

# Handling precautions for the use of cellulose esters in formulated products

*Eastman markets cellulose esters that are routinely mixed with solvents to produce formulations for a variety of applications. Eastman supplies cellulose esters as dry, free-flowing powders, and they should be handled accordingly, since static electricity can be generated by any free-falling powder. There is no evidence that the chemical nature of cellulose esters contributes to or increases the dangers in handling powders, those dangers being attributed only to their physical form. Following the handling precautions in this publication can help minimize the possibility of explosion and fire associated with formulating lacquers when using dry powders such as cellulose esters. Users must determine for themselves whether the precautions are appropriate and adequate for their operations.*

## General procedures

Mixing cellulose esters in a nonpolar solvent such as toluene or xylene should be avoided, since such solvents increase the possibility of a static electricity buildup, which can cause a flash fire or explosion (refer to National Fire Protection Association Standard No. 77, *Static Electricity*). Incorporating a conductive solvent, such as an alcohol or ester, reduces the possibility. An inert gas atmosphere should be maintained at all times within any vessel containing flammable liquids, since the introduction of a powder can be a source for static discharge and ignition (refer to National Fire Protection Association Standard No. 69, *Explosion Prevention Systems*).

The method suggested for adding dry powders such as cellulose esters into flammable liquids is to feed them from their original containers into an auxiliary hopper equipped with a discharge valve that is closed during the filling operation. The hopper, chute, and mixing vessel should be electrically bonded and grounded. The connection between the hopper and mixing vessel should be designed to minimize the escape of flammable vapors and to prevent air from being introduced into the vessel on discharge. Additionally, the discharge chute should limit the free fall of the powder to a maximum of 12 inches from chute to liquid and should be designed to prevent free fall through the chute itself. Employees should avoid being positioned over the top of the tank hatch, manway, or auxiliary hopper when flammable vapors are present.

## Mixing vessel

The lowest practical agitator speed should be used in the mixing vessel to reduce the generation of static charges. Solvents used for mixing should not be heated to temperatures near their flash points.

## Protective equipment

Employees working with cellulose esters and other powders should wear electrically conductive shoes and stand on a grounded metal plate when charging esters. Additionally, they should wear safety glasses and a flame-retardant uniform. Cellulose esters can be classified as nuisance particulates. If the ACGIH TLV<sup>a</sup> for nuisance particulates (10 mg/m<sup>3</sup> averaged over an 8-hour workday) or the TLV for the solvent(s) being used is likely to be exceeded, the use of engineering controls (such as local exhaust ventilation) is recommended to reduce employee exposures. If engineering controls do not adequately control particulates/solvent vapors, employees should wear an appropriate NIOSH<sup>b</sup>-approved respirator.

## Summary

The preceding actions represent known handling precautions. Users must determine for themselves whether these precautions are appropriate and adequate for their operations and whether additional actions are necessary.

<sup>a</sup> Threshold Limit Value, American Conference of Governmental Industrial Hygienists

<sup>b</sup> National Institute for Occupational Safety and Health



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