

SPECIFICATION FOR SEALING ADHESIVE FOR 3-PHASE ELECTRIC LOCOMOTIVES.

SPECIFICATION No.
CLW/MS/3/Bogie/005 Alt.-2
ISSUE DATE: 11.06.2018.

ISSUED BY:

DY. CHIEF ELECTRICAL ENGINEER/D/CONV.
CHITTARANJAN LOCOMOTIVE WORKS
P.O. CHITTARANJAN – 713331
DIST. BARDHAMAN (WEST), WEST BENGAL (INDIA)

PREPARED BY	CHECKED BY	APPROVED BY
ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:25:05 +05'30'	ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:25:24 +05'30'	SYAMA PRASAD PATRA Digitally signed by SYAMA PRASAD PATRA Date: 2023.04.03 16:31:14 +05'30'
SSE/DRG	SSE/DRG	DY. CEE/D/Conv.

Signature Not
Verified
Digitally signed by
ACHYUT PHAMR
SUTARABANDREDDY
Date: 2023.04.30
16:39:51
Reason: I am not
Location: New Delhi

Superseded by sheet-3**Alteration Sheet for Earlier Specification No.CLW/MS/3/Bogie/005/Alt.-1**

Alt No.	Description				Reason	Approved By
	Loctite	Parameter	Previous Data	Updated		
1	241/243 or equivalent	Application	Thread locking/Bearing	Thread locker	Specification of sealing adhesive was issued on 05.03.2016. A copy was uploaded on CLW website for suggestions and clarifications. A meeting with Vendors was held on 18.05.18 in chamber of Dy .CEE/DII. After scrutinizing their feedback this alteration has been prepared to update technical data and overcome typographical error.	Dy.CEE/DII
	577 or equivalent	Break away Torque	6-15 N-m	15-25 N-m		
	271/270 or equivalent	Break Away Torque	16-36N-m	15-40 N-m		
	542 or equivalent	Handling cure time	2-10 Min	10-30 Min		
	638 or equivalent	Handling cure time	2-20 Min	5-20 Min		
	7649 or equivalent	Feature	Liquid cleaning of oily parts	Surface activator		
		Chemical Type		Copper salt & aliphatic amine		
		Colour	Green	Green/Clear		
		Compressive shear strength	~5±10%N/mm2	NA		
	767 or equivalent	Features	Liquid	Paste		
		Break away torque	89-270 N-m	>210 Nm @22°C		
		Temp Range	+840°C	+870°C		
	406/767/7649	Handling cure time	Handling cure time	Drying time		
406 or equivalent	Specific gravity @25°C	-	1.1 ±10%			
Other Changes 1. Under Environmental testing addition of time duration as three hours for hot strength test as per DIN 267 part 27 2..Addition of ISO 10964 along with DIN 267 part 27 wherever applicable 3.Addition of ASTM D5363 in temperature range, 4.Removal of Max gap fill parameter for Loctite 406 or equivalent 5.Tolerance of 10% in specific gravity at 22°C for all except Loctite 7649 or equivalent and Loctite 767 or equivalent. 6.Type test of all adhesives included.						

PREPARED BY		CHECKED BY		APPROVED BY	
ACHYUT KUMAR	Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:25:36 +05'30'	ACHYUT KUMAR	Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:25:50 +05'30'	SYAMA PRASAD PATRA	Digitally signed by SYAMA PRASAD PATRA Date: 2023.04.03 16:31:47 +05'30'
	SSE/DRG		SSE/DRG		DY. CEE/D/Conv.

Signature Not Verified

Digitally signed by
LAKSHMI PHANI
KUMAR BANDREDDY
Date: 2023.04.30
16:55:51 IST
Reason: IREPS-CRIS
Location: New Delhi

Alteration Sheet for Earlier Specification No. CLW/MS/3/Bogie/005/Alt.-2

Alt No.	Description				Reason	Approved By
	Loctite	Parameter	Previous Data	Updated		
2	241/243 or equivalent	Application	Thread locking	Thread locker	Specification of sealing adhesive was issued on 05.03.2016. A copy was uploaded on CLW website for suggestions and clarifications. A meeting with Vendors was held on 21.08.2019 at D&D centre. After scrutinizing their feedback this alteration 2 has been prepared to update technical data and overcome typographical errors.	Dy.CEE/D/ CONV.
	577 or equivalent	Break away Torque	15-25 N-m	15-25 N-m		
	271/270 or equivalent	Break Away Torque	15-40 N-m	15-40 N-m		
	542 or equivalent	Handling cure time	10-30 Min	10-30 Min		
	638 or equivalent	Handling cure time	5-20 Min	5-20 Min		
	7649 or equivalent	Feature	Surface activator	Surface activator		
		Chemical Type	Copper salt &aliphatic amine	Copper salt &aliphatic amine		
		Colour	Green/Clear	Green/Clear		
		Compressive shear strength	NA	NA		
	767 or equivalent	Features	Paste	Paste		
		Break away torque	>210 Nm @22°C	20-30 N-m		
		Pre torque	Nil	40 N-m		
		Temp Range	+870°C	+870°C		
		Curing Time	-	24hrs at 22°C		
	406 or equivalent	Specific gravity @23°C±2C	1.1 ±10%	1.1 ±10%		
	Other Changes 1. Under Environmental testing addition of time duration as three hours for hot strength test as per DIN 267 part 27 2..Addition of ISO 10964 along with DIN 267 part 27 wherever applicable 3.Addition of ASTM D5363 in temperature range, 4.Removal of Max gap fill parameter for Loctite 406 or equivalent 5.Tolerance of 10% in specific gravity at 22°C for all except Loctite 7649 or equivalent and Loctite 767 or equivalent. 6.Type test of all adhesives included. 7. Changes made against clause no. 3.1, 3.3, 4.1 6.2, 6.5, 8, 12, 13 Tech data sheet 1, 2, 3.					

Specification have been digitized and all alterations have been incorporated

PREPARED BY		CHECKED BY		APPROVED BY	
ACHYUT KUMAR	Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:26:07 +05'30'	ACHYUT KUMAR	Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:26:18 +05'30'	SYAMA PRASAD PATRA	Digitally signed by SYAMA PRASAD PATRA Date: 2023.04.03 16:32:00 +05'30'
	SSE/DRG		SSE/DRG		DY. CEE/D/Conv.

Signature Not Verified

Digitally signed by LAKSHMI PHANI KUMAR BANDREDDY
Date: 2023.04.30 16:55:51 IST
Reason: IREPS-CRIS
Location: New Delhi

Technical 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 varieties 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 conductive environment.

3.2 The sealing adhesives shall remain impervious to oil and water.

3.3 The required service life will be for a minimum of 10 (Ten) years from the date of application. The sealing compound should remain serviceable for a period of at least 06 (Six) months at ambient condition of $\leq 30^{\circ}\text{C}$. The sealing adhesives shall maintain serviceability life in the temperature range 10°C to 80°C .

3.4 No residual odour shall be apparent after 07 (Seven) days from the date of application.

3.5 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 should be Anaerobic for thread locker, retaining and gasketing, pipe sealing. Anaerobic adhesive cures in absence of air & in presence of metal. Anaerobic adhesive are used for thread locking, retaining, pipe sealing & liquid gasketing etc.

4.2 Working room temperature should not be below 15°C and relative humidity not less than 30%.

PREPARED BY	CHECKED BY	APPROVED BY
ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:26:31 +05'30'	ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:26:59 +05'30'	SYAMA PRASAD PATRA Digitally signed by SYAMA PRASAD PATRA Date: 2023.04.03 16:32:12 +05'30'
SSE/DRG	SSE/DRG	DY. CEE/D/Conv.

Signature Not
Verified

Digitally signed by
LAKSHMI PHANI
KUMAR BANDREDDY
Date: 2023.04.30
16:55:51 IST
Reason: IREPS-CRIS
Location: New Delhi

5. INSPECTION AND 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 Joint Inspection 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 of their product.

7. LABELLING & MARKING:

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

- 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.

PREPARED BY	CHECKED BY	APPROVED BY
ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:27:14 +05'30'	ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:27:25 +05'30'	SYAMA PRASAD PATRA Digitally signed by SYAMA PRASAD PATRA Date: 2023.04.03 16:32:25 +05'30'
SSE/DRG	SSE/DRG	DY. CEE/D/Conv.

- 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 shelf 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. 8, 9 and 10.

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 (Heated at this temp for three hours)	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	Test 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/ISO10964
577	Min 25%	100%	100%	-	90%	
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	-	-	-	-	-	-

PREPARED BY	CHECKED BY	APPROVED BY
ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:27:42 +05'30'	ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:27:51 +05'30'	SYAMA PRASAD PATRA Digitally signed by SYAMA PRASAD PATRA Date: 2023.04.03 16:32:37 +05'30'
SSE/DRG	SSE/DRG	DY. CEE/D/Conv.

Item Loctite or Equivalent	Strength as (%) of Initial Lap Shear Strength	Hot Strength as (%) of Initial Lap Shear Strength (Heated at this temp for three hours)	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.	Technical 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(Heated at this temp for three hours)	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.	Technical 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(For three hours)	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.	Technical Standard
518	AT 150°C	AT 120°C	AT 120°C		AT 87°C	ASTM D 1002:2010
	>25%	>100%	100%	-	>50%	

PREPARED BY	CHECKED BY	APPROVED BY
ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:28:04 +05'30'	ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:28:17 +05'30'	SYAMA PRASAD PATRA Digitally signed by SYAMA PRASAD PATRA Date: 2023.04.03 16:32:52 +05'30'
SSE/DRG	SSE/DRG	DY. CEE/D/Conv.

Signature Not
Verified

Digitally signed by
 LAKSHMI PHANI
 KUMAR BANDREDDY
 Date: 2023.04.30
 16:55:51 IST
 Reason: IREPS-CRIS
 Location: New Delhi

13. Type Test for set of Sealant & Adhesives for production of Electric Loco

Loctite Parameters	Loctite 241/243	Loctite 242	Loctite 577	Loctite 262	Loctite 271/270
TYPE TEST					
Break Loose Torque	24±20%	12±20%	27±20%	38±20%	39±20%
Prevailing Torque	4±20%	5±20%	2 ±20%	40±20%	25±20%
Tech Standard/Routine Inspection	DIN 267 Part 27/ISO 10964 M10 Steel Nuts & Bolts	DIN 267 Part 27/ISO 10964 M10 Steel Nuts & Bolts	DIN 267 Part 27/ISO 10964 M10 Steel Nuts & Bolts	DIN 267 Part 27/ISO 10964 M10 Steel Nuts & Bolts	DIN 267 Part 27/ISO 10964 M10 Steel Nuts & Bolts

Item - Loctite - 638 or Equivalent

Type Test			
1	Compressive shear Strength, N/mm ²	≥22	ASTM D44562:2013 Steel pin & collars, ISO10123

Item - Loctite - 767 or Equivalent

Type Tests			
1	Breakaway Torque	AT 22°C, >20-30 N-m At 760°C, >20-30 N-m	DIN 267 Part 27/ISO 10964 Plain 3/8 x 16 Fasteners, degreased, Coated, Pre-- torqued to 40 N-m Curing time is 24 hrs at 22°C
2	Prevailing Torque	AT 22°C, >4 N-m At 760°C, > 12.7 N-m	

Item - Loctite - 518 or Equivalent

Type Tests			
1	Tensile Modulus, N/mm ²	54±20%	ISO 527-2
2	Elongation @ Break %	64 ±20%	ISO 527-2
3	Lap Shear Strength 24 Hrs @ 23±2 °C, N/mm ²	7.5±20%	ISO 4587 Mild Steel (Grit Blasted)

Item - Loctite - 542 or Equivalent

Type Tests			
1	Break loose Torque, N-m After 24 hrs @22°C	25±20%	ISO 10964, Pre torque to 5 N-m M10 Steel Nuts & Bolts
2	Prevailing Torque, N-m	25±20%	

PREPARED BY		CHECKED BY		APPROVED BY	
ACHYUT KUMAR		ACHYUT KUMAR		SYAMA PRASAD PATRA	
Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:28:30 +05'30'		Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:28:39 +05'30'		Digitally signed by SYAMA PRASAD PATRA Date: 2023.04.03 16:33:06 +05'30'	
SSE/DRG		SSE/DRG		DY. CEE/D/Conv.	

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

Sl. No.	Loctite Parameters	Loctite 241/243 or equivalent	Loctite 242 or equivalent	Loctite 577 or equivalent	Loctite 262 or equivalent	Tech. Standard/ Routine Inspection
1	Application	Thread Locker	Nut Lock /Thread Locking	High Pressure Pipe Sealant/ Thread Sealant	Stud Lock/ Thread Locking	-
2	Features	Strength, Liquid	Medium Strength, Liquid	Sealing Paste	High Strength Liquid	-
3	Chemical Type	Dimethacrylate Ester (Anaerobic)	Dimethacrylate Ester (Anaerobic)	Dimethacrylate Ester (Anaerobic)	Dimethacrylate Ester (Anaerobic)	FTIR* (Fourier Transform Infrared Spectrometer)
4	Colour	Blue	Blue	Yellow	Red	Visual
5	Handling cure time	10-30 minutes	5-30 minutes	20 - 30 minutes	10-30 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	8-14 N/mm ²	5-14 N/mm ²	5-13 N/mm ²	10-30 N/mm ²	ASTM D4562:2013 TS 101 Grade Steel Pin & Collar/ISO 10123
8	Break away Torque	15-35 Nm	8-18 Nm	15-25 Nm	14-29 Nm	DIN 267 Part 27/ISO 10964
9	Prevailing Torque	5-20 Nm	2-7 Nm	2.5-9 Nm	15 -30Nm	
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 +180	-55 to +150	-55 to +150	-55 to +150	ASTM D 5363
13	Fluorescence	Positive	Positive	Positive	Positive	UV Lamp 365 nm Bulb
14	Specific Gravity @23±2°C	1.08±10%	1.0±10%	1.1 ±10%	1.1±10%	ASTM D 1475

*FTIR is a type test. At the time of routine inspection a copy of type test report should suffice.

PREPARED BY	CHECKED BY	APPROVED BY
ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:28:53 +05'30' SSE/DRG	ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:29:05 +05'30' SSE/DRG	SYAMA PRASAD PATRA Digitally signed by SYAMA PRASAD PATRA Date: 2023.04.03 16:33:23 +05'30' DY. CEE/D/Conv.

Signature Not Verified
 Digitally signed by LAKSHMI PHANI KUMAR BANERJEE
 Date: 2023.04.30 16:55:51 IST
 Reason: IREPS-CRIS
 Location: New Delhi

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

Sl. No.	Loctite Parameters	Loctite 271/270 or equivalent	Loctite 542 Or equivalent	Loctite 518 Or equivalent	Loctite 638 Or equivalent	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 3/4" pipe fitting.	Gasketing Paste	High Strength, Liquid/ Vibration proof	-
3.	Chemical Type	Dimethacrylate Ester (Anaerobic)	Dimethacrylate Ester (Anaerobic)	Dimethacrylate Ester (Anaerobic)	Urethane Methacrylate Ester (Anaerobic)	FTIR * (Fourier Transform Infrared Spectrometer)
4.	Colour	Green	Brown	Red	Green	Visual
5.	Handling cure time	10-30 minutes	10-30 minutes	10-30 minutes	5-20 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 ²	7-20 N/mm ²	5-15 N/mm ²	22-40 N/mm ²	ASTM D4562:2013 TS 101 Grade Steel Pin & Collar / ISO 10123
8.	Break away Torque	15- 40 Nm	10-20 Nm	-	25-50 Nm	DIN 267 Part 27/ISO 10964
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 +180	ASTM D 5363
13.	Fluorescence	Positive	-	Positive	Positive	UV Lamp 365 nm Bulb
14.	Specific Gravity @23±2°C	1.1 ±10%	1.1 ±10%	1.1 ±10%	1.1 ±10%	ASTM D1475

*FTIR is a type test. At the time of routine inspection a copy of type test report should suffice.

PREPARED BY	CHECKED BY	APPROVED BY
ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:29:18 +05'30' SSE/DRG	ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:29:28 +05'30' SSE/DRG	SYAMA PRASAD PATRA Digitally signed by SYAMA PRASAD PATRA Date: 2023.04.03 16:33:47 +05'30' DY. CEE/D/Conv.

Signature Not Verified

Digitally signed by LAKSHMI PHANI KUMAR BANDREDDY
 Date: 2023.04.30 16:55:51 IST
 Reason: IREPS-CRIS
 Location: New Delhi

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

Sl. No.	Loctite Parameters	Loctite 7649 or equivalent	Loctite 406 or equivalent	Loctite 767 Or equivalent	Tech. Standard/ Routine Inspection
1.	Application	Activator	Instant Adhesive	Anti-Seize Lubricating excluding Bearing	-
2.	Features	Surface Activator	Cyanoacrylate adhesive liquid for use on rubbers	Paste	-
3.	Chemical Type	Copper salt and aliphatic amine	Cyanoacrylate	Synthetic Grease	FTIR* (Fourier Transform Infrared Spectrometer)
4.	Colour	Green/clear	Colour less	Aluminium White	Visual
5.	Drying time	60- 150 seconds	10-20 seconds	NA	ASTM D 1002:2010 (for 406, 7649)/Buna N Rubber
6.	Ultimate Strength	-	24 hours	-	
7.	Tensile Strength	-	Substrate failure or $\geq 9\text{N/Sq mm}$	-	Tested on Buna N / ISO 6922
8.	Break away Torque	-	-	20-30 N-m@22 °C	ISO 10964/ DIN 267 Part 27 Plain 3/8-15 fastener Degreased & pre-torqued to 40 NM
9.	Prevailing Torque	-	-	-	
10.	Viscosity (Centipoise)	2-5 mPa.s	15-25 mPa.s	200000 mPa.s \pm 10%	ISO 2555
11.	Temperature Range (°C)	-	-50 to +83	Up to +870	ASTM D 5363
12.	Fluorescence	-	-	-	UV Lamp 365 nm Bulb
13.	Specific Gravity @23 \pm 2°C	0.79 \pm 10%	1.1 \pm 10%	1.0 - 1.3	ASTM D1475 ASTM D 1465 (for 767)

*FTIR is a type test. At the time of routine inspection a copy of type test report should suffice.

PREPARED BY	CHECKED BY	APPROVED BY
ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:29:41 +05'30' SSE/DRG	ACHYUT KUMAR Digitally signed by ACHYUT KUMAR Date: 2023.04.03 16:29:52 +05'30' SSE/DRG	SYAMA PRASAD PATRA Digitally signed by SYAMA PRASAD PATRA Date: 2023.04.03 16:34:01 +05'30' DY. CEE/D/Conv.

Signature Not Verified
 Digitally signed by LAKSHMI PHANI KUMAR BANDREDDY
 Date: 2023.04.30 16:55:51 IST
 Reason: IRE PS-CRIS
 Location: New Delhi