CNSL-BASED PU FOAMS
GUIDE FORMULATIONS

PIR FOAMS WITH HIGH BIOCONTENT

- CNSL Mannich as aromatic polyester polyol replacement
- CNSL Novolac and Hybrid Polyols as aliphatic polyester polyol replacement
- High biocontent foams (>50% of overall polyol amount)
- Good reactivity
- Good compatibility with pentane (or cyclopentane) when used as blowing agent
- Good compression strength
- Overall good foam formation properties

Guide Formulation

Ingredients	PU-Ref Parts by wt	PU-CNSL Parts by wt	PU-CNSL2 Parts by wt
Aromatic PET polyester polyol (OH 240)	44		
Aliphatic polyester polyol (OH 190)	15		
Sorbitol polyether polyol (OH 482)	13		
Glycerol		0.7	0.47
GX-9104 (CNSL Mannich Polyol)[1]		44	44
LITE 9001 (CNSL Novolac Polyol)[1]		15	
GX-9007 (CNSL Hybrid Polyol)[1]			15
TCPP	21		
Silicone surfactant	3		
Amine based, delayed action trimerization catalyst	1.7	1.6	1.6
Metal based trimerization catalyst	1	0.86	0.87
Amine blowing agent	0.58	0.4	0.4
Water	0.77		
n-pentane	12.1		
NCO Index	280		
Mix Time (sec)	7		
String Time (sec)	55	48	57
Tack Free Time (sec)	92	92	93
Density (Kg/m3)	34	34.6	34.8
Compression strength (kPa)	151	153	161

[1] Cardolite

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

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