

Benefits to use Methylal as Blowing Agent by Types of Polyurethane Foam

 **Univar**Solutions

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Blowing Agents Used in Europe



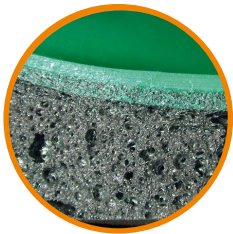
Rigid foams

- Water
- n-Pentane in companies equipped to handle flammable liquid category 1
- Cyclopentane
- HFC-365mfc/HFC-227ea and HFC-245fa
- HFO-1233 zd-E and HFO-1336 mzz-Z



Flexible foams

- Water
- Liquid CO₂



Integral skin foams

- Water
- Cyclopentane
- HFC-365mfc/HFC-227ea and HFC-245fa
- HFO-1233 zd-E and HFO-1336 mzz-Z

General Benefits to use Methylal as Blowing Agents for Polyurethane Foams

- Available
- Attractive cost
- Good toxicological profile
- Good eco-toxicological profile
- Benign atmospheric behavior (no ODP, GWP <<1)
- Easy to handle (boiling point 42°C)
- Easily miscible with all polyols
- Miscible with all other blowing agents
- Improvement of the miscibility of poorly miscible blowing agents
- Very good viscosity reducer
- Very good flow
- Improvement of the adhesion on surfaces



Additional Benefits of Methylal in Rigid Foams

COMBINED WITH / COMPARED TO	
WATER	Reduction of the density
n-PENTANE	Combined with n-Pentane, general benefits
CYCLOPENTANE	Significant reduction of the flammability No phase separation during the shelf life of the product
HFC-365mfc/HFC-227ea and HFC-245fa	HFCs must be phased out in 2023 HFCs are much more expensive than Methylal Based on the molecular weight, 2 parts of HFCs are replaced by 1 part of Methylal Due to the volatility of HFC-227ea, the flash point of blends with polyols cannot remain constant In combination with HFCs, low percentage of Methylal in the polyol <ul style="list-style-type: none"> • has an acceptable flash point • does not affect the flammability of the finished foam
HFO-1233 zd-E and HFO-1336 mzz-Z	HFOs are extremely expensive Based on the molecular weight, 2 parts of HFOs are replaced by 1 part of Methylal In combination with HFOs, low percentage of Methylal in the polyol <ul style="list-style-type: none"> • has an acceptable flash point • doesn't affect the thermal conductivity of the foam • doesn't affect the flammability of the finished foam

Additional Benefits of Methylal in Flexible Foams (viscoelastic, high resilience, molded and continuous blocks)

COMBINED WITH / COMPARED TO	
WATER	Reduction of the density Reduction of the temperature inside the foam during the foaming Soft touch of the foam No issue of flammability in viscoelastic foams, as the quantity of Methylal is low
CO ₂	This technology used to reduce the density needs significant investments

Additional Benefits of Methylal in Integral Skin Foams

COMBINED WITH / COMPARED TO	
WATER	Methylal gives a smooth, closed surface without holes Methylal increases the density of the skin No issue of flammability as the quantity of Methylal is low
CYCLOPENTANE	Significant reduction of the flammability No phase separation during the shelf life of the product
HFCs	HFCs must be phased out HFCs are very expensive 2 parts of HFCs are replaced by 1 part of Methylal
HFOs	HFOs are extremely expensive 2 parts of HFOs are replaced by 1 art of Methylal



Contact:

For more information contact your local Univar Solutions representative or visit:
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