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THE HANSON GROUP, LLC

SOY POLYOL Formulation Guide

Purpose: This guide is intended to help with incorporating Soy Polyols and non-reactive Soy products into a polyurethane system. Please consider the applications when applying these recommendations. The formulations provided in this guide are for starting point formulations only. Variations of these will be necessary to achieve the properties specific to your application. Please see the USSC brochure or contact your Hanson Group representative for help in selecting the best polyols for your blend. There have been several new products added to the commercial ones given in the original USSC brochure. You will find a spreadsheet of these products listed in the body of this guide.

Note: It will be necessary in most applications to only replace a percentage of the Polyether based polyols in order to maintain good properties. We recommend partial replacement of petroleum-based polyols in the range of between 10% - 50% by weight."

Rigid Pour & Spray Foams

1. The triol family of soy-based polyols is recommended for these applications
2. Depending upon the catalysis used in the current formulation, increasing the level of catalyst may be necessary to adjust for the secondary reactive groups in the soy-based polyol

Rigid spray foam starting point formulation for ½ lb class I flame retardant:

Rigid Insulation

Soy Polyol (R3)	25.0
Other Polyol	6.0
Additives	5.0
Flame Retardant	45.0
Catalyst Package	5.0
Surfactant	2.5
Water	15.0

Iso 1:1 by volume





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SOY POLYOL Formulation Guide (cont)

Benefits:

1. Cost saving
2. More hydrophobic
3. Better wetting properties with fillers
4. Better wetting properties on substrate leading to better adhesion
5. Special consideration for government project



Look Out For:

1. Phase compatibility with low molecular weight polyols

Spray Elastomers

1. The diol family of soy-based polyols is recommended for these applications
2. Depending upon the catalysis used in the current formulation, increasing the level of catalyst may be necessary to adjust for the secondary reactive groups in the soy-based polyol
3. Use typical catalyst used in hybrid formulations
4. Increase the catalyst levels to increase gel times

Spray elastomer starting point formulation:

Bio-Tuff® Coatings

Soy Polyol R2	30.0
Aminated Polyols	36.0
Additive	15.0
L-Paste	7.0
Carbon Black	5.0
Catalyst	6.5
De-Foamer	0.3

Benefits:

1. Cost savings
2. More hydrophobic elastomer



Look Out For:

2. Phase compatibility with low molecular weight polyols



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SOY POLYOL Formulation Guide (*cont*)

Diluents:

1. Use SoyOyl® RS
2. Variations of this product are available – Notify your Hanson representative for more information.



Benefits:

1. Lower Cost
2. More environmentally friendly than current chemistries
3. Fewer handling requirements
4. Special consideration for government projects

USSC now has available (in pilot scale quantities – i.e., at partial drum scale) the following new products. These products are the result of a new transesterification process approach that involves reaction of our Soyol™ polyols with other hydroxyl-bearing co-reactants. These co-reactants have been selected because they impart various functionalities and molecular weights.

Reference	Hydroxyl Value (mg KOH/g)	Theo. Functionality	Viscosity (cP)
Agent 019-04	180.0	2.7	2650
Agent 019-15	163.7	2.7	1790
Agent 019-23	86.9	2.6	2840
Agent 019-36	93.2	2.5	2940
Agent 019-19	252.2	2.8	4620
Agent 019-09	119.7	3.0	3380
Agent 019-35	139.6	2.9	3100
Agent 019-05	565.1	2.9	5480
Agent 019-37	179.0	3.6	5000
Agent 019-33	206.5	3.3	4250