

New High-Performing Surfactants For Insulation Boards & Sandwich Panels



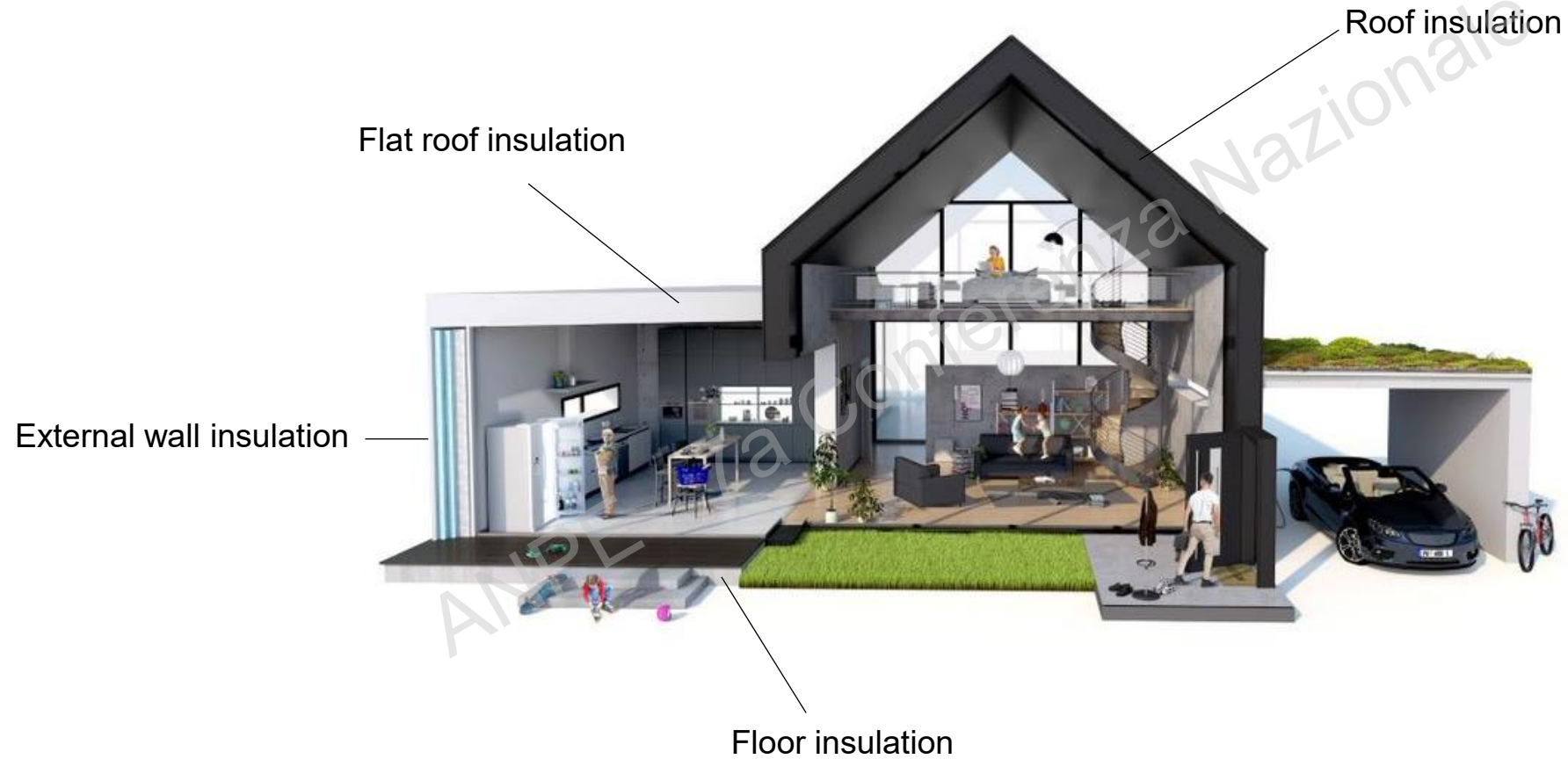
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Surfactants For Insulation Boards

ANPE - 7a Conferenza Nazionale

Flex-Faced Insulation Board Applications - Improved Energy Efficiency of Buildings



Formulation For Surfactant Screening

Component	Parts
Polyester polyol	100.0
TCP	15.0
KOSMOS® K 67	3.2
POLYCAT® 520	2.8
Water	0.4
Surfactant	2.0
c/i-Pentane (70/30)	17.0
MDI	<300>



Machine Foaming experiments

Name	Type
TEGOSTAB® B 84507	Reference
TEGOSTAB® B 84521	Commercial grade
TEGOSTAB® B 84522	Commercial grade
TEGOSTAB® B 84525	Commercial grade
TEGOSTAB® B 84526	Commercial grade

High-Pressure Machine Foaming Conditions

KraussMaffei RIM-Star MiniDos		
	Polyol	Isocyanate
Pressure	135 bar	140 bar
Temperature	30 °C	30 °C
Ratio	100	163
Throughput	~80 g/s	~125 g/s

Panel Mold	
Dimensions	50 x 50 x 7 cm ³
Release Agent	PE Foil
Temperature	65 °C



Foam Parameters	
Free Rise Density	28 kg/m ³
Gel Time	35 s

Results of Surfactant Screening

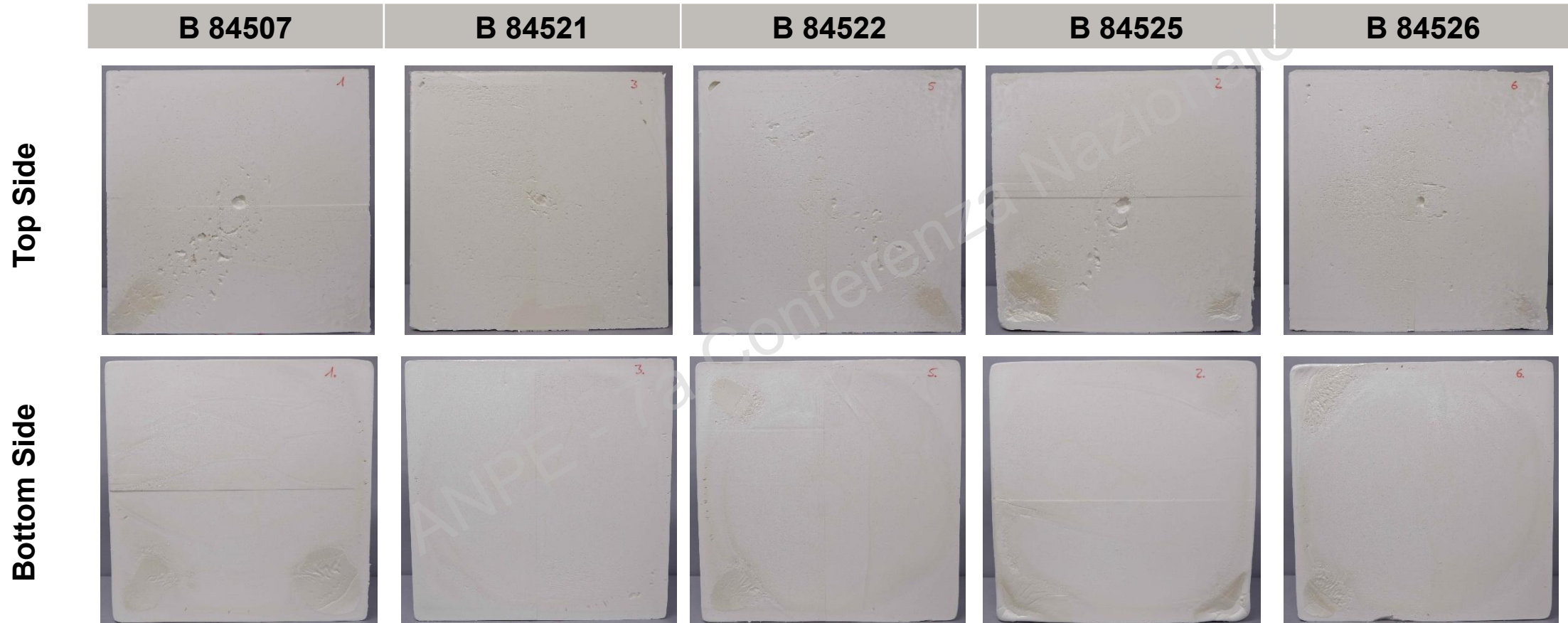
	Top Surface Quality*	Bottom Surface Quality*	Bulk Defects	Cell Structure	Core Foam Density (kg/m ³)	λ -value (10 °C) (mW/m·K)
B 84507 (Ref.)	5.0	6.0	7.5	8.0	30.5	21.4
B 84521	6.0	7.0	7.5	8.0	30.9	21.3
B 84522	5.5	6.0	7.5	8.0	30.7	21.5
B 84525	5.0	6.0	7.5	8.0	30.8	20.9
B 84526	6.0	6.0	7.5	8.0	30.8	21.0

*Foam skin has been planed off (~1.5 mm) to evaluate sub-surface voids.

Rating is relative to each other and with reference as base line on a scale 1 (worst) to 10 (best).

- Best surface improvement with TEGOSTAB® B 84521
- Best λ -values achieved with TEGOSTAB® B 84525 and TEGOSTAB® B 84526

Pictures of Planed Foam Surfaces



Surfactants For Sandwich Panels

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Steel-Faced Sandwich Panel Applications

- Building Material With Outstanding Insulation Properties



Roof construction & insulation



Wall construction & insulation

Formulation For Surfactant Screening

Component	Parts
Polyester Polyol	100.0
TCP	12.0
DABCO® TMR 23	3.5
POLYCAT® 520	2.4
Water	0.6
Surfactant	2.5
n-Pentane	14.0
MDI	<260>



Hand-Mix Foaming Experiments

Name	Type
TEGOSTAB® B 8496	Reference
TEGOSTAB® B 84526	Commercial grade
TEGOSTAB® B 84527	Commercial grade
EP-IS-248	Experimental grade
EP-IS-263	Experimental grade

Hand-Mixing Foaming Conditions

Hand mix conditions:

- Pre-mixing of A-component with 6 cm plate stirrer for 25 s at 1000 rpm
- Addition of required amount of MDI and mixing A+B for 7 s at 3000 rpm
- Pouring the reaction mixture into half panel mold
- Pouring time: 5 s

Panel Mold	
Dimensions	50 x 25 x 7 cm ³
Release Agent	PE Foil
Temperature	65 °C

Foam Parameters	
Free Rise Density	33 kg/m ³
Gel Time	45 s



Results of Surfactant Screening

	Top Surface Quality*	Bottom Surface Quality*	Bulk Defects	Cell Structure	Core Foam Density (kg/m ³)	λ -value (10 °C) (mW/m·K)
B 8496 (Ref.)	5.0	6.0	8.0	7.5	38.4	22.8
B 84526	4.5	6.0	8.0	7.5	38.9	22.0
B 84527	4.5	6.0	8.0	7.5	38.2	22.3
EP-IS-248	5.0	6.0	8.0	7.5	39.0	22.1
EP-IS-263	4.5	6.0	8.0	7.5	38.8	22.5

*Foam skin has been planed off (~1.5 mm) to evaluate sub-surface voids.

Rating is relative to each other and with reference as base line on a scale 1 (worst) to 10 (best).

- Surface aesthetics overall on a good level (note: hand mixing foams!)
- Significant λ -value improvements achieved with TEGOSTAB® B 84526 & EP-IS-248

Pictures of Planed Foam Surfaces (Top Side)



B 8496

B 84526

B 84527

EP-IS-248

EP-IS-263

Pictures of Planed Foam Surfaces (Bottom Side)



B 8496

B 84526

B 84527

EP-IS-248

EP-IS-263

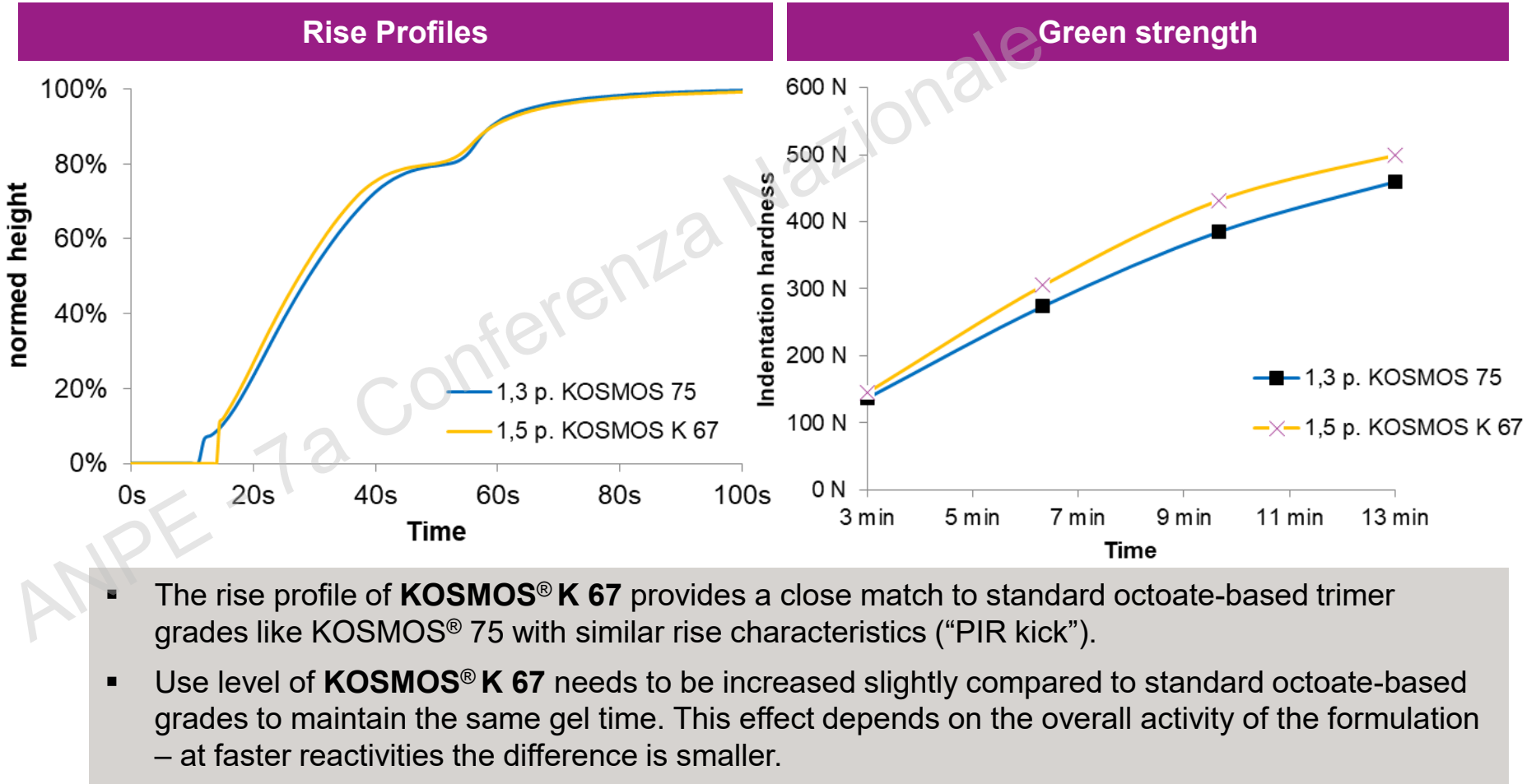
And What About Trimer Catalyst Developments?

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KOSMOS K 67

Next Generation Trimer Catalyst As Potassium Octoate Replacement

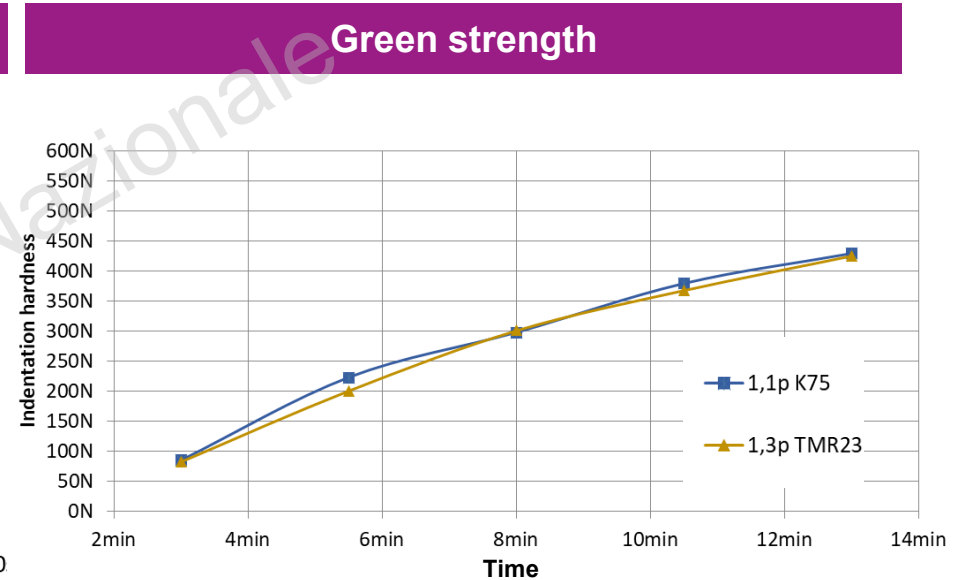
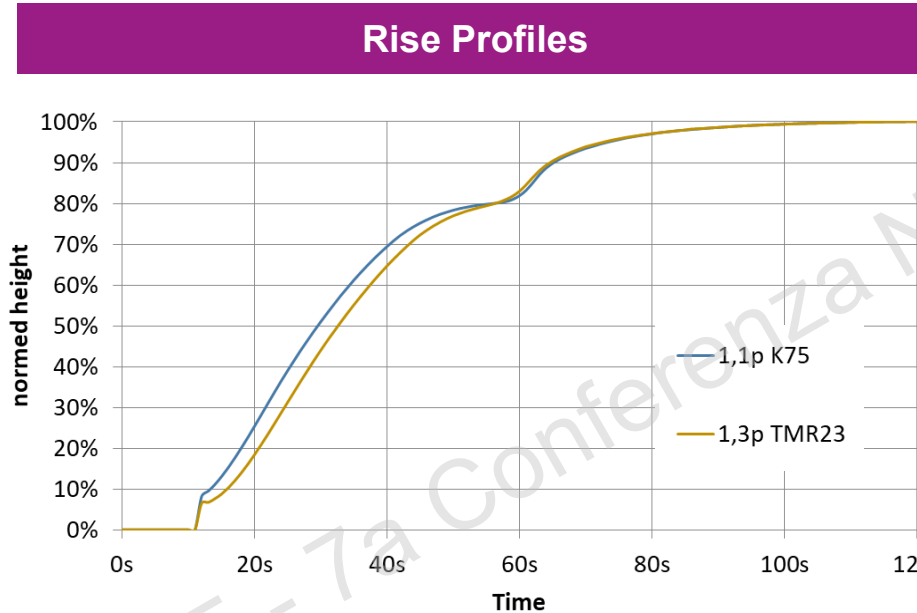
Test formulation	m (pphp)
Polyester Polyol	100
TCPP	15
TEGOSTAB® B 84521	2.0
POLYCAT® 5	0.5
Trimer catalyst	variable
Water	0.5
Cyclo-/Isopentane (70/30)	17
MDI	<300>
Gel time (s)	~60
Density (kg/m³)	~35



DABCO TMR 23

Next Generation Trimer Catalyst For A Smoother Rise Profile

Test formulation	m (pphp)
Polyester Polyol	100
TCPP	15
TEGOSTAB® B 84521	2.0
POLYCAT® 5	0.5
Trimer catalyst	variable
Water	0.5
Cyclo-/Isopentane (70/30)	17
MDI	<300>
Gel time (s)	~60
Density (kg/m³)	~35



- **DABCO® TMR 23** provides a smoother rise profile with a less pronounced “PIR kick” compared to octoate-based trimer grades like KOSMOS® 75. This can help with better processing during continuous production.
- Use level of **DABCO® TMR 23** needs to be increased slightly compared to standard octoate based grade to maintain the same gel time, again depending on the overall desired reactivity of the foam.



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