TSE INDUSTRIES, INC.
5180 113th Avenue North, Clearwater, Florida 33760 USA
tse-industries.com
(800) 237-7634 | (727) 573-7676

Bonding (During Curing) of Millathane® Compounds to NR, SBR and EVA using SAFIC-CHEM® TPU7840

INTRODUCTION

Millathane Millable Polyurethanes are known for their excellent strength and abrasion resistance properties, and it is sometimes desirable to use an outer layer of Millathane compound over a compound of a general purpose rubber, like SBR or natural rubber (NR), for cost reasons. The bonding of Millathane millable polyurethane compounds to other types of rubber during curing is, however, often difficult, due to differences in polymer compositions and curing systems.

SAFIC-CHEM® TPU7840, a special thermoplastic polyurethane from Safic-Alcan[1], when added to sulfur-cured Millathane E34 or Millathane E40 compounds, greatly improves bonding during curing to NR and SBR compounds. The adhesion is further improved when the TPU7840 is added to the substrate compound.

Bonding of peroxide-cured Millathane E34 to EVA (foamed or dense) is also greatly improved by including SAFIC-CHEM® TPU7840 into the Millathane compound, giving cohesive failure (within the EVA).

RESULTS

Bond strength (T-Peel) test results on test compounds bonded together during curing:

Millathane Compound*	Substrate Compound*	Adhesion, lbf/in (N/mm)	Failure Mode
Millathane E34	Natural Rubber	7 (1.3)	Adhesive
Millathane E34 +15 TPU7840	Natural Rubber	**> 36 (>6.3)**	**Cohesive****
Millathane E40	SBR	8 (1.4)	Adhesive
Millathane E40 + 5 TPU7840	SBR	17 (3.0)	Adhesive
Millathane E40 + 15 TPU7840	SBR	18 (3.2)	Adhesive
Millathane E40 + 25 TPU7840	SBR	23 (4.0)	Adhesive
Millathane E40	SBR + 10 TPU7840	14 (2.5)	Adhesive
Millathane E40 + 5 TPU7840	SBR + 10 TPU7840	**> 36 (>6.3)**	**Cohesive****
Millathane E34***	EVA Foam***	6.9 (1.2)	Adhesive
Millathane E34***	EVA Dense***	12.4 (2.2)	Adhesive
Millathane E34 + 15 TPU7840***	EVA Foam***	**> 21 (>3.7)**	**Cohesive****
Millathane E34 + 15 TPU7840***	EVA Dense***	**> 39 (>6.9)**	**Cohesive****

* sulfur-cured Millathane compounds (MBTS/MBT/Thanecure® ZM/Sulfur cure system), except as noted; sulfur-cured NR and SBR compounds (CBS/Sulfur cure system); peroxide-cured EVA. Formulations are available upon request.
** within substrate compound (bond strength is higher than substrate compound strength)
*** peroxide-cured compounds

APPLICATIONS

Improved bonding of Millathane millable polyurethane compounds to general purpose rubber compounds and EVA would be useful for conveyor belting, footwear, rubber-covered rollers, and other applications where a strong, abrasion-resistant layer of Millathane millable polyurethane compound would be beneficial.

MIB-012R4_Millathane-Adhesion-with- SAFIC-CHEM® TPU7840
Ref: XP8244/XP8260/XP8272

[1] http://www.safic-alcan.com; available in the USA from ChemSpec Ltd http://chemspecltd.com

October 2020