

## INDIAN RAILWAYS



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# SCHEDULE OF TECHNICAL REQUIREMENTS FOR PURCHASE AND ACCEPTANCE OF IMPROVED HIGH TENSILE TIGHTLOCK CENTRE BUFFER COUPLER WITH AAR 'H' TYPE HEAD AND BALANCED DRAFT GEAR FOR FITMENT ON BG PASSENGER COACHES OF INDIAN RAILWAYS

(Oct -2011)

Issued by  
RESEARCH DESIGNS AND STANDARDS ORGANISATION Manak  
Nagar, Lucknow-226011

## IMPORTANT

Tenderers are advised to go through this schedule carefully. In case they need clarification regarding any of the clauses of this schedule, they should contact Director General (Carriage), RDSO, Manak Nagar, Lucknow – 226 011 (India).  
FAX No. 91 -0522 – 2450679

DRAFT

## Preamble

Since the introduction of Centre Buffer Coupler (CBC), Indian Railways (IR) are facing problem of longitudinal jerks. Though various measures were taken in the past to deal with the problem of jerks, no significant improvement was observed. RDSO has done a comprehensive analytical study on causes for Longitudinal jerks and based on the findings, it has been concluded to use balanced type draft gear for coaching stock. A new specification of CBC with balanced type draft gear has been prepared. The specification has been made to meet IR's specific requirement and on the basis of experience of using CBC in passenger stock for approx. one decade.

At present, the supporting arrangement inside the under frame of the coach has provision of front stopper and rear stopper which is suitable for single pack draft gear. This is not optimal for balanced type draft gear. However, as of now, no change in supporting arrangement has been made in the specification. RDSO may review design of supporting arrangement once CBC with balanced type draft gear is adopted for regular use.

CBC is a niche item. There shall be no part-I or part-II supplier of the item. The supplier with satisfactory performance shall be considered suitable for regular supply.”

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## **SCHEDULE OF TECHNICAL REQUIREMENTS FOR PURCHASE AND ACCEPTANCE OF IMPROVED HIGH TENSILE TIGHTLOCK CENTRE BUFFER COUPLER WITH AAR 'H' TYPE HEAD AND BALANCED DRAFT GEAR FOR FITMENT ON BG PASSENGER COACHES OF INDIAN RAILWAYS**

### **1. SCOPE**

- 1.1 This schedule covers the technical provisions relating to material, purchase and acceptance requirements for high tensile tightlock centre buffer coupler and its associated components including AAR 'H' Type coupler head assembly, yokes, draft gear, front and rear carrier plates, coupler operating mechanism with mounting brackets and coupler carrier for fitment on all types of Broad Gauge passenger coaches of Indian Railways.

### **2. DEFINITIONS**

- 2.1 'PURCHASER' means the Ministry of Railways, or an administration under the Ministry of Railways, on behalf of the President of the Republic of India.
- 2.2 'IR' means Indian Railways.
- 2.3 'RDSO' means Research Designs and Standards Organisation Manak Nagar, Lucknow - 226 011.
- 2.4 'INSPECTING AUTHORITY' means the representative of RDSO nominated by Director General/RDSO to inspect the supply on behalf of the PURCHASER.
- 2.5 'TENDERER' means the firm/company that submits offer for supply of centre buffer couplers (hereinafter referred to as couplers), draft gears and associated components as per this schedule.
- 2.6 'CONTRACTOR' means the firm/company on whom order, for supply of couplers, draft gears and associated components, in full or part, as per this schedule, is placed.
- 2.7 'SUB-TENDERER' means any firm or company from whom the TENDERER may obtain an item of supply not necessarily manufactured by the TENDERER himself.
- 2.8 'SUB-CONTRACTOR' means any firm or company from whom the CONTRACTOR may obtain any material, assemblies or sub-assemblies used for the manufacture of couplers, draft gears and other associated components.
- 2.9 'SPECIFICATION', unless otherwise mentioned, refers to specifications of IR/RDSO and the same could be procured from DG/RDSO on normal payment basis.

### **PARTICULAR REQUIREMENTS**

- 3.1 The coupler shall be of non-transition type and also couplable with the existing AAR E Type couplers, to RDSO Specification No. 56-BD-07 and drawing number SKDL-3430, being used on locomotives as enlisted in Annexure 'A'.

3.2 Coupler head should be of AAR 'H' type. The connection between coupler and draft gear should have sound design concept suitable for main line passenger trains."

3.3 All components and sub-assemblies of the coupler (including draft gear) shall be interchangeable with corresponding parts of another coupler of the same make and design. The coupler and its sub-assemblies shall meet the operating conditions indicated in Annexure-B of this schedule.

3.4 Coupler mounting arrangement on under frame shall be generally to drawing No.CG- K4012.

3.5 Length from coupling line to pivot point as 1030 mm shall be mandatory. The head contour shall be as per S-168 of APTA SS-M-002-98. The guard arm of coupler head shall be at the vertical centre of the coupler head. The slack when two couplers of same make are coupled together shall be up to 3.5 mm only in new condition.

3.5.1 Double Rotary lock lifter should be provided with an additional anticreep mechanism by providing rib in addition to existing rib to prevent unintended lifting of lock lift lever (the hook of the uncoupling rod should be in between ribs).

3.5.2 The coupler operating mechanism shall comprise of rigid steel members for articulation. Use of wire or any other limp / flexible material in the articulation shall not be accepted. The coupler operating mechanism should have proper locking arrangement for anti-vandalism. Locking screw arrangement with protective cover to prevent lifting of uncoupling rod by unauthorized persons shall be provided. It should be possible to operate the locking mechanism with the help of a key as per RDSO drg. No. CG-10100.

3.5.3 The design of coupler head shall enable coupling of two couplers with a maximum vertical displacement of their centre lines of by 90 mm, without manual assistance.

3.5.4 The horizontal gathering range of the coupler heads shall be 110 mm on either side of the longitudinal centre lines of the coaches without manual assistance on straight track.

### 3.6 MATERIAL AND MANUFACTURE OF STEEL CASTINGS

3.6.1 Steel castings shall be heat treated and marked in accordance with AAR specification M-201 Grade E. The locks and knuckles shall be furnished in accordance with para 3.6.2.

3.6.2 Knuckles and locks shall be heated to the proper temperature above the critical range for the required time and upon removal from the furnace shall be subjected to accelerated cooling by immersion in a suitable liquid medium. All E grade knuckles and locks shall have Brinell hardness range of 241 -291. All quenched castings (except knuckles and locks) shall be tempered immediately following the quenching operation to a hardness of Brinell Number range of 241 – 311.

### 3.7 CHEMICAL COMPOSITION

3.7.1 The percentage by weight of different elements in Grade 'E' steel of specification M-201 shall not exceed the following limits:

Carbon, Maximum percent	0.32
Manganese, maximum percent	1.85
Phosphorus, maximum percent	0.04
Sulfur, maximum percent	0.04

Silicon, maximum percent 1.50

### 3.8 CHEMICAL ANALYSIS

All relevant chemical analysis shall be done as per AAR specification M 201, Grade 'E' steel.

### 3.9 HEAT TREATMENT

Heat treatment process shall be done as per AAR specification M 201, Grade 'E' steel.

### 3.10 MECHANICAL PROPERTIES AND TESTS

All relevant mechanical properties and tests shall be done as per AAR specification M 201, Grade 'E' steel. The hardness shall be checked on the location as shown in fig.1 for hardness.

Each melt shall be tested for mechanical properties after heat treatment. The coupons from each melt shall be heat treated with castings of the same grade, in the same manner as the casting they represent.

All the tests conducted as per AAR specification M 201, Grade 'E' shall be clearly brought out in QAP and their results maintained in the test records.

## 4. COMPONENTS PERFORMANCE AND TEST REQUIREMENTS

### 4.1 PROOF TESTS

4.1.1 The coupler and the draft gear housing body along with draft gear pads will be tested by applying a tensile load of 1000 KN. The residual strain should be below 0.2% after release of load. No fracture should be observed at a load of 1500 KN.

4.1.2 The coupler and the draft gear frame will be tested by applying a compressive load of 2000KN. The residual strain should be below 0.2% after release of load.

4.1.3 Bending test of the coupler body by applying a force of 300 KN in graduated steps at the centre of the coupler shank. The residual strain should be below 0.2%. No fracture should be observed on application of load of 500 KN.

### 4.2 COUPLER OPERATION

4.2.1 The coupler assembly shall be checked in accordance with clause 6.8 of APTA RP - M- 003-98 (of March 17,1999)

### 4.3 CASTING FINISH

4.3.1 Riser pads and gate stubs shall not project more than 6mm above the surrounding surface at any location, where interference would exist in the operation or application or where serviceability would be affected, the riser pads and gate stubs shall be contoured to surrounding areas.

4.3.2 Castings shall be blasted sufficiently clean to permit thorough, visual Inspection. Prior to shipment, castings shall be free of dirt, rust, or loose material that would affect operation. Couplers must not be sand or shot blasted when completely assembled.

4.3.3 The castings shall not be painted or covered with any substance that will hide defects prior to inspection. Manufacturer's and/or purchaser's identification marks shall be put after the complete inspection and acceptance of the parts by the purchaser. The supplier shall paint the coupler exterior except at mating parts to protect the coupler from corrosion

#### 4.4 LUBRICATION

4.4.1 Only dry lubricant shall be applied to the coupler head or the coupler head fittings. This lubricant may be applied using water, alcohol, or other non-petroleum based carrier.

#### 4.5 MARKINGS

4.5.1 The coupler shall be marked in accordance with clause 6.12 of APTA RP-M- 003-98 .(of March 17,1999)

4.5.2 The manufacturer shall ensure that marking details are legible and are of good quality, which shall remain legible throughout the entire service life of coupler and its components. The marking shall be done at the casting stage itself. The manufacturer will not be permitted to provide manufacturer's code and marking by electric arc welding in case these are not visible at casting stage.

#### 4.6 GENERAL REQUIREMENT FOR CASTING ACCEPTANCE

This section defines and classifies casting defects. Visual inspection and gauging of coupler bodies, knuckles, locks, and yokes to be complied as per clause 14 of AAR M-211 by the manufacturer before offering for Purchase Inspection.

##### 4.6.1 SURFACE ACCEPTANCE LEVEL

Coupler bodies, knuckles and yokes shall conform to the requirements of AAR M -211, Surface Acceptance Level Specifications.

##### 4.6.2 EVIDENCE OF IMPROPER HEAT TREATMENT

Evidence of improper Heat Treatment as shown from manufacturer's records shall not be accepted. Heat treatment lugs may be used by Inspecting Authority to assist in the determination of improper heat treatment.



## 5. DRAFT GEAR

**Draft gear** - shall be balanced with force flow diagram as shown in diagram in sketch CG- K8207 alt.1. The draft gear shall be with elastomeric springs and suitable for running long train.

**Draft gear characteristics-** The draft gear characteristics shall be-

1.	Travel (in draw mode)	58mm (maximum)
2.	Travel (in buff mode)	90mm (maximum)
3.	Initial pre compression	Balanced draft gear suitably compressed for the application
4.	End force	1600kN (maximum))
5.	Energy storage capacity (dynamic). The energy storage capacity shall be obtained observing both the limits of travel and end force as mentioned above simultaneously	Buff mode 35 kJ (minimum.)
		In draw mode: (1-Damping Factor)* Energy storage in Buff mode (minimum )
6	Damping Factor	0.6 (minimum)

Draft gear Pad shall be made of elastomer having non- linear characteristic with low spring rate at low travel and significantly higher rates at high travel. In the case of draft gears with internal articulation, it shall be the responsibility of the supplier to certify suitability of the same for use in Indian Railways applications.

- 5.1 The TENDERER shall also submit static and dynamic force travel diagram indicating the pre-compression, end force, energy absorbed and the damping factor (both in draw and buff modes) of the draft gear along with the offer.

## 6. PIVOT AND THE COUPLER SHANK PIN ARRANGEMENT

- 6.1 Pivot and the coupler shank pin arrangement shall have spherulastic bearing for providing slack free service for long period. Or, alternatively, use of socket type joints between the Mechanical coupler head and the draft gear without pivot and pin arrangement and with proven draft gear pad, designed to take asymmetry load during horizontal or vertical swing, shall be provided.

## 7. CRASH ELEMENT (if required by the purchaser)

- 7.1 The TENDERER shall include crash element in his offer, if so required by the purchaser at the time of purchase. The crash element should trigger at 2000 kN and should absorb energy at a rate of approximately 1600KN for displacement of 200mm. Energy absorption should be more than 320 kJ.

## 8. QUALIFYING REQUIREMENTS

The TENDERER shall meet the qualifying requirements listed below and submit the documents in support thereof, along with the offer.

8.1 The TENDERER meeting any one of the following criteria shall qualify

- (i) Tenderer having experience in supplying AAR 'H' type coupler to INDIAN RAILWAYS for coaching stock.
- (ii) Tenderer having collaboration with a member of MCSCM of AAR for manufacturing of AAR 'H' type coupler.
- (iii) MCSCM Company & its subsidiary.
- (iv) The TENDERER having experience in manufacturing AAR 'H' type coupler and supplying to reputed international Railway like European, American, Japanese or any other developed country. Subsidiary of such a manufacturer and supplier which are located in India is also eligible to submit the offer.

8.2 The TENDERER or SUB-TENDERER should have adequate plant and manufacturing capacity to manufacture and supply the couplers within the delivery schedule.

8.3 The TENDERER should have a well-established quality control system and organizational set-up, to ensure adequate quality, at all stages of manufacture.

8.4 The TENDERER shall give documentary evidence indicating latest supply of the type of coupler being offered. In case the TENDERER is manufacturing the coupler or draft gear for the first time, it should indicate specifically as NEW OFFER.

8.5 The general design and the arrangement drawing of the coupler and the draft gear system should be got approved from RDSO.

8.6 QAP for the manufacture and inspection of the coupler and draft gear system should be prepared by the tenderer and it should be submitted to RDSO for approval.

8.7 List of the manufacturing and acceptance gauges, used by the tenderer or the sub-tenderer to check the internal components and the coupler head to ensure interchangeability, should be submitted to RDSO. The functional similarity of these gauges with the corresponding gauges given in the list in clause 6.7 of APTA RP-M-003-98 including the various dimensions measured should be illustrated.

8.8 Coupling and uncoupling operation must be performed on two newly developed couplers on a special test rig made for this purpose by the tenderer or sub-tenderer to ensure repeatability of the coupling and the uncoupling. The functioning of anti-creep mechanism will be checked before the tests and after every 50 operations thereafter. The number of operations shall be decided while finalizing the test plan, depending upon the characteristics of the design offered.

8.9 Repeated coupling and uncoupling operation must be performed on the newly developed coupler head and the coupler head brought from the other sources approved by MCSCM of AAR on a special test rig made for this purpose by the tenderer or sub-tenderer to ensure compatibility with coupler from other sources. The coupler head approved by MCSCM of AAR will be supplied by RDSO/IR. Ten numbers of operations should be carried out for repeated coupling and uncoupling.

- 8.10 The operation of the coupler in respect of coupling, uncoupling and the working of anti-creep-mechanism will be checked. The process will be repeated by changing the internal parts of the coupler head.
- 8.11 Functional tests on the couplers as per the agreed protocol between the contractor and the RDSO.
- 8.12 The TENDERER will specify the wear limits for the components of the coupler head and demonstrate the functioning of the coupler head with fully worn components.
- 8.13 Strength tests are to be done on the coupler and the draft gear as per the clause 4.1 of this schedule.
- 8.14 Tests on the draft gear to measure the energy storage capacity as per the agreed protocol between the contractor and RDSO.
- 8.15 “Endurance test shall be conducted on the draft gear as specified in Section B of AAR Manual of Standards Recommended Practice for Couplers and Freight Car Draft Components or UIC (524 O(V) or 526-1) standards to show that the draft gear will retain its functional and operational reliability between two successive maintenance periods as specified in clause 9.7 of the schedule.”
- 8.16 Sturdiness test on the draft gear shall be carried out in case supplier chooses to conduct endurance test as per provision in AAR. The test is required to show its ability to withstand the impact loads experienced in service
- 8.17 Coupler operation to be checked as mentioned in clause 4.2.
- 8.18 A test plan should be submitted by the tenderer and after the assessment of the test plan along with the design of coupler offered; RDSO may modify or supplement the test plan before granting approval.
- 8.19 In addition to the above, further information, if required by the PURCHASER, shall be promptly provided by the TENDERER / CONTRACTOR.
- 8.20 TENDERER not submitting the above mentioned requisite information should note that incomplete offer is liable to be rejected.
- 9.0 **GENERAL REQUIREMENT**
- 9.1 The CONTRACTOR shall set aside one set of gauges for the exclusive use of INSPECTING AUTHORITY. The accuracy of gauges shall be checked by the INSPECTING AUTHORITY before the commencement of manufacture. Recalibration shall, subsequently, be done at the frequency stipulated in internal Quality Assurance Programme. Gauge drawings, in original, shall also be made available for checking the tolerances of these gauges.
- 9.2 Inspection of coupler and associated components shall be carried out by the INSPECTING AUTHORITY and notwithstanding what has been specified in this schedule, inspection shall be conducted as per relevant standard international practices / specifications and as mutually agreed to by the INSPECTING AUTHORITY and the CONTRACTOR. In case of dispute, however, the decision of the PURCHASER shall be final. If PURCHASER desires, in process inspection can be carried out at the manufacturing stage also.
- 9.3 The inspection of couplers and associated components shall be done at

the CONTRACTOR'S premises. The CONTRACTOR shall also provide, at his cost, labour and appliances / gadgets required by the INSPECTING AUTHORITY for conducting complete inspection as required under the Contract.

- 9.4 The CONTRACTOR shall be responsible for execution of the Contract in accordance with this schedule and for satisfactory fitment and operational performance of the couplers supplied, irrespective of any approval which the PURCHASER / RDSO may have given.
- 9.5 The CONTRACTOR shall provide adequate supervision to ensure satisfactory fitment of at least ten (10) coupler sets.
- 9.6 The CONTRACTOR shall also provide, training to IR officials, at his own cost, regarding maintenance practices of the coupler system.
- 9.7 The design of coupler and associated components must be such that it may not warrant any major maintenance/ attention before 5 years.
- 9.8 The coupler offered shall render a service life of 30 years.

## **10. SUPPLY OF TECHNICAL DATA OF COUPLER**

- 10.1 TENDERER shall submit complete assembly drawings, and related specifications of the coupler and assembly being offered by him. These drawings shall be complete in respect of :
- 10.1.1 Material specification.
- 10.1.2 Estimated weight.
- 10.1.3 Dimensions.
- 10.1.4 Reference of detailed manufacturing drawings.

## **11. SUBMISSION OF OFFERS**

- 11.1 TENDERER shall offer clause by clause comments on this schedule, confirming compliance with all the clauses and elaborating, wherever necessary. In case there be any deviations, complete details of alternate proposal against the clause/s shall be given as a consolidated 'STATEMENT OF DEVIATIONS'. In the absence of any deviation, however, a 'NO DEVIATION STATEMENT' shall, necessarily, be given.
- 11.2 Tender offers shall also be accompanied with complete information listed in Annexure-C.
- 11.3 English translation of Standards quoted (other than those referred to in this schedule) and other documents shall be submitted with the offer.
- 11.4 The tenderer shall submit a list of wearable/ consumable parts along with the period after which these parts are expected to be changed. The tenderer shall quote for the price of these parts along with its offer.

## **12. MAINTENANCE OF COUPLERS**

- 12.1 The TENDERER shall provide detailed instructions for day-to-day and

workshop maintenance and shall include the following:

- 12.1.1 Detailed work content of various inspection / maintenance practices, including procedure for assembly and fitment of couplers. The work content of each schedule shall also be intimated.
- 12.1.2 A list of technical specification (for procurement purpose) of all special purpose tools, gauges and testing/ measuring instruments required for examination, repair and over-hauling / reconditioning of couplers. Price proposal for these tools, gauges and testing / measuring instruments shall also be submitted with the offer separately.
- 12.1.3 Recommendations suggesting scale of spares to be maintained for holding 500 couplers for a period of 10 years. Price proposal for these spares shall also be submitted, with the offer, separately.
- 12.1.4 Criteria for replacement of components of couplers during maintenance. These criteria should further meet the requirements of para 9.7 of this schedule.
- 12.1.5 Copy of Maintenance Manual, which details the maintenance procedures for couplers in workshops and open lines.
- 12.1.6 Maintenance Manuals at the rate of 10 copies of Maintenance Manuals for every supply of 500 couplers and also give a soft copy on CD with every order and subsequently whenever revised.
- 12.1.7 Bidders shall quote for unit price of following APTA gauges.

Sl.	Gauge	Description
1.	31000	Contour Maintenance Gauge
2.	32600	Aligning Wing limit Gauge
3.	34100-1	Contour condemning limit gauge
4.	34100-2A	Knuckle nose Wear and Stretch Limit Gauge
5.	34101-4	Vertical Height Aligning wing Pocket and Guard Arm gauge
6.	44250-5	Vertical height condemning limit Aligning wing Pocket and Guard arm Gauge

### 13. GUARANTEE

- 13.1 The CONTRACTOR shall, at his cost, replace the couplers and associated components failing prematurely or proving unsatisfactory in service for reasons attributed to defective / faulty design, defective material or poor workmanship within a period of 48 months from the date of delivery or 36 months from the date of fitment, whichever is earlier. This warranty shall survive, notwithstanding the fact that the couplers may have been inspected, accepted and payment thereof made by the PURCHASER. For the replaced coupler, the period of 36 months shall commence when the replaced coupler is commissioned in service. The sole judge in this case shall be the PURCHASER.

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Specification No. RDSO/2011/CG-03 (Final Draft)	Date/month of issue Oct. 2011	Annexure of specification
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## Annexure – A

### DESIGN PARAMETERS OF WDP<sub>2</sub> CLASS LOCOMOTIVE

1. Length over buffer beams	: 17900 mm
2. Length over buffer face to face	:19182 mm
3. Distance between bogie pivot centres	:10700 mm
4. Weight of locomotive	:117 t
5. Axle load	:19.50 t
6. Type of brake system	:28 LAVI/IRABI
7. Theoretical Brake Force	:23.72t
8. Type of coupler on locomotive	:AAR E/F
9. Nominal height of Coupler from rail level	:1090+15mm - 5
10. Number of Side Buffers per locomotive	: 2 per end (#)

#### NOTE:

# Locomotives are provided with Centre Buffer Couplers and Side Buffers.

## Annexure – B

### OPERATING CONDITIONS FOR COUPLERS

- |        |  |   |
|--------|--|---|
| 1.     | Coach Type   | :Broad Gauge Passenger Coaches<br>(fitted with CBC)           |
| 2.     | Axle Load  | :16.25t(max.)   |
| 3.     | Gross Load (Coach)                                   | :65t (max.)   |
| 4.     | Gross Load (Train)                                   | :1700 t (max. Without loco)                                   |
| 5.     | Grade  | :1 in 37 (steepest)   |
| 6.     | Speed (maximum)                                      | :160 km/h   |
| 7.     | Curve (Sharpest)                                     | :175 m (radius)   |
| 8.     | Climatic & Environmental<br>Conditions               |   |
|        | - Maximum Temperature<br>(under the sun)             | :70 <sup>0</sup> C  |
|        | - Maximum Temperature<br>(under shade)               | :45 <sup>0</sup> C  |
|        | - Minimum<br>Temperature(at night)                   | :-5 <sup>0</sup> C  |
|        | - Rainfall   | :Fairly Heavy   |
|        | - Humidity   | :100% saturation  |
|        | - Environment  | : Dusty during hot weather and<br>saline in coastal areas     |
| 9.     | Coupler Height (for coaches)                         | :1105 mm(from Rail Level)                                     |
| 10.    | Coupler Height (for locos)                           | :1090 mm (from Rail Level)                                    |
| 11.    | Wheel Diameter (for coaches)                         | :915 mm (new)<br>813 mm (condemning)<br>840 mm (LHB variants) |
| 12.(i) | Maximum coupling/uncoupling operations: 12 per day   |   |
| (ii)   | Speed at the time of coupling loco with rake: 3 kmph |   |

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13. Type of Brake System : Graduated Release Twin Pipe Air Brake System generally as per UIC 540. Coaches shall be equipped with disc brakes or clasp type brakes having composition or cast iron brake blocks.
14. Braking Distance of Train : 1200 m from a speed of 160 km/h
15. Maximum deceleration : 1.3 m/sec<sup>2</sup>
16. Rolling Resistance of Coaching stock:  
 $R = 0.685 + 0.0211V + 0.000082 V^2$   
Where, R= Rolling Resistance in kg/t of coach weight and  
V= Speed in km/h
17. Side Buffers : On end coaches next to locos.  
(Power Cars and SLRs only)
18. Coach Strength : Satisfies end load requirements as per UIC 566



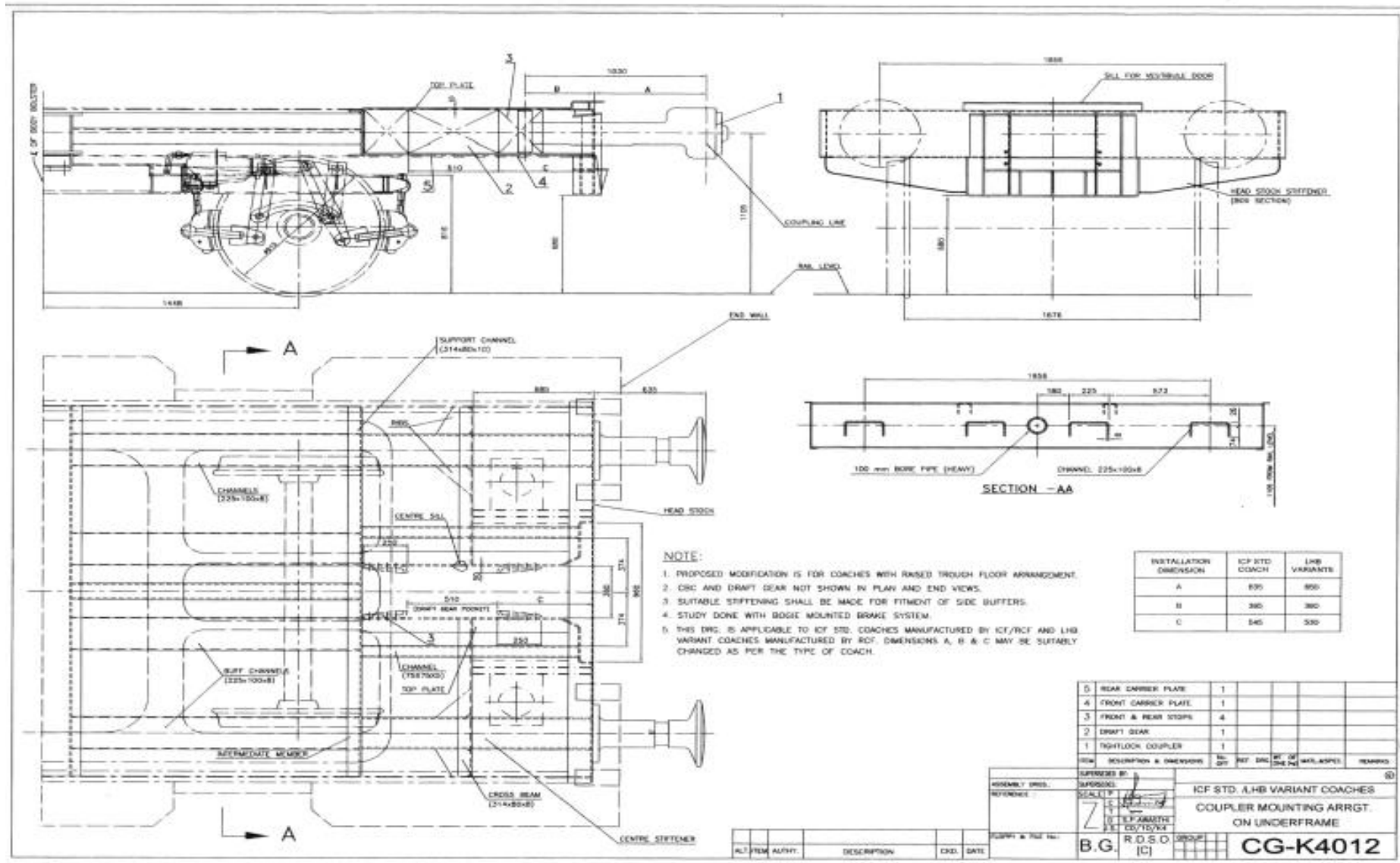
Specification No. RDSO/2011/CG-03 (Final Draft)	Date/month of issue Oct. 2011	Annexure of specification
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## Annexure – C

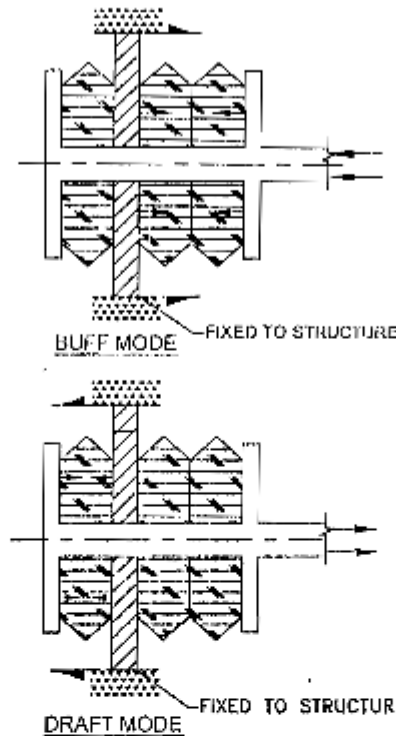
### INFORMATION TO BE SUBMITTED BY TENDERER WITH TECHNICAL OFFER

1. Drawing of coupler, yoke, yoke connection, draft gear details, coupler operating mechanism, coupler carrier, etc.
2. Copy of TENDERER'S internal quality assurance programme. In addition, TENDERER'S internal process specification and quality assurance programme certifying the casting integrity shall also be submitted.
3. Copy of document in support of AAR or other reputed agencies' approval.
4. Drawing of draft gear along with dimensional and material specification details and arrangement of draft gear.
5. Detailed calculations and technical basis for draft gear design offered.
6. Following parameters shall also be advised:
  - 6.1 Characteristic of the draft gear
  - 6.2 Capacity of the draft gear at various strokes proposed
  - 6.3 Capacity of draft gear at half travel
  - 6.4 Energy storage capacity of draft gear
  - 6.5 Energy absorption capacity of crash element (if required by the purchaser at the time of purchase).
  - 6.6 Initial pre-compression ,if provided.
7. Detailed procedures for building up coupler shank wear.
8. Detailed Procedure for Installation and Dismantling of draft gear (#)
9. Detailed Procedure for renewal of components of draft gear (#)

# Maintenance Manual, to this effect, giving detailed maintenance and repair procedure shall be submitted.



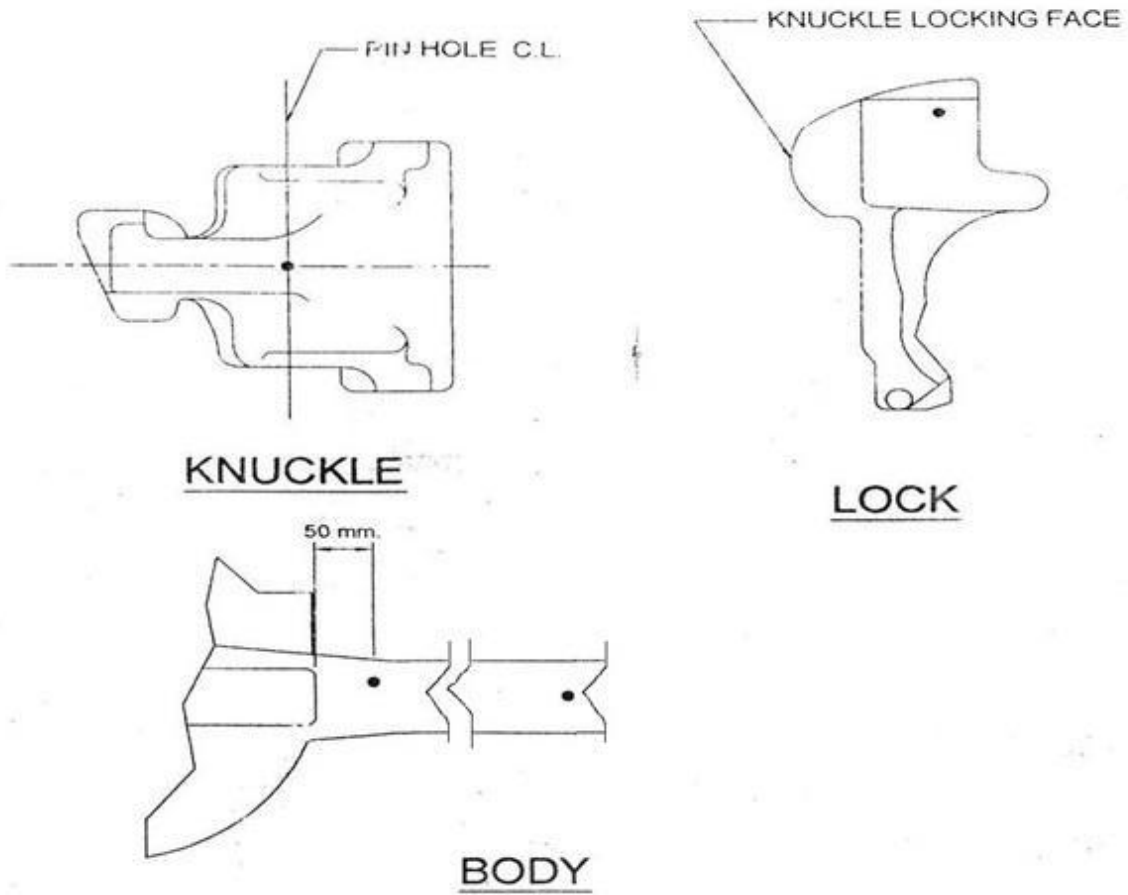
**FORCE FLOW DIAGRAM OF DOUBLE ACTING BALANCED DRAFT GEAR**



**NOTE**

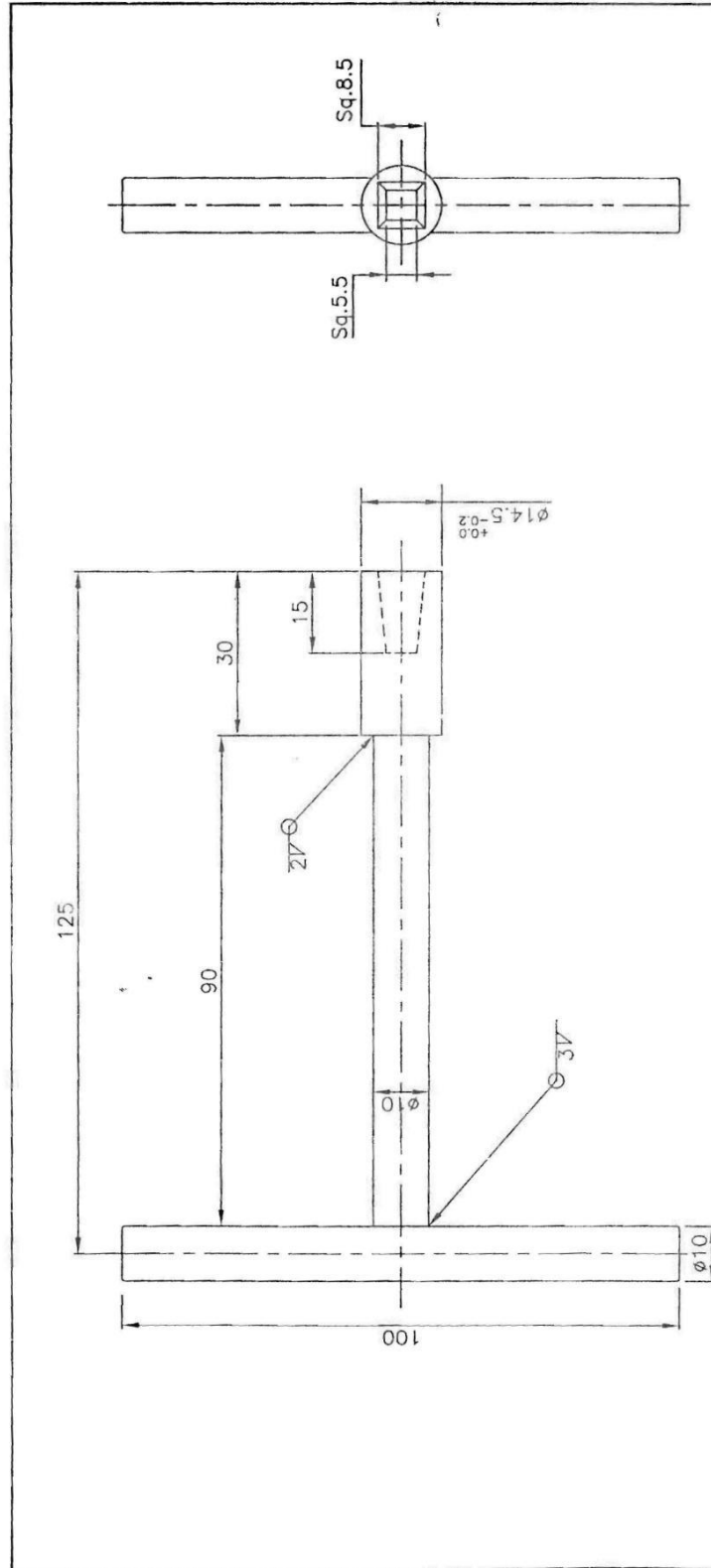
1. NO. OF PAD SHOWN IN THE SKETCH IS SYMBOLIC ONLY.
2. DRAFT GEAR ARRANGEMENT SHALL HAVE EFFECTIVE ZERO PRELOAD IN BUFF AS WELL AS DRAFT MODE. IT MEANS THAT FORCE Vs DISPLACEMENT CURVE OF DRAFT GEAR CHARACTERISTICS DRAWN FOR QUASISTATIC CONDITION SHALL PASS THROUGH ZERO FORCE AND SHALL HAVE REGULAR CURVE (NOT SEPARATED BY VERTICAL LINE) IN LOAD REVERSAL IN BOTH THE DIRECTIONS i.e.  
(a) BUFF TO NEUTRAL TO DRAW AND  
(b) DRAW TO NEUTRAL TO BUFF.

①		CD/48/11	NOTE ADDD.	08/11
ALT.		AJTHY	DESCRIPTION	DATE
SUPERSEDED BY				
SUPERSEDES ALT. NL				
REFERENCE:-	SCALE	IP	FORCE FLOW DIAGRAM OF DOUBLE ACTING BALANCED DRAFT GEAR	
	NTS	C		
		D		
		T		
		CD/10'08		
FILE No.:-	BG	RDSO (CARR AGE)	CG- K8207	



LOCATION FOR BRINELL  
HARDNESS TESTING

Fig. 1



MATERIAL – CLASS 3, IS:1875  
REMOVE SHARP EDGES AND CORNERS  
ALL DIMENSIONS ARE IN mm.

REFERENCE :- RDSO DRG. No. CG-K6036	SUPERSEDED BY:		ICF/RCF, CBC COACHES	
SCALE	P	SUPERSEDES:		
NTS	C	KEY FOR LOCKING SCREW OF MANUAL UNCOUPLING DEVICE		
	D	R.D.S.O. (CG)		
	J.S.	CD/7/10		
CDIC No.:- 1009	BG	CG-10100		