

Clause No.	Clause	M/s Dadi Inf. Pvt. Ltd.	M/s Jupiter Wagon Ltd.	M/s Knorr-Bremse	RDSO Comments
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Sub.: Reasoned document on draft specification for Standardized Brake Disc for LHB Coaches to RDSO spec. RDSO/2017/CG-02 (Rev.1).

3.3	The firm should possess ISO:9001 certificate issued by International Accreditation Forum (IAF) under Multilateral Recognition Arrangement (MLA) for his works address, covering the items for which he seeks registration with RDSO.	Not acceptable, To be consider for maintaining quality of the product.			The requirement of ISO certificate is covered in RDSO ISO doc. No. QO-F-8.1-7 (Ver. 1.3) 'List of Documents to be sought from Vendor at the time of Registration & Annexures/forms'. No change required.
5.4	Friction ring & hub shall be assembled by using M12 bolts conforming to IS:1364-2002 Part-I and IS:1367-2002 Part-III or equivalent, with suitable mating nuts.		Friction ring & hub shall be assembled by using M12 bolts conforming to IS: 1364-2002 Part-I and IS: 1367-2002 Part-III or ISO 4014 or equivalent, with suitable mating nuts. <i>Equivalent ISO standard added as ISO standard internationally recognized.</i>		Comments may be accepted. However, no change needed as the word 'equivalent' is already mentioned in the phrase which permits for the use of equivalent standards.
5.19	Unless the purchaser requests otherwise, a suitable hole and groove feature shall be incorporated to facilitate pressurized liquid assisted assembly and/or disassembly of hub and axle. The threaded hole connection is to be closed with a locking bolt G1/4A DIN 908 and sealing ring A14 x 20 x 1.5 DIN 7603.		Unless the purchaser requests otherwise, a suitable hole and groove feature shall be incorporated to facilitate pressurized liquid assisted assembly and/or disassembly of hub and axle. The threaded hole connection is to be closed with a locking bolt G1/4A DIN 908/DIN 910 and sealing ring A14 x 20 x 1.5 DIN 7603/ A14 x 18 x 1.5 DIN 7603. <i>New option added</i>		Comments may partially be accepted. Para may modify as: ".....The threaded hole connection is to be closed with a locking bolt G1/4A DIN 908/ DIN 910 and sealing ring A14 x 20 x 1.5 DIN 7603." <ul style="list-style-type: none"> • <i>DIN 908 specifies for 'Hexagon socket screw plugs' while DIN 910 specifies for 'Heavy-duty hexagon head screw plugs'.</i> • <i>Screw plug as per DIN 910 is mentioned in FIAT spec. for Brake Disc & similar type is also shown in EN 14535-1.</i> • <i>Din 910 have two categories of G1/4 screw plug with dimension 'i' as 8 & 12 respectively. FIAT spec. specifies screw plug as 'G1/4A X 8', while dimension 'i' of plug as shown in diagram is '12'. As per Para 2 in footnote of the table at Page 2 of DIN910, it is mentioned that "The size (with short stud end) is not recommended....."</i> • <i>The properties (material, product grade, surface finish etc.) are similar for the screw plugs as per DIN 908 & 910.</i> • <i>As per DIN 910 & 908, plugs mentioned in these standards may be used together with seal rings as specified in DIN 7603 'Sealing rings for compression couplings and screw plugs'.</i> • <i>Sealing ring mentioned as per A14 X 20 X 1.5 DIN 7603 is in conformance to FIAT specification requirement.</i> • <i>Brake Disc manufacturers are using both DIN 908 & 910 type screw plugs.</i>

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8.1.4	FEA report of brake disc offered to Indian Railways. The maximum stress from the FEA at the specified load, with a factor of safety of at-least 1.50, shall be less than the allowable fatigue limit. The FEA report must include an analysis for fatigue life showing the damage factor due to loads imposed by vertical and lateral axle box acceleration and thermal loads resulting from friction between disc and brake pads. The FEA report shall include but not limited to, the following:.....			<p>FEA report of brake disc must be offered to Indian Railways in case of new supplier entrant or any critical design changes in brake disc by existing supplier which may affect the parameter described in clause below. The maximum stress from the FEA at the specified load, with a factor of safety of atleast 1.50, shall be less than the allowable fatigue limit. The FEA report must include an analysis for fatigue life showing the damage factor due to loads imposed by vertical and lateral axle box acceleration and thermal loads resulting from friction between disc and brake pads. The FEA report shall include but not limited to, the following:.....</p> <p><i>The existing brake discs already endured these conditions and had performed successfully over the years.</i></p>	<p>Comments may be accepted.</p> <p>Para may modify as:</p> <p>“FEA report of brake disc must be offered to Indian Railways in case of new supplier entrant or any critical design changes in brake disc by existing supplier which may affect any physical/chemical/functional property of the brake disc. The.....”</p>
8.1.9	For a new entrant or in case of any design changes of the existing approved registered suppliers, the type and routine test specification and test reports shall be submitted. RDSO or authorized Railway representative have their discretion to pick up sample for conducting type and routine test.	<p><i>Please specify design change (major changes e.g material) requirement in the clause.</i></p> <p><i>For minor design changes no need for routine test.</i></p>			No change required.
11.2	Brake Disc shall be free from casting defects.		<p>Brake Disc machining surface shall be free from casting defects. Brake discs shall not have any casting defects beyond acceptance limit. This limit can be defined by manufactures during application.</p> <p><i>As per metallurgy experts, Casting defects upto allowable limit do not impact in product performance.</i></p>		No change required, as the mentioned requirement provides better clarity.
11.4	The surface roughness on friction faces shall be $\leq 16\mu\text{m}$, except where otherwise specified by the IR or purchaser.		<p>The surface roughness on friction faces shall be $< 16\mu\text{m}$ Ra, except where otherwise specified by the IR or purchaser.</p> <p><i>Surface roughness unit of</i></p>		<p>Comments accepted. Para may modify as per EN 14535-1 as:</p> <p>“The surface roughness on friction faces shall be Rz$\leq 16\mu\text{m}$, except.....”</p> <p><i>Rz is also mentioned in EN 14535-1.</i></p>

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			<i>measurement added.</i>		
11.5	The surface roughness on hub bore shall be between 0.8µm to 3.2µm, except where otherwise specified by the IR or purchaser.		The surface roughness on hub bore shall be between 0.8µm Ra to 3.2µm Ra, except where otherwise specified by the IR or purchaser. <i>Surface roughness unit of measurement added.</i>		Comments accepted. Para may modify as per EN 14535-1 as: "The surface roughness on hub bore shall be between Ra= 0.8µm to 3.2µm, except....." <i>Ra is also mentioned in EN 14535-1.</i>
13.4.2	1% or minimum two disc picked up at random shall be verified for tests mentioned in clause 14.2.1 (a), (b), (c) & (d) of specification during prototype inspection. The supplier shall produce relevant test reports of the test done on the test bars/chilled samples used for the manufacture of particular batch/lot/heat of disc for the tests mentioned in clause 14.2.1 (a), (b), (c) & (d) during purchase inspection. Manufacturer also keep the test bar/chills samples with appropriate marking of each heat, received from raw material supplier, which have gone for manufacturing of friction ring and to be tested. The test result must confirm to the specified value.			<i>Retention period for samples is to be specified.</i>	Comments accepted. A new para "The manufacturer shall preserve the sample for the period of 18 months from the date of supply. " is added.
15.1	The brake disc offered by the new supplier who have not experience in manufacturing of brake disc for Railway application shall be subjected to field trials on minimum 18 coaches (Preferably 1 rake) for a period of minimum 2 years 18 months or 4,00,000 3,00,000 Km whichever is later.		The brake disc offered by the new supplier having no prior experience in manufacturing of brake disc for Railway application shall be subjected to field trials on minimum 18 coaches (Preferably 1 rake) for a period of minimum 3 years or 4,00,000 km whichever is later. <i>Since Brake disc is a safety critical product, the minimum period of field trail validation is recommended as 50% of warranty period for no prior experience suppliers.</i>	The brake disc offered by the new supplier having no prior experience in manufacturing of brake disc for Railway application shall be subjected to field trials on minimum 18 coaches (Preferably 1 rake) for a period of minimum 36 months or 3,00,000 km whichever is later . <i>Since brake discs are a safety critical element, thorough in-service trials are necessary before clearance is given for supply.</i>	Comments not accepted as it may hinder in increasing vendor base of the item. No change required.
15.2	In case the brake disc is offered by a new supplier having technical collaboration with any collaborator having experience of at least 5 years in manufacturing of brake disc for Railways, and similar design brake disc of collaborator has satisfactory performance for more than 2 years on			In case the brake disc is offered by a new supplier having technical collaboration with any collaborator having experience of at least 5 years in manufacturing of brake disc for Railways, and similar design brake disc of collaborator has satisfactory performance for more than 2 years	Comments not accepted as it may hinder in increasing vendor base of the item. No change required.

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	any international Railways (for at least 18 coach sets), the field trial shall be on minimum 18 coaches (Preferably 1 rake) for a period of minimum 09 months or 1,50,000 km whichever is earlier. The supplier shall provide collaborator's detail design, drawings, supplies made to Railways and satisfactory performance certificate from end user. Supplier shall also submit MOU with collaborator for transfer of technology (TOT). Authenticity of MOU of Collaborator shall be checked at initial level before any decision on trial etc. for item.			<p>on any international Railways (for at least 18 coach sets), the field trial shall be on minimum 18 coaches (Preferably 1 rake) for a period of minimum 18 months or 3,00,000 km whichever is earlier. The supplier shall provide collaborator's detail design, drawings, supplies made to Railways and satisfactory performance certificate from end user. Supplier shall also submit MOU with collaborator for transfer of technology (TOT). Authenticity of MOU of Collaborator shall be checked at initial level before any decision on trial etc. for item.</p> <p><i>Since brake discs are a safety critical element, thorough in-service trials are necessary before clearance is given for supply.</i></p>	
1.1 of Annex-I	This section covers the infrastructural requirements for manufacture of standardized brake disc used in LHB Coaches of Indian Railways.			<p>This Section covers the infrastructural requirements for manufacture of standardized brake disc used in LHB Coaches of Indian Railways.</p> <p><i>There is typographical error as repetition of 'manufacture of'.</i></p>	Comments accepted. Typographical error, para may corrected accordingly.
12.c of Annex-III	Super elevation (max): 1765 mm max. 185 mm	Please Check			The mentioned requirement is as per latest information (<i>mentioned in train set specification</i>).

Note: *Italic texts are the reason for the statements.*