



Polyurethanes

## Product Lines

Water Heaters

Seek **Together**<sup>™</sup>



# Water blown solutions (WB)



# Water blown systems technology

Zero ODP, low GWP, non flammable solutions, may be easily implementable without investment costs. Open cell technology allows to get dimensional stable foam at very low applied density but it features the worst insulation performance.

PU foam performance – Dow R&D Laboratory					
Technology	Gel time (s) High pressure machine data	Applied density (kg/m <sup>3</sup> ) 2m length vertical Brett mold	Demold time (min) 60 mm PU thick horizontal mold	k-factor @ 24°C (mW/mK) Lasercomp FOX 200	Typical production process
Closed cell Water Blown	40 - 60	41 - 43	25 - 30	23.5 – 24.5	Molding
Open cell Water Blown	40 - 60	33 - 35	-	34.0 – 35.0	On fly

These are typical properties and should not be construed as specifications





# Hydrofluorocarbon solutions (HFC)



# HFCs

**Zero ODP, non flammable solutions, may be easily implementable without investment costs:**

- Improved insulation performance versus full water blown technologies
- Reduced applied density versus closed cell full water blown technology

PU foam performance – Dow R&D Laboratory					
Technology	Gel time (s) High pressure machine data	Applied density (kg/m <sup>3</sup> ) 2m length vertical Brett mold	Demold time (min) 60 mm PU thick horizontal mold	k-factor @ 24°C (mW/mK) Lasercomp FOX 200	Typical production process
HFC 134a	45 - 65	40 - 42	8 - 10	22.5 – 23.5	Molding/Clamping/ On fly
HFC 134a + HFC 365mfc/227ea	45 - 65	38 - 40	6 - 8	22.0 – 23.0	Molding/Clamping/ On fly
HFC 245fa	45 - 65	38 - 40	5 - 7	22.0 – 23.0	Molding/Clamping/ On fly

These are typical properties and should not be construed as specifications





# Hydrocarbon solutions (HC)



# Hydrocarbons (HCs)

**Zero ODP, low GWP solutions for the entire Water Heater industry:**

- low applied foam density
- enhanced insulation performance for future energy classes
- Fire rated solutions maintaining good processability

PU foam performance – Dow R&D Laboratory					
Technology	Gel time (s) High pressure machine data	Applied density (kg/m <sup>3</sup> ) 2 m length vertical Brett mold	Demold time (min) 60 mm PU thick horizontal mold	k-factor @ 24°C (mW/mK) Lasercomp FOX 200	Typical production process
Non fire rated (B3)	45 - 65	36 - 38	5 - 7	21.0 – 22.0	Clamping / On fly
Fire rated (B2)	45 - 65	40 - 42	16 - 18	22.0 – 23.0	Molding

These are typical properties and should not be construed as specifications





# Hydrofluoroolefin Solutions (HFO)





## Hydrofluoroolefins (HFO)

Non flammable, Zero ODP, low GWP solution, may be easily implementable without investments costs. VORATEC™ SN 1000 systems combine good insulation efficiency with enhanced processability and sustainability. The insulation performance of the foam is directly linked to the blowing agent amount in the formulated polyol. Fully formulated polyol typical shelf life is three months.

PU foam performance – Dow R&D Laboratory					
Technology generation	Gel time (s) High pressure machine data	Applied density (kg/m <sup>3</sup> ) 2 m length vertical Brett mold	Compressive strength thickness direction (kPa)	k-factor @ 24°C (mW/mK) Lasercomp FOX 200	Typical production process
HFO LL <sup>(1)</sup>	40 - 60	40.0 – 42.0	150 - 170	22.3 – 23.3	Clamping/ Molding
HFO ML <sup>(2)</sup>	40 - 60	40.0 – 42.0	150 - 170	21.5 – 22.5	Clamping/ Molding
HFO HL <sup>(3)</sup>	40 - 60	38.0 – 40.0	140 - 160	20.5 – 21.5	Clamping/ Molding

These are typical properties and should not be construed as specifications

<sup>(1)</sup> Typically low level HFO content in polyol blend - <sup>(2)</sup> Typically medium HFO content in polyol blend - <sup>(3)</sup> Typically high HFO content in polyol blend



## Abbreviations and Annotations

Abbreviation	Description
HFC	Hydrofluorocarbon
HC	Hydrocarbons
HFO	Hydrofluoroolefins
GWP	Global Warming Potential
ODP	Ozone Depletion Potential
WB	Water blown

Annotations	Description
Brett mold	2 m vertical mold used to measure system flow-ability
Jumbo mold	40x70 mm (60 mm adjustable thickness) horizontal mold used to measure foam mechanical properties
Lasercomp FOX 200	Thermoconductivimeter used to measure foam thermal insulation properties on 200x200 mm foam samples





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