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QM-C-8.1/Coupler/0015

INSPECTION PLAN (CHECK SHEET)

(M/s Wabtec Texmaco Rail Private Limited, F-192, Chawdhuri Para Road, Belgharia, Kolkata-700 056)

Item : Upgraded High Capacity Draft Gear, Mark-325

RDSO Specification No. : WD-71-BD-15 (REV.1)

1. Firm's Name
2. Date of Inspection
3. Contract Details
 - a. Contact No. and Date
 - b. Order Placing Authority
 - c. Quantity on Order
 - d. Quantity earlier supplied
 - e. Quantity offered for Inspection
 - f. Consignee
 - g. Delivery Period

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Signature of Inspecting Official of RDSO



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SUMMARY OF RESULTS

SN	Items Inspected	Observation
1	Metallurgical & Chemical properties of Housing	
	Visual & dimensions by Gauging (DG Housing)	
2	Metallurgical & Chemical properties of Spring Seat	
	Visual & dimensions by Gauging (Spring Seat)	
3	Metallurgical & Chemical properties of Centre Wedge	
	Visual & dimensions by Gauging Centre Wedge	
4	Metallurgical & Chemical properties of Wedge Shoe	
	Visual & dimensions by Gauging Wedge Shoe	
5	Metallurgical & Chemical properties of Tapered Stationary Plate	
	Visual & dimensions by Gauging Tapered Stationary Plate	
6	Metallurgical & Chemical properties of Outer Stationary Plate	
	Visual & dimensions by Gauging Outer Stationary Plate	
7	Metallurgical & Chemical properties of Moveable Plate	
	Visual & dimensions by Gauging Moveable Plate	
8	Metallurgical & Chemical properties of Shortening Pin	
	Visual & dimensions Shortening Pin	
9	Metallurgical & Chemical properties of Release Spring	
	Visual & dimensions Release Spring	
10	Metallurgical & Chemical properties of Outer Coil	
	Visual & dimensions by Gauging Outer Coil	
11	Metallurgical & Chemical properties of Inner Coil	
	Visual & dimensions of Inner Coil	
12	Draft Gear Assembly - Dimension by Gauging	
13	Tup Hammer Test	
14	Metallurgical & Chemical properties of Follower Casting	
	Visual & dimensions by Gauging Follower	
15	Painting on Draft Gear & Follower	

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INSPECTION CHECK SHEET

Inspection of Draft Gear Mark-325 and its components as per Approved QAP

Visual Inspection: 100%

Draft Gear - Mark-325

Sr.No.	Components	Drawing Number	Remarks of Inspecting Official
1	DG Housing	E-3178 Rev. B	
2	DG Spring Seat	E-3153 Rev.A	
3	Centre Wedge	E-3179 Rev.A	
4	Wedge Shoe	F-1499 Rev.A	
5	Tapped Stationary Plate	F-1501 Rev.A	
6	Outer Stationary Plate	H-880 Rev.A	
7	Moveable Plate	H-1196 Rev.A	
8	Shortening Pin	H-1180 Rev.A	
9	Release Spring	S-206 Rev.A	
10	Outer Coil	S-126-1 Rev.A	
11	Inner Coil	S-126-2 Rev.A	

1. Metallurgical & Chemical properties of Housing Casting:-

Heat No.										
Serial No.										

A. Chemical Analysis: Each Heat

Sr.No.	Parameter	Specified Value	Observed Value			
		Heat Number ----->				
1	%C	0.32 max				
2	%Mn	1.85 max				
3	%P	0.04 max				
4	%S	0.04 max				
5	%Si	1.50 max				

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B. Mechanical & Metallurgical Properties/NDT : Each Heat

Sr.No.	Parameter	Specified Value	Observed Value			
		Heat Number ----->				
1	UTS kSi Min.	115 kSi				
2	YS kSi Min.	95 kSi				
3	E% Min	14				
4	RA% Min.	30				
5	Impact Test	20 ft.lb @ 40F from keel block or 15ft.lb @ 40F from casting				

C. Visual & Dimensions by Gauging (DG Housing) : 2%

Sr.No.	Parameter	Gauge Number	Observation			
1	Visual Inspection					
2	Max Length go gauge	G-976-1				
3	Max width go gauge	G-976-2				
4	Min length no-go	G-976-3				
5	Min go & no-go for inside width	E-3154-4 & 4A				
6	Min go gauge for slot width	E-3154-5				
7	Min go gauge for slot width	E-3154-6				
8	Max no go & go for inside diameter	E-3154-8				
9	no go gauge for inside groove thickness	E-3154-9				
10	min go gauge for inside width	E-3154-10				

2. Metallurgical & Chemical properties of Spring Seat Casting:-

A. Chemical Analysis: Each Heat

H/No----->

Sr.No.	Parameter	Specified Value	Observed Value			
1	%C	0.32 max				
2	%Mn	1.85 max				
3	%P	0.04 max				
4	%S	0.04 max				
5	%Si	1.50 max				

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B. Mechanical & Metallurgical Properties/NDT : Each Heat

Sr.No.	Parameter	Specified Value	Observed Value			
1	UTS kSi Min.	115 kSi				
2	YS kSi Min.	95 kSi				
3	E% Min	14				
4	RA% Min.	30				

C. Visual & Dimensions by Gauging (DG Spring Seat) : 2%

Sr.No.	Parameter	Gauge Number	Observation			
1	Visual Inspection					
2	Max go gauge for dia	E-3155-1				
3	Max go gauge for dia inside hole	E-3155-2				
4	Max go gauge for length & width	E-3155-3				
5	Max go gauge for for taper profile outside	E-3155-4				
6	Max go & no-go gauge for thickness	E-3155-5				

3. Metallurgical & Chemical properties of Centre Wedge:-

A. Chemical Analysis: Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	%C	0.18-0.23				
2	%Mn	0.70-0.90				
3	%P	0.035 max.				
4	%S	0.040 max.				
5	%Si	0.15 - 0.30				

B. Mechanical & Metallurgical Properties/NDT : Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	Hardness	50-60 HRC				

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C. Visual & Dimensions by Gauging (DG Center Wedge) : 2%

Sr.No.	Parameter	Gauge Number	Observation			
1	Visual Inspection					
2	Max go gauge for outer length	E-3156-1				
3	Go gauge for dia of outside projection	E-3156-3				
4	Max go gauge for taper profile outside	E-3180-1				
5	Max go gauge for height inside	E-3180-2				
6	Max go gauge for width	E-3180-3				

4. Metallurgical & Chemical properties of Wedge Shoe:-

A. Chemical Analysis: Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	%C	0.48-0.53				
2	%Mn	0.75-1.00				
3	%P	0.035 max				
4	%S	0.040 max				
5	%Si	0.20-0.35				

B. Mechanical & Metallurgical Properties/NDT : Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	Hardness	429-495 BHN				

C. Visual & Dimensions by Gauging (DG Wedge Shoe) : 2%

Sr.No.	Parameter	Gauge Number	Observation			
1	Visual Inspection					
2	Max go gauge for outer profile	G-975				
3	Max no-go gauge and min go gauge for slot at bottom surface	E-2814-5				

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5. Metallurgical & Chemical properties of Tapped Stationary Plate:-

A. Chemical Analysis: Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	%C	0.48-0.53				
2	%Mn	0.75 - 1.00				
3	%P	0.035 max.				
4	%S	0.040 max.				
5	%Si	0.20 - 0.35				

B. Mechanical & Metallurgical Properties/NDT : Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	Hardness	429-495 BHN				

C. Visual & Dimensions by Gauging (DG Tapped Stationary Plate) : 2%

Sr.No.	Parameter	Gauge Number	Observation			
1	Visual Inspection					
2	Max go gauge for outer profile	E-2814-1				
3	Max go & no-go gauge for outer profile thickness	E-2814-2				
4	Max go & no-go gauge for outer length of outside wing	E-2814-3				
5	Max no-go gauge and min go gauge for slot at bottom surface	F-1502				

6. Metallurgical & Chemical properties of Outer Stationary Plate:-

A. Chemical Analysis: Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	%C	0.48-0.53				
2	%Mn	0.75 - 1.00				
3	%P	0.035 max.				
4	%S	0.040 max.				
5	%Si	0.20 - 0.35				

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B. Mechanical & Metallurgical Properties/NDT : Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	Hardness	429-495 BHN				

C. Visual & Dimensions by Gauging (DG Outer Stationary Plate) : 2%

Sr.No.	Parameter	Gauge Number	Observation			
1	Visual Inspection					
2	Max go gauge for outer profile length & width	E-2246-2				
3	Max go & no-go gauge for outer profile thickness	E-2246-6				

7. Metallurgical & Chemical properties of Moveable Plate:-

A. Chemical Analysis: Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	%C	0.18-0.23				
2	%Mn	0.70 - 0.90				
3	%P	0.035 max.				
4	%S	0.040 max.				
5	%Si	0.15 - 0.35				

B. Mechanical & Metallurgical Properties/NDT : Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	Hardness	50-60 HRC				

C. Visual & Dimensions by Gauging (DG Outer Stationary Plate) : 2%

Sr.No.	Parameter	Specified Dimension	Observation			
1	Visual Inspection					
2	Length	213.13mm +/-1.2mm				
3	Width	138.50+/-2.0mm				
4	Thickness	19.10mm+/-0.10mm				

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8. Metallurgical & Chemical properties of Shortening Pin/Device:-

A. Chemical Analysis: Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	%C	0.10 max				
2	%Mn	0.30 - 0.50				
3	%P	0.030 max.				
4	%S	0.050 max.				

B. Mechanical & Metallurgical Properties/NDT : Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	Hardness	NA				

C. Visual & Dimensions by Gauging (DG Shortening Device/Pin) : 2%

Sr.No.	Parameter	Specified Dimension	Observation			
1	Visual Inspection					
2	Length	25.50mm+/- 0.6mm				
3	Diameter 1	20.65mm+/-0.3mm				
4	Diameter 2	15.90mm+/-0.1mm				

9. Metallurgical & Chemical properties of Release Spring:-

A. Chemical Analysis: Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	%C	0.51-0.59				
2	%Mn	0.60 - 0.80				
3	%P	0.025 max.				
4	%S	0.025 max.				
5	%Si	1.20 - 1.60				

B. Mechanical & Metallurgical Properties/NDT : Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	Hardness	320 max BHN				

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C. Visual & Dimensions by Gauging (DG Release Spring) : 2%

Sr.No.	Parameter	Specified Dimension	Observation			
1	Visual Inspection					
2	Free Height	114.30mm+/-0.1mm				
3	Coil Diameter	9.50mm+/-0.2mm				
4	Outer Diameter	50.80mm+/-0.3mm				

10. Metallurgical & Chemical properties of Outer Coil:-

A. Chemical Analysis: Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	%C	0.56-0.64				
2	%Mn	0.70 - 1.00				
3	%P	0.035 max.				
4	%S	0.035 max.				
5	%Si	0.20 - 0.35				

B. Mechanical & Metallurgical Properties/NDT : Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	Hardness	NA				

C. Visual & Dimensions by Gauging (DG Outer Coil) : 2%

Sr.No.	Parameter	Specified Dimension	Observation			
1	Visual Inspection					
2	Free Height	355.60mm+/-0.1mm				
3	Coil Diameter	31.80mm+/-0.3mm				
4	Inner Diameter	114.30mm+/-0.3mm				
5	Outer Diameter	By Gauge SK-1599				

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11. Metallurgical & Chemical properties of Inner Coil:-

A. Chemical Analysis: Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	%C	0.56-0.64				
2	%Mn	0.70 - 1.00				
3	%P	0.035 max.				
4	%S	0.035 max.				
5	%Si	0.20 - 0.35				

B. Mechanical & Metallurgical Properties/NDT : Each Lot

Sr.No.	Parameter	Specified Value	Observed Value			
1	Hardness	NA				

C. Visual & Dimensions by Gauging (DG Inner Coil) : 2%

Sr.No.	Parameter	Specified Dimension	Observation			
1	Visual Inspection					
2	Free Height	355.60mm+/-0.1mm				
3	Coil Diameter	20.60mm+/-0.2mm				
4	Outer Diameter	111.90mm+/-0.3mm				

12. Dimensions by Gauging Assembly : 5%

Sr.No.	Parameter	Gauge Number	Observation			
1	Assembled Draft Gear Mark-325	G-976-1				

13. Tup Hammer Test : One Assembly of Mark-325 Draft Gear

A. The following tests have to be carried out once in six month by Inspecting Official

Sr.No.	Tests	Last Test done on	Remarks			
1	Capacity Test					
2	Sturdiness Test					

If due, conduct tests and attach results.

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B. Production Testing:-

- (i) Check all the test results of the tests conducted at different stages by Manufacturer
- (ii) The Draft Gear Manufacturer shall conduct the Official Capacity Test (as defined in Clause 2 of Annexure-1) of 5% of Purchase Order or 5 in 100 whichever is higher and maintain as a part of its internal records.
- (iii) The Inspecting Authority shall audit check the QAP records of Manufacturer to ensure that draft gear components are manufactured as per QAP of the Manufacturer and meets the requirements of dimensions, chemical properties, mechanical properties as laid down in QAP.
- (iv) It should be possible for Inspecting Authority to find out QAP test/inspection records of draft gear components with Serial no. cast on draft gear housing. On failure to meet this requirement, the whole lot shall be rejected.
- (v) Two draft gears shall be selected by the inspecting authority from a lot of not less than fifty (50) draft gears. They shall be measured both in assembled and in disassembled condition. The dimensions shall be checked with gauges which should be in conformity with Manufacturer's approved drawings.
- (vi) At least 2 draft gears out of every 100 draft gears or part thereof shall be drop-hammer tested in presence of Inspecting authority to ensure minimum capacity of the specification under which it has been approved. The test shall consist of the minimum number of blows required to produce the minimum capacity required. If any unacceptable gears are found, this will necessitate testing of the next 50 untested gears to 100% capacity. If any defective gears are found within that 50, 100% capacity testing shall be continued until 50 consecutive gears have been tested without failure.
- (vii) Draft Gear Follower (if Grade E cast steel) shall be tested for Chemical composition, mechanical properties, impact Test, Hardness and Dimensions as per procedure given in RDSO Specification for Upgraded High Tensile CBC No.WD-70-BD-10 (Rev-2) or latest. Draft gear follower (if rolled steel) shall be test. General requirement of casting acceptance, Marking, Weight variation tested for material, heat treatment and hardness as given in AAR S-119.

C. Capacity Test Results:-

Sr.No.	Draft Gear Heat No. & Sl No.	Capacity obtained in Tup Hammer test (Min. Capacity 45000ft.lb)
1		
2		
3		
4		
5		

14. Metallurgical & Chemical properties of Follower Casting:-

Heat No.										
Serial No.										

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A. Chemical Analysis: Each Heat

Sr.No.	Parameter	Specified Value	Observed Value			
		Heat Number ----->				
1	%C	0.32 max				
2	%Mn	1.85 max				
3	%P	0.04 max				
4	%S	0.04 max				
5	%Si	1.50 max				

B. Mechanical & Metallurgical Properties/NDT : Each Heat

Sr.No.	Parameter	Specified Value	Observed Value			
		Heat Number ----->				
1	UTS kSi Min.	115 kSi				
2	YS kSi Min.	95 kSi				
3	E% Min	14				
4	RA% Min.	30				
5	Impact Test	20 ft-lb @ 40F from keel block or 15ft.lb @ 40F from casting				

C. Visual & Dimensions by Gauging (Follower Casting) : 2%

Sr.No.	Parameter	Gauge Number	Observation			
1	Visual Inspection					
2	Radius Template	DG-66274				
3	Shank-Butt seat gauge	DG-66284				
4	Shank centering lug seat gauge	DG-66285				
5	Length & Width Gauge	DG-66287				
6	Thickness Gauge	DG-66288				

15. Painting:

As Specified in Para 8.0 of STR WD-71-BD-15 (REV.01)	Observation
Firoji paint on only exposed surfaces excluding working portions of Draft Gear Mark-325 and entire surfaces of Follower	

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