



Statsafe™

Statsafe™ is a static dissipator used in many chemical processing operations to reduce the risk of static build up and consequent damage and loss. Statsafe™ is a low treat-rate product bringing maximum effect for minimal cost.

Statsafe™ in solvent applications

Statsafe™ products are suitable additives to increase hydrocarbon conductivity and to reduce electrostatic hazards in a variety of applications.

Statsafe™ 3000 is preferred for most solvents and Statsafe™ 2500 is preferred when the solvent is pentane or isooctane. Statsafe™ 5000 can be used for pharmaceutical and other sensitive applications.

ATEX 137 and Dangerous Substances and Explosive Atmosphere Regulations UK (DSEAR)

Where flammable and potentially explosive atmospheres exist the ATEX 137 regulations (EU Directive 99/92/EC) place a mandatory obligation on employers to “consider and eliminate possible sources of static electricity.”

One source that is often overlooked is the flammable liquid itself. One way to minimise the hazard of static electricity is by using an additive to increase the conductivity of the solvent.

One such product is the Statsafe™ range produced by Innospec Active Chemicals used in conjunction with appropriate earthing equipment.

Treat rates with Statsafe™ depend on the liquid being treated and composition of the formulation but typical rates are 5-50ppm. It is advisable to measure the conductivity of the solvent system to determine a suitable rate.

How static electricity is generated in solvents

Anywhere there is movement e.g. by filling and splashing or in stirred vessels; there is the possibility of static electricity being generated. So wherever solvents are pumped, stirred, blended, crystallisation or dissolving occurs a static electricity charge can be formed.

For a highly conductive liquid this charge can flow to the earthed vessel and subsequently to ground.

However if the conductivity of the liquid is low (<2000pS/m) then this charge can build until it can be discharged in the form of a spark leading to fires or explosions. In the absence of oxygen, static discharge can also lead to pitting of reactors and equipment.

Increasing hydrocarbon conductivity for other purposes

Statsafe™ products are also used in a variety of applications where electrostatic charge relaxation is required for other purposes or where it is necessary to render a low-conductivity fluid electrically conductive.

Statsafe™ as a process aid in the manufacture of polyolefins using Liquid Slurry and Gas Phase processes

The series of anti-static agents Statsafe™ are used to give access to higher production rates and also give more stable production with less down time resulting in higher production efficiencies.

All polyolefin processes are highly exothermic and the safe removal of the heat of reaction is a fundamental issue in the process design.

Liquid Slurry

If particles become too hot they start to stick together and become larger and heavier. Such particles are then more difficult to suspend and cool and are themselves more likely to become hotter. This is when one type of fouling starts to occur.

In the extreme case, enough particles stick together to block fully a reactor resulting in long shut downs to clear the problems.

Particles may also start to stick to the reactor walls as they become charged. This can also lead to agglomeration of particles and or a reduction in heat transfer and pumping capability in slurry processes.

Gas Phase

The particles in the fluid bed are very close together and can generate static, which can lead to fouling. Elimination of static can help avoid fouling.

The fouling can either be in the form of agglomeration of particles, fines build up on the wall or fines accumulation on the angled top disengagement section of the reactor.

The heat transfer is limited by the maximum fluidisation rate and the temperature of the cold gas entering the reactor. The addition of cooled liquid for evaporation in the bed greatly increases the ability of the reactor bed to be cooled.

Statsafe™ is currently used by a number of multinationals in polyethylene production on a global basis to prevent reactor fouling and increase yield and throughput.

Statsafe in aluminium foil rolling

Aluminium foil manufacture involves the processing of aluminium sheets to a desired thickness usually involving a series of roll mills often lubricated with flammable solvents such as kerosene.

A European customer had reported a number of fires on the manufacturing plant due to static discharge igniting the lubricant used in the process. Innospec investigated the conductivity changes in the lubricant during the process and recommended the use of Statsafe™ 3000 as an anti-static additive to improve the conductivity of the fluid.

The plant has now been running for several years without any further static induced incidents.

Statsafe™ Key Benefits

For flammable solvents:

- Increase conductivity of flammable solvents to safe levels
- Reduce risk of static discharge and consequent fires or static damage such as reactor pitting
- Helps meet requirements of ATEX 137 and DSEAR regulations to “consider and eliminate possible sources of static electricity”
- Low dose rates give cost-effective performance

For polyolefin manufacture:

- Increased reactor throughput from:
 - Higher solid concentration in reactor
 - Reduced reactor fouling
 - Increased thermal stability
- Cost Savings from:
 - Higher plant capacity
 - Fewer shutdowns for cleaning
 - Low treat cost



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