



Thanecure® T9¹

An Adhesion Promoter in Rubber to Textile Bonding

Thanecure T9 is the dimer of 2,4-toluene diisocyanate and used in various applications. For general information please refer to the Thanecure T9 data sheet.

This bulletin describes the use of Thanecure T9 in rubber to textile bonding applications, especially in the vulcanization of rubber to polyester fibers. Thanecure T9 improves the adhesion from rubber to fibers substantially, i.e. in the case of polyester fibers by more than 100% compared to plain RFL-dips.

Compared to many other adhesion promoters, Thanecure T9 offers numerous advantages, such as:

- Thanecure T9 is 100% active which reduces dip costs
- Lower treating temperatures results in energy saving
- No formation of activation by-products reduces pollution control costs
- Thanecure T9 does not affect the strength and flexibility of polyester fibers

Thanecure T9 can be employed in the single-dip method as an additive to the RFL bath or in the double-dip method, involving a pre-dip with Thanecure T9 from a aqueous dispersion, followed by the RFL-dip.

Single-Dip Method

In the single-dip method, Thanecure T9 is added to the RFL bath at a 5 - 10 % by weight level, based on dip solids. Since Thanecure T9 is insoluble in water, it is recommended to prepare an aqueous dispersion prior to adding to the latex. This prevents the formation of lumps, which would reduce the performance of the T9/RFL dip. The use of emulsifiers may improve the dispersion of Thanecure T9, but **a good dispersion has to be ascertained at all times by continuous mechanical agitation** or a recirculation by pump. The T9/RFL dip is ready to use immediately after preparation and remains effective for about 2 to 3 days.

A pick-up of 5 - 10 % of the dip by the fibers is recommended.

In order to achieve the expected adhesion results **it is important to completely dry the dipped fabric before entering the hot stretch section** of the oven

Recommended drying oven temperatures are 130° - 160° C and in the hot stretch section of the oven at least 180° C. Thanecure T9 dissociates at the hot stretch section temperatures into TDI (toluene diisocyanate); appropriate exhaust equipment is necessary to keep the working area below the threshold limit value (TLV).



Double-Dip Method

In this method the fabric passes first through 5 % aqueous dispersion of Thanecure T9 with a pick-up level of 0.5 - 1.0 %.

After **complete drying** at 130° - 160° C the pre-dipped fabric is passed through the RFL bath and treated in the common way in the hot stretch section of the oven at temperatures of at least 180°C. Since the RFL pick-up level can be reduced to 3.0 - 5.0 % the overall consumption of resorcinol can be reduced which can lead to a significant cost saving.

The preparation of an aqueous dispersion prior to adding to the RFL-dip is strongly recommended, especially in the Single-Dip Method.

Production of Aqueous Dispersions Based on Thanecure T9

	50% Dispersion	25% Dispersion
Thanecure® T9	100.0	25.0
Water	100.0	75.0
Surfactant Whewell S 70 ²	1.0	0.75
Xanthan Gum	0.16	0.12

Mix water and xanthan gum for 45 minutes with high shear mixing blade or use high speed on low shear mixing blade; make sure that gum is fully dispersed without lumps.

Add surfactant and agitate for 2 minutes.

Add Thanecure T9 by using low shear mixing blade at moderate speed (low speed in order to avoid excessive foaming). When T9 is fully dispersed, agitate for an additional 45 minutes.

The 50% dispersion should be stable for several days to several weeks, depending on acidity of water etc.; The 25% dispersion should be stable for several months.

NOTE: Please refer to the Material Safety Data Sheet and to the available literature regarding the handling of TDI and TDI Dimer.

¹Thanecure® T9SF is the specific product that is referred to by 'Thanecure T9' and should be used.

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