

CNSL-BASED PU FOAMS GUIDE FORMULATIONS



PIR BOARDSTOCK/PANELS WITH GX-9104 MANNICH POLYOL

BENEFITS

- Replacement for aromatic polyester polyol
- Excellent insulation properties
- Excellent reactivity (lower catalyst level needed)
- Excellent compatibility with HFO blowing agents
- Higher compression strength
- Good overall foam formation properties

Guide Formulation

Ingredients	PU-Ref Parts by wt	PU-CNSL Parts by wt
Polyether polyol (OH 360)	30	30
Aromatic polyester polyol (OH 240)	70	
GX-9104 ¹		70
TCPP	15	15
Silicone DC5598 ²	1.4	1.4
Water	1.2	1.01
Dabco TMR2 ²	1.2	1.2
Dabco K15 ²	1.5	1.5
PMDTA	0.5	0.4
Solstice LBA ³	20	20
pMDI Index	250	250

¹Cardolite ²Evonik ³Honeywell

Typical Properties

Properties	PU-Ref	PU-CNSL
Mix Time (sec)	8	8
Gel Time (sec)	43	38
Tack Free Time (sec)	95	70
Density (kg/m ³)	37.4	37.7
Compression strength (kPa)	282	294
Thermal conductivity 24°C (mW/mK)	22.4	23.0
10°C (mW/mK)	21.1	21.7
LOI (%)	27	24.5
Temperature at 20% weight loss (°C TGA)	315.5	319.7

PROCESSING

On lab scale, polyurethane formulations are prepared by properly weighing all the Part B components (polyols, catalysts, silicone, flame retardant additives, water) in a paper cup or in a plastic container. The mixture is then stirred for 600 rpm for 1.5 minutes. pMDI (Part A) is weighed in a different container (typically a paper cup). The correct amount of the blowing agent is then added to Part B, mixed for 10-15 seconds till a homogenous mixture is obtained. Part B's weight is then controlled to check whether any blowing agent loss has occurred during mixing. If so, the necessary amount of blowing agent is added. Part A is then poured onto Part B and the resulting mixture stirred at 2000-3000 rpm (depending on mechanical stirrer type) for the proper amount of time (some seconds, depending on systems reactivity). The resulting mixture is then poured in a mold (wood or metal one) to record the reactivity or left freely rising (e.g. for spray systems).

Please refer to each supplier's material safety data sheet (MSDS) for the most current safety and handling information.

DISCLAIMER

All statements, technical information and recommendations contained herein are based on tests Cardolite believes to be reliable, but the accuracy or completeness thereof is not guaranteed or warranted either express or implied including but not limited as to merchantability or fitness for a particular purpose. The formulations contained herein are not optimized for any particular use and are therefore, only to be considered as references. It is the responsibility of the user to fully test their formulations for the intended use. Use of the product is at the user's risk.



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