

The self-ignition of solid substances

The proper handling of solids

Deposits of dust are not only unsightly to look at – they can also be dangerous! Reactions of the solid substances with the oxygen in the air are a common cause for hazardous effects! At low temperatures, oxidation still takes place only very slowly. On hot surfaces or with large layer thicknesses, where heat accumulation can occur due to insulating effects, the reaction rate of the oxidation can be so high that combustion can occur – e.g. in deposits and silos.

Basic characteristics of the self-ignition of solid substances can be obtained by screening in the Grewer oven or by DSC in the pressure cell at 20 bar air-pressure.

Detailed statements on self-ignition characteristics result from isoperibolic and/or adiabatic wire basket tests. With both methods the self-ignition behavior of large deposits can be determined. The advantage of the adiabatic method is that kinetic parameters can be determined independent of the volume, with which the self-ignition characteristics of any packed bed of a solid substance or layer thicknesses can be calculated.

You will receive an overview of the safety and technical parameters and potential hazards in handling solids as part of the "Basic Testing of Dusts". In addition to the self-ignition characteristics, the thermal stability as well as the flammability of solid substance deposits will be examined. Testing is supplemented by the test for the explosivity of air-dust mixtures

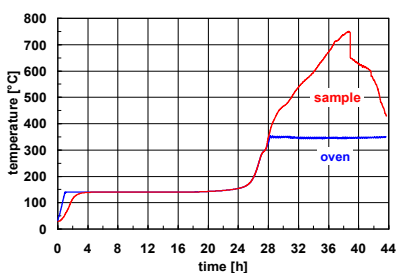
Interested ? Contact us!
Engineering & Consulting
PD PA SE&C EC
team-ec.industry@siemens.com
Tel.: +49 (69) 797-84500
siemens.com/processsafety

Your benefit

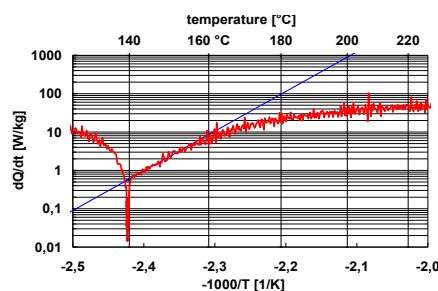
- Reliable statement on the hazard potential of your solid
- Sustainable protective concept for the safe operation of your plant

Our service offer

- Investigations performed according to recognized and standardized methods (VDI, EN, ISO, UN, EU- Regulations)
- Derivation of maximum process and plant temperatures in order to exclude spontaneous combustion
- Classification according to UN transport manual and GHS/CLP



Spontaneous combustion of a wire basket test at a storage temperature of 140 °C



Temperature development and analysis of the kinetic parameters E_a and k_0

