

Reinforced thermosetting moulding compounds — Specification for Sheet Moulding Compound (SMC) and Bulk Moulding Compound (BMC) —

Part 3: Specific requirements

The European Standard EN 14598-3:2005 has the status of a British Standard

ICS 83.120

National foreword

This British Standard is the official English language version of EN 14598-3:2005. Together with BS EN 14598-1:2005 and BS EN 14598-2:2005, it supersedes BS 5734-1:1990, BS 5734-2:1990, BS 5734-3:1990, and BS 5734-4:1990 which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/42, Fibre reinforced thermosetting plastics and prepregs, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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**Reinforced thermosetting moulding compounds - Specification
for Sheet Moulding Compound (SMC) and Bulk Moulding
Compound (BMC) - Part 3: Specific requirements**

Mélanges à mouler thermodurcissables renforcés -
Spécification pour mats préimprégnés (SMC) et mélanges
à mouler en masse (BMC) - Partie 3 : Exigences
spécifiques

Verstärkte härtbare Formmassen - Spezifikation für
Harzmatten (SMC) und faserverstärkte Pressmassen
(BMC) - Teil 3: Spezifische Anforderungen

This European Standard was approved by CEN on 21 February 2005.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 14598-3:2005) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by IBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2005, and conflicting national standards shall be withdrawn at the latest by October 2005.

EN 14598 consists of the following parts, under the general title *Reinforced thermosetting moulding compounds – Specification for Sheet Moulding Compound (SMC) and Bulk Moulding Compound (BMC)*

- *Part 1: Designation*
- *Part 2: Methods of test and general requirements*
- *Part 3: Specific requirements*

This document includes a Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This part of EN 14598 specifies the requirements for physical and chemical properties of Sheet moulding Compounds (SMC) and Bulk Moulding Compound (BMC) and compression or injection moulded specimens. The selection in this part is limited to those materials the composition and properties of which are significantly different.

Furthermore the selection is limited to those materials which are of more general technical and/or economical importance.

The properties which are used for the characterization of the moulding compounds, the test methods and the test conditions are based on Part 2 of this document. The list of properties is selected, initially, from those general test methods found in EN ISO 10350-2, *Plastics - Acquisition and presentation of comparable single-point data – Part 2: Long-fibre-reinforced plastics (ISO 10350-2:2001)*.

The moulding compounds are divided into types corresponding to their composition and properties. The designation of the types of moulding compounds is based on *Part 1 - Designation* of this document.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods (IEC 60695-11-10:1999)*

EN 60707, *Flammability of solid non-metallic materials when exposed to flame sources – List of test methods (IEC 60707:1999)*

EN ISO 295, *Plastics - Compression moulding of test specimens of thermosetting materials. (ISO 295:2004)*

EN ISO 12114, *Fibre-reinforced plastics - Thermosetting moulding compounds and preregs - Determination of cure characteristics (ISO 12114:1997)*

EN ISO 12115, *Fibre-reinforced plastics - Thermosetting moulding compounds and preregs - Determination of flowability, maturation and shelf life (ISO 12115:1997)*

ISO 3795, *Road vehicles, and tractors and machinery for agriculture and forestry - Determination of burning behaviour of interior materials*

3 Terms and definitions

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

3.1

Sheet Moulding Compound

reinforced thermosetting moulding material, flat sheets

3.2

Bulk Moulding Compound - BMC

reinforced thermosetting moulding materials, bulk

3.3

thermal flow

characterizes the flow behaviour of plastized thermosetting moulding compounds, e.g. when filling a mould cavity and for which the minimum torque

4 Requirements

4.1 General

Sheet moulding compounds, bulk moulding compounds and test specimens prepared by compression moulding complying with this document shall meet the appropriate property requirements shown in Table 1 to Table 4.

No specific limits are placed on rheological and processing properties. Never the less suitable rheological and processing properties are essential for the satisfactory use of a sheet moulding compound (SMC) and bulk moulding compound (BMC). Appropriate properties shall therefore be specified in any contract.

The test method and the test condition shall be as agreed by the interested parties.

In addition, for some applications, it may be desirable for information to be made available on other properties of the moulding compounds, for example:

- curing time;
- peak exotherm;
- flowability.

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

4.2 Type and content of filler/reinforcement

Sheet moulding compounds (SMC), bulk moulding compound (BMC) and test specimens prepared by compression moulding complying with this document shall meet the appropriate nature and form of the filler/reinforcement and its mass content according to its designation (see Part 1, 3.2, of this document).

4.3 Recycling

All formulations can contain recycling materials. Some properties may be changing with contents more than 10 %.

4.4 Property data

For those moulding compounds complying with this document the mean value for the number of test specimens to be used for each test method shall meet the appropriate requirement listed in Table 1.1 to Table 1.4 for SMC and Table 3.1 to Table 3.4 for BMC of this part.

Properties which may be specified are shown in Table 2.1 to Table 2.4 for SMC and Table 4.1 to Table 4.3 for BMC.

Table 1.1 - SMC-properties which shall be specified

					1	2	3	4
					Type/Grade SMC EN 14598-3 – UP. . .			
	Property	Unit	Proc ^a	Max. min.	GF15 G	GF20 G	GF25 G	GF25 G
1. Mechanical properties								
1.1	Tensile modulus E_t	MPa	Q	$\geq$	7000	8000	8500	9000
1.2	Stress at break σ_B	MPa	Q	$\geq$	40	45	50	55
1.3	Strain at break ε_B	%	Q		1,2	1,5	1,5	1,4
1.4	Flexural modulus E_f	MPa	Q	$\geq$	7000	8500	9000	9500
1.5	Flexural strength σ_{fM}	MPa	Q	$\geq$	100	120	145	150
1.6	Charpy Impact strength a_{cU}	kJ/m ²	Q	$\geq$	35	40	50	60
2. Thermal properties								
2.1	Temperature of deflect. Under load $T_{f1,8}$	°C	Q	$\geq$	180	180	180	190
2.2	Coefficient of linear thermal expansion	10E -6/K	Q		18	18	18	18
3. Electrical properties								
3.1	Dissipation factor Tan δ 100	-	Q/M	$\leq$	0,01	0,01	0,01	0.01
3.2	Volume resistivity ρ_e	Ω cm	Q/M	$\geq$	10^{13}	10^{13}	10^{14}	10^{14}
3.3	Surface resistivity σ_e	Ω	Q/M	$\geq$	10^{12}	10^{12}	10^{12}	10^{12}
3.4	Proof tracking index CTI	-	Q/M	$>$	600	600	600	600
4. Flammability, Burning behaviour								
4.1	EN 60695-11-10	class	Q/M		HB	HB	HB	V1
4.2	ISO 3795 (>3,2 mm)	class	Q/M		NBR	NBR	NBR	NBR
4.3	Glow bar EN 60707	step	Q/M		BH 2-95	BH 2-95	BH2-95	BH 2-30
5. Chemical and physical properties								
5.1	Density	g/cm ³	Q/M		1,9	1,85	1,85	1,9
5.2	Moulding shrinkage	%	Q		0,15	0,15	0,15	0,14
6. Rheological and processing properties								
6.1	Glass content	% by mass	Q/M		15	20	25	25
7. Remarks								
7.1	Characteristic				Standard	Standard,	Standard, E	LS,E,FR
7.2	EN ISO 295, EN ISO 12114, EN ISO 12115						830, 830.5	831. 831.5
7.3	Special properties							
Properties to be specified are those, which should typically appear on a data sheet. A selection of these properties also should be included on the certificate of conformity.								
^a Proc.= Processing; Q = Compression moulding; M = Injection moulding, G = General purpose.								