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ISO RECOMMENDATION

R 1622

PLASTICS

DESIGNATION FOR POLYSTYRENE MOULDING AND EXTRUSION MATERIALS

1st EDITION

October 1970

For each individual country the only valid standard is the national standard of that country.

Printed in Switzerland

Also issued in French and Russian. Copies to be obtained through the national standards organizations.

BRIEF HISTORY

The ISO Recommendation R 1622, *Plastics – Designation for polystyrene moulding and extrusion materials*, was drawn up by Technical Committee ISO/TC 61, *Plastics*, the Secretariat of which is held by the American National Standards Institute (ANSI).

Work on this question led to the adoption of Draft ISO Recommendation No. 1622, which was circulated to all the ISO Member Bodies for enquiry in May 1968. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Austria	Israel	Spain
Belgium	Italy	Sweden
Brazil	Japan	Switzerland
Czechoslovakia	Korea, Rep. of	Turkey
France	Netherlands	U.A.R.
Germany	Poland	United Kingdom
Hungary	Portugal	U.S.A.
India	Romania	U.S.S.R.
Iran	South Africa, Rep. of	

No Member Body opposed the approval of the Draft.

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided to accept it as an ISO RECOMMENDATION.

ISO Recommendation | R 1622 | October 1970

PLASTICS

DESIGNATION FOR POLYSTYRENE MOULDING AND EXTRUSION MATERIALS

1. SCOPE

1.1 This ISO Recommendation provides a method of designation and the general requirements for polystyrene moulding and extrusion materials.

1.2 Major types of polystyrene moulding and extrusion materials are differentiated from one another by appropriate levels of selected specific properties. Polystyrene itself is described by selected general characteristics for reference purposes.

1.3 These types are amorphous homopolymers of styrene, coloured or uncoloured. Excluded are styrene copolymers, homopolymers of substituted styrenes, and those modified with other polymers, such as elastomers. Specific tests for special purpose materials, such as light-stabilized or anti-static grades, are not included. High pigment contents may affect properties.

1.4 Other properties may be necessary to specify materials for particular purposes.

2. DESIGNATION

Types of polystyrene materials are identified by two-digit numerical designations. The first digit refers to Vicat softening temperature, specifically to whichever one of the four ranges in Table 1 includes the average value for the pertinent polystyrene. The second digit similarly refers to melt flow index. The mechanical properties such as impact strength and flexural modulus, which are necessary to designate other styrene-containing plastics, need not be considered here.

Thus, for example, type "14" describes polystyrene within the lowest Vicat softening temperature range and the greatest melt flow index range. Type "41" describes polystyrene within the highest softening temperature range and the lowest melt flow index range. Tensile strength increases directly with softening temperature.

Not all possible combinations of softening temperature and melt flow index are provided by available polystyrenes. The following designated types are presently available :

Vicat softening temperature	Melt flow index	Polystyrene type
1	2, 3, 4	12, 13, 14
2	2, 3	22, 23
3	1, 2	31, 32
4	1, 2	41, 42

3. GENERAL REQUIREMENTS

3.1 Table 1 lists the physical properties and methods for determining them to differentiate the designated types of polystyrene. Finer differentiation of any property may be agreed upon by the parties concerned.

3.2 Characteristic properties of polystyrene moulding and extrusion materials, and methods for their determination, are listed in Table 2.

3.3 Average results of tests should conform to the tabulated requirements. Only those tests characteristic of type should be used to establish conformity of a material to type. Other properties needed for a particular purpose may be identified, with method for determination, and specified between manufacturer and purchaser. Routine inspection should be limited to those properties required to identify the material to the satisfaction of the purchaser.

4. TEST SPECIMENS

4.1 Preparation

Test specimens should be moulded by compression or injection process, conforming to ISO Recommendation R 293, *Compression moulding test specimens of thermoplastic materials*, and ISO Recommendation R 294, *Injection moulding test specimens of thermoplastic materials*, respectively, and under conditions recommended by the manufacturer.

Since most mechanical properties of injection moulded specimens are affected by excessive residual stresses, it is important that these stresses be controlled. (In compression moulded specimens, such residual stresses are usually minimal, but they should be controlled.) For test purposes, this control should be accomplished by adjusting moulding conditions so that maximum shrinkage is within the range of 65 to 70 %, which is a normal range of orientation.

Shrinkage should be evaluated according to ISO Recommendation R ...*, *Preparation of specimens in form of test bars with a defined level of internal stress, from amorphous thermoplastic moulding materials.*

4.2 Conditioning

Moulded test specimens should be allowed to cool, after moulding or annealing, under standard atmospheric condition (2) (23 ± 2 °C and 50 % relative humidity) specified in clause 3.1 of ISO Recommendation R 291, *Plastics – Standard atmospheres for conditioning and testing*, for at least 16 hours before testing.

TABLE 1 – **Characteristics of type**

Property		Method of test	Unit	Tentative limiting values for each property				
				Limit	Type			
					1	2	3	4
Thermal	Vicat softening temperature	ISO/R 306** Method B (5 kgf load, ethylene glycol)	°C	min.	–	80.0	90.0	100.0
				max.	79.9	89.9	99.9	–
Rheological	Melt flow index	ISO/R 292 Method C (200 °C, 5 kgf, pellets)	g/10 minutes	min.	–	4.0	8.0	16.0
				max.	3.9	7.9	15.9	–

* In preparation.

** VST values are 5.0 °C higher when determined by 1 kgf load; differences due to heating rates of 50 °C and 120 °C per hour are less than 1 °C.