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**ISO 14530-3**

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# Plastics — Unsaturated-polyester powder moulding compounds (UP-PMCs) —

## Part 3: Requirements for selected moulding compounds

*Plastiques — Poudres à mouler à base de polyester non saturé (UP-PMC) —*

*Partie 3: Exigences relatives à certaines poudres à mouler*

Reference number
ISO 14530-3:1999(E)

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## Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 14530 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 14530-3 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 12, *Thermosetting materials*.

ISO 14530 consists of the following parts, under the general title *Plastics — Unsaturated-polyester powder moulding compounds (UP-PMCs)*:

— *Part 1: Designation system and basis for specifications*

— *Part 2: Preparation of test specimens and determination of properties*

— *Part 3: Requirements for selected moulding compounds*

Annex A of this part of ISO 14530 is for information only.

# Plastics — Unsaturated-polyester powder moulding compounds (UP-PMCs) —

## Part 3: Requirements for selected moulding compounds

## 1 Scope

This part of ISO 14530 specifies the requirements for the physical and chemical properties of unsaturated-polyester powder moulding compounds (UP-PMCs) and compression- or injection-moulded test specimens produced from them.

It is limited to those powder moulding compounds whose composition and properties are significantly different. It is further limited to those moulding compounds which are of general technical and/or economic importance.

The properties which are used to characterize the moulding compounds, the test methods and the test conditions are selected from those given in ISO 14530-2.

The moulding compounds are divided into types according to their composition and properties. The various types are designated using the designation system defined in ISO 14530-1.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 14530. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 14530 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 472:1999, *Plastics — Vocabulary.*

ISO 14530-1:1999, *Plastics — Unsaturated-polyester powder moulding compounds (UP-PMCs) — Part 1: Designation system and basis for specifications.*

ISO 14530-2:1999, *Plastics — Unsaturated-polyester powder moulding compounds (UP-PMCs) — Part 2: Preparation of test specimens and determination of properties.*

## 3 Terms and definitions

For the purposes of this part of ISO 14530, the terms and definitions given in ISO 472, ISO 14530-1 and ISO 14530-2 apply.

# 4 Requirements

## 4.1 Property values

In order for an unsaturated-polyester powder moulding compound to be considered as complying with this part of ISO 14530, it shall meet the requirements given in Table 1.

Table 1 gives the mean value obtained for the set of test specimens used to determine a particular property. Individual values of properties 2.1, 2.2, 2.3 and 2.4 shall be within 10 % of the mean value, and individual values of properties 3.1 and 3.2 shall be within 5 °C of the mean value.

No specific limits are placed on rheological and processing properties. However, suitable rheological and processing properties are essential for the satisfactory use of a moulding compound. The test methods and test conditions used shall be as agreed between the interested parties.

In addition, for some applications, it may be useful for information to be made available on other properties, for example:

— cure time;

— particle size;

— moisture content.

If this is so, these properties and test methods, as well as the test conditions to be used, shall be as agreed between the interested parties.

## 4.2 Filler/reinforcement type and content

In order for a phenolic powder moulding compound to be considered as complying with this part of ISO 14530, the nature, form and content by mass of its filler/reinforcement shall be as given in the designation of the moulding compound (see ISO 14530-1:1999, subclause 4.2).

**Table 1 — Property requirements for UP-PMCs containing (GF+MD) or (LD+MD) as filler**

| | | | | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|
| | | | | | Type: PMC ISO 14530-UP. . . | | | |
| | Property | Unit | Pro-cess-ing [a] | Max. or min. | (GF10+MD60) to (GF20+MD50) | (GF10+MD65),X,F to (GF20+MD55),X,F | (LD20+MD50) to (LD30+MD40) | — |
| **1** | **Rheological and processing properties** | | | | | | | |
| 1.1 | To be agreed between the interested parties | | | | | | | |
| **2** | **Mechanical properties** | | | | | | | |
| 2.1 | Stress at break, $\sigma_B$ | MPa | Q<br>M | ⩾<br>⩾ | 35<br>45 | 35<br>45 | 25<br>35 | |
| 2.2 | Flexural strength, $\sigma_{fM}$ | MPa | Q<br>M | ⩾<br>⩾ | 80<br>100 | 80<br>1000 | 70<br>80 | |
| 2.3 | Charpy impact strength, $a_{cU}$ | kJ/m$^2$ | Q<br>M | ⩾<br>⩾ | 5,0<br>7,5 | 5,0<br>7,5 | 4,5<br>5,0 | |
| 2.4 | Charpy notched impact strength, $a_{cA}$ | kJ/m$^2$ | Q<br>M | ⩾<br>⩾ | 1,1<br>1,3 | 1,1<br>1,3 | 1,0<br>1,0 | |
| **3** | **Thermal properties** | | | | | | | |
| 3.1 | Temperature of deflection under load, $T_f1{,}8$ | °C | Q/M | ⩾ | 250 | 250 | 110 | |
| 3.2 | Temperature of deflection under load, $T_f8{,}0$ | °C | Q/M | ⩾ | 180 | 180 | 70 | |
| 3.3 | Flammability (glow bar), BH | — | Q/M | ⩽ | BH 2-95 | BH 2-10 | BH 2-30 | |
| **4** | **Electrical properties** | | | | | | | |
| 4.1 | Dissipation factor, $\tan\delta 100$ | — | Q/M | ⩽ | 0,03 | 0.03 | — | |
| 4.2 | Volume resistivity, $\rho_e$ | Ω·cm | Q/M | ⩾ | $10^{13}$ | $10^{13}$ | $10^{11}$ | |
| 4.3 | Surface resistivity, $\sigma_e$ | Ω | Q/M | ⩾ | $10^{12}$ | $10^{12}$ | $10^{10}$ | |
| 4.4 | Proof tracking index, PTI | — | Q/M | ⩾ | 600 | 600 | 600 | |
| **5** | **Other properties** | | | | | | | |
| 5.1 | Water absorption, $W_w24$ | mg | Q/M | ⩽ | 50 | 50 | 200 | |
| 5.2 | | % by mass | | ⩽ | — | — | — | |

[a] Q = Compression moulding
M = Injection moulding

NOTE 1 See ISO 14530-2:1999, Tables 3 and 4, columns 3, 4, and 7, for the methods to be used for the preparation of test specimens and the determination of properties.

NOTE 2 In view of the differences between the property-value limits for compression-moulding and injection-moulding materials, the likely variations in test results and the wide range of properties covered, it should not be assumed that materials having the same designation are exactly equivalent.

# Annex A
(informative)

# Comparison of designations

**Table A.1 — Comparison of designations used for UP-PMCs in national and international standards**

| National or international standard | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | Type: PMC ISO 14530-UP. . . | | | |
| ISO 14530-3:1999 | (GF10+MD60) to (GF20+MD50) | (GF10+MD65),X,F to (GF20+MD55),X,F | (LD20+MD50) to (LD30+MD40) | — |
| ISO | — | — | — | |
| ASTM | — | — | — | |
| BS | — | — | — | |
| DIN 16911:1978 | 802 | 804 | — | |
| JIS | — | — | — | |
| NF | — | — | — | |

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