

ISO 9001:2015	Document no: IRS:T- 48	Version 4.0	Date Effective: 06/03/2025
Document Title: TECHNICAL SPECIFICATIONS FOR TRACK BASED LUBRICATORS (ELECTRONIC & HYDRAULIC TYPE)			



सत्यमेव जयते

भारत सरकार

रेल मंत्रालय

Government of India

MINISTRY OF RAILWAYS

TECHNICAL SPECIFICATIONS FOR TRACK BASED LUBRICATORS

(ELECTRONIC & HYDRAULIC TYPE)


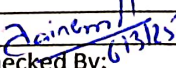
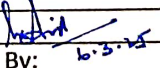
Specification No. IRS:T-48

**Amendment History**

S. No.	Month of Issue	Version	Reason of Amendment
1	June, 2013	1.0	First Issue of Specification
2	March, 2022	2.0	Inclusion of ACS 1 & ACS 2
3	January, 2025	3.0	Inclusion of ACS 3
4	March, 2025	4.0	Inclusion of ACS 4

**Issued in March, 2025**

**TRACK DESIGN DIRECTORATE  
RESEARCH DESIGN AND STANDARDS ORGANISATION  
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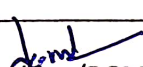
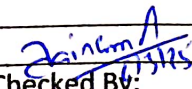
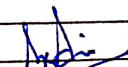
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## PREFACE

- 1.0 Para 424 (2) of IRPWM provides that Track mounted gauge face lubricators should be provided on curves of radius 875 m (2<sup>o</sup>) and sharper on Broad Gauge to reduce rail gauge face wear. On routes where rail grinding is in practice, track mounted automatic gauge face lubricators should be provided on curves of radius 1400m (1.25<sup>o</sup>) and sharper on Broad Gauge. Trial was undertaken with hydraulic, electronic with AC power and electronic with solar power lubricators on sharp curves in ghat sections. Based on experience of trial and inputs from various stake holders, the "Technical specification for Track Based Lubricators (Electronic & Hydraulic Type)" was prepared by RDSO.
- 2.0 The Basic dispensing system of lubricant is almost similar for both Electronic and Hydraulic types of lubricating systems. During Trial, it was observed that electronic lubricators both with AC power and with solar power have exhibited better control in dispensing the lubricant resulting in lesser wastage of Lubricant compared to hydraulic type. AC Powered electronic lubricators can be provided wherever feasible. Solar powered electronic lubricators can be provided on all routes except in case of heavy dense forest and hilly regions, where getting a sun light for few hours in a day is a problem. Hydraulic type lubricators may be provided, preferably on sections having less GMT & speed, whenever it is not possible to provide electronic lubricators.
- 3.0 Railways shall arrange track mounted gauge face lubricators as per requirement to meet the provisions of IRPWM through service contract. The agency (RDSO approved firm only) would arrange, install on track and commission the lubricator system as per Zonal Railway's requirements and will ensure its proper functioning during the service contract period. The scope of work will be for 5years. While providing service to Zonal Railways, agency would ensure that: -
  - (i) Adequate arrangement is made for Lubricant to be used with lubricators to avoid idling. Performance Parameters of Lubricant to be used in Lubricators have been laid down in the specification.
  - (ii) Availability of RDSO Validated friction measurement equipment. i.e. Tribometer (as per RDSO Document No. IS/RDSO-TMM/0001:2023 or Latest if any), shall be ensured for measurement of coefficient of friction at gauge face corner of outer rail of curve to judge the efficacy of lubricant and lubricators installed for the purpose, as specified.
  - (iii) Adequate arrangements for operation and maintenance of lubricators including supply of consumables and spare parts as required. The entire cost of operation and maintenance would be borne by the agency.

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### TECHNICAL SPECIFICATION OF TRACK BASED LUBRICATORS (Electronic Type)

## 1.0 SCOPE

This specification covers the description, functional and performance parameters of electronic track based lubricators for gauge face lubrication. The delivery system should be specifically designed to apply lubricant on curves under different environmental and traffic conditions on Indian Railways.

## 2.0 DEVIATIONS

The tenderer shall furnish compliance or deviations, if any, for each clause and sub clause of the specifications along with technical explanations/details. The tenderer shall also furnish financial implications of the deviations if any.

### 3.0 SERVICE CONDITIONS

**3.1 System should be able to work under following service conditions:**

- i) Ambient temperature : 0°C to 50 °C
- ii) Rail temperature : (-)10°C to (+) 75°C
- iii) Humidity : 40-100%
- iv) Rainfall : Fairly heavy
- v) Atmospheric condition : Very dusty, heavy fog

3.2 On IR network the electrified traction consists of overhead electric system of either 25000 V AC or 1500 V DC with residual return current passing through one of the rails in the track. The voltage for track circuits for signaling purpose is up to 12 volts and the corresponding current upto 1 amp. Passes through the other rail. The lubricator system should be able to work in above stated electric traction and signaling system and its induction effect.

**3.3 The lubricator system should be such that it does not affect the signaling system.**

3.4 The firm should offer proven technology with lubricator and lubricant supplied by them and working satisfactorily in any reputed railway system of the world of similar environment prevailing in India. Certificate in this regard from relevant railway system shall be furnished.

#### 4.0 DOCUMENTS TO BE SUPPLIED AND TRAINING

- i. **Installation Manual**
- ii. **Maintenance Manual**
- iii. **Service Manual**
- iv. **Part Manual**

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v. Action Plan for providing the services

Necessary training required to Railway officials for monitoring of performance of the equipment would be imparted by the agency.

## 5.0 FUNCTION

The applicator system should be an electrically powered pumping system for delivering an adjustable quantity of lubricating material to the rails in a manner such that passing wheels, either all or nominated would carry the designed amount of lubricant along the gauge face of rails.

## 6.0 SYSTEM DESCRIPTION

The application system must be proven system and should be functional in all climatic conditions in India.

The application system should consist of a rail-mounted sensor, a control box, an AC to DC converter or solar-charged battery, a motor, a pump, a tank with a cover and a material distribution system of hoses and applicators attached to the rails. The whole system should be compatible with the lubricant as defined in para 8.0 of this specification.

The system should operate as passing wheels enter magnetic or such field of the rail-mounted sensor. The sensor should transmit a signal back to the control box. After counting the number of signals from the sensor and when the pre-selected total is reached, the control box should turn on the pump for the pre-selected duration. The material should be pumped through a main hose to a central distribution manifold where it may split into distribution hoses that connect to the multi-ported applicators, clamped to the rail i.e. the application of the lubricant to the rail should be of non-squirting type. The product should then travel to the dispensing ports of each applicator to deliver controlled amounts of product onto the rails. The product should then be picked-up by passing train wheels. The arrangement should be such that the optimum product distribution takes place both along circumference of wheel flange as well as longitudinally along gauge face of rail.

## 7.0 MAJOR COMPONENT SPECIFICATIONS

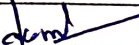
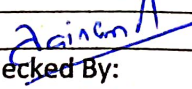
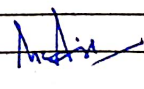
### 7.1 Wheel Sensor

Wheel passage should be determined by a disturbance to the localized magnetic flux or such field established by the sensor. Disturbance of the magnetic flux or such field should induce a voltage signal indicating a passing wheel.

Assembly to the rail should not require machining of the rail.

The control circuit should be designed to accept voltage signals for speeds as low as 10 kmph and should be able to function properly up to speed of 200 kmph.

Sensors should be available from the equipment manufacturer in configuration allowing for (1) bi-directional traffic without special

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requirements, (2) for use in environments where stray currents from power lines or buried cables may cause false detection of wheel passage, and (3) single-direction traffic activation.

## 7.2 Power Supply

Application system should be designed to operate either with direct electrical connection to AC power source or independently using a solar panel and battery.

### (a) AC Power

Unit should also be workable with 230 volts, 50Hz. Supply. It should be able to withstand voltage fluctuation in the range of 180-260 volts.

### (b) Solar Power

The unit should be supplied with a solar panel and battery system. The solar panel should be able to charge a sealed, deep-cycle, battery designed for extended use outdoors without high wattage recharging. Erection of solar panel should be done in a manner so as to prevent vandalism.

Railway may arrange the power supply on the request of agency through a metered source as per feasibility with the approval of competent authority. The applicable charges for the monthly consumption of Power as per Meter reading will be deducted from the monthly payment to be made to the agency. The responsibility of power supply will be with the agency in all the cases.

## 7.3 Electronic Control Circuit

The control circuit should serve to coordinate all operational functions of applicators, meeting a wide variety of application needs and conditions.

Specific performance and functional requirements are:

Operating Voltage	Minimum 12 Volts DC
Circuiting Protection	Minimum 15-amp fuse
Operating Temperature	Ambient temperature 0°C to 50°C or Rail temperature (-)10°C to (+) 75°C
Enclosures	NEMA 4 Rated or equivalent
Sensitivity	Factory Set A 3.5 Volts DC (may be adjusted lower to accommodate slower speed trains, with a corresponding

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	sacrifice of accuracy)
Counter Circuit	Should activate counter with every passage of wheel. It should be possible to incorporate a skip count feature to activate motor selectively after passage of selected number of wheels so as to minimize the consumption of lubricant and maximize use of lubricant applied.
Timer Circuit	Should allow selection of variably timed motor activation cycle for maximizing the utilization of lubricant applied and minimize its consumption. Circuit should also provide for a constant setting used to prime the system.

The control circuit should have the capability to operate the motor for traffic in both directions or in a single direction when used with the appropriate wheel sensor.

For security of the installation, the tank lid should be openable to access the controls but duly locked. The vendor has to provide satisfactory solution to make complete unit theft/vandalism proof and safety against damage to any part of the equipment. The steel tank containing the complete equipment including control panel etc. should be enclosed with suitable fencing system having separate door with lock and key arrangements. The above planning and execution of work is to be done by vendor himself along with installation of the equipment. If required, vendor is to submit the necessary drawings to comply this requirement.

The system should have separate controls to allow the selection of the interval, based on wheel counts, between each activation and to select the duration of the motor "on" cycle.

The motor should be capable of activation on demand for maintenance and test purposes.

A signal lamp should illuminate when motor is activated and another to illuminate when the sensor is tripped.

It should have arrangement for anti-vandalism and anti-theft features.

#### 7.4 Electric Motor

The electric motor powering the pump should be directly coupled to the pump and designed to operate on minimum 12 volts DC. Electric

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motor should incorporate a suitable arrangement to coordinate with the speed requirements of the pump.

### 7.5 Pump

The pump should be efficient and compact It should require little and easy maintenance and also easy to prime. Pump should be capable of handling a wide range of viscosities, from the stiffest of lubricant to the most fluid one. Pump should be able to produce adequate minimum pressure required for pumping the desired quantity of lubricant from the lubricant chamber to track rail gauge face for various lifts/heights as per site conditions during passage of train and to perform all the functions of gauge face lubricator. Pump should be mounted in such a way that the pump's inlet port mates directly to tank's outlet near bottom of tank. Between the pump and material there should be a large mesh screen. The supplier will submit the detailed specifications of pump for technical scrutiny of the offer.

### 7.6 Lubricant Distribution System

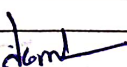
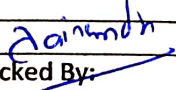
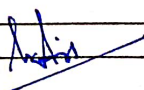
Shut off valve or any other suitable lubricant distribution system should be used to control the flow of lubricant to the applicators. Distribution system should be efficient, able to distribute the lubricant evenly. It should preferably have minimum moving parts. It should require minimum and easy maintenance.

### 7.7 Hose

Hoses used with the application system should be connected via screw-type connections to the tank and manifold.

Specific performance and functional requirements are:

Outlet hose	May be wire-braided
Distribution hoses	Must be non-conductive type hose.
Inner Tube	Suitable Oil Resistant Material
Cover Construction	Suitable Oil Resistant Material
Reinforcement	Suitably reinforced
Temperature Range	Ambient temperature 0°C to 50°C or Rail temperature (-)10°C to (+) 75°C
Burst Press Min.	84.37 Kgf/cm <sup>2</sup> (1200 Psi)

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Fittings	Cast or forged brass alloy end fittings with cast or spun brass ferrules.
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Manifold valve handles should be removable for easy storage in the dry chamber of the tank.

Distribution hoses should be long enough to supply applicators mounted to the rails.

### 7.8 Tank

Tank should be made of all welded steel construction and preferably should include a separate section from the material to hold the control box, power supply, and motor/pump etc. to improve protection against vandalism.

Tank lid will include provisions for a locking mechanism to prevent unauthorized access to the tank and controls.

Each tank should be fitted with a seal to prevent entry of any foreign material, snow, sand, rain or other wind-born particulate matter. The seal should have the arrangement to allow easy field replacement, if necessary. The bottom and sides of the tank should be such that it aids to easy flow of the material to the pump.

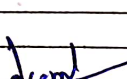
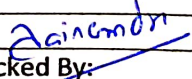
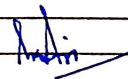
Tanks should include lifting lugs. The minimum Capacity of tank for storage of lubricant should be such that refilling would usually not be required in less than 3 months subject to a minimum of 50 Kg.

### 7.9 Applicators

The application bars should clamp securely to the rail and be adjustable for different sizes of rails being used in India and distribution configurations. It should have coverage of minimum 1 Km or 2 Km as the case may be with the recommended high quality rail-road lubricant. Temperature range should be same as for hose.

All bars should mount to rail in such a way so as to minimize the wastage of material from leakage around mounting.

The applicators should be multi-port (minimum 10 ports per applicator) configuration designed to deposit material uniformly along the length of the applicator. Internally, each applicator should incorporate passageways designed so as to equally balance distribution from each port opening. These passageways should be finished such as to minimize sticking and clogging of material within the applicators.

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Gauge face lubrication applicators should be mounted such that gauge face lubricant is deposited on to the upper portion of the rail's gauge face so as to come in contact with wheel flange.

## 8.0 LUBRICANT

A suitable lubricant for heavy rail road traffic should be used which is compatible with the system. Its lubricity should be such that it shall be capable of providing a value of Coefficient of friction not greater than 0.25 on the gauge face corner of rail. Coefficient of friction will be measured by a calibrated Tribometer/Tribotester.

The lubricant should be non-inflammable, non-toxic and non-health hazard. It should not give adverse effect on rolling stock components and track components i.e. rails, sleepers, fastenings, ballast etc.

Lubricant should be resistant to both water and high temperature. It should not get washed away in rain/moist conditions and also should not get softened or run down during high temperatures prevailing in the country.

The agency will give detailed specifications of lubricant to comply the above requirement and scrutiny of the offer. The agency will also furnish the average consumption rate of lubricant per actuating wheel for all types of lubricant suitable for the equipment being offered.

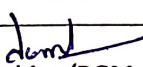
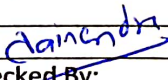
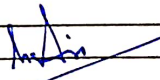
**8.1 Rail condition:** Lubrication should be done on new rails or on old rails which do not have Gauge Corner Cracking or head checks.

## 9.0 DOCUMENTATION

**9.1** Documentation of the track based lubricator system should be supplied comprising of detail of diagram, electrical and electronic designs with descriptions, component materials/part number, equivalent international part number, component specification etc. along with explanatory notes and comments wherever necessary.

**9.2** Calibration, operation, maintenance and troubleshooting manuals should be prepared in detail to the satisfaction of purchaser and supplied in six copies each.

**9.3** Record of specification of Lubricant used, its frequency of filling in the tank, consumption rate etc. and performance of equipment in terms of coefficient of friction and carry down effect shall be maintained on regular basis by the agency.

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#### 10.0 Performance of application system (Lubricator and Lubricant):

Performance of the application system (Lubricator and Lubricant) would be evaluated in terms of the 'Carry down Effect'.

Carry down effect is the distance from the location of applicator fixed in the track in the intended direction up to which lubricant should be carried by the wheel flange effectively to reduce the rail wear. Lubricator should be located on tangent track at the beginning of transition curve where wheel flanging is just beginning to occur. On single lines, the lubricator shall be located in the direction of heaviest traffic.

The coefficient of friction at gauge face corner of outer rail of curve should not be greater than 0.25. To ascertain the efficacy of the application system, coefficient of friction shall essentially be measured at the farthest point of the carry down effect.

Outer rail of the entire curve length of similar flexure (LH or RH) within the length of carry down effect should get lubricated for which applicator has been installed. However, rail in the straight track, if available within this stretch may not get lubricated. Lubricant should not come on the top of the rail except for the near vicinity of the applicator. The carry down effect will have the following two categories:

- (i) Up to 1 Km
- (ii) Up to 2 Km

Carry down effect of 1 Km category would be made use of only where there is no other curve of similar flexure requiring lubrication in the adjoining 1 Km in the intended direction.

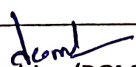
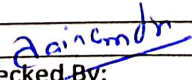
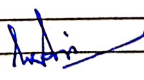
Requirement for Application system falling in the above two categories shall be made separate items in the Schedule of Work in the tender document.

Coefficient of friction and carry down effect of lubricator shall be measured at a frequency of three months or higher, depending on the site conditions.

**Note:-**

#### Intended Direction:

Intended direction is the traffic direction in case of Double line whereas it is heaviest traffic direction for Single line.

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### 11.0 Responsibilities of Agency:

**11.1** The agency would ensure that system installed including all parts, components etc. used is free from manufacturing, design, material, and workmanship defects and should be of the highest quality and in conformity with the specifications.

**11.2** Any part of the rail lubricating unit failing or proving unsatisfactory in service would be replaced by the agency at its own cost.

### 12.0 SERVICE ENGINEERS:

The agency should provide at his own expense the services of competent engineers during the entire service period. Service engineers should be available for commissioning of rail lubricators for regular service, trouble free operation, repair and maintenance.


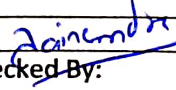
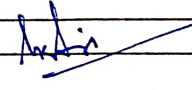
### 13.0 INSPECTION

**13.1** The inspection of rail lubricators shall be carried out by the Zonal Railways during installation of equipment.

**13.2** Inspection for Performance monitoring will be carried out as per para 10.0 by Zonal Railways. Representative of service provider should also be on site at the time of inspection.

### 14.0 Evaluation Process

Forma for evaluating the performance of the Lubricator has been attached as Annexure-I for Electronic Type.

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## **TECHNICAL SPECIFICATION OF TRACK BASED LUBRICATORS**

### **(Hydraulic Type)**

#### **1.0 SCOPE**

This specification covers the description, functional and performance parameters of hydraulic track based lubricators for gauge face lubrication. The delivery system should be specifically designed to apply lubricant on curves under different environmental and traffic conditions on Indian Railways.

#### **2.0 DEVIATIONS**

The tenderer shall furnish compliance or deviations, if any, for each clause and sub clause of the specifications along with technical explanations/details. The tenderer shall also furnish financial implications of the deviations if any.

#### **3.0 SERVICE CONDITIONS**

3.1 System should be able to work under following service conditions:

- i) Ambient temperature : 0°C to 50 °C
- ii) Rail temperature : (-)10°C to (+) 75°C
- iii) Humidity : 40-100%
- iv) Rainfall : Fairly heavy
- v) Atmospheric condition : Very dusty, heavy fog


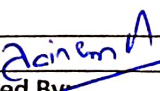
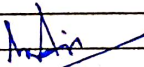
3.2 On IR network the electrified traction consists of overhead electric system of either 25000 V AC or 1500 V DC with residual return current passing through one of the rails in the track. The voltage for track circuits for signaling purpose is up to 12 volts and the corresponding current upto 1 amp. Passes through the other rail. The lubricator system should be able to work in above stated electric traction and signaling system and its induction effect.

3.3 The lubricator system should be such that it does not affect the signaling system.

3.4 The firm should offer proven technology with lubricator and lubricant supplied by them and working satisfactorily in any reputed railway system of the world of similar environment prevailing in India. Certificate in this regard from relevant railway system shall be furnished.

#### **4.0 DOCUMENTS TO BE SUPPLIED AND TRAINING**

- i. Installation Manual
- ii. Maintenance Manual
- iii. Service Manual
- iv. Part Manual

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v. Action Plan for providing the services

Necessary training required to Railway officials for monitoring of performance of the equipment would be imparted by the agency.

## 5.0 FUNCTION

The applicator system should be a hydraulically powered pumping system for delivering an adjustable quantity of lubricating material to the rails in a manner such that passing wheels, would carry the desired amount of lubricant along the gauge face of rails.

## 6.0 SYSTEM DESCRIPTION

The application system must be proven system and should be functional in all climatic conditions in India.

The application system should consist of an actuator, a pump, a tank with cover, and a material distribution system of hoses and applicators attached to the rails. The whole system should be compatible with the lubricant as defined in para 8.0 of this specification.


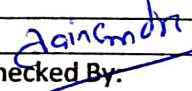
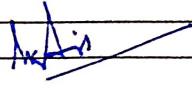
The material should be pumped through main hose to a central distribution manifold where it may split into distribution hoses that connect to the multi-ported applicators clamped to the rail. The product should then travel to the dispensing ports of each applicator to deliver controlled amounts of product onto the rails. The product should then be picked-up by passing train wheels. The arrangement should be such that the optimum distribution of the product takes place both along circumference of wheel flange as well as longitudinally along gauge face of rails.

## 7.0 MAJOR COMPONENT SPECIFICATIONS

### 7.1 Actuator

It should be easy to install and easy to remove for servicing. It should operate through a closed loop hydraulic system that delivers consistent pressure. While it should be a wheel actuated actuator, the conversion of train wheel energy into the impulses of hydraulic power must be independent of train wheel speed.

It should be adjustable to compensate for train speed and wear on head of rails. Also it should be bi-directional.

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## 7.2 Pump

It should be an efficient, compact and hydraulically powered motor driving lubricant pump. It should require little maintenance and be easy to prime. Pump should be capable of handling a wide range of viscosities, from the stiffest of lubricant to the most fluid. Pump should be able to produce adequate minimum pressure required for pumping the desired quantity of lubricant from the lubricant chamber to track rail gauge face for various lifts/heights as per site conditions during passage of train and to perform all the functions of gauge face lubricator. Pump should be mounted in such a way that the pump's inlet port mates directly to tank's outlet near bottom of tank. Between the pump and material there should be a large mesh screen. The supplier will submit the detailed specifications of pump for technical scrutiny of the offer.

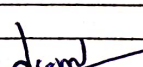
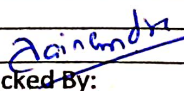
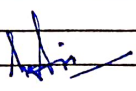
## 7.3 Lubricant distribution system

Shut off valve or any other suitable lubricant distribution system should be used to control the flow of lubricant to the applicators. Distribution system should be efficient, able to distribute the lubricant evenly. It should preferably have minimum moving parts. It should require minimum and easy maintenance.

## 7.4 Hose

Hoses used with the application system should be connected via screw-type connections to the tank and manifold. Specific performance and functional requirements are:

Outlet hose	May be wire-braided
Distribution hoses	Must be non-conductive type hose.
Inner Tube	Suitable Oil Resistant Material
Cover Construction	Suitable Oil Resistant Material
Reinforcement	Suitably reinforced
Temperature Range	Ambient temperature 0°C to 50°C or Rail temperature (-)10°C to (+) 75°C
Burst Press Min.	84.37 Kgf/cm <sup>2</sup> (1200 Psi)
Fittings	Cast or forged brass alloy end fittings with cast or spun brass ferrules.

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Manifold valve handles should be removable for easy storage in the dry chamber of the tank.

Distribution hoses should be long enough to supply applicators mounted to the rails.

### 7.5 Tank

Tank should be made of all welded steel construction and preferably should include a separate section from the material to hold the control box, motor/pumps etc. The vendor has to provide satisfactory solution to make complete unit theft/vandalism proof and safety against damage to any part of the equipment. The steel tank containing the complete equipment including control panel etc. should be enclosed with suitable fencing system having separate door with lock and key arrangements. The above planning and execution of work is to be done by vendor himself along with installation of the equipment. If required, vendor is to submit the necessary drawings to comply this requirement.

Tank lid will include provisions for a locking mechanism to prevent unauthorized access to the tank and controls.

Each tank should be fitted with a seal to prevent entry of any foreign material, snow, sand, rain or other wind-born particulate matter. The seal should have the arrangement to allow easy field replacement, if necessary. The bottom and sides of the tank should be such that it aids to easy flow of the material to the pump.

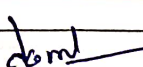
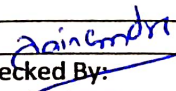
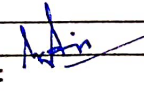
Tanks should include lifting lugs. The minimum Capacity of tank for storage of lubricant should be such that refilling would usually not be required in less than 3 months subject to a minimum of 50 Kg.

### 7.6 Applicators

The application bars should clamp securely to the rail and be adjustable for different sizes of rails being used in India and distribution configurations. It should have coverage of minimum 1 Km or 2 Km as the case may be with the recommended high quality rail-road lubricant. Temperature range should be same as for hose.

All bars should mount to rail in such a way so as to minimize the wastage of material from leakage around mounting.

The applicators should be multi-port (minimum 10 ports per applicator) configuration designed to deposit material uniformly along the length of the applicator. Internally, each applicator should incorporate passageways designed so as to equally balance distribution from each port opening. These passageways should be finished such as to minimize sticking and clogging of material within the applicators.

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Gauge face lubrication applicators should be mounted such that gauge face lubricant is deposited on to the upper portion of the rail's gauge face so as to come in contact with wheel flange.

## 8.0 LUBRICANT

A suitable lubricant for heavy rail road traffic should be used which is compatible with the system. Its lubricity should be such that it shall be capable of providing a value of Coefficient of friction not greater than 0.25 on the gauge face corner of rail. Coefficient of friction will be measured by a calibrated Tribometer/Tribotester.

The lubricant should be non-inflammable, non-toxic and non-health hazard. It should not give adverse effect on rolling stock components and track components i.e. rails, sleepers, fastenings, ballast etc.

Lubricant should be resistant to both water and high temperature. It should not get washed away in rain/moist conditions and also should not get softened or run down during high temperatures prevailing in the country.

The agency will give detailed specifications of lubricant to comply the above requirement and scrutiny of the offer. The agency will also furnish the average consumption rate of lubricant per actuating wheel for all types of lubricant suitable for the equipment being offered.

**8.1 Rail condition:** Lubrication should be done on new rails or on old rails which do not have Gauge Corner Cracking or head checks.

## 9.0 DOCUMENTATION

**9.1** Documentation of the track based lubricator system should be supplied comprising of detail of diagram, electrical and electronic designs with descriptions, component materials/part number, equivalent international part number, component specification etc. along with explanatory notes and comments wherever necessary.

**9.2** Calibration, operation, maintenance and troubleshooting manuals should be prepared in detail to the satisfaction of purchaser and supplied in six copies each.

**9.3** Record of specification of Lubricant used, its frequency of filling in the tank, consumption rate etc. and performance of equipment in terms of coefficient of friction and carry down effect shall be maintained on regular basis by the agency.

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#### 10.0 Performance of application system (Lubricator and Lubricant):

Performance of the application system (Lubricator and Lubricant) would be evaluated in terms of the 'Carry down Effect'.

Carry down effect is the distance from the location of applicator fixed in the track in the intended direction up to which lubricant should be carried by the wheel flange effectively to reduce the rail wear. Lubricator should be located on tangent track at the beginning of transition curve where wheel flanging is just beginning to occur. On single lines, the lubricator shall be located in the direction of heaviest traffic.

The coefficient of friction at gauge face corner of outer rail of curve should not be greater than 0.25. To ascertain the efficacy of the application system, coefficient of friction shall essentially be measured at the farthest point of the carry down effect.

Outer rail of the entire curve length of similar flexure (LH or RH) within the length of carry down effect should get lubricated for which applicator has been installed. However, rail in the straight track, if available within this stretch may not get lubricated. Lubricant should not come on the top of the rail except for the near vicinity of the applicator. The carry down effect will have the following two categories:

- (i) Up to 1 Km
- (ii) Up to 2 Km

Carry down effect of 1 Km category would be made use of only where there is no other curve of similar flexure requiring lubrication in the adjoining 1 Km in the intended direction.

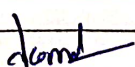
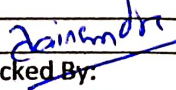
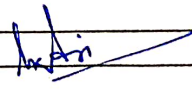
Requirement for Application system falling in the above two categories shall be made separate items in the Schedule of Work in the tender document.

Coefficient of friction and carry down effect of lubricator shall be measured at a frequency of three months or higher, depending on the site conditions.

**Note:-**

#### Intended Direction:

Intended direction is the traffic direction in case of Double line whereas it is heaviest traffic direction for Single line.

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#### 11.0 Responsibilities of Agency:

- 11.1 The agency would ensure that system installed including all parts, components etc. used is free from manufacturing, design, material, and workmanship defects and should be of the highest quality and in conformity with the specifications.
- 11.2 Any part of the rail lubricating unit failing or proving unsatisfactory in service would be replaced by the agency at its own cost.

#### 12.0 SERVICE ENGINEERS:

The agency should provide at his own expense the services of competent engineers during the entire service period. Service engineers should be available for commissioning of rail lubricators for regular service, trouble free operation, repair and maintenance.

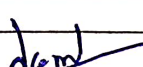
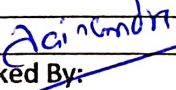
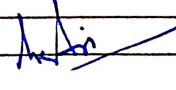
#### 13.0 INSPECTION

- 13.1 The inspection of rail lubricators shall be carried out by the Zonal Railways during installation of equipment.
- 13.2 Inspection for Performance monitoring will be carried out as per para 10.0 by Zonal Railways. Representative of service provider should also be on site at the time of inspection.

#### 14.0 Evaluation Process

Performa for evaluating the performance of the Lubricator has been attached as Annexure-II for Hydraulic Type.

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## Annexure -I

### Field Trial of Track Based Lubricators (Electronic)

#### 1. MANUFACTURING DETAILS :

- i) Manufacturer's/ Suppliers Name :  
& Address
- ii) No. of Prototype Sample offered :  
for trial
- iii) Place of Installation :
- iv) Date of Installation :
- v) Date of Inspection :
- vi) Sl. No. of equipment for test :
- vii) Type of Category for Trial being :  
conducted (1 Km or 2 Km)
- viii) Make & Model :

#### 2. Working Condition during type testing: (Compliance as per para no. 3.1 of specification to be submitted by firm)

- a. Ambient Temperature- :
- b. Rail Temperature :
- c. Humidity :
- d. Atmospheric Condition :
- e. Rainfall

#### 3. Track Features details :

Rly-

Div. -

Section-

Sectional/Permissible Speed -

Up/Down Line-

SL/DL-

Section Electrified (Yes/No):

Rail (New/Old) -

Curve Type/ No.	RH/ LH	Curve/ Straight	Degree/ Radius	Chainage	Length (m)	repuS noitavele (mm)	Remarks

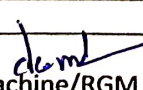
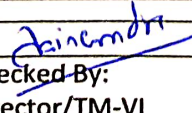
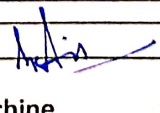
#### 4.0 Major Component description:

SN	Major Component	Description	Remark
1.	<b>Wheel Sensor – (yes/no)</b> <ul style="list-style-type: none"> <li>Sensor Type</li> <li>Assembly to the rail (weather require machining of the rail)</li> </ul>		
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	<ul style="list-style-type: none"> <li>• Sensing Speed (10 to 200 kmph)</li> <li>• Allow bi-directional traffic without special requirements</li> <li>• Can sensor use in environments where stray currents from power lines or buried cables may cause false detection of wheel passage</li> <li>• single-direction traffic activation</li> </ul>		
2.	<b>Power Source – (yes/no)</b> <ul style="list-style-type: none"> <li>a) AC Power Supply <ul style="list-style-type: none"> <li>• Unit workable with 230 volts, 50Hz</li> <li>• Ability to withstand voltage fluctuation in the range of 180-260 volts</li> </ul> </li> <li>b) Solar Power <ul style="list-style-type: none"> <li>• Solar panel</li> <li>• Battery</li> <li>• Solar system working or not</li> </ul> </li> </ul>		
3.	<b>Electronic Control Circuit – (yes/no)</b> <ul style="list-style-type: none"> <li>• Operating Voltage (Minimum 12 Volts DC)</li> <li>• Circuiting Protection (Minimum 15-amp fuse)</li> <li>• Operating Temperature (Ambient temperature 0°C to 50°C or Rail Temperature (-) 10°C to (+) 75°C)</li> <li>• Enclosures (NEMA 4 Rated or equivalent)</li> <li>• Sensitivity (Factory Set A 3.5 Volts DC (may be adjusted lower to accommodate slower speed trains, with a corresponding sacrifice of accuracy)</li> <li>• Provision for Counter Circuit</li> <li>• Provision for Timer Circuit</li> <li>• Provision in control circuit to operate for traffic in both direction or single direction</li> </ul>		

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	<ul style="list-style-type: none"> <li>• Arrangement for anti-vandalism and anti-theft features</li> </ul>		
4.	<b>Electric Motor – (yes/no)</b> <ul style="list-style-type: none"> <li>• Operating Voltage (Minimum 12 Volts DC)</li> <li>• Provision for suitable arrangement to coordinate with the speed requirements of the pump</li> <li>• The motor should be capable of activation on demand for maintenance and test purposes</li> <li>• Provision of signal lamp for motor is activated and additional lamp for sensor is tripped.</li> </ul>		
5.	<b>Pump – (yes/no)</b> <ul style="list-style-type: none"> <li>• Easy to prime</li> <li>• Sufficient to produce adequate pressure</li> <li>• Weather inlet port mates directly tank outlet near bottom of tank</li> <li>• Availability of mesh screen between pump and material</li> <li>• Weather details specification of pump provided by firm</li> </ul>		
6.	<b>Lubricant Distribution System – (yes/no)</b> <ul style="list-style-type: none"> <li>• Provision for control the flow of lubricant to the applicators</li> <li>• Distribution of the lubricant – evenly</li> </ul>		
7.	<b>Hose – (yes/no)</b> <ul style="list-style-type: none"> <li>• Screw-type connections</li> <li>• Outlet hose – wire braided</li> <li>• Distribution hoses- non-conductive type hose</li> <li>• Inner Tube- Suitable Oil Resistant Material</li> <li>• Cover Construction- Suitable Oil Resistant Material</li> </ul>		

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	<ul style="list-style-type: none"> <li>• Reinforced</li> <li>• Temperature Range – (certificate/compliance by firm)</li> <li>• Burst Press Min.- 84.37 Kg/ cm<sup>2</sup> (1200 PSI)</li> <li>• Fittings – Cast or forged brass alloy</li> </ul>		
8.	<b>Tank – (yes/no)</b> <ul style="list-style-type: none"> <li>• Provision of theft/vandalism proof</li> <li>• Material of tank – Steel</li> <li>• Separate section from the material to hold the control box, power supply, and motor/pump etc.</li> <li>• Locking arrangement for tank and controls</li> <li>• Provision of seal – (to prevent entry of any foreign material, snow, sand, rain or other wind-born particulate matter)</li> <li>• Tank Capacity- (min. 50 kg storage of lubricant)</li> <li>• Provision of lifting lugs</li> </ul>		
9.	<b>Applicator – (yes/no)</b> <ul style="list-style-type: none"> <li>• Adjustable for different sizes of rails</li> <li>• Temperature range – (should be same as for hose)</li> <li>• Multi-port configuration (Minimum 10 ports per applicator)</li> <li>• Dispensing Uniformity</li> <li>• Dispensing of lubricant at upper portion of gauge face of rail</li> </ul>		
10.	<b>Lubricants – (yes/no)</b> <ul style="list-style-type: none"> <li>• Non-inflammable, non-toxic and non-health hazard (certificate/compliance)</li> <li>• Specification of Lubricant (to be submitted by firm)</li> </ul>		

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**5. Details of Applicators:**

Location of Applicator in Chainage (should be located at the beginning of transition curve)	Size (mm)	Fixing arrangement on Rail	No. of Ports	Remarks

\* On single line the lubricator shall be located in the direction of heaviest traffic.

**6. Details of Lubricant Dispense through applicator:**

Wheel Counts	Continuous Spillage time	Spillage In per minutes(cc)	Remarks

**7. Detail of Lubricant**

Brand	Grade	Total Lubricant filled (kg)	Consumption Period	Daily Consumption (gm.)	Remarks

**8. Performance:**

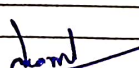
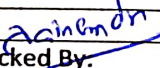
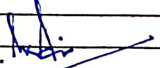
Carry down effect from applicator (m)	Spillage on rail top, if yes, length (m)	Remark

**9. Coefficient of Friction ( $\mu$ ) measured by Tribometer/Tribotester:**

Date of inspection	Coefficient of friction at Gauge face					
	Coefficient of friction ( $\mu$ ) should be 0.25 or below					
	Near applicator		Approx. Middle		Farthest end	
	Chainage	Value of $\mu$	Chainage	Value of $\mu$	Chainage	Value of $\mu$

Note: Minimum 10 reading shall be taken at different places for 01 Km category and 20 reading for 02 Km category.

**10. Remarks on field trial:**

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## Annexure -II

### Field Trial of Track Based Lubricators (Hydraulic)

#### 1. MANUFACTURING DETAILS :

- i) Manufacturer's/ Suppliers Name :  
& Address :
- ii) No of Prototype Sample offered :  
for trial :
- iii) Place of Installation :
- iv) Date of Installation :
- v) Date of Inspection :
- vi) Sl. No. of equipment for test :
- vii) Type of Category for Trial being :  
conducted (1 Km or 2 Km)
- viii) Make & Model :

#### 2. Working Condition during type testing: (Compliance as per para no. 3.1 of specification to be submitted by firm)

- a. Ambient Temperature :
- b. Rail Temperature :
- c. Humidity :
- d. Atmospheric Condition :
- e. Rainfall :

#### 3. Track Features details :

Rly-

Div. -

Section-

Sectional/Permissible Speed -

Up/Down Line-

SL/DL-

Section Electrified (Yes/No):

Rail (New/Old) -

Curve Type/ No.	RH/ LH	Curve/ Straight	Degree/ Radius	Chainage	Length (m)	repuS noitavele (mm)	Remarks

#### 4.0 Major Component description:

SN	Name of Component	description	Remarks
1	Actuator (yes/no) • Closed loop hydraulic system		

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	<ul style="list-style-type: none"> <li>• Wheel actuated actuator</li> <li>• Adjustable</li> <li>• Bi-directional</li> </ul>		
2	<b>Pump</b> <b>(yes/no)</b> <ul style="list-style-type: none"> <li>• Hydraulic powered motor</li> <li>• Easy to prime</li> <li>• Inlet port mates directly tank outlets near bottom of Tanks</li> <li>• Mess screen available between pump &amp; material</li> <li>• Specifications of pump for technical scrutiny submit</li> </ul>		
3	<b>Lubricant Distribution system</b> <b>(yes/no)</b> <ul style="list-style-type: none"> <li>• Shut off valve provided</li> <li>• Distribute the lubricant evenly</li> </ul>		
4	<b>Hose</b> <b>(yes/no)</b> <ul style="list-style-type: none"> <li>• Screw type connections provided</li> <li>• Outlet hose – wire braided</li> <li>• Distribution hoses- non-conductive type hose</li> <li>• Inner Tube- Oil Resistant Material</li> <li>• Cover Construction- Oil Resistant Material</li> <li>• Reinforced</li> <li>• Temperature Range – (certificate by firm)</li> <li>• Burst Press Min.- 84.37 Kgf/cm<sup>2</sup> (1200 PSI)</li> <li>• Fittings – Cast or forged brass alloy</li> </ul>		

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5	<b>Tank (yes/no)</b> <ul style="list-style-type: none"> <li>• Complete unit theft/vandalism proof</li> <li>• Material of tank – Steel</li> <li>• Separate door with lock &amp; key.</li> <li>• Drawings of Tank available</li> <li>• Tank fitted with seal</li> <li>• The minimum capacity of tank should be 50 kg</li> <li>• Lifting Lugs available</li> </ul>		
6	<b>Applicator (yes/no)</b> <ul style="list-style-type: none"> <li>• Adjustable for different sizes of rails</li> <li>• Temperature range same as for hose</li> <li>• Multi-port configuration (Minimum 10 ports per applicator)</li> <li>• Dispensing Uniformity</li> <li>• Dispensing gauge face upper portion</li> </ul>		
7.	<b>Lubricants (yes/no)</b> <ul style="list-style-type: none"> <li>• Non-inflammable, non-toxic and non-health hazard ( if yes, certificate/compliance submitted)</li> <li>• Specification of Lubricants submitted (to be submitted by firm)</li> <li>• Consumption rate of lubricants per actuating wheel- calculation sheet provided by firm</li> </ul>		

**5. Details of Applicators:**

Location of Applicator in Chainage(should be located at the beginning of transition curve)	Size (mm)	Fixing arrangement on Rail	No. of Ports	Remarks
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\* On single line the lubricator shall be located in the direction of heaviest traffic.

**6. Details of Lubricant Dispense through applicator:**

Wheel Counts	Continuous Spillage time	Spillage in per minutes(cc)	Remarks

**7. Detail of Lubricant**

Brand	Grade	Total Lubricant filled (kg)	Consumption Period	Daily Consumption (gm.)	Remarks

**8. Performance:**

Carry down effect from applicator (m)	Spillage on rail top, if yes, length (m)	Remark

**9. Coefficient of Friction ( $\mu$ ) measured by Tribometer/Tribotester:**

Date of inspection	Coefficient of friction at Gauge face					
	Coefficient of friction ( $\mu$ ) should be 0.25 or below					
	Near applicator		Approx. Middle		Farthest end	
	Chainage	Value of $\mu$	Chainage	Value of $\mu$	Chainage	Value of $\mu$

Note: Minimum 10 reading shall be taken at different places for 01 Km category and 20 reading for 02 Km category.

**10. Remarks on field trial:**

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