INDIAN RAILWAYS

FUNCTIONAL REQUIREMENT OF SPECIFICATION FOR HEAT REJECTION FILM TO BE APPLIED ON SEALED WINDOW GLASS UNIT OF AC COACHES

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Functional Requirement Specification for Heat Rejection Film to be used on Sealed Window Glass Unit of AC coaches

1. FOREWORD

Indian Railway is intended to improve the thermal insulation and heat load of Air Conditioned coaches to save energy. Provision of suitable heat rejection film on glass window can be one of the energy efficiency measures for AC Coaches. The sealed window Glass unit to ICF's specification ICF/MD/Spec-103 and RCF's specification No.MDTS-089 are being provided in IR AC Coaches. The heat Rejection Film to be applied to inner side of outer glass panel of sealed window glass unit to reduce heat transfer.

2. SCOPE

This specification covers the functional requirement related to heat rejection film to be applied to inner side of outer glass panel of sealed window glass unit to reduce heat transfer under the operating conditions as given in Para 4 of this FRS.

3. FUNCTIONAL REQUIREMENT

The heat rejection film is intended for the following functional requirements:

a) The film should have a quality to improve the insulation (Min 25%) from existing glass window.
b) Film should have high heat rejection property to facilitate energy saving and improve comfort.
c) Film should provide thermal insulation.
d) Film should provide protection from UV rays.
e) Film should reduce glare and eye discomfort,
f) Film should enhance views with low interior reflectivity, especially at night.
g) Film should maintain appearance without discoloration (yellowing)
h) Film should maintain heat rejection property without cracking, crazing or peeling.
i) Film should maintain adhesive property without blistering, bubbling and delaminating from glass.
j) Film should have long lasting performance.

4. OPERATING CONDITION

4.1 Ambient Conditions

(i) Ambient temperature : - 4° C to 50° C

Altitude	:	Sea level to 2500m
Max. Temperature under Sun	:	70° C
Relative humidity	:	40% to 95%

(ii) The rainfall is fairly heavy.

(iii) During dry weather, the atmosphere is likely to be dusty.

(iv) Temperature variations can be quite high in the same journey or short period of time.

(v) Coaches operate in coastal areas with continued exposure to salt laden air.

(vi) The coach length over buffer is approximately 22.3 meters for ICF type coaches & for LHB type coach length over coupler is approximately 24 meters.

4.2 Coach Inside Conditions:

Air conditioned Coaches are equipped with roof mounted air conditioning system with central ducting system and side distribution branch lines. The coaches are conditioned to a nominal temperature of 23°C to 25°C, RH 55% to 60% & air flow @ 4000 cubic meter /hour. The specified speed of the coaches is 110 kmph and 160 kmph which may vary as per IR requirements.

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