

INDIAN RAILWAYS

SPECIFICATION

FOR

**HIGH TENSILE CENTER BUFFER COUPLER
AAR E/F TYPE AND HIGH CAPACITY DRAFT GEAR FOR
BROAD GAUGE BOGIE WAGONS**

(Amendment No. 1 of March-2007)
(Amendment No. 2 of March-2010)

ISSUED BY

**RESEARCH DESIGNS AND STANDARDS ORGANISATION
MINISTRY OF RAILWAYS
MANAK NAGAR
LUCKKOW-226011
INDIA**

July, 2006

PRICE Rs. 8200.00

SPECIFICATION - NO. WD-66-BD-06

Amendment No. 2 of March' 2010 to Specification No. WD-66-BD - 06 of July' 2006 for High Tensile Centre Buffer Coupler AAR E/F type and High Capacity Draft Gear for Broad Gauge Bogie Wagons

1. Correction in the existing clauses with the following:

S. No.	Clause No.	
1.	4.3.1, 4.3.2.4 and 4.3.2.5	SK-62724 Alt. 19 shall be read as SK-62724 with latest alteration.
2.	4.3.2.7	WA/BD-4460 Alt. 6 shall be read as WA/BD-4460 with latest alteration.
3.	4.4.3	WA/BD-4462 Alt. 3 shall be read as WA/BD-4462 with latest alteration.

2. Appendix-A: - Alteration No. of all drawings shall be read as `with latest alteration`.

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Amendment No. 1 of March'07 to Specification No. WD-66-BD-06 of July'2006 for High Tensile Centre Buffer Coupler AAR E/F type and High Capacity Draft Gear for Broad Gauge Bogie Wagons

3. Replace the existing clauses with the following:

6.1	Inspection of all the items shall be carried out strictly as per relevant AAR Specifications.
8.1(b)	Details regarding supplies of Couplers and Draft Gears made by the tenderer during the past three calendar years with year-wise and type-wise break up and railroad system to which these supplies have been made.
11.1.1(a)	The tenderer has the unconditional approval of AAR Mechanical Division for manufacture of AAR Standard Couplers and parts and AAR approved Draft Gears generally corresponding to the items to be supplied as per this specification.
11.4	Marking: Marking on the Coupler and Draft Gear Components shall be finalized in consultation with RDSO.
11.6	The supplier shall also furnish a copy of the general instructions covering assembly, maintenance and reconditioning of these Couplers and Draft Gears with the tender offer for approval of Director General (Wagon) Research Design and Standard Organisation ministry of railways Manak Nagar Lucknow-226011, India.

4. Following clause will be added:

10.7	Deputation of qualified engineers/supervisors/artisan staff from the parent unit to India, if necessary, to sort out fitment/operational/maintenance problems.
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**SPECIFICATION FOR HIGH TENSILE CENTER BUFFER COUPLER AAR E/F
TYPE AND HIGH CAPACITY DRAFT GEAR FOR BROAD GAUGE BOGIE
WAGONS**

0.0 FOREWORD: -

- 0.1 This specification is intended to cover the technical provisions and does not include all the necessary provisions of the contract.
- 0.2 Whenever there is a conflict among the stipulations in the present specification, drawings or any of the relevant specifications, the most stringent requirement will apply.
- 0.3 IR uses Center Buffer Couplers of AAR type having 'E' type head and modified 'F' type shank for freight stock of B.G. system.
- 0.4 IR is at present having wagon of 23 t axle load and gross trainload of 5336 t (58 wagon train). These wagons can also be utilized in rake formation of 116 nos.
- 0.5 High tensile center buffer coupler AAR E/F type and high capacity draft gears as described herein after shall be suitable for running heavy haul trains mentioned in clause 0.4.
- 0.6 The Coupler and Draft Gears shall be strictly in accordance with latest AAR specifications, unless other wise specified in this specification.

1.0 SCOPE: -

- 1.1 This specification covers purchase and acceptance requirements, scope of supply, design parameters, performance requirements and inspection of the Couplers and Draft Gears.

2.0 DEFINITIONS: -

- 2.1 'PURCHASER' means the President of the Republic of India.
- 2.2 'IR' means Indian Railways.
- 2.3 'RDSO' means the Research Designs and Standards Organisation, Ministry of Railways, Manak Nagar, Lucknow-226011, India.
- 2.4 'TENDERER' means the firm/company that submits offer for supply of Couplers and Draft Gears as per this specification.
- 2.5 'CONTRACTOR' means the firm/company on whom order for supply of Couplers and Draft Gears, as per this specification, is placed/will be placed.
- 2.6 'INSPECTING AUTHORITY' means the organisation (or its representative) nominated by the Purchaser to inspect the supplies on his behalf.
- 2.7 'SUB-TENDERER' means any firm or company from whom the tenderer may obtain an item of supply, not manufactured by the tenderer himself.
- 2.8 'SUB-CONTRACTOR' means any firm or company from whom the Contractor may obtain any material, sub-assemblies used for the manufacture of Couplers and Draft Gears.
- 2.9 'AAR' means Association of American Railroads.
- 2.10 'BG' means 1676 mm gauge, referred to as Broad Gauge.
- 2.11 'IRS' means Indian Railway Standard.
- 2.12 'BRAKE RATE' means total brake block force as a gross load.

3.0 SCOPE OF SUPPLY:-

- 3.1 **CENTER BUFFER COUPLER: -**
- 3.1.1 The tenderer shall submit his offer for AAR type center buffer coupler with 'E' type head and modified 'F' type shank, consisting of the following items:

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Item	Name of the Parts	Nos. per coupler
1.	Coupler body with shank wear plate	1
2.	Knuckle	1
3.	Lock	1
4.	Knuckle Thrower	1
5.	Top Lock Lift Hole Cap	1
6.	Knuckle Pivot Pin	1
7.	Rotary Bottom Operated articulated Lock lift assembly	1
8.	Coupler Yoke	1
9.	Yoke Pin	1
10.	Yoke Pin Support with Wear Plate	1
11.	Striker Casting with Wear Plate	1

3.2 **DRAFT GEAR: -**

The tenderer shall submit separate offer for the draft gear. The draft gear shall consist of: -

1.	Draft Gear	1 no.
2.	Draft Gear Follower	1 no.

3.3 **GAUGES: -**

3.3.1 One complete set of maintenance gauges of Coupler components for each 500 nos., or part thereof, of supply of Coupler.

3.3.2 One complete set of maintenance gauges for Draft Gear and its components for each 500 nos., or part thereof, of supply of Draft Gears.

3.4 **CUT MODELS AND COLOURED WALL CHARTS**

3.4.1 The contractor shall supply following items free of cost to Railways:

- (i) One no. of cut model each of Coupler and Draft Gear per 1000 nos., or part thereof, of supply

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- (ii) 25 sets of colored wall charts, explaining working, component and details of maintenance requirements, of Coupler and Draft Gear per 1000 nos., or part thereof, of supply

4.0 DESIGN REQUIREMENTS: -

- 4.1 The static tension test requirements of the coupler body, knuckle and coupler yoke shall be as under: -

	Max. Permanent set of 0.76 mm at a load of	Min. Ultimate
(i) Coupler Body	318 t	408 t
(ii) Knuckle	180 t	295 t
(iii) Yoke	340 t	408 t

- 4.2 The material of the coupler body, knuckle, lock and coupler yoke shall be Grade E steel to AAR specification M-201. The castings shall be quenched & tempered and shall have chemical composition compatible with quench & temper heat treatment so as to gain the full mechanical properties imparted by this heat treatment.

4.3 COUPLER:

- 4.3.1 AAR Type E/F coupler shall be generally to AAR standard S-108 and generally to catalogue No. E68CE to with shank length as per drawing No. SK-62724 Alt. 19 (Item 1), indicated in Appendix – A. The coupler Shank Wear plate shall be as per AAR Standard S-137. The tenderer shall ensure the design conforms to current AAR Standards and shall guarantee trouble free performance of these couplers on Indian Railways.

- 4.3.2 Coupler parts shall be in accordance with AAR specification No. M-211 and AAR standard S-105 and S-130 and shall meet the stipulations given below:

4.3.2.1 Knuckle to AAR catalogue No. E 50 AE and AAR Standard S-105

4.3.2.2 Lock to AAR catalogue No. E 42 AE and AAR Standard S-105

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- 4.3.2.3 Knuckle thrower to AAR catalogue No. E 30 and AAR Standard S-105
- 4.3.2.4 Knuckle pivot pin to catalogue No. C-10 and AAR Standard S-105 with securing arrangement for Knuckle pin as per Drg. No. SK-62724 Alt.19 Item No. 4, indicated in Appendix-A
- 4.3.2.5 Articulated locklift assembly generally to Catalogue No. E 24B and AAR Standard S-105 but to be fitted with universal locklift lever connector (Item No.6 of Drawing No.SK-62724 Alt. 19, indicated in Appendix-A) for fitment of uncoupling gear on guard arm side of coupler body.
- 4.3.2.6 Top lift hole cap shall be to AAR Standards.
- 4.3.2.7 Striker casting shall be in accordance with drg. No. WA/BD-4460 Alt. 6 indicated in Appendix-A. However, the material of wear plate shall be in accordance with AAR Standard S-269.

4.4 COUPLER YOKE

- 4.4.1 Coupler Yoke shall be in accordance with Catalogue No.Y45AE to AAR Standard S-149.
- 4.4.2 Yoke Pin shall be in accordance with Catalogue No.Y47 and AAR Standard S-116.
- 4.4.3 Yoke pin support shall be in accordance with Drawing No. WA/BD-4462 Alt.3 indicated in Appendix-A. However, material of wear plate shall be AISI C 1095 or as per AAR Standard to M-201 Gr 'B'.

4.5 DRAFT GEAR:

- 4.5.1 Draft gear shall be strictly as per AAR specification No. M-901E. Draft gear shall have unconditional approval of AAR.
- 4.5.2 Draft gear follower shall be to AAR Catalogue No. Y46AE and AAR Standard S-119

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- 4.6 All components of coupler and draft gear shall be interchangeable. Gauging shall be carried out as per AAR Specification No. M-211 and other relevant specifications.
- 4.7 The coupler fitment and overall dimensions/material etc. of coupler and components shall also be in accordance with drawings listed in Appendix-A.
- 4.8 Notwithstanding the drawings listed in appendix-A and mentioned in para 4.7 above, the tenderer may offer coupler and parts with suitable improvements in designs, materials and fitment etc. provided these changes are in accordance with AAR proven practices and are with a view to improve the performance of IR coupler and draft gear. Technical reasons along-with relevant specification and data shall be furnished to substantiate the improvements. The tenderer shall also suggest changes for improvement considered necessary by him on fitment of coupler and to the items 19, 20,21and 22 of Appendix-A (Not required to be supplied).

5.0 PERFORMANCE REQUIREMENTS:-

5.1 CLIMATIC AND ENVIRONMENTAL CONDITIONS

Coupler and Draft Gears shall be suitable for operation under climatic and environmental conditions prevalent on Indian Railways, as under:-

- | | | |
|-------|---------------------------|---|
| 5.1.1 | Max. Temperature in sun. | 70 degree C |
| 5.1.2 | Max. Temperature in shade | 45 degree C |
| 5.1.3 | Min. temperature in night | -5 degree C |
| 5.1.4 | Humidity | 100% saturation during rainy season. |
| 5.1.5 | Rainfall | Fairly heavy. |
| 5.1.6 | Environment | Dusty during hot weather, saline in coastal areas |
| 5.2 | Max. Curvature of track | 175m |
| 5.3 | Max. Gradient | 1 in 37 |

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- 5.4 Max. Operating speed 120 km/h
- 5.5 Normal shunting speed 10 km/h
- 5.6 Freight stock may be fitted with single pipe/twin pipe graduated release compressed air brakes.
- 5.7 Maximum variation of height of Coupler of empty wagon and fully loaded Wagon- 75mm
- 5.8 For curving test on Couplers, drawings of BOXN and BCNA wagons are attached.
- 5.9 Suitable for impact load at shunting speed of 10% more than normal shunting speed and during braking with 20% brake rate with 'L' type brake block for a rolling stock of 100 t gross rail load.

6.0 INSPECTION:-

- 6.1 Inspection of all the items shall be carried out strictly as per relevant AAR Specifications. For Draft Gears destruction test shall be carried out on one assembly per 1000 Draft Gears, or part thereof, in addition to other tests stipulated in the AAR Specification.
- 6.2 Contractor shall provide such additional material or test pieces as may be required for testing and checking compliance with this specification, at his cost
- 6.3 Contractor shall provide free-of-charge labour and appliances required by the inspecting authority for inspecting whole of the works under contract..

7.0 MAINTENANCE:-

- 7.1 Complete details on maintenance practices to be followed for maintaining the Couplers and Draft Gears being offered against this specification will, inter alia, cover the following:
 - a) Maintenance standards including clearances and tolerances for various components / sub- assemblies.

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- b) Inspection procedures and periodicity of various inspection schedules including gauging practices.
- c) The work content of each inspection schedule shall also be indicated.
- d) Maintenance procedures.
- e) Facilities for maintenance, e.g.
 - (i) Machinery and Plant required
 - (ii) Gauges, Jigs and Fixtures and tools required

7.2 Life achieved of components subjected to wear under operating conditions prevalent in tenderer's country shall be submitted with the offer.

7.3 Tenderer shall make recommendations suggesting scale of spares to be provided for holding of 5000 Couplers and Draft Gears for a period of six years. Price proposals for these spares shall also be submitted with the offer separately.

7.4 The tenderer shall also undertake to supply complete manufacturing drawings of gauges necessary for inspection, maintenance and reconditioning of Couplers as per AAR Specification M-212, in case order is placed on him.

7.5 Tenderer shall also advise criteria for replacement of Draft Gear springs and friction elements.

7.6 Tenderers may note that wagons are normally overhauled in workshops after 6 years.

8.0 SUBMISSION OF OFFER:-

8.1 The offer shall be submitted in five copies. It shall, inter alia, consist of –

- a) All technical details required to be submitted by the tenderer as asked for in this specification including the particulars in Appendix-B.
- b) Details regarding supplies of Couplers and Draft Gears made by the tenderer during the past three years (viz. during the years 2003, 2004 and 2005) with year-wise and type-wise break up and railroad system to which these supplies have been made.

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- c) Details of the current order of Couplers and Draft Gears being executed type-wise and the railroad system to which such supplies are being made.
- d) Letters/certificates from the railroad to which such supplies have been made in the past, testifying to the quality and service reliability of the Couplers and Draft Gears supplied by the tenderer.
- e) Commercial terms and conditions for supply of Couplers and Draft Gears conforming to this specification.

8.2 Tenderer shall offer clause-by-clause comments on this specification conforming compliance with the clause and elaborating wherever necessary. In case there are any deviations, complete details of alternate proposals against the clause shall be given.

8.3 In addition, the tenderer shall submit consolidated statement of deviations from this specification.

8.4 In case, the tenderer does not require any deviation from this specification, a NIL DEVIATION certificate will be submitted by him.

8.5 English translation of standard quoted and other documents shall be submitted with the offer, in case original standards and other documents are in any other language.

8.6 Offers which are incomplete in respect of details indicated vide clause 8.1 to 8.5 are liable to be ignored.

9.0 PRICES

9.1 Tenderer shall in his offer give cost per item (see clause 3.1, 3.2 & 3.3 for items) with break up cost of components as well as total cost.

10.0 CONTRACTORS' RESPONSIBILITY:

Contractor shall be completely responsible for: -

10.1 The Execution of the contract in accordance with this specification and for satisfactory operation of the Couplers and Draft Gears supplied by him, irrespective of any approval which purchaser / RDSO may have given.

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- 10.2 Ensuring that the drawing prepared by the Contractor and design features incorporated therein are as per latest AAR Standards.
- 10.3 Assemblies, sub-assemblies and component during the course of manufacture at the contractor / sub-contractors' works.
- 10.4 The sub-contractor for any item / material or fitting.
- 10.5 Other parts of works involved in the contract.
- 10.6 For bearing the associated costs of tests/ checks carried out by the Purchaser/ Inspecting Authority.

11.0 GENERAL AND OTHER QUALIFYING REQUIREMENTS:-

11.1 QUALIFYING REQUIREMENTS:

- 11.1.1 The Tenderer shall provide a satisfactory evidence acceptable to the purchaser to show that: -
 - a) The tenderer has the approval of AAR Mechanical Division for manufacture of AAR Standard Couplers and parts and AAR approved Draft Gears generally corresponding to the items to be supplied as per this specification.
 - b) He has supplied a minimum of 2000 nos. similar Couplers and Draft Gears during last two calendar years. List of supply made and performance certificate from user railways shall be submitted.
 - c) He has a well-equipped Foundry with requisite heat treatment facilities, a sound R&D back up and that he regularly manufactures the items offered and has adequate technical knowledge and practical experience. He should possess or failing that be associated with design capability for the Couplers and Draft Gears offered.
 - d) He has adequate financial stability and status to meet the obligations under the contract for which he is required to submit a report from a recognized bank or a financial institution. He should also submit a copy of his company's latest annual report.
 - e) He had adequate plant and manufacturing capacity to manufacture and supply the items offered within the delivery schedule offered by him.

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- f) He has an established quality control system and organisation to ensure that there is adequate control at all stages of the manufacturing process.
- 11.1.2 For purposes of para 11.1.1, the tenderers should submit information as required in Appendix-B.
- 11.1.3 The tenderer should submit offers for only such Draft Gears which have the unconditional approval of AAR and which meet the requirements of this specification and AAR M-901-E specification.
- 11.1.4 In additional to the above, further information, regarding his capacity/capability, if required by the purchaser, shall be promptly furnished by the tenderer.
- 11.1.5 Tenderer not submitting the requisite information may note that his offer is liable to be ignored.
- 11.2 Documents and design data required with the bid documents are indicated in Appendix-B.
- 11.3 Manufacturer shall supply Installation and Maintenance Manuals for proper installation and maintenance of Coupler and Draft Gear to RDSO. The number of manuals to be supplied shall be 25 per 1000 nos., or part thereof, of Couplers and Draft Gears and shall be free of cost. The manual shall contain following information:
- i) Principal of operation and important design features
 - ii) Illustration explaining the working and maintenance practices
 - iii) Details of attention required during overhauling
 - iv) Special tools, capacity and specification
 - v) Details of welding equipments & method of welding
 - vi) List of spares along with the specification and part No. etc
- 11.4 **Marking:** Marking on the Coupler and Draft Gear Components shall be as per relevant provisions in AAR specifications.
- 11.5 Before commencing manufacture, successful tenderer should put up a full set of Coupler and Draft Gear drawings and gauging scheme drawings to the Director General (Wagon), Research, Designs and Standards Organization, Manak Nagar, Lucknow-226011, India for approval.

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- 11.6 The tenderer shall also furnish a copy of the general instructions covering assembly, maintenance and reconditioning of these Couplers and Draft Gears with the tender offer for approval of Director General (Wagon) Research Design and Standard Organisation ministry of railways Manak Nagar Lucknow-226011, India. Successful Tenderer shall supply further 1000 copies of the approved instructions pamphlet to the Director General (Wagon) Research Design and Standard Organisation Ministry of Railways, Manak Nagar Lucknow-226011, India within one month after opening of letter of credit.

12.0 GUARANTEE:-

- 12.1 The Contractor shall at his expense, replace the Couplers, Draft Gears and components failing or proving unsatisfactory in service attributed to defective/faulty design, defective material or poor workmanship within a period of 72 months after their delivery or 60 months after the date of fitment whichever is earlier. This warranty shall survive notwithstanding the fact that the equipment may have been inspected, accepted and payment thereof made by the purchaser for the replaced equipment and period of 60 months would commence when the replaced component is commissioned in service. The sole judge in this case would be the purchaser.

13.0 TECHNICAL CLARIFICATIONS

Technical Clarifications, if any, required by the tenderer, can be obtained from: -

**Director General (Wagon)
Research, Designs & Standards Organisation,
Govt. of India, Ministry of Railways,
Lucknow –226011 (INDIA)**

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APPENDIX-A

**LIST OF IR DRAWINGS FOR CENTER BUFFER COUPLER, COUPLER PARTS
AND FITMENT ARRANGEMENT ON EXISTING WAGON.**

S.NO.	DESCRIPTION	DRAWING NO.
1.	ARRANGEMENT OF HIGH TENSILE CENTER BUFFER COUPLER (NON-TRANSITION).	WD-81010-S-03 ALT. 8
2.	COUPLER BODY	SK-62724 ALT. 19 ITEM 1
3.	KNUCKLE	SK-62724 ALT. 19 ITEM 2
4.	YOKE	SK-62724 ALT. 19 ITEM 3
5.	LOCK	SK-62724 ALT. 19 ITEM 8
6.	KNUCKLE PIVOT PIN WITH WASHER	SK-62724 ALT. 19 ITEM 4
7.	TOGGLE	SK-62724 ALT. 19 ITEM 5
8.	UNIVERSAL LOCK LIFT LEVER CONNECTOR	SK-62724 ALT. 19 ITEM 6
9.	LOCK LIFT LEVER HOOK	SK-62724 ALT. 19 ITEM 7
10.	KNUCKLE THROWER	SK-62724 ALT. 19 ITEM 9
11.	SHANK WEAR PLATE	SK-62724 ALT. 19 ITEM 10
12.	TOP LIFTER HOLE CAP	SK-62724 ALT. 19 ITEM 11
13.	YOKE PIN	SK-62724 ALT. 19 ITEM 12
14.	LOCK LIFT LEVER RIVET	SK-62724 ALT. 19 ITEM 16
15.	LOCK LIFT RIVET	SK-62724 ALT. 19 ITEM 17
16.	YOKE PIN SUPPORT WITH WEAR PLATE	WA/BD-4462 ALT.3
17.	STRIKER CASTING	WA/BD-4460 ALT.6
18.	STRIKER CASTING WEAR PLATE	WD-87056-S/1 ALT.4
19.	BACK STOP	W/BD-699 ALT. 1
20.	YOKE SUPPORT PLATE	WD-80007-S-14 ALT.18
21.	SAFETY PLATE WITH ANCHOR PLATE	WD-80007-S-14 ALT.18
22.	UNCOUPLING GEAR	WD-00046-S-01 ALT.1

NOTE:

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1. Items at serial nos. 19, 20, 21 & 22 are not required to be supplied by the tenderer
2. Items other than those listed above of drawings SK-62724 and WD-80007-S-14 are not relevant to this specification.

APPENDIX-B

INFORMATION TO BE SUBMITTED BY TENDERER WITH THE OFFER

1. Drawing of all the item listed in clause 3.1 & 3.2 along with components as well as drawings of assembled Coupler and its fitment on wagon, Drawings shall be suitably sectioned to show all details and shall give: -
 - a) Important dimensions and tolerances.
 - b) Material specifications.
 - c) Reference of manufacturing drawings.
 - d) Reference of gauges to be applied.
 - e) Weight.
2. All the information required to be furnished by manufacturer as per AAR specifications M-211, M-901E and any other specifications, which may be applicable for supply of Couplers and Draft Gears to American Railroads.
3. Copy of documents in support of the AAR approval for manufacture of all the items.
4. Complete test results of all the tests carried out by AAR for granting conditional and unconditional approval for Draft Gear.
5. Copies of documents in support of AAR approval of Draft Gear offered. Detailed calculations and considerations on which choice of the Draft Gear offered is based.
6. Strength of Coupler body, Yoke and Knuckle as per details below:
 - a) Minimum, maximum and average ultimate strength
 - b) Strength minimum, maximum and average at max. Permanent set of 0.76mm (0.03 inch)

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- c) Maximum allowable continuous working load under dynamic conditions
 - d) Maximum peak values and their frequencies, which can be allowed
7. Performance and other data of Draft gear, as per details below:
- a) Rating Travel
 - b) Official Capacity
 - c) Maximum Travel in Draft (in inches)
 - d) Maximum Travel in Buff (in inches)
 - e) Total Maximum Travel (in inches)
 - f) Coupler horn clearance at Maximum Travel
 - g) Reaction force level at Rating Travel
 - h) Energy absorption in % of Official Capacity
 - i) Recoil in % of Official Capacity
 - j) Free slack
 - k) Gear weight
8. Graph of Reaction Force v/s Travel characteristics of Draft Gear
9. Copies of all the latest AAR and other specifications referred to by him in his offer and accompanying drawings/documents.
10. Details of the foundry, heat treatment and in-house Testing, Research and Development (R&D) facilities and the design capability possessed by the tenderer and his associates.
11. Details of the Quality Assurance Programme followed by the tenderer and his associates.
12. Any other information which tenderer has been asked to submit in other clauses of this specification, but not included in this Appendix.