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Govt. of India  
Ministry of Railway  
Research Design & Standard Organization  
Manak Nagar- Lucknow-226011

**QM-C-8.1/COUPLER/0013**

**INSPECTION PLAN (CHECK SHEET)**

**(M/s Jupiter Wagons Ltd. Kolkata)**

Item : Upgraded High Capacity Draft Gear (JWL-71)  
Specification: WD-71-BD-15  
Amd.: Rev.(01)  
Drg. No. & Alt.: WD-81010-S-03 (latest alt.)

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1. Firms Name :

2. Date (Period) of Inspection:

Contract details:

a. Contract No. and Date:

b. Order Placing authority:

c. Specification no.:

(as mentioned in contract)

d. Drawing No.:

(as mentioned in contract)

3. Quantity on Order:

4. Quantity offered for inspection:

5. Date of offering for inspection:

6. Consignee:

7. Delivery Period:

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## Summary of Results

SN	Items Inspected	Specified values	Observations
1	Metallurgical & Chemical Properties of Housing & Front Follower	As per check Sheet	
2	Draft Gear Assembly	Gauging	
3	DG Housing	Gauging	
4	Wedge Shoe	Gauging	
5	Wedge	Gauging	
6	Top Follower	Gauging	
7	Bore insert	Gauging	
8	Pre-shortener	Gauging	
9	Rubber pads	Verify challan	
10	Capacity	Last test done on	
11	Production Testing	Verify from records	
12	Status of QAP	Verify from records	
13	Chemical of bought out components	Verify from TC	

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### INSPECTION CHECK SHEET

Lot size – 50 nos. Max.

Sample size – 2 nos.

1. Manufacturing & Inspection of Upgraded High Capacity Draft Gear & its components as per manufacturer's approved QAP.

2. Visual Inspection

Sample size : One assembly

**JWL-71 Draft Gear**

S No.	Components	Remarks of RDSO inspecting official
1.	Draft Gear Housing	
2.	Draft Gear Follower	
3.	Pre shortener	
4.	Top Follower	
<b>5.</b>	<b>Wedge Shoe</b>	
6.	Bore insert	
7.	Wedge	
8.	Rubber pads	

3. Metallurgical & Chemical Testing of Draft Gear Housing (JWL-71)

Heat No.	
Serial No.	

4. Spectro Analysis

S. No.	Parameter (HOUSING)	Specified value	Observed value
1	C%	0.28 – 0.33	
2	Mn%	0.60 – 0.90	
3	Si%	0.40 – 0.60	
4	S%	0.030 Max.	
5	P%	0.030 Max.	
6	Cr%	0.50 – 0.80	
7	Mo%	0.15 – 0.25	
8	Ni%	0.50 – 0.60	
9	Al%	0.02 – 0.05	

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## 5. Spectro Analysis

S. No.	Parameter (Cast Follower)	Specified value	Observed value
1	C%	0.28 – 0.33	
2	Mn%	0.60 – 0.90	
3	Si%	0.40 – 0.60	
4	S%	0.030 Max.	
5	P%	0.030 Max.	
6	Cr%	0.50 – 0.80	
7	Mo%	0.15 – 0.25	
8	Ni%	0.50 – 0.60	
9	Al%	0.02 – 0.05	

## 6. Mechanical & Metallurgical Properties (HOUSING)

S. No.	Parameter	Specified value	Observed value
1	UTS	84.40 Kg/mm <sup>2</sup>	
2	YS	70.30 Kg/mm <sup>2</sup>	
3	EL%	14% (Min.)	
4	RA%	30% (Min.)	
5	Imp.	34 J at -40 <sup>0</sup> C	
6	Hardness	241-311 BHN	
7	MICRO	Tempered Martensite	

## 7. Mechanical & Metallurgical Properties (Cast Follower)

S. No.	Parameter	Specified value	Observed value
1	UTS	84.40 Kg/mm <sup>2</sup>	
2	YS	70.30 Kg/mm <sup>2</sup>	
3	EL%	14% (Min.)	
4	RA%	30% (Min.)	
5	Imp.	27.1 J at -40 <sup>0</sup> C	
6	Hardness	241-311 BHN	
7	MICRO	Tempered Martensite	

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**8. Dimensions by gauging (Assembly) (JWL-71)**

Sample – Two no.

Heat no. & Serial no. 1.

2.

S. No.	Draft Gear Assembly	Firm's gauge No.	Observations	
			Sample 1	Sample 2
1	Assembled Draft Gear			
2	Draft gear pre shortened length top (Go gauge)	JWL/PL/01		

**9. Dimensions by gauging (DG housing) to be measured after disassembly**

Sample size – one assembly

**JWL-71-Draft Gear**

S. No.	DG Housing GAUGES	Firm's gauge no.	Observations
1	Length go gauge	JWL/G/DGH/002	
2	Length no go gauge	JWL/G/DGH/003	
3	Width go gauge	JWL/G/DGH/004	
4	Width no go gauge	JWL/G/DGH/005	
5	Box Gauge	JWL/G/DGH/006	

**10. Dimensions by gauging (Cast Follower) to be measured after disassembly**

Sample size – one assembly

S. No.	Cast Follower Gauges	Firm's gauge no.	Observations
1	Thickness Gauge	JWL/CFT/01	
2	Length & Width Gauge	JWL/CFL/02	
3	Profile Gauge	JWL/CFP/03	

**11. Dimensions by gauging (30° Shoe) to be measured after disassembly**

Sample size – one assembly

**JWL-71 Draft Gear**

SN	30° Shoe	Firm's gauge no.	Observations	
			Sample 1	Sample 2
1	OUTSIDE WIDTH	JWL/G/DGS/001		
2	Shoe Back Angle and Radius	JWL/G/DGS/002		
3	Back Surface Flatness	JWL/G/DGS/003		
4	HARDNESS	444-495 BHN		

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**12. Dimensions by gauging ( Wedge) to be measured after disassembly**

Sample size - One assembly

**JWL-71 Draft Gear**

S.N.	Wedge	Firm's gauge no.	Observations
1	Top to Top Lug Depth Gauge	JWL/G/DGW/001	
2	Length	JWL/G/DGW/002	
3	Lug Width	JWL/G/DGW/003	
4	Angle gauge	JWL/G/DGW/004	
5	HARDNESS	555-683 BHN	

**13. Dimensions by gauging (Top Follower) to be measured after disassembly**

Sample size – one assembly

**JWL-71 Draft Gear**

SN	Top Follower	Firm's gauge no.	Observations
1	Follower Outside	JWL/G/DGF/001	
2	Bottom Flange Thickness	JWL/G/DGF/002	
3	Thickness Gauge	JWL/G/DGF/003	
4	Follower Overall Thickness	JWL/G/DGF/004	
5	HARDNESS	277-331 BHN	

**14. Dimensions by gauging (Bore Insert) to be measured after disassembly**

Sample size – one assembly

**JWL-71 Draft Gear**

SN	Bore Insert	Dimensions	Observations		
1	Length	104.77+0.78/-1.60			
2	Width	53.97+ 0.40			
3	Thickness	5.56++0.40			

**15. Dimensions by gauging (Pre-shortener) to be measured after disassembly**

Sample size – one assembly

**JWL-71 Draft Gear**

SN	Pre- Shortener	Dimensions	Observations		
			1	2	3
1	Length	18.25+0.40/-0.00			
2	Width	18.25+0.40/-000			
3	Cross Length	19.05 Nominal			

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**16. Verification of Challan (Rubber Pads) to be measured after disassembly**

**Sample size – one assembly**

**JWL- 71 Draft Gear**

SN	MARKING	FREE HT.(mm)	Visual
1.			
2.			
3.			
4.			
5.			

**17. Capacity & other tests**

Sample size – one assembly

The following tests have to be carried out once in six month by inspecting official

SN	Tests	Last test done on	Remarks
1.	Capacity test		
2.	Sturdiness test		
3.	Sticking		
4.	Uniformity of action		

If due, conduct tests and attach results

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### 18. 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, 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 gear or part thereof shall be shall be drop –hammer tested to 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.

### 19. Capacity test Results:

SN	Draft Gear Heat no. & SL no.	Capacity obtained in Tup hammer test (Min. Capacity 45000 ft.lb)
1.		
2.		
3.		
4.		
5.		

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