

PU PANELS

for a safer and sustainable future

HUNTSMAN

Enriching lives through innovation



Milano, 25th of May 2017

Polyurethanes

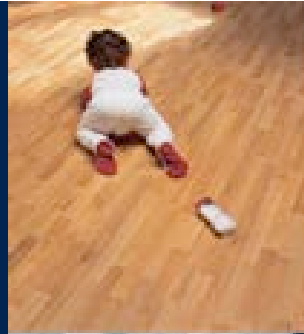


- **HUNTSMAN Polyurethanes Introduction**
- **Mega Trends**
- **Trends in the Panels Market**
- **HPU Solutions**

Business Dimensions

Markets include:

- Adhesives, Coatings and Elastomers
- Appliances
- Automotive
- Composite Wood Products
- Footwear
- Furniture and Bedding
- Insulation



- Sales revenue \$3.8 billion
- Leadership positions in numerous market sectors
- Global reach: 2,400 associates and sales in 90+ countries
- Commitment and focus on MDI-based applications, over 500 products
- 3 World scale MDI production facilities backward integrated into aniline/nitrobenzene
- Highly capable downstream 'systems' capability

Strong Global Presence

Note: sales offices & distribution points also located strategically across the world



Construction Applications

- Composite panels
- Insulation boards & insulation blocks
- Technical insulation
- Pipe insulation
- Garage and entry doors
- Rigid foam construction
- Spray foam (roof, wall and adhesives)
- Walk-in coolers



Determining our Future and leading to...



Raw material scarcity



Population growth, migration



Water



Urbanisation



Food supply



Waste

... Significant changes in Construction ...

EU Policy, regulation, trends



Energy targets



CPR & Changing
Building Codes



Circular
economy

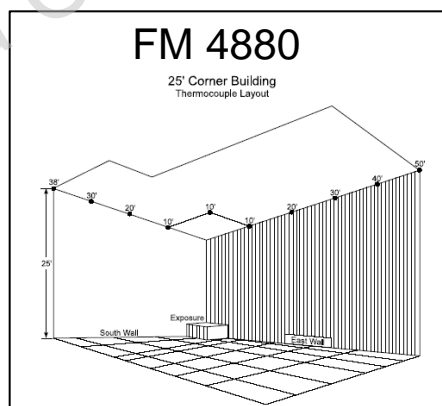


Innovation

... and increased Fire standards...





Evolution to higher fire ratings

- More demand for class E foam core, following EN 14509-2013
- Opportunity to widen application of sandwich panels
 - Architectural, commercial, industrial, tertiary buildings
 - Food processing and higher risk areas
 - Fire resistant walls and roofs, (R)EI 15, 30, 45
- Low smoke rating
- Insurance and National approvals via large scale testing, requiring steel composite panels with PIR core



... driving the Trends in Composite Panels

Drivers for growth

-  Energy efficiency
-  Fire standards
-  Green building
-  Cold chain evolution in EAME

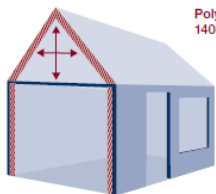
Trendsetters

- ✓ Investors, architects, designers
- ✓ Fire brigades
- ✓ Competition
- ✓ Composite panel innovators

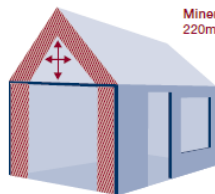
Advantages of PU versus MW in steel composite panels

- Thinner insulation
- Light weight
- Speed of construction
- Lower life cycle cost
- Versatility, e.g. operating at wide temperature range
- No condensation at low operating temperatures
- Hygiene & food safety
- durability

Optimising living space and rental value (thermal insulation effect / U-value [W/(m².K)])



Polyurethane:
140mm/U-value: 0.16



Mineral wool:
220mm/U-value: 0.18



Solutions designed to meet Market needs

Non Fire-rated and Fire-rated Product Range

	DaltoPUR® STD	DaltoPUR® FR	DaltoPIR® FR	DaltoPIR® HFR	DaltoPIR® XHFR
Reaction to fire	F	min. Cs3d0	Bs2d0	Bs2d0	Bs1d0
Fire resistance (100 mm)			EI 15	EI 30	EI 30
Conveyor temperature (°C)	40	40	50	60	60
Iso / polyol ratio	155 -165	165 -180	185 -210	250 -265	250 -280
DaltoPIR® PRIM	Not required	Not required	Recommended	Required	Required
Overall density (kg/m³)	38 - 39	39 - 41	38 - 42	38 - 42	38 - 42
Initial lambda (mW/mK at 10°C)	18 - 21	18 - 22	18 - 21	18 - 21	18-21



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THANK YOU !

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