

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Explosive atmospheres –
Part 20-2: Material characteristics – Combustible dusts test methods**

**Atmosphères explosives –
Partie 20-2: Caractéristiques des produits – Méthodes d'essai des poussières
combustibles**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –

Part 20-2: Material characteristics – Combustible dusts test methods

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International Standard ISO/IEC 80079-20-2 has been prepared by subcommittee 31M: Non-electrical equipment and protective systems for explosive atmospheres, of IEC 31: Equipment for explosive atmospheres.

It is published as a double logo standard.

This first edition cancels and replaces the first edition of IEC 61241-2-1 published in 1994, the first edition of IEC 61241-2-2 published in 1993 and the first edition of IEC 61241-2-3 published in 1994, combining the requirements into a single document, and is considered to constitute a technical revision.

The text of this standard is based on the following documents:

FDIS	Report on voting
31M/102/FDIS	31M/108/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table. In ISO, the standard has been approved by 15 P-members out of 21 having cast a vote.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

"A list of all parts in the IEC 60079 series, under the general title *Explosive atmospheres*, as well as the International Standard 80079 series, can be found on the IEC website."

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

Significant changes with respect to IEC 61241-2-1:1994, IEC 61241-2-2:1993 and IEC 61241-2-3:1994

Explanation of the significance of the changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Normative references	2	X		
Terms and Definitions	3	X		
Dust sample Requirements	4	X		
Combustible Dust Determination	5	X		
Procedure for Characterisation of combustible dust or combustible flying	6	X		
Test methods for determination of a combustible dust or a combustible flying	7	X		
MIT of a dust cloud	8.1	X		
MIT of a dust layer	8.2	X		
MIE of a dust/air mixture	8.3	X		
Tests on resistivity	8.4	X		
Measurement of temperature distribution on the surface of the hot plate	Annex A	X		
Godbert-Greenwald oven	Annex B	X		
Examples of spark-generating systems	Annex C	X		
Vertical tube apparatus	Annex D	X		
20-litre sphere	Annex E	X		
BAM oven	Annex F	X		
Data for dust explosion characteristics	Annex G	X		
1m ³ vessel	Annex H	X		

EXPLOSIVE ATMOSPHERES –

Part 20-2: Material characteristics – Combustible dusts test methods

1 Scope

This part of ISO/IEC 80079 describes the test methods for the identification of combustible dust and combustible dust layers in order to permit classification of areas where such materials exist for the purpose of the proper selection and installation of electrical and mechanical equipment for use in the presence of combustible dust.

The standard atmospheric conditions for determination of characteristics of combustible dusts are:

- temperature -20 °C to $+60\text{ °C}$,
- pressure 80 kPa (0,8 bar) to 110 kPa (1,1 bar) and
- air with normal oxygen content, typically 21 % v/v.

The test methods defined do not apply to:

- recognized explosives, propellants (e.g. gunpowder, dynamite), or substances or mixtures of substances which may, under some circumstances, behave in a similar manner or
- dusts of explosives and propellants that do not require atmospheric oxygen for combustion, or to pyrophoric substances.

2 Normative references

None.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

combustible dust

finely divided solid particles, 500 μm or less in nominal size, which may form explosive mixtures with air at standard atmospheric pressure and temperatures

Note 1 to entry: This includes dust and grit as defined in ISO 4225.

Note 2 to entry: The term 'solid particles' is intended to address particles in the solid phase but does not preclude a hollow particle.

3.1.1

conductive dust

combustible metal dusts and other combustible dusts with electrical resistivity equal to or less than $1 \times 10^3\ \Omega\cdot\text{m}$

Note 1 to entry: Metal dust is treated as conductive dust because it is assumed that surface oxidation cannot be depended upon to always ensure electrical resistivity greater than $1 \times 10^3\ \Omega\cdot\text{m}$

3.1.2

non-conductive dust

combustible dust with electrical resistivity greater than $1 \times 10^3 \Omega \cdot m$

3.2

combustible flyings

solid particles, including fibres, where one dimension is greater than 500 μm in nominal size, which may form an explosive mixture with air at standard atmospheric pressure and temperature

Note 1 to entry: The ratio of length to width is 3 or more.

Note 2 to entry: Examples of flyings include carbon fibre, rayon, cotton (including cotton linters and cotton waste), sisal, jute, hemp, cocoa fibre, oakum and baled waste kapok.

3.3

explosive dust atmosphere

mixture with air, under atmospheric conditions, of combustible substances in the form of dust, fibres, or flyings which, after ignition, permits self-sustaining propagation

3.4

minimum ignition temperature of a dust layer

lowest temperature of a hot surface at which ignition occurs in a dust layer under specified test conditions

3.5

minimum ignition temperature of a dust cloud

lowest temperature of a hot surface on which the most ignitable mixture of the dust with air is ignited under specified test conditions

3.6

minimum ignition energy (of a combustible dust/air mixture)

lowest electrical energy stored in a capacitor which upon discharge is sufficient to effect ignition of the most sensitive dust/air mixture under specified test conditions

4 Dust sample requirements

4.1 Receipt of sample for testing

A material safety data sheet or equivalent with the sample.

The test material shall be provided in suitable packaging, labelled according to relevant guidelines labelled according to relevant guidelines, and appropriate transportation.

NOTE It is usual to provide a quantity of at least 0,5 kg for testing. If sample preparation is required this may be insufficient. If only a smaller volume of material is available then the full range of testing may not be possible.

4.2 Characterisation of sample

The sample shall be representative of the material as it appears in the entire process operated.

NOTE Many unit operations such as extract systems will separate dust into finer fractions than seen in the main processing equipment and this is accounted for when taking the sample.

If the sample is not representative of the material as found in the process then sample preparation shall be carried out to apply the worst case conditions.

At least the following information about the sample shall be provided: