supplying in two segments:
production system and
its turn-key solution

IMG PLASTEC
MACHINERY & PLANT ENGINEERING GROUP

'Group of experts in the production of particle foams over 30 years'

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Non-flammable, Fire-retardant
imgNF EPS Insulation Board
Production Plant & Technology

A New Solution
for Fire protection

I . imgNF Insulation Board

imgNF, A New Solution For Fire Protection

- ✓ **Smokeless**
- ✓ **Non-melting**
- ✓ **Non-flammable**

imgNF Insulation Board is an outcome of innovative thermosetting polymer technology, which has an excellent thermal insulation and fire-proof performance. imgNF Insulation Board doesn't burn, melt, and emit the toxic gases on the fire so it can be a new solution to prevent the spread of flame and protect people from suffocation in fire accident.

imgNF Insulation Board Characteristics

- Fire-resistance & Thermal Insulation
- High Tensile Strength
- Energy Efficiency
- Excellent Mechanical & Physical Properties
- Water Resistance & Breathable
- Lightweight
- Various Application
- Environment Friendly

II. Application of imgNF Insulation Board

Interior & Exterior Thermal Insulation Board for Building

imgNF Insulation Board is a perfect substitute for rockwool to prevent the spread of fire. Non-combustible imgNF Insulation Board passed a full-scale of wall fire test of IBF in Germany, which means when using imgNF Insulation Board, the fire bars are no more needed for building construction in Europe.

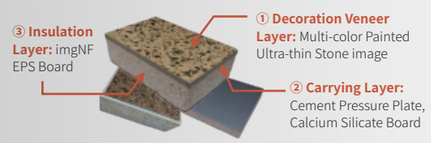
Stone Wool

Stone Wool Fire bar

imgNF Insulation Board

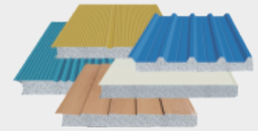
Decorative Board

imgNF Insulation Board is used for calcium silicate decorative board.



Interior & Exterior Insulation Board

Non-flammable, Non-melting Sandwich Panel



2D & 3D imgNF EPS Sculpture

EPS is widely used for creative artworks, theme parks, and decorations in shopping malls and kids' clubs where people are always crowded. The sculptures made of imgNF can protect and save people from the spread of fire and toxic gases released from EPS.

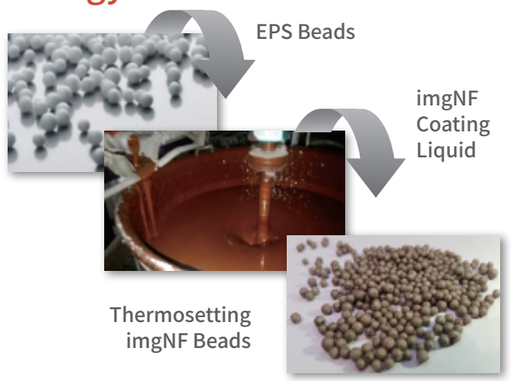
The Pororo Theme park in Korea was burnt. The fire spread very quickly due to the ornaments which were made of flammable materials like polystyrene. In this accident, a lot of people were died or injured due to toxic gases released when burning the displayed sculptures in the mall.

III. Principle of imgNF Insulation Board

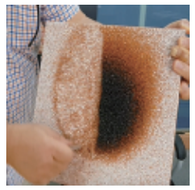
The Coating Liquid & NF Beads Technology

imgNF coating liquid is the key technology of incombustibility, consisting of a few kinds of mineral powder, chemical extra, and water. Those ingredients are mixed altogether in an effector for fusion reaction and finally become imgNF coating liquid.

The next process to make imgNF EPS beads is to put normal EPS beads into the coating machine to be covered with imgNF coating liquid. When the normal EPS beads are coated and completely dried, they finally turn to thermosetting imgNF EPS beads, which don't burn, melt nor release toxic gases in fires.



Honeycomb Structure

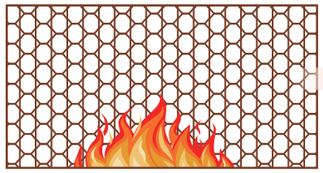


Honeycomb Layer

[imgNF Beads] [Inside of imgNF Beads]

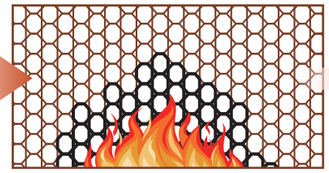
When heat (700 °C~1000 °C) is applied to imgNF Insulation Board, the surface of the imgNF beads creates a layer of honeycomb structure. This layer blocks flames and the release of toxic gases from EPS.

1. Being exposed to fire



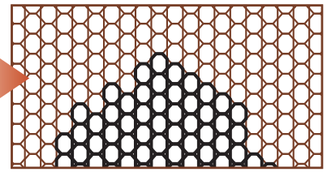
Being exposed to fire, imgNF beads don't melt or burn but turn to honeycomb structure.

2. Blocking fire spread



The layered honeycomb structure prevents the spread of fire from the surface.

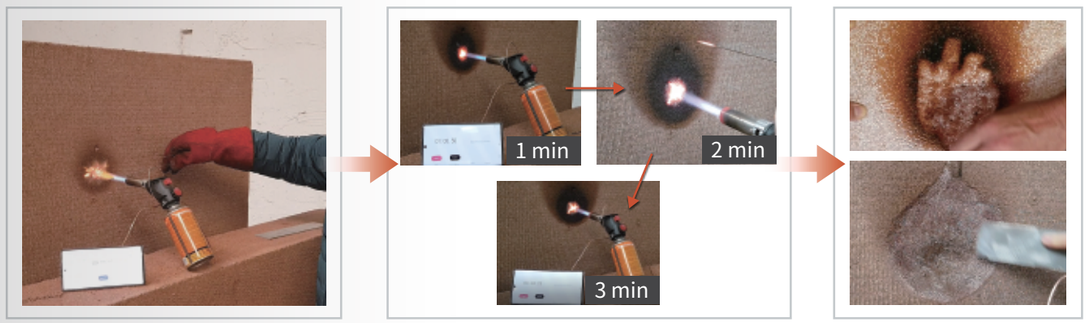
3. Carbonization of surface



The carbonized surface of imgNF beads blocks the toxic gases like Benzene not to be released in the air.

IV. Fire Retardant Performance

Fire Retardant Performance

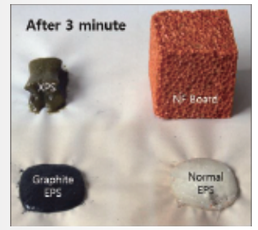


Scorch the surface of imgNF board

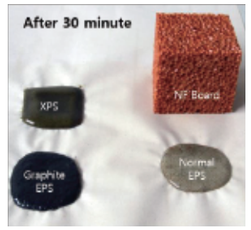
Smokeless, Non-melting, Non-flammable

High-temperature Oven Melting Test

Oven Melting Test (200 °C)



Other materials started melting at 200 °C



In case of imgNF

When putting imgNF, XPS, Graphite EPS and normal EPS foam blocks in a high-temperature oven for 3 min and 30 min, other foam blocks easily melted. On the other hand, imgNF block became granularities without a deformity of the foam itself.

Performance Comparison between imgNF & EPS Board

imgNF Insulation Board

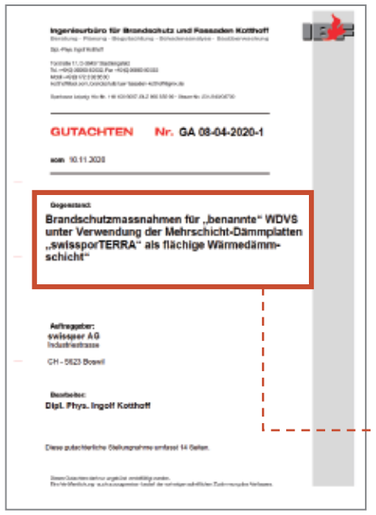
Through the massive experiments, it is verified that NF EPS board is resistant to fire and non-combustible due to its unique structure compared to other normal insulation board. Not only it has the most optimal property of fire resistance, but also eliminates the danger of spread of fire. (certificated by IBF, Germany)

Combustible Insulation Board(EPS, XPS, PU Foam)

On 14, May in 2012, in France Roubaix Mermoz Tower, the fire started from the balcony on 2nd floor, and destroyed the skyscraper in an instant where the external wall contains of EPS insulation core and Aluminum complex panel.

V . imgNF Fire Protection Test

Incombustible Property Certified by EU



Ingenieurbüro für Brandschutz und Fassaden Kotthoff

GUTACHTEN Nr. GA 08-04-2020-1

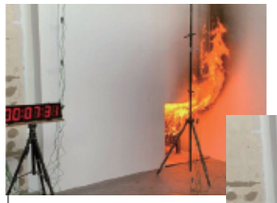
vom 10.11.2020

Gegenstand:
Brandschutzmassnahmen für „benannte" WDVS unter Verwendung der Mehrschicht-Dämmplatten „swissporTERRA" als flächige Wärmedämmschicht"

Auftraggeber:
swisspor AG
Industriestrasse
CH - 5623 Boswil

Bearbeiter:
Dipl. Phys. Ingolf Kotthoff

Diese gutachterliche Stellungnahme umfasst 14 Seiten.



[7 minutes later]

[15 minutes later]

[20 minutes later]

With imgNF Insulation Board, you can replace the rookwools, and fire bars are no more needed.

Object: Fire protection property of ETICS using the multi-layer insulation boards "swissporTERRA" as a flat thermal insulation layer.

IBF Test

1 Zone 1 : No thermal change (Initial state)

-No change of form, solidity, structure or color from the initial state
-Thickness 4~7cm (Maximum 1.5m from direct flame with high temperature)
Thickness 9cm, (1.5-1.9m from the fire)

2 Zone 2: Thermal change, Copper red

-No discoloration & No deformity (No contraction of thickness)
-EPS beads completely melted but not burnt
-Thickness 5~7cm (1.5m from the fir e), maximum thickness 4cm or more than 4cm (1.5m~1.9m from the fire) ⇒ Not burnt, Not damaged

3 Zone 3: Thermal decomposition & Carbonized zone

-Easily cracked carbonized foam
-Thickness 2~3cm (1.5m from the fire), maximum thickness 1cm (1.5-1.9m)
⇒ Not burnt but damaged by flame

Result (Limit for evaluation : ÖNORM 3800-1, 4.0m from the floor)

- ✓ No fire spread to external wall (plaster)
- ✓ No primary fire spread and releasing pyrolysis gas
- ✓ No fire spread to insulation section
- ✓ No melting or collapsing

II. Application of imgNF Insulation Board

imgNF Liquid Coating & Drying Machine

imgNF coating liquid adheres to the surface of normal EPS beads in the coating machine. After drying process, they finally turn to thermosetting imgNF EPS beads that can effectively prevent the spread of fire. We have done R&D and experiments for several years, and finally we acquired know-how for coating beads with even amount of liquid and succeeded to produce imgNF with A or B1 class of incombustibility and non-melting.

imgNF EPS Block Cutting Machine

imgNF EPS block cutting machine provides 3 way cutting system which is a horizonal, vertical and cross cutting. The cutting wires with max. 50 strands are automatically set for horizonal cutting. In case of vertical and cross cutting, the vibrating wires with max. 20 strands are used.

imgNF Production Line (Poland, 2020)