TECHNOLOGY TRANSFER

Interest Exploratory Note

Flameproofing Coating-Caspol

Introduction

CASPOL (Ceramic-Polymer hybrid) is a water based, ready-to-coat and easy-to-use flame proof coating having both societal and advanced end-use applications. It confers excellent flame retardant, waterproofing and thermal control properties to substrates ranging from masonry surfaces, textiles, paper, thatched leaves, wood etc. to advanced materials like polyurethane and phenolic based thermal insulation foam pads.

Salient features of CASPOL are:

1. No liquid or vaporizable material (except water)
2. Human and eco-friendly
3. Brushable and sprayable
4. Low cost

Description

CASPOL is a room temperature curable, water based formulation having self-extinguishing properties, good adhesion and water repellency characteristics. It is based on ceramic composition dispersed in an aqueous polymeric emulsion containing flame retardant components. All the ingredients are dispersed in water to get a suspension of the required viscosity for application by brushing or spraying. It is having limiting oxygen index (LOI) above 40. The material coated with CASPOL will be self-extinguished within 4 seconds after removal of flame. It is also having good adhesion to the substrate surface both in the dry condition and after exposing the coated forms in water shower. Foam materials can be impregnated with CASPOL by dip coating.

Fig. 1 Model huts made of thatched coconut leaves set to fire. (Left)-Hut without CASPOL coating gutted completely in fire within a few seconds whereas CASPOL coated hut remained intact even in fire.

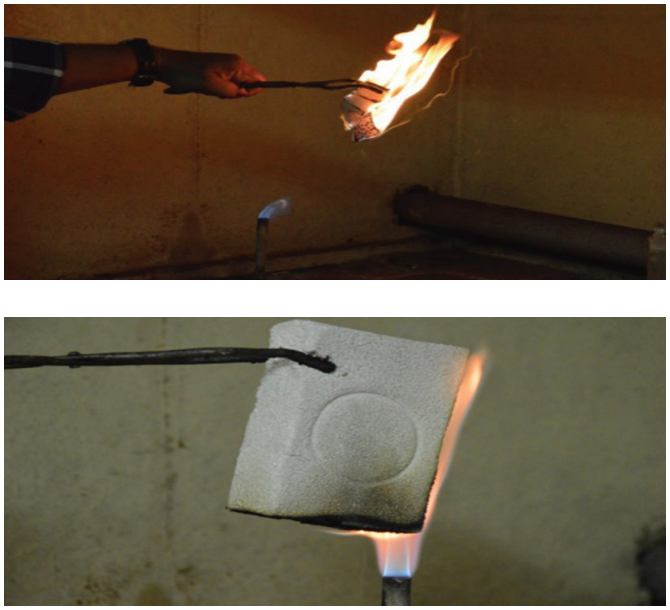

Fig. 2 Images of commercial polyurethane foams set to fire. (Left)-foam without CASPOL impregnation burned completely in fire within a few seconds whereas CASPOL impregnated foam (right) remained intact even in fire.

Department of Space has authorised NSIL for Technology Transfer of Flameproofing Coating-Caspol to suitable entrepreneurs/ Industry in India. Interested Parties may please fill the enclosed form and send by email to contact-nsil@isro.gov.in

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Applications of CASPOL

1. ***Launch vehicle:*** CASPOL is a flame proof coating, giving the required flame retardant properties to thermal protection foam pads used in Launch Vehicles.

2. ***House hold:*** CASPOL can be applied over thatched leaves of the cottage roof to flameproof it in addition to increasing the life of such roofing of households, so that periodicity of the maintenance and replacement can be reduced significantly. Application of CASPOL reduces the temperature inside the room and prevents water leakage. The low solar absorptivity (0.20%-0.40%) and high emissivity make it a good temperature controller in sunny weather

3. ***Waterproofing/thermal control of concrete:*** CASPOL can be applied over the concrete surface of a building to prevent water seeping. The high emissivity keeps the building cool by at least 5 to 6°C less. After the application of CASPOL, water seepage problems will not be felt as CASPOL pots micro cracks and holes.

4. ***Railways and automobiles:*** CASPOL can be used as a flame retardant material in railways and automobiles where the seat cushions can be made flameproof using this material, without affecting the cushioning characteristics significantly.

5. ***Foams In Public Transport:*** If the foam materials used in passenger seats are rendered flameproof, fire accidents can be reduced to a large extend. Since flame proofing of foam materials using CASPOL can be achieved through less expensive processes, there is considerable market potential for CASPOL in Indian foam market.

Properties	CASPOL- alone	CASPOL coated PIPhenotherm/ Polyurethane
LOI, %	32-42	32-42
Solar absorptance	0.20-0.40	0.20-0.40
Adhesion tape test at RT	N/A	pass
Oxyacetylene flame test, time for extinction, sec	N/A	≤ 4 sec
Ignitability	N/A	Not easily ignitable
Surface spread of flame	N/A	Class 3
Heat release rate	N/A	53.83 kW/m^2
Fire propagation index	N/A	17.97
Sensitization to skin	No sensitization	N/A
Irritation to skin	Non-irritant	N/A
Toxicity	Cytotoxic	

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Fig. 3 Two images of commercial seat cushion set to fire. In each image: (Left)-cushion with CASPOL impregnation remain intact even after fire whereas cushion without CASPOL impregnation (Right) is burned completely in fire within a few seconds

CASPOL can also be used for flame proofing foam materials used in auditoriums and cinema halls where chances of fire related accidents are high.

VSSC is willing to offer the technology of CASPOL to capable and interested parties who are in the field of manufacturing similar items.

Interested entrepreneurs are requested to contact the address given below with all relevant particulars regarding their line of current activity, infrastructure available, market assessment of the product, financial arrangements strength of the company, turn over and sales of their products for the past few years and a copy of their latest annual report.

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