

TENDER SPECIFICATION

No. CLW/MS/3/Bogie/005

TOTAL NO. OF SHEET: 8 + 1 (Alteration sheet) .


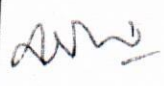

Alt. No.	1							
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TENDER SPECIFICATION  
FOR

SEALING ADHESIVE FOR 3-PHASE ELECTRIC LOCOMOTIVES


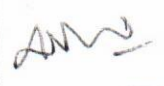

ISSUED BY:

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DIST: BURDWAN, WEST BENGAL (INDIA)

			SPECIFICATION FOR SEALING ADHESIVES	Chittaranjan Locomotive Works
Prepared by SSE/Drg.	Reviewed by SME/D	Approved by Dy.CEE/D-II	FOR 3-PHASE LOCOS	SPECN. No. CLW/MS/3/Bogie/005 alt-1

**Tender Specification of Sealing Adhesive for 3-Phase Electric Locomotives:**

1. **Scope:**  
This tender specification covers the minimum requirement of manufacturing, testing and supply conditions of Sealing Adhesives to be used in 3-Phase Electric Locomotives.
2. **General:** The sealing adhesives are capable of absorbing micro movement between a variety of materials and give even distribution of stresses and sound damping.
3. **Technical Requirement:**
  - 3.1 The sealing adhesives shall be suitable for being delivered, stored, applied and put to use under tropical conditions of high temperature, high humidity, heavy rainfall and fungus conducive environment.
  - 3.2 The sealing adhesives shall remain impervious to oil and water.
  - 3.3 The sealing adhesives shall be suitable for being painted over and its properties shall not deteriorate due to the application of paint.
  - 3.4 The required service life will be for a minimum of 10 (Ten) years from the date of application. The sealing compound shall remain serviceable for a period of at least 06 (Six) months from the date of packing in the original sealed containers, when stored at temperature not exceeding 30°C. The supplier shall also provide the self life data for the storage at 30°C. The sealing adhesives shall maintain serviceability life in the temperature range - 10°C to 80°C.
  - 3.5 No residual odours shall be apparent after 07 (Seven) days from the date of application.
  - 3.6 Migration of oil, solvents, resins, dyes and other substances to surrounding areas is not acceptable.
4. **Manufacture:**
  - 4.1 The chemical basis of sealant adhesive may be Anaerobic or any other in nature as per the item in particular. Anaerobic adhesives cure in the absence of air and in the presence of Metal. Anaerobic adhesives are used for Thread Locking, Retaining, Pipe Sealing and Liquid Gasketing etc.
  - 4.2 Working room temperature should not be below 15°C and relative humidity not less than 30%.

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9.2 Proper function of caulking Gun wherever applicable with compound shall be guaranteed by the supplier.

10. **Packing & Delivery:**

The protective packing to be done which is suitable for transport and storage under the conditions mentioned in Clause 3.1 and will prevent any damage or deterioration of the material during handling, transit and storage. Storage period considered maximum as self life period of the product as printed on the cartridge.

11. **Technical Data:**

Technical Data Sheets (1, 2 & 3) as a general guideline has been included in page no. 6, 7 and 8.

12. **Environmental Test:**

Environmental Tests according to technical standard as tabled below will be called for prototype test / major failure / deviation of Technical data as per the purchaser need from NABL accreditation laboratory.

Environmental Testing						
Item - Loctite or Equivalent	Hot Strength as (%) of Initial Break loose Torque	Heat Ageing as (%) of Initial Break loose Torque for 1000 Hrs	Aged under motor oil media as (%) of Initial Break loose Torque for 1000 Hrs	Aged under Gasoline Media as (%) of initial Break loose Torque for 1000 Hrs	Aged under Water media as (%) of initial Break loose Torque for 1000 Hrs	Tech. Standard
	AT 120°C	AT 120°C	AT 125°C	AT 22°C	AT 87°C	
242	Min 25%	Min 75%	100%	95%	70%	DIN 267 part 27 M10 Steel Nut & Bolts
577	Min 25%	100%	100%	-	50%	
262	Min 50%	Min 75%	Min 60%	100%	Min 75%	
241/243	Min 60%	100%	100%	100%	100%	
271/270	>50%	>50%	>70%	>90%	>80%	
542	>25%	>50%	>80%	-	>80%	
767	-	-	-	-	-	-
7649	-	-	-	-	-	-

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## 5. Inspection & Testing:

- 5.1 Nominated representative of Chittaranjan Locomotive Works/Railways will carry out the inspection of the sample. All the necessary tests conducted during inspection shall be arranged and borne by the supplier.
- 5.2 Any defect / deviation in physical properties or non-conformance with a stipulation shall lead to the rejection of particular sealing adhesive.

## 6. Supply of Documents:

- 6.1 The supplier shall provide the data sheet and the application instructions and details.
- 6.2 Material certificate indicating the specification.
- 6.3 Health and Safety Data Sheet to be submitted.
- 6.4 Test procedure as per relevant DIN / ISO to be supplied during offer.
- 6.5 For equivalent supply vendor have to submit copy of Test Document from NABL/NABL Accredited Laboratory for their product.

## 7. Labeling & Marking:

With respect to the limited self life at the elevated temperature, each individual cartridge shall be labeled to provide the following informations.

- i) Item Identification or description.
- ii) Colour, quality, recommended storage temperature.
- iii) Data, Month and Year of manufacture.
- iv) Date of Expiry.
- v) Original Equipment Manufacturer's name.
- vi) Manufacturer's Batch No. & Code No.

## 8. Quality Assurance:

Quality Assurance Plan should be as per ISO-9000, and in the line of Format No.FLD-014 issued by CLW.

## 9. Guarantee:

- 9.1 All aspects of design, workmanship and material will be covered by the guarantee of satisfactory performance of the product from the date of application for at least 10 (Ten) years.

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Environmental Testing						
Item - Loctite or Equivalent	Hot Strength as (%) of Initial Lap Shear Strength	Hot Strength as (%) of Initial Lap Shear Strength	Heat Ageing as (%) of Initial Lap Shear Strength for 1000 Hrs	Aged under motor oil media as (%) of Initial Lap Shear Strength for 1000 Hrs	Aged under Gasoline media as (%) of initial Lap Shear Strength for 1000 Hrs	Tech. Standard
406	AT 20°C	AT 80°C	AT 80°C	AT 40°C	AT 22°C	ASTM D 1002:2010 Grit Blasted Mild Steel
	100%	>50%	>50%	>50%	>80%	
Item - Loctite or Equivalent	Hot Strength as (%) of Initial Compressive Shear Strength	Heat Ageing as (%) of Initial Compressive Shear Strength for 1000 Hrs	Aged under brake fluid media as (%) of Initial Compressive Shear Strength for 1000 Hrs		Aged under Water media as (%) of initial Compressive Shear Strength for 1000 Hrs	Tech. Standard
638	AT 150°C	AT 150°C	AT 22°C		AT 87°C	ASTM D 4562:2013 TS 101 Grade Pin and Collar
	Min 50%	100%	100%		100%	
Item - Loctite or Equivalent	Hot Strength as (%) of Lap Shear Strength	Heat Ageing as (%) of Initial Lap Shear Strength for 1000 Hrs	Aged under motor oil media as (%) of Initial Lap Shear Strength for 1000 Hrs		Aged under Water media as (%) of initial Lap Shear Strength for 1000 Hrs	Tech. Standard
518	AT 150°C	AT 120°C	AT 120°C		AT 87°C	ASTM D 1002:2010
	>25%	>100%	100%		>50%	

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**Technical Data (Sheet 1 of 3)**  
**Specification No. CLW/MS/3/Bogie/005**

Sl. No.	Loctite Parameters	Loctite 241/243	Loctite 242	Loctite 577	Loctite 262	Tech. Standard/ Routine Inspection
1.	Application	Thread Locking / Bearing Thread Locker	Nut Lock / Thread Locking	High Pressure Pipe Sealant / Thread Sealant	Stud Lock / Thread Locking	-
2.	Features	Medium Strength, Liquid	Medium Strength, Liquid	Sealing Paste	High Strength, Liquid	-
3.	Chemical Type	Di Methylacrylate Ester (Anaerobic)	Di Methylacrylate Ester (Anaerobic)	Di Methylacrylate Ester (Anaerobic)	Di Methylacrylate Ester (Anaerobic)	FTIR (Fourier Transform Infrared Spectrometer)
4.	Colour	Blue	Blue	Yellow	Red	Visual
5.	Handling cure time	10 – 30 minutes	5 – 30 minutes	<del>20 – 30 minutes</del> 5 – 30 ①	<del>10 – 30 minutes</del> 5 ①	DIN 267 Part 27 M10 Black Bolt & Nut / ISO 10964
6.	Ultimate Strength	24 hours	24 hours.	24 hours.	24 hours.	
7.	Compressive Shear Strength	8 – 14 N/mm <sup>2</sup>	5 – 14 N/mm <sup>2</sup>	5 – 13 N/mm <sup>2</sup>	10 – 30 N/mm <sup>2</sup>	ASTM D4562:2013 TS 101 Grade Steel Pin & Collar / ISO 10123
8.	Break away Torque	15 – 35 Nm	8 – 18 Nm	<del>9.6 – 15 Nm</del> ①	14 – 29 Nm	DIN 267 Part 27
9.	Prevailing Torque	5 – 20 Nm	2 – 7 Nm	<del>2.5 – 9 Nm</del> ①	15 – 30 Nm	
10.	Av Viscosity (Centipoise)	1700 – 3000 mPa.S	800 – 1600 (thixo) mPa.S	16000 – 33000 (thixo) mPa.S	1400 – 2400 (thixo) mPa.S	ISO 2555
11.	Maximum Gap Fill	0.25 mm	0.25 mm	0.25 mm	0.25 mm	ASTM D4562:2013
12.	Temperature Range (°C)	-55 to +150	-55 to +150	-55 to +150	-55 to +150	-
13.	Fluorescent	Positive	Positive	Positive	Positive	UV Lamp 365 nm Bulb
14.	Specific Gravity @25° C	1.08	1.0	1.1	1.1	ASTM D 1475

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**Technical Data (Sheet 2 of 3)**  
**Specification No. CLW/MS/3/Bogie/005**

Sl. No.	Loctite Parameters	Loctite 271/270	Loctite 542	Loctite 518	Loctite 638	Tech. Standard/ Routine Inspection
1.	Application	Thread Locker	Thread Sealant	Flange Sealant	Retaining Compound	-
2.	Features	Heavy Duty, Medium Viscosity liquid for Nuts & Bolts upto M36	(High Pressure Pneumatic) up to ¾" pipe fitting.	Gasketing Paste	High Strength, Liquid/ Vibration proof	-
3.	Chemical Type	Di Methylacrylate Ester (Anaerobic)	Di Methylacrylate Ester (Anaerobic)	Synthetic Grease (Anaerobic)	Di Methylacrylate Ester (Anaerobic)	FTIR (Fourier Transform Infrared Spectrometer)
4.	Colour	Green	Brown	Red	Green	Visual
5.	Handling cure time	10 – 30 minutes	2 – 10 minutes 10 – 30 (1)	10 – 30 minutes	2 – 20 minutes	DIN 267 Part 27 M10 Black Bolt & Nut / ISO 10964
6.	Ultimate Strength	24 hours	24 hours.	24 hours.	24 hours.	
7.	Compressive Shear Strength	12 – 24 N/mm <sup>2</sup>	7 – 20 N/mm <sup>2</sup> (Tensile)	5 – 15 N/mm <sup>2</sup>	22 – 40 N/mm <sup>2</sup>	ASTM D4562:2013 TS 101 Grade Steel Pin & Collar / ISO 10123
8.	Break away Torque	16 – 36 Nm 10 – 33 (1)	10 – 20 Nm	Shear 5 – 13 Nm	25 – 50 Nm	DIN 267 Part 27
9.	Prevailing Torque	15 – 50 Nm	6 – 13 Nm	-	20 – 40 Nm	
10.	Av Viscosity (Centipoise)	450 - 550 mPa.S	500 – 550 (thixo) mPa.s	5 Lacs – 10 Lacs (thixo) mPa.S	2000 – 3000 mPa.S	ISO 2555
11.	Maximum Gap Fill	0.25 mm	0.25 mm	0.25 mm	0.25 mm	ASTM D4562:2013
12.	Temperature Range (°C)	-55 to +150	-55 to +150	-55 to +150	-55 to +120	-
13.	Fluorescent	Positive	-	Positive	Positive	-
14.	Specific Gravity @25° C	1.1	1.1	1.1	1.1	UV Lamp 365 nm Bulb ASTM D 1475

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**Technical Data (Sheet 3 of 3)**  
**Specification No. CLW/MS/3/Bogie/005**

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Sl. No.	Loctite Parameters	Loctite 7649	Loctite 406	Loctite 767	Tech. Standard/ Routine Inspection
1.	Application	Activator	Instant Adhesive	Anti Seize Lubricating excluding Bearing Liquid	-
2.	Features	Liquid, cleaning of oily parts	Cyanoacrylate adhesive liquid for use on rubbers	Synthetic Grease	-
3.	Chemical Type	-	-	Aluminium White	FTIR (Fourier Transform Infrared Spectrometer) Visual
4.	Colour	Green	Colourless	-	ASTM D 1002:2010 (for 406, 7649) / DIN 267 Part 27
5.	Handling cure time	<del>30 - 70 seconds</del> Drying time (1)	10 - 20 seconds	Immediate (1)	M10 Black Bolt & Nut / ISO 10964
6.	Ultimate Strength	-	24 hours	-	ASTM D 1002:2010 (for 406) / ASTM D4562:2013 TS 101 Grade Steel Pin & Collar / ISO 10123
7.	Compressive Shear Strength	<del>5 ± 10% N/mm<sup>2</sup></del> (1)	10 - 15 N/mm <sup>2</sup>	-	-
8.	Break away Torque	-	-	89 - 270 Nm	DIN 267 Part 27
9.	Prevailing Torque	-	-	-	ISO 2555
10.	Av Viscosity (Centipoise)	2 - 5 (thixo) mPa.s	15 - 25 mPa.S	200000 cP ± 10%	ASTM D4562:2013
11.	Maximum Gap Fill	-	0.1 mm	-	-
12.	Temperature Range (°C)	-	-50 to +83	Upto +840	UV Lamp 365 nm Bulb
13.	Fluorescent	-	-	-	ASTM D 1475
14.	Specific Gravity @25° C	0.79 ± 10%	-	1.0 - 1.3	ASTM D 1465 (for 767)

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**Alteration Sheet**

Alt. No.	Description			Reason	Approved By
	Loctite	Parameter	Previous Data		
<b>(1)</b>	241/243	Application	Thread Locking/ Bearing	Specification of sealing adhesive was issued on 05.03.18. Copy of the specification was issued to the approved suppliers. Comments / corrections have been received from all the vendors. After scrutinizing the received documents this alteration <b>(1)</b> have been prepared to overcome some typographical error and updated technical data.	Dy. CEE/D
	577	Handling Cure time	20 – 30 min		
	577	Break away torque	6 – 15 Nm		
	577	Prevailing torque	2.5 – 9 Nm		
	262	Handling Cure time	10 – 30 min		
	271/270	Break away torque	16 – 36 Nm		
	542	Handling Cure time	2 – 10 min		
	7649	Handling Cure time	30 – 70 sec		
	7649	Compressive shear strength	5 ± 10% N/mm <sup>2</sup>		
	767	Handling Cure time	-		

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