

## Annexure-I

**FUNCTIONAL REQUIREMENT SPECIFICATION(FRS) FOR HIGH PERFORMANCE RAIL CLAMP WITH STANDARD/JOGGLED FISH PLATE ON INDIAN RAILWAYS.****1. EXISTING TRACK STRUCTURE ON INDIAN RAILWAYS:**

60Kg/ 52 Kg Rail laid on Pre-stressed Concrete Sleepers at sleeper density 1540/1660 nos. per km with elastic fastenings and ballast cushion of 300/350 mm on important Broad Gauge routes.

**2. OPERATING CONDITIONS OF IR:****(i) Axle load and Speed**

Traffic Type	Axle Load	Speed upto
Goods	25T	100 kmph
Passenger	20T	160 Kmph

- (ii) Electric Traction (Minimum) : 25 KV AC.
- (iii) Track Circuits : DC (2 – 6 volts) / AC 110V & AFTC
- (iv) Gauge : Broad Gauge, Nominal (1676 mm)
- (v) Ambient Temperature : (-) 5°C to 50°C.
- (vi) Rail Temperature : (-) 15°C to (+) 76°C.
- (vii) Humidity : Max. 100%

- The clamping system with standard fish plate/joggled fish plate should be compatible with the existing track structure and operating conditions as given in 1 and 2 above. It should enable passing of trains at a higher speed.
- The clamp should be made up of durable material so that the clamp is in usable condition for a minimum period of 8-10 years. The details of the material used in the manufacturing of the clamp shall be furnished. Reports of tests conducted on clamps relating to its quality, type of material, strength of material etc. shall be provided.
- Clamp should be of compact design, lightweight with less maintenance and should be mounted directly on standard or Joggled fish plate on rail /weld joint without drilling of a hole in the rail. The detailed installation procedure should be furnished along with dimensional drawings and pictures.
- The firm would specify the clamping force for the system. The minimum clamping force for the complete system (including all the clamps) should not be less than 30 KN.
- The jaw of the clamp may be connected by suitable arrangement to exert a requisite clamping force on fish /joggled fish plate such that the clamp is capable of fixing the rails to proper alignment.
- The screw or nut of the clamping arrangement should be secured by some locking arrangement to protect from the loosening of clamps due to the movement of traffic.

Initial tightening torque and resulting clamping force for the arrangement shall be furnished.

9. The clamp should not loose the tightening torque by more than 20% of the initial tightening torque in 30 days, when put in service in running track. The frequency of inspection/maintenance of the system would be furnished. The corresponding nature of traffic and detailed items of inspection /maintenance would be furnished.
10. Minimum ballast excavation should be required in ballasted track and the system should also be usable on ballastless track. Mounting and dismounting of clamps should be easy. The clamp should also enable unhindered working of track machine.
11. Certificate for satisfactory performance in running track at a minimum speed of 50Kmph (100 Kmph desirable) from world railway networks, where it is in use, shall be provided along with track structure and operating conditions of that railway. The duration of use on that railway shall also be provided.

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