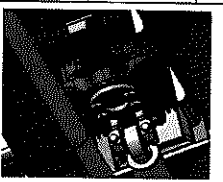
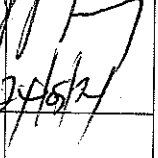
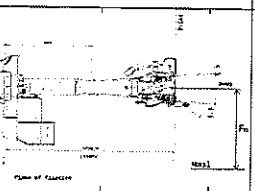
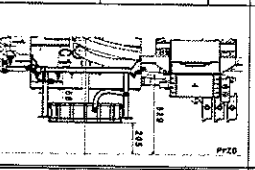
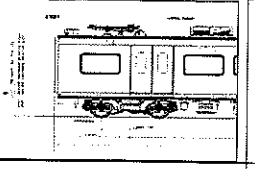
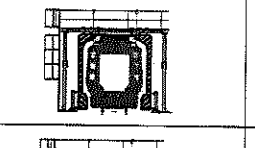
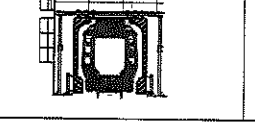

MOUNTING	DESCRIPTION	STATION	CAR TYPE						WORK INSTRUCTION	SAFETY ? 
			TC1	M4	M1	M2	M3	TC2		
<input type="checkbox"/>	DTR3-PROCE-14	LEVELLING, WEIGHTING AND BALANCING M CAR	FT1140	<input checked="" type="checkbox"/>	1	1	1		PRA.FT1140.04	YES
<input type="checkbox"/>	DTR3-PROCE-14	LEVELLING, WEIGHTING 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"/>										
<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 225	M4	Matimba	23/05/24	SI.FT1140.52	01/08

	SELF INSPECTION INDUSTRIAL QUALITY		Rev:09	Projet: PRASA	SI.FT1140.52						
			Date: 5/31/2022								
Car:	NCR:		Work Station FT1140								
 Safety Related											
1 - Document and Instrument Control											
I.1 - Documents control											
Document	TC1	M1	M2	M3	M4	TC2	Revision	Remark	OK	Signature/Date	
PRA.FT1140.04					X				✓	M 24/05/24	
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		26/10/23-26/10/24		✓						
Vernier Caliper	GIBUR 0056		06/06/23-06/06/24		✓	24/05/24					
Torque wrench 35 Nm	D2S11023		19/12/23-19/12/24		✓						
Torque wrench 150 Nm	D2S.622009		19/12/23-19/12/24		✓						
Torque wrench 320 Nm	A9650027		21/12/23-21/12/24		✓	M					

	<h1>SELF INSPECTION INDUSTRIAL QUALITY</h1>		Rev:09	Project: PRASA	SI.FT1140.52								
			Date: 5/31/2022										
II - Self Inspection - Items to Check													
II.1 - Items to Check													
Item	Picture/Sketch	Description	Criteria/Record	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		✓	 24/05/24								
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): 1000 bar Final pressure (FP): 996 bar FP - IP = 204 bar APPROVAL CRITERIA: After 5 minutes the pressure cannot drops more than 0,2 bar	✓	 24/05/24								
03		Movement performed at least 50m to shudder the car. And position on the leveled load cell, with wheels on the center.		✓	 24/05/24								
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	✓	 24/05/24								
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"> <thead> <tr> <th>EQUIPMENT DESCRIPTION</th> <th>WEIGHT (kg)</th> </tr> </thead> <tbody> <tr> <td>garguery</td> <td>360</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	EQUIPMENT DESCRIPTION	WEIGHT (kg)	garguery	360					✓	 24/05/24
EQUIPMENT DESCRIPTION	WEIGHT (kg)												
garguery	360												
06		The pressure difference between air spring on each bogie when raise the pressure was maintained < 0,3 bar.		✓	 24/05/24								
07		Measurement recorded with empty suspension and loaded are on conformity with tolerances of the project.		✓	 24/05/24								
08		All levelling measurements are according to the reference. (Values out of reference must be recorded on "Description of defects")		✓	 24/05/24								

		<h1>SELF INSPECTION INDUSTRIAL QUALITY</h1>		Rev:09 Date: 5/31/2022	Project: PRASA	SI.FT1140.52
Item	Picture/Sketch	Description	Criteria/Record	OK	NG	Signature/Date
09		Check that the leveling rods are torqued and have torque marker.		L		 24/05/24
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).		L		 24/05/24
11		Remove the car, move back onto the load cells and repeat the step 09. Confirm if both are in the tolerance of $\leq 4\%$.		L		 24/05/24
12		1 - Record shims thickness used on rod. 2 - All screws were torqued and have torque marker.	THICKNESS (mm) I  II  III  IV 	L		 24/05/24
13		Pivot fixation	1- M20 x 60 screws with application of torque according to PRA.FT1140.04 / 05	L		 24/05/24
14		FOR TC CARS F= Height of the center of Automatic coupler F = 895mm (+5 / -10mm) (Using levelled rail)	TC CAB #1= _____ mm			H/A
15		FOR TC CARS Height of Eurobalise Antenna = 205mm(+/-10mm) (Using levelled rail)	TC CAB #1= _____ mm			H/A
16		Check pantograph piping air tightness. Test performance according to VVI 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)			H/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			H/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	L		 24/05/24



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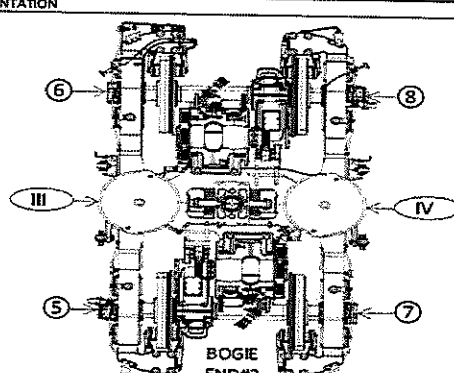
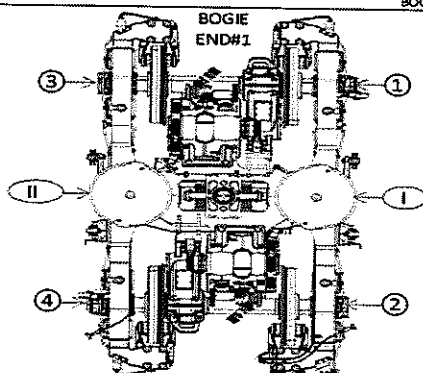
Projet:
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SI.FT1140.52

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

DESCRIPTION	TOLERANCE	END#1												END#2											
		LEFT SIDE						RIGHT SIDE						LEFT SIDE						RIGHT SIDE					
AIR SPRING HEIGHT (EMPTY)	N/A	A ₁₁												A ₁₁											A ₁₁
AIR SPRING HEIGHT (FULL)	min 254 max 261	A ₁₂				259	260	267		259	250	255		A ₁₂											A ₁₂
FLOOR COVERING HEIGHT	min 1096 max 1116	E ₁₁												E ₁₁											E ₁₁
AIR SPRING PRESSURE	≤ 0.3 (Ci - Ci)	C ₁₁				2,79	2,99	3,22		2,36	2,61	2,69		C ₁₁											C ₁₁
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₃												D ₃											D ₃
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₄												D ₄											D ₄
PIVOT VERTICAL GAP	min 25 max 32	K ₁₁												K ₁₁											K ₁₁
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (Ji - Ji)	J ₁₁												J ₁₁											J ₁₁
QTY OF TURNS OF LEVELLING ROD	N/A	X ₁₁												X ₁₁											X ₁₁
SHIMS OF ANTI-ROLL BAR	N/A	Y ₁₁												Y ₁₁											Y ₁₁
AIR SPRING HEIGHT (EMPTY)	N/A	A ₁₃												A ₁₃											A ₁₃
AIR SPRING HEIGHT (FULL)	min 254 max 261	A ₁₄				256	257	245		257	258	258		A ₁₄											A ₁₄
FLOOR COVERING HEIGHT	min 1096 max 1116	E ₁₃												E ₁₃											E ₁₃
AIR SPRING PRESSURE	≤ 0.3 (Qv - Qv)	C ₁₃				2,67	2,63	2,27		3,11	2,86	2,80		C ₁₃											C ₁₃
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₅												D ₅											D ₅
PRIMARY SUSPENSION	SEE TABLE (ONLY REF)	D ₆												D ₆											D ₆
PIVOT VERTICAL GAP	min 25 max 32	K ₁₃												K ₁₃											K ₁₃
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (Jiv - Jiv)	J ₁₃												J ₁₃											J ₁₃
QTY OF TURNS OF LEVELLING ROD	N/A	X ₁₃												X ₁₃											X ₁₃
SHIMS OF ANTI-ROLL BAR	N/A	Y ₁₃												Y ₁₃											Y ₁₃

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 CARE)		
AUTOMATIC COUPLER HEIGHT		
ANTENNA HEIGHT		





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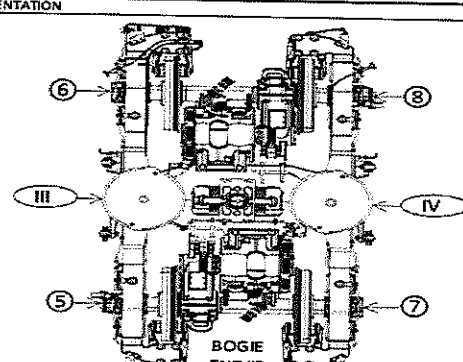
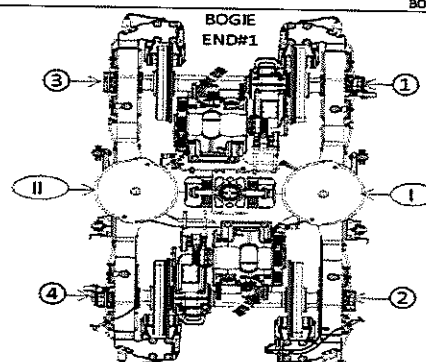
SI.FT1140.52

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

		END#1												
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 _I - Q _J)	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 (J _{II} - J _I)	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
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 ₈)	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 _{IV} - J _{III})	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		





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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	MB2	MB1	MB2	MB1	MB2	MB1	MB2	TBext	TBint
Pivot lateral stop gap difference [mm]	Fig. 4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4
		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 height [mm]	Fig. 5												
Air spring pressure at AWD [Bar]	Fig. 5	3,76	2,82	2,83	2,91	3,02	3,07	2,85	2,83	2,87	2,83	2,83	3,76
		[Ref.]	[Ref.]	[Ref.]	[Ref.]	[Ref.]	[Ref.]	[Ref.]	[Ref.]	[Ref.]	[Ref.]	[Ref.]	[Ref.]
		0,3 Mdx.	0,3 Mdx.	0,3 Mdx.	0,3 Mdx.	0,3 Mdx.	0,3 Mdx.	0,3 Mdx.	0,3 Mdx.	0,3 Mdx.	0,3 Mdx.	0,3 Mdx.	0,3 Mdx.
Primary Suspension gaps [mm]	Fig. 6	35	35	35	35	35	35	35	35	35	35	35	35
		D3; D5	D3; D6	D3; D6	D3; D7	D3; D7	D3; D7	D3; D7	D3; D7	D3; D7	D3; D7	D3; D7	D3; D7
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 ⁺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]	Fig. 8	895	760	760	760	760	760	760	760	760	760	895	
	Fig. 9	760	760	760	760	760	760	760	760	760	760	760	
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	



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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

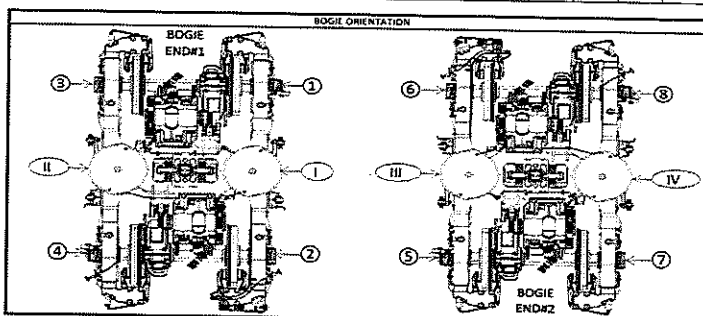
A'n Air spring height
B'n Difference between measurement A'n and An
En Floor covering height
Cn Air spring pressure
Dn Primary suspension
Kn Pivot Vertical gap
Jn Pivot Lateral stop gaps difference

Item	Reference [mm]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
A'n	N/A	A'i 241	A'ii 242	A'iii 242	A'iv 241
An	254 to 261	AI 258	AII 258	AIII 256	AIV 258
Bn = An - A'n	N/A	BI 17	BII 16	BIII 14	BIV 17
En	1106 ±10 mm	Ei 1108	Eii 1109	Eiii 1110	Eiv 1111
Item	Reference [bar]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
Cn	Table 02 (*)	CI 2,70	CII 2,77	CIII 2,70	CIV 2,77
Cn - Cn+1	Difference ≤ 0,3	CI - CII 0,07		CIII - CIV 0,07	
Gauge serial number	N/A	G1B05873	G1B05873	G1B05873	G1B05873
Item	Reference [mm]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
Dn	Table 01 (*)	D1 45,32	D2 45,52	D3 45,94	D4 44,60
		D2 46,61	D4 44,44	D5 45,49	D7 45,74
Kn	25 to 45	KI 36,16		KII 36,09	
Jn	Difference ≤ 4	Ji 24,64	Jii 26,32	Jiii 25,77	Jiv 25,35

(*) 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)

[illegible]



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TRAIN SET 224	PC09 WEIGHING REPORT
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M4	Balance across front and rear bogies	Front Bogie [Tons]	Rear Bogie [Tons]	Longitudinal Imbalance [%]	Criteria Longitudinal Imbalance $\leq 3\%$
		17.73	17.82	0.25%	PASS
	Weight Measured vs Predicted	Weight Measured [Tons]	Weight Predicted [Tons]	Weight Difference [%]	Tolerance [%]
		35.55	35.95	1.11%	1.36% Criteria Min:Diff:Max PASS

Test Participants			
Name	Company	Department	Date
Thato Muka	Gibela	EOC	24/05/24