

T-FIT® Hygiene

Condensation control in
frozen food environments

T-FIT®

INSULATION

Fit to perform. Fit to last



T-FIT® Hygiene insulation is made from Zotefoams' ZOTEK® F43HT PVDF closed cell foam, a material which has numerous benefits when it comes to insulation, especially within food manufacturing environments.

Benefits of PVDF

Polyvinylidene fluoride (PVDF) is a semi-crystalline thermoplastic from the family of fluoropolymers, known for their toughness and stability. It is an excellent choice for applications requiring;

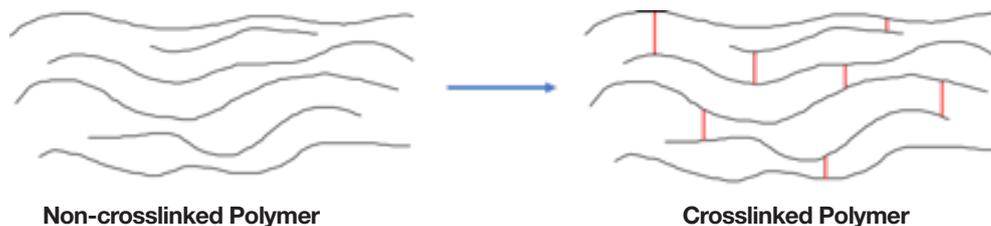
- Highest purity
- Resistance to a wide range of chemicals (such as harsh cleaning agents)
- Low permeability (molecules of gas or liquid find it difficult to travel through the polymer structure)
- UV resistance
- Excellent flammability credentials

PVDF is stable over a wide range of temperatures, from negative temperatures right through to +145°C, meaning that the material can be used on pipelines subject to 'Clean-In-Place' (CIP) processes. The insulation can perform at both the chilled process temperatures and high cleaning temperatures without any loss of thermal performance over the lifetime of the product.

Zotefoams uses a unique three-stage process

to make ZOTEK® F43HT foam material, utilising pure nitrogen as a foaming agent.

Stage 1 - pure PVDF polymer is extruded into a solid slab, where it is physically crosslinked using irradiation, meaning that the polymer chains that make up the material are joined by chemical bonds. These linkages give the material thermal stability, durability, high strength and toughness compared to non-cross-linked materials.



Crosslinking adds to the long-term durability, important for insulation materials, since it allows the purchase price of the insulation to be spread over a longer service life, with minimal maintenance, disruption or replacements required.

Stage 2 - extremely high pressures and temperatures are used to dissolve nitrogen gas into the solid slabs.

Stage 3 - the nitrogen-saturated slabs are put through a second, lower pressure and temperature cycle where the pressure is released to allow free expansion of the material into sheets of foam.

On test equipment, Zotefoams can demonstrate that an operator can safely touch the surface of a T-FIT Process tube with 6.35 mm wall thickness and clad with aluminium/PET film composite on a pipe with process temperatures of 200°C, even though the measured surface temperature can be as high as 90°C. Injury is not sustained, despite the high surface temperature, because the PET film is an extremely poor conductor. The maximum skin contact temperature measured is only around 40°C after 5 seconds contact (standard reaction time in an industrial

environment). These contact temperatures are deemed safe as they are below the threshold temperature for burn injuries over this time frame.

The widespread use of metallic cladding systems may have given rise to an acceptance that 60°C is the upper surface temperature limit with regards to personal protection, but substitution of this cladding with the composite described above allows operators to be protected even when temperatures exceed this so-called limit.

Benefits of nitrogen expansion

The Zotefoams manufacturing process described above produces a premium foam compared to other foam insulation materials that are expanded using chemical foaming agents;

High purity foam

- Low odour and outgassing
- Noncorrosive and non-toxic

Isotropic properties

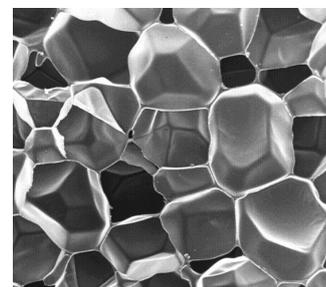
- Free expansion means the foam cells have no specific orientation
- Properties consistent throughout material

Completely closed cell

- This type of structure gives superior insulating properties compared to open-cell materials.
- Closed-cell materials more effectively reduce moisture and gas penetration through the material, due to the lack of a continuous gas network through which these substances could be transferred.

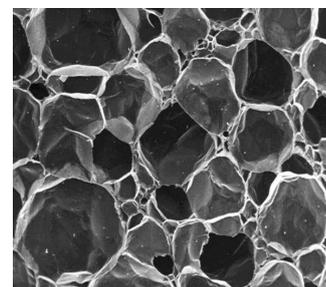
Zotefoams

- Completely closed cell
- Consistent cell size
- Low outgassing



Chemically blown

- Up to ~10% open cell
- Inconsistent cell size
- Directional properties
- Residual chemicals from blowing agents



The combination of Zotefoams unique manufacturing processes, and the natural properties of PVDF polymers make for a high-performance insulation foam material ideally suited to any production processes that need to cycle between low and high temperatures on a regular basis. Such changes of operating temperature will not impact the long-term thermal performance of the material, giving the product a long-term life cycle.

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Quality
FM 01870
ISO 9001:2015



Safety
OHS 52538
ISO 45001: 2018



Environment
EMS 36270
ISO 14001:2015

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