



## QM-C-7.1/FORGING/0003

### Inspection Plan(Check Sheet)

**Item:** Screw Couplings  
(Including spares, coaching, freight & locomotive application)

**Specn. :** For Freight stock- R-9-66 Corr. No. 3 of Dec'1988,  
For coaching stock - C-9505 Rev Aug 2001,  
For locomotives- MP.0.41.00.01

**Amd.:**

**Drg. No. & Alt.:** For Freight stock- SK-69503, For coaching stock - SK-99001,  
For locomotives- SKDL-2494

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- 1) Firm's Name :
- 2) Date (Period) of Inspection :
- 3) Contract Details
  - a) Contract No. & Date :
  - b) Order Placing Authority :
  - c) Specification No. :  
(As mentioned in Contract)
  - d) Drawing No. :  
(As mentioned in Contract)
- 4) Quantity on Order date :
- 5) Quantity offered for Inspection on Date :
- 6) Consignee :

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### SUMMARY OF RESULTS

S.NO.	Parameters	Specified Value	Observations
7.1	Raw Material		
	Test Certificate Details		
7.2	Visual Check		
7.3	Chemical Composition	C-0.3 to 0.4 Mn-1.3 to1.8, Si 0.1 to 0.35, S&P 0.025 max.	
7.4	Inclusion Rating	Not worse than 2.0A, B, C, D, in thin & 1.0A, B, C, D, thick Series.	
7.5	Impact test at 1500 Kgm. (Destroy coupling by gas cut after impact test)	Total extension after 3 <sup>rd</sup> blow shall not exceeds 50mm On whole coupling or 3mm on the screw.	
7.6	Destruction Test at 130 MT direct pull. Destroy coupling by gas cut after test).	No breakage	
7.7	Proof load test at 75 MT direct Pull. All components are to be examined for deformation separately.	No Sign. Of deformation or permanent set after release of pull.	
7.8	Afresh or repaired on.		
7.9	Marking, painting & Packing	As per drawing. One coat of boiled linseed oil to IS:77. If not mentioned otherwise in P.O.  Packed in rigid case /double gunny bags.	
7.10	Dimensional Check	By Go / No Go Gauges.	
7.11	Heat treatment cycle verify time / temperature graph.		

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7.12	Mechanical properties.		
8.1	Link.		
8.2	Bent coupling link		
8.3	Trunnion LH / RH		
8.4	Screw		
8.5	Lever & Weight		
8.6	Pin 60 dia x 218		

**7.0 Tests to be carried out for screw coupling assemble and parts –**

**7.1 (A) Raw Material** - Check original test certificate produced by the manufacturer duly signed by their Quality Control Manager to ensure that the material of link, bent coupling link, Screw, pin & trunion is confirming to 35 Mn 6 Mo3 to IS : 5517-93.

	<b>Parameters</b>	<b>Observation on the basis of Suppliers Record</b>
I.	Manufacture of steel is done in electric are furnace followed by Secondary refining (Vacum – degassing is preferable)	
II.	Hydrogen content in the liquid steel is max. 2 ppm.	
III.	The sulphur & phosphorus content during ladle analysis is shall be 9.925% Max. each.	
IV.	Minimum reduction ratio of 8:1 from the minimum cross-section area of ingot or concast billets to the maximum cross section area of the product is ensured.	
V.	Elements not mentioned in IS : 5517-93 are not added to the Steel.	

**(A) Tests certificate (TC) no. & date produced by the Supplier -**

- Name of the raw material supplier.
- Raw material supplier should be approved by RDSO.
- Quantity of material indicated on TC.
- Quantity of material used from this TC till this lot offered for inspection.
- Quantity of material used from this.
- Quantity of material balance against this TC for future lots.

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**7.2 Visual Check**

Specified Sample Size – 10% subject to minimum 5 Nos.

Actual Sample Size –

Check the screw coupling and/or spares (best link, screws, links, pin & trunnion) shall be free from harmful defects.

**OBSERVATIONS**

S.No.	1	2	3	4	5	6	7	8	9	10
Surface Defects										
Formation of Rivet										

**7.3 Chemical Composition :**

Batch Size - Min 100 for screw coupling assembly  
 - Min 300 for spares.

Sample Size - One per batch for screw coupling assembly.  
 - One separate part per batch for spares.

Elements Specified (%)	Carbon 0.3 to 0.4	Manganese 1.3 to 1.8	Silicon 0.20 to 0.35	Molybdenum 0.20 to 0.35 max.	Sulphur 0.025 max	Phosphorus 0.025 max

**7.4 Metallographic examination inclusion rating (to be checked as per IS : 4163) -**

Batch Size - Min 100 for screw coupling assembly  
 - Min 300 for spares.

Sample Size - One per batch for screw coupling assembly.  
 - One separate part per batch for spares.

SPECIFIED	A Not more		Thin 2.0		C Not more than		D Not more than	
	Thick 1.0	Thin 2.0	Thick 1.0	Thin 2.0	Thick 1.0	Thin 2.0	Thick 1.0	Thin 2.0
Observations								

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**7.5 Impact test**  
 Sample Size - One Coupling Per Batch

<b>Specified Value</b>	The extension after third blow shall not exceed 50 min on the whole coupling or 3mm on the screw, when subjected to the impact of 1500 Kgm. Also the part should not brake, after impact test the coupling which impact test is carried out should be destroyed by gas cutting.
<b>Observation</b>	

**7.6 Destructive Test**  
 Sample Size - One per Batch.

<b>Specified Value</b>	Should not brake with a load of 130T of direct pull test. This coupling should be separate from coupling subjected to impact test. After destruction test the coupling of which destruction test is carried out should be destroyed by gas cutting.
<b>Observation</b>	

**7.7 Proof load test:**  
 Sample Size – 10% subjected to minimum 5 Nos.  
 Actual Size

**Specified value** – The coupling shall be subjected to a direct pull of 70 T It should not show any signs of permanent set under the pull, after release of pull.

The inspector shall verify the records of proof load testing carried out by the manufacturer on 100% screw coupling. After proof load testing one screw coupling should be completely dismantled and checked for permanent set.

OBSERVATIONS									
1	2	3	4	5	6	7	8	9	10

- 7.8 (i) Whether the batch is offered afresh or after repair as per clause 7.0 of C-9505.
- (ii) If yes, whether RDSO approved was obtained?  
 Indicate RDSO authority reference permitting repair -

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7.9 Marking, Painting and Packing  
Sample Size – 10% or 5 Nos. min.  
Actual Size:

S.N.	Specified	OBSERVATION									
		1	2	3	4	5	6	7	8	9	10
1	Identification stamping on all parts as specified in drawing.										
2	Painting with one coat of boiled linseed oil to IS:77										
3	Packing should be proper & in rigid cases.										
4	Weight of each shall not exceed 750 Kgs.										

7.10 **Dimensional Checks for Screw Coupling Assembly:-**  
Sample Size – 10% or 5 Nos. min.  
Actual Size –

(i) Fully opened condition (997mm as per RDSO Drg.)

S.No.	1	2	3	4	5	6	7	8	9	10
Observations										

(ii) Fully opened condition (771mm as per RDSO Drawing)

S.No.	1	2	3	4	5	6	7	8	9	10
Observations										

7.11 **Heat treatment Cycle:**

This is to be checked for the lot from the time temperature graph available with manufacturer.

	Parameters	Specific Value	Value as recorder in the Certificate of the firm
1	Temperature of furnace at the time of placing assembly.	Less than 500 deg. C	
2	Time of heat up to 860 deg. C	4 hours	
3	Soaking time at 860 deg. C	3 Hours	
4	Tempering Temp	550 to 600 deg. C	
5	Tempering time at specified Temp. (550-600 deg. C)	2 hours	

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### 7.12 Mechanical Properties:

Sample Size – One each for Link, bent coupling ring and screw.

S.NO.	Parameters	Specified Value	Link	Bent Coupling	Screw	Pin Dia 60x218
1.	Tensile strength	900 to 1050 Mpa				
2.	0.2% Proof stress	700 Mpa (Min)				
3.	Elongation %	15% min.				
4.	Izod impact	55 Joules min.				

### 8.1 Link Drg. SK-99002 Item No. 1

- (i) Dimension Checks –  
Sample Size – 10% or 5 Nos. min.  
Actual Size-  
Parameters to be checked

Observed dimensions	1	2	3	4	5	6	7	8	9	10
Drawing Dimensions										
O/D 90±1										
Length 475										
Centre Distance 380±0.5										
Hole dia 47+0.2/-										
Hike 61+0.2										
Thickness 31±0.5										
O/D 80±1										
Thick 52±0.5										
Thick 16+2/-0 at section BB of Drawing										
O/D 50±0.5 at section AA & BB of drawing										
Width 39 mm.										
Thickness at section AA 15 + 0.6/-0.4										

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**8.2 Bent coupling link Drawing No. SK-99002 Item No. 2**

- (ii) Dimension Checks –  
Sample Size – 10% or 5 Nos. min.  
Actual Size-  
Parameters to be checked

Observed dimensions	1	2	3	4	5	6	7	8	9	10
Drawing Dimensions										
Centre Distance $46 \pm 0.5$										
Centre Distance $260 + 2.5/-0$										
Dia 42										
Total Length $348+2.5/-0.5$										
Hole Dia $47\pm 0.2$										
Thickness 55/35										
Gap $78\pm 1$										
O/D 82										

**8.3 Trunnion LH/RH Drawing No. SK-99002 Item No. 5 & 6**

- Dimension Checks –  
Sample Size – 10% or 5 Nos. min.  
Actual Size-

Observed dimensions	1	2	3	4	5	6	7	8	9	10
Drawing Dimensions										
Length 76										
Step Length 15/15										
Step Length 39/39										
O/D 76										
O/D 71										
O/D $46=0/-0.2$										
Knuckle thread 55.655 dia x 6.35 pitch										
Hardness 270-320 BHN										

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**8.4 Screw Drawing No. SK-99002 Item No. 3**

Dimension Checks –  
Sample Size – 10% or 5 Nos. min.  
Actual Size-  
Parameters to be checked -

Observed dimensions	1	2	3	4	5	6	7	8	9	10
Drawing Dimensions										
Length (total) 453										
Length 428										
Length 38										
Threaded length 175										
Dia 58										
Dia 48.65										
Knuckle Thread 55 dia x 0.35 pitch										
Centre Distance 226.5										

**8.5 Lever and Weight Drg. No. 98155**

Dimension Checks –  
Sample Size – 10% or 5 Nos. min.  
Actual Size-

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## CHECK SHEET FOR HEAT TREATMENT

	Date of Oprn.	Max. Temp. Recorded	Shocking Time	Time Required to Attain Max. Temp.	No. of Pcs. Loaded at a time.
HARDENING					
TEMPERING					

### A. LINK:

	1	2	3	4	5	6	7	8	9	10
BHN RANGE (241 TO 285)										
OBSERVED										

### B. BENT COUPLING LINK :

	1	2	3	4	5	6	7	8	9	10
BHN RANGE (241 TO 285)										
OBSERVED										

### C. SCREW (Ø58 X 453) :

	1	2	3	4	5	6	7	8	9	10
BHN RANGE (241 TO 285)										
OBSERVED										

### D. TRUNNION (LH & RH):

	1	2	3	4	5	6	7	8	9	10
BHN RANGE (241 TO 285)										
OBSERVED										

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**DIMENSIONAL CHECK SHEET IN ASSEMBLY CONDITION**

Dimension Checked – 5% or 5 Nos. minimum

**1. OPENDED CONDITION (997 mm) :-**

SL.NO.										
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										

**2. CLOSED CONDITION (771 mm):-**

SL.NO.										
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										

**3. PROOF LOAD TEST:-**  
(Required Value 70 tones)

	1	2	3	4	5	6	7	8	9	10
Deflection										
Permanent Set										

Remarks:

**4. RESULT OF IMPACT OF DESTRUCTIVE TEST REPORT TO BE ATTACHED:-**

**5. PAINTING, PACKING & WEIGHT :-** All Screw Couplings and/or spares, after testing acceptance are being painted with one coat of boiled linsed oil and packed securely in rigid case more than 760 Kgs. each weight.

**6. VISUAL INSPECTION :**  
(10% or 5 Nos. minimum) of the offered lot.

Sl.No.	Quality of Welding	Surface Finish	Painting	Formation of Rivet	Remarks

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## CHECK SHEET SCREW

1. Test Certificate No. & Date :
2. Visual Checked :
3. Dimension Checked 5% or 5 Nos. minimum :
4. Parameter to be checked :

Measuring Points	Total Length	Thread Length	Length	Length	O/D	Step Length	O/D
Drawing Dimensions	453	175	38	20	38	12.5	Ø58
Observe Dimensions							

HARDNESS										
(241-285 BHN)										

5. Marking : LBIC & Manufacturing month and last two digit of year.
  6. Packing : As per RDSO Instrument.
- REMARKS :** 1) Radius and Contour Checked by corresponding Gauges, Templates, Jigs & Fixtures & Found Satisfactory.  
2) OK – Gauges, Templates, Jigs & Fixtures.

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