



# Combustion Research Center

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- The IEP Technologies Combustion Research Center (CRC) is an independent test laboratory specializing in the Combustion Hazards testing of dusts, liquids, and gases.
- The CRC has been providing combustion test services for over 35 years.
- CRC clients represent a wide range of business and industry sectors:



Do you know what

Mining	Metals Processing
Petrochemical	Environmental
Plastics	Industrial Hygiene
Pharmaceutical	Environmental State
Food Products	Agencies
Wood Products	Federal Agencies
Fine Chemicals	Universities

- All testing is performed in accordance with the requirements of recognized standards including ASTM, OSHA, US DOT, and UN.

## Why Combustion Hazards Testing?

Many dusts, liquids and gases pose fire and explosion risks in the workplace. Common materials of commerce are subject to ignition by various means. An explosion can result from ignition of a flammable gases atmosphere created by suspended dust (dust cloud), vapor clouds and gases that may exist in closed or semi-enclosed process spaces. Combustion Hazards Testing can reveal the sensitivity of materials to ignition and the explosion characteristics of flammable atmospheres. Preventing explosions and fires in industrial settings involves many considerations.

## Explosion Prevention/Fire Prevention

Central to any Process Safety Analysis is accurate data that represents the ignition and combustion properties of materials used in the workplace. Data on ignition sensitivity, minimum explosible concentration, and limiting oxygen concentration of dusts and vapors can be used as part of a program to reduce explosion risk by controlling fuel concentrations and limiting ignition sources.



your dusts are capable of?

## Dust Cloud Combustibility (Pmax & Kst)

Combustible dusts suspended in air form highly flammable atmospheres. Explosion testing of dusts is carried out per ASTM E1226 in a 20-liter Kuhner spherical test vessel. The key explosion properties of dust clouds (Pmax and Kst) are determined and used to design explosion protection systems such as pressure relief vents (per NFPA 68) and suppression systems (per NFPA 69).

## Minimum Explosible Dust Concentration (MEC)

Also tested in the 20L vessel per ASTM E1515, dusts are ignited at progressively reduced dust cloud concentrations until the concentration is reached at which flame propagation will no longer occur.

## Dust Classification (OSHA)

Determines whether a combustible dust meets the criteria of a Class II dust as defined by OSHA *Explosion Severity* criteria.

## Minimum Ignition Energy (MIE)

Performed to ASTM E2019, the MIE is an important indicator of the sensitivity of a dust to ignition. A dust having a very low MIE may require special attention to process conditions to avoid ignition.



## Dust Cloud Ignition (Tc)

Performed to ASTM E1491,  $T_c$  is the minimum temperature that results in flame propagation when dust is conveyed through an electric furnace.



## Flammability & Burning of Liquids and Gases

The CRC also conducts the following specialized tests to determine important flammability and burning properties of liquids and gases.

- Closed Cup Flash Point – ASTM D93
- Limiting Oxygen Concentration – (LOC)
- Sustained Burning of Liquids – ASTM D4206 or US DOT 49 CFR 173 App. H

