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2024-03-28

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PRASA PROJECT




SELF INSPECTION SHEET

CONFIDENTIAL INFORMATION



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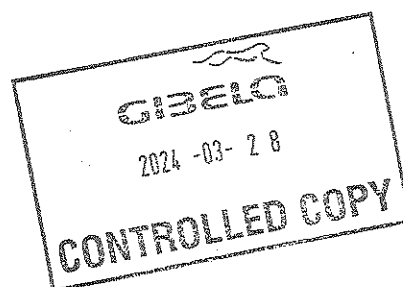
APPLICATION REFERENCE



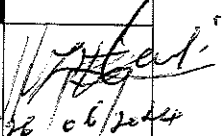
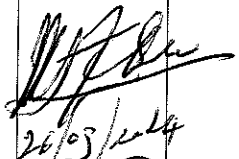

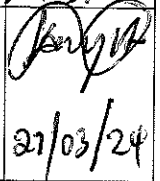

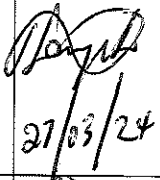

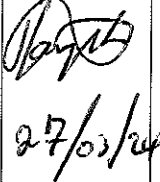

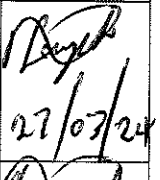

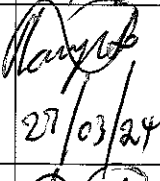

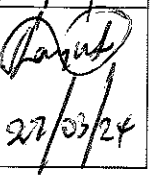
MOUNTING	DESCRIPTION	STATION	CAR TYPE						WORK INSTRUCTION	SAFETY ? 
			TC1	M4	M1	M2	M3	TC2		
<input type="checkbox"/>	DTR3-PROCE-14	LEVELLING, WEIGHTING AND BALANCING M CAR	FT1140	1	1	✓	1		PRA.FT1140.04	YES
<input type="checkbox"/>	DTR3-PROCE-14	LEVELLING, WEIGHTING AND BALANCING TC CAR	FT1140	1		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

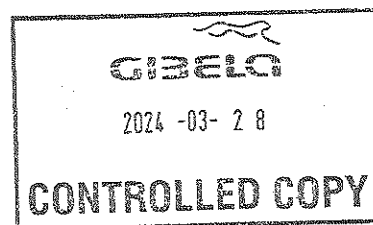
REV	DATE	MODIFICATION CONTENT	RESPONSIBLE	NAME	DATE
7	2/11/2020	UPDATE OF AIR TIGHTNESS TEST TIME FROM 4 MIN TO 5 MIN. ADD PANTOGRAPH AIR TIGHTNESS.	APPROVER	GIVEN SILOWA	2/11/2020
			CHECKER	SIMON MOKOENA	2/11/2020
			COMPILER	COMFORT MALATJI	2/11/2020
8	9/13/2021	ADDING GAUGE MEASUREMENT CHECK ON THE 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 216	M2	Andrew	27/03/24	SI.FT1140.52	01/08

	<h1 style="margin: 0;">SELF INSPECTION INDUSTRIAL QUALITY</h1>										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	Remark							Signature/Date	
PRA.FT1140.04																
PRA.FT1140.05			✓											✓		27/03/24
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									Signature/Date	
Measuring Tape	GIBTA 0276					24/10/23 - 24/10/24					✓				27/03/24	
Vernier Caliper	GIBVR 0056					06/06/23 - 06/06/24					✓				27/03/24	
Torque Wrench 320 N.m	A9680053					21/12/23 - 21/12/24					✓				27/03/24	
Torque Wrench 150 N.m	D28622008					19/12/23 - 19/12/24					✓				27/03/24	
Torque Wrench 35 N.m	D2S11023					19/12/23 - 19/12/24					✓				27/03/24	



	<h1 style="text-align: center;">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		✓	 26/03/24								
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): 10.0 bar Final pressure (FP): 9.51 bar FP - IP = 0.49 bar APPROVAL CRITERIA: After 5 minutes the pressure cannot drops more than 0,2 bar	✓	 26/03/24								
03		Movement performed at least 50m to shudder the car. And position on the leveled load cell, with wheels on the center.		✓	 27/03/24								
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 19/12/23	✓	 27/03/24								
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>GANGWAY</td> <td>360</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	EQUIPMENT DESCRIPTION	WEIGHT (kg)	GANGWAY	360					✓	 27/03/24
EQUIPMENT DESCRIPTION	WEIGHT (kg)												
GANGWAY	360												
06		The pressure difference between air spring on each bogie when raise the pressure was maintained < 0,3 bar.		✓	 27/03/24								
07		Measurement recorded with empty suspension and loaded are on conformity with tolerances of the project.		✓	 27/03/24								
08		All levelling measurements are according to the reference. (Values out of reference must be recorded on "Description of defects")		✓	 27/03/24								



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SELF INSPECTION
INDUSTRIAL QUALITY

Item	Picture/Sketch	Description	Criteria/Record	✓	✗	Signature/Date
09		Check that the leveling rods are torqued and have torque marker.		✓		<i>Rogers</i> 27/03/24
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).		✓		<i>Rogers</i> 27/03/24
11		Remove the car, move back onto the load cells and repeat the step 09. Confirm if both are in the tolerance of $\leq 4\%$.		✓		<i>Rogers</i> 27/03/24
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	✓		<i>Rogers</i> 27/03/24
13		Pivot fixation	1- M20 x 90 screws with application of torque according to PRA.FT1140.04 / 05	✓		<i>Rogers</i> 27/03/24
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 Eurobalise 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 trimming)	✓		<i>Rogers</i> 27/03/24
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	✓		<i>Rogers</i> 27/03/24
18		Car does not come into contact with the gauge.	No Contact with Car and Gauge -GO Contact with Car and Gauge - NO GO	✓		<i>Rogers</i> 27/03/24



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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 ₁₁											A ₁
AIR SPRING HEIGHT (FULL)	min 254 max 261	A ₁₁			254	259	256	262	265	257			A ₁
FLOOR COVERING HEIGHT	min 1096 max 1116	E ₁₁											E ₁
AIR SPRING PRESSURE	≤ 0.3 (Q ₁ - Q ₁)	C ₁₁				3.123	0.02	2.91	2.84				C ₁
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 ₁₁											K ₁
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (J ₁ - J ₁)	J ₁₁											J ₁
QTY OF TURNS OF LEVELLING ROD	N/A	X ₁₁						1					X ₁
SHIMS OF ANTI-ROLL BAR	N/A	Y ₁₁											Y ₁
AIR SPRING HEIGHT (EMPTY)	N/A	A ₁₁₁											A ₁₁₁
AIR SPRING HEIGHT (FULL)	min 254 max 261	A ₁₁₁			256	255	261	258	258	255			A ₁₁₁
FLOOR COVERING HEIGHT	min 1096 max 1116	E ₁₁₁											E ₁₁₁
AIR SPRING PRESSURE	≤ 0.3 (Q ₁₁ - Q ₁₁)	C ₁₁₁				2.70	2.83	2.79	2.88				C ₁₁₁
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 ₁₁₁											K ₁₁₁
PIVOT LATERAL STOP GAPS DIFFERENCE	≤ 4 (J ₁₁ - J ₁₁)	J ₁₁₁											J ₁₁₁
QTY OF TURNS OF LEVELLING ROD	N/A	X ₁₁₁					1/2						X ₁₁₁
SHIMS OF ANTI-ROLL BAR	N/A	Y ₁₁₁											Y ₁₁₁

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

GOOD LOWER HIGHER

✓ ↓ ↑

WEIGHT COMPENSATION

EQUIPMENT

WEIGHT

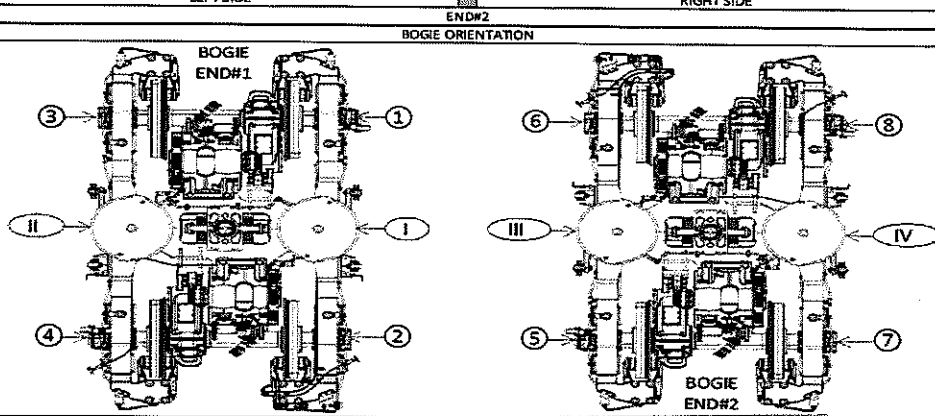
EQUIPMENT

WEIGHT

SECONDARY MEASUREMENTS (ONLY TO CARS)

AUTOMATIC COUPLER HEIGHT

ANTENNA HEIGHT



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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 (C ^{II} - C ^I)	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 ^I - J ^{II})	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 (C ^{IV} - C ^{III})	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 BELOWGOOD LOWER HIGHER
✓ ↓ ↑WEIGHT
COMPENSATION

EQUIPMENT

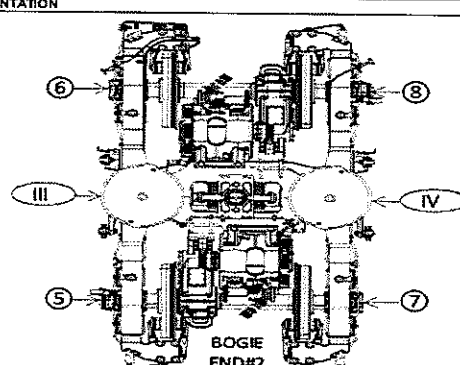
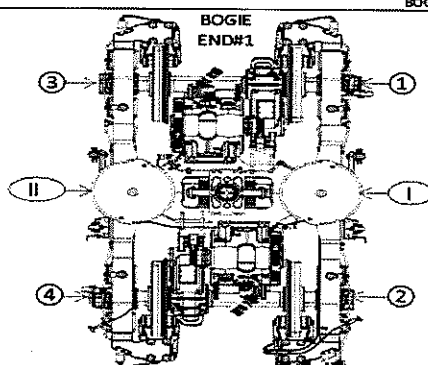
WEIGHT

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											
		TCL CAR		M4 CAR		M3 CAR		M2 CAR		M3 CAR		TCL CAR	
		Tbext	Tbint	MB1	MB2	MB1	MB2	MB2	MB2	MB1	MB1	Tbint	Tbext
		≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4	≤4
Pivot lateral stop gaps difference [mm]	Fig. 4	Jm-Jm1 (+/-)	255 ⁺⁶ ₋₄	255 ⁺⁶ ₋₄	255 ⁺⁶ ₋₄	255 ⁺⁶ ₋₄	255 ⁺⁶ ₋₄	255 ⁺⁶ ₋₄	255 ⁺⁶ ₋₄	255 ⁺⁶ ₋₄	255 ⁺⁶ ₋₄	255 ⁺⁶ ₋₄	255 ⁺⁶ ₋₄
Air Spring height [mm]	Fig. 5	A _n (+/-)	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.)	3,76 (Ref.)
Air spring pressure at AW0 [Bar]	Fig. 5	C ₁ -C ₁₁ C ₁₁ -C ₁₇	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	D ₁₁ D ₅ D ₁₁ D ₆ D ₁₁ D ₇ D ₁₁ D ₈	35 ⁺¹² ₋₄	35 ⁺¹² ₋₄	35 ⁺¹² ₋₄	35 ⁺¹² ₋₄	35 ⁺¹² ₋₄	35 ⁺¹² ₋₄	35 ⁺¹² ₋₄	35 ⁺¹² ₋₄	35 ⁺¹² ₋₄	35 ⁺¹² ₋₄	35 ⁺¹² ₋₄
Carbody floor height [mm]	Fig. 7	E ₁₁ (+/-)	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	N ₁ (+/-)	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]	Fig. 8 Fig. 9	F ₁ F ₂	895 (Ref.) 760 (Ref.)	760 (Ref.) 760 (Ref.)	760 (Ref.) 760 (Ref.)	760 (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.) 760 (Ref.)	895 (Ref.) 760 (Ref.)
Pivot Vertical gap [mm]	Fig. 10	K _n	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

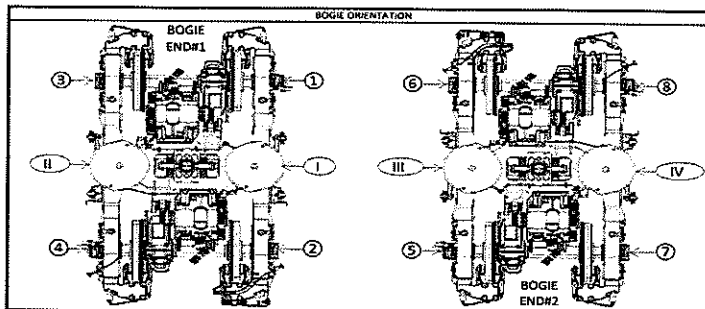
A'n Air spring height
B'n Difference between measurement A'n and A'n
E'n Floor covering height
C'n Air spring pressure
D'n Primary suspension
K'n Pivot Vertical gap
J'n Pivot Lateral stop gaps difference

Item	Reference [mm]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
A'n	N/A	A'i 243	A'j 237	A'iii 241	A'iv 241
An	254 to 261	Ai 260	Aii 256	Aiii 259	Aiv 256
Bn = An - A'n	N/A	Bi 17	Bii 19	Biii 18	Biv 15
En	1106 ±10 mm	Ei 1110	Eii 1112	Eiii 1110	Eiv 1110
Item	Reference [bar]	END#1		END#2	
		Right Side	Left Side	Left Side	Right Side
Cn	Table 02 (*)	Ci 2,95	Cii 2,94	Ciii 2,84	Civ 2,74
Cn - Cn+1	Difference ≤ 0,3	Ci - Cii 0,01		Ciii - Civ 0,1	
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 43,22	D3 44,28	D5 44,97	D8 46,97
		D2 44,03	D4 43,11	D6 45,35	D7 45,75
Kn	25 to 45	Ki 35,17		Kii 33,36	
Jn	Difference ≤ 4	Ji 24,15	Jii 25,80	Jiii 24,84	Jiv 26,08

(*) 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

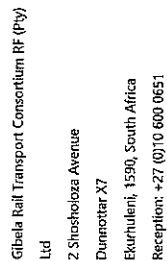
Table 02 C Theoretical Values	TC1		M4		M1		M2		M3		TC2	
	Tbex	Tbin	Mb1	Mb1	Mb1	Mb2	Mb2	Mb1	Mb1	Mb1	Tbin	Tbex
C=	3,76	2,82	2,87	2,83	3,02	2,91	3,07	2,85	2,83	2,87	2,83	3,76



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



[illegible]



	Balance across front and rear bogies	Front Bogie [Tons]	Rear Bogie [Tons]	Longitudinal Imbalance [%]	Criteria Longitudinal Imbalance ≤ 3%
M2		18.70	17.98	1.96%	PASS
	Weight Measured vs Predicted	Weight Measured [Tons]	Weight Predicted [Tons]	Weight Difference [%]	Criteria MinDiff/Max
		36.68	37.06	1.03%	1.37% PASS

[illegible]