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Plastics — Vocabulary

AMENDMENT 1: Additional items

Plastiques — Vocabulaire

AMENDEMENT 1: Éléments
supplémentaires

Kunststoffe — Fachwörterverzeichnis

ÄNDERUNG 1: Weitere Einträge



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Plastics — Vocabulary

AMENDMENT 1: Additional items

Clause 2

Delete terminological entries 2.193, 2.195, 2.263, 2.400, 2.964, 2.1197, 2.1216.

Clause 2, after 2.1265

Add the following Clause 3.

3 Terms and definitions — Additional items

3.1

ageing

entirety of all irreversible chemical and physical processes occurring in a material in the course of time

3.2

chlorinated poly(vinyl chloride)

PVC-C

poly(vinyl chloride) modified by the controlled chlorination of the polymer

3.3

compressive strength

<compression test> maximum compressive stress sustained by the test specimen during a compressive test

Note 1 to entry: It is expressed in megapascals.

3.4

critical energy release rate

G_{IC}

<fracture toughness test> value of the energy release rate G in a precracked specimen under plane-strain loading conditions, when the crack starts to grow

Note 1 to entry: It is expressed in Joules per square metre, J/m².

3.5

critical stress intensity factor

K_{IC}

<fracture toughness test> value of the stress intensity factor when the crack under load actually starts to enlarge under a plane-strain loading condition around the crack tip

Note 1 to entry: It is expressed in pascals square root of metre, Pa√m.

Note 2 to entry: It is related to its critical energy release rate G_{IC} by the formula:

$$G_{IC} = \frac{K_{IC}^2}{E}$$

where E is the modulus of elasticity, determined under similar conditions of loading time (up to crack initiation) and temperature.

In the case of plane-strain conditions:

$$E = \frac{E_t}{1 - \mu^2}$$

where E_t is the tensile modulus and μ is Poisson's ratio.

**3.6
dammar resin**

resin obtained from species of Shorea, Hopea, and Balnocarpus

Note 1 to entry: Dammar resin is soluble in certain organic solvents and used as a tackifier and modifier of pressure-sensitive adhesives.

**3.7
degate, verb**

<injection and transfer moulding> to separate the sprue from the moulded part

**3.8
degree of polymerization**

<polymer molecule> average number of the monomeric units in a polymer

**3.9
gate**

<injection and transfer moulding> channel or orifice through which material is injected from the sprue into a mould cavity

**3.10
lamine, noun**

product made by bonding together two or more layers of a material or materials

**3.11
Poisson's ratio**

negative ratio of the strain increment $\Delta\epsilon_n$, in one of the two axes normal to the direction of extension, to the corresponding strain increment $\Delta\epsilon_l$ in the direction of extension, within the linear portion of the longitudinal versus normal strain curve

Note 1 to entry: It is expressed as a dimensionless ratio.

**3.12
polyolefin**

thermoplastic polymer produced by the polymerisation or copolymerisation of olefins

Note 1 to entry: Examples of olefins include ethylene, propylene.

**3.13
pot life**

maximum period of time during which a multi-part adhesive or resin can be used after mixing the components

Note 1 to entry: The pot life varies with volume and temperature of the mixed adhesive and the ambient temperature. The term "pot life" is also used for the application of hot-melt adhesives for the period for which an adhesive, ready for use, remains usable when kept at normal operating temperature.

3.14**resin transfer moulding****RTM**

closed-mould system for moulding of reinforced plastics that processes inject matrix resins in to the mould in which reinforcement materials are preset

Note 1 to entry: The reinforcement materials include continuous strand, cloth, woven roving, long fibre and chopped strand.

3.15**submarine gate****tunnel gate**

injection channel situated mainly underneath the mating surface, so that the sprue is pulled off with the ejection operation

3.16**unplasticized poly(vinyl chloride)****PVC-U**

poly(vinyl chloride) without any plasticizer

Note 1 to entry: Ingredients added to poly(vinyl chloride), such as stabilizers, lubricants, etc., are not considered as plasticizers in the usual technical sense.

3.17**volume resistivity**

quotient obtained when the potential gradient is divided by the current density

Note 1 to entry: The volume resistivity of a material, in ohm centimetres, is equal to the volume resistance between opposite faces of a $1 \times 10^{-6} \text{ m}^3$ cube of the material.

3.18**anisotropic**

different properties, such as Young's modulus or strength, along with different directions

3.19**cavity pressure** P_c

pressure of the thermoplastic material in the cavity at any time during the moulding process, measured centrally near the gate or the inner surface of the cavity

Note 1 to entry: It is expressed in megapascals (MPa).

3.20**control**

material which is of similar composition and construction to the test material, used for comparison and exposed at the same time as the test material

3.21**electroformed mould**

container with a cavity or cavities, made by electroplating metal on the reverse pattern of the cavity

3.22**family mould**

container with a cavity or cavities, that contains more than one cavity which have different geometries

3.23**flat wise**

perpendicular direction to original laminated sheet surface when referring to the cutting of the test specimen

3.24

hand lay up

process of placing (and working) successive plies of reinforcing material or resin impregnated reinforcement in position on a mould by hand

3.25

impregnate, verb

<reinforced plastics> to soak reinforcements with a resin

3.26

interpenetrating polymer network

IPN

polymer comprising two or more networks which are at least partially interlaced on a molecular scale but not covalently bonded to each other and cannot be separated unless chemical bonds are broken

Note 1 to entry: A mixture of two or more pre-formed polymer networks is not an IPN, they are polymer blends.

3.27

liquid crystalline polymer

LCP

polymer that can exhibit one or more fluid state(s) with long-range orientational order over a certain range of temperatures (thermotropic liquid-crystalline polymer) or solution concentrations (lyotropic liquid-crystalline polymer)

3.28

miscibility

capability of a mixture to form a single phase

Note 1 to entry: Single phases exist over certain ranges of temperature, pressure and composition. Whether or not a single phase exists depends on the chemical structure, molar mass distribution, and molecular architecture of the components present.

3.29

polycondensation

polymerization in which the growth of polymer chains proceeds by condensation reactions between molecules of all degrees of polymerization

3.30

polymer blend

macroscopically homogeneous mixture of two or more different species of polymer

Note 1 to entry: In most cases, blends are homogeneous on scales smaller than several times visual optical wavelengths.

Note 2 to entry: For polymer blends, no account is taken of the miscibility or immiscibility of the constituent polymers, i.e., no assumption is made regarding the number of phases present.

Note 3 to entry: The use of the term polymer alloy for a polymer blend is discouraged.

3.31

polymer gel

polymer network, including a physical one, swollen or capable of being swollen in a liquid

3.32**semi-interpenetrating polymer network****SIPN**

polymer comprising one or more networks and one or more linear or branched polymer(s) characterized by the penetration on a molecular scale of at least one of the networks by at least some of the linear or branched macromolecules

Note 1 to entry: Semi-interpenetrating polymer networks are distinguished from interpenetrating polymer networks because the constituent linear or branched polymers can, in principle, be separated from the constituent polymer network(s) without breaking chemical bonds; they are polymer blends.

3.33**S-glass**

magnesia-alumina-silica glass, especially designed to provide high tensile strength glass filaments

3.34**ultimate anaerobic biodegradation**

breakdown of an organic compound by microorganisms in the absence of oxygen to carbon dioxide, methane and mineral salts of any other elements present (mineralization) plus new biomass

3.35**unidirectional laminate**

reinforced plastics laminate in which substantially all of the fibres are oriented in the same direction

3.36**wet out**

condition of an impregnated reinforcement wherein substantially all voids between the strands or filaments are filled with resin

3.37**defin**, verb

to remove fins from moulded resin

3.38**transfer moulding**

process of moulding a thermosetting material by passage from a heated pot into the cavity of a closed, heated mould

3.39**unsaturated polyester resin**

thermosetting resin polycondensated from unsaturated acids and alcohols

3.40**feed**

<extrusion or injection moulding> material placed in the hopper

3.41**alloy**

two or more immiscible polymers united, usually by another component, to form a polymeric composition having enhanced performance properties

3.42**antistatic agent**

substance added in small proportions to a material or applied to its surface to counteract the build-up of an electrical charge on the material

3.43**chain length**

total length of a chain molecule measured from atom to atom along the chain

Note 1 to entry: This term should not be used for the direct distance between the ends of the molecule.

3.44

comb chain

macromolecule consisting of a main chain from which, at regular intervals, linear chains, all of comparable length, emanate

3.45

comb polymer

polymer, the molecules of which are *comb chains* (3.44)

3.46

constitutional repeating unit

smallest *constitutional unit* (3.47) the repetition of which describes a regular polymer

3.47

constitutional unit

species of atom or group of atoms present in a chain of a polymer or oligomer molecule

3.48

damping

measure of the energy dissipated as heat by a material or a material system subjected to an oscillatory load

Note 1 to entry: In the case of free oscillation, damping is the decrease with time of the amplitude of a system.

3.49

double-strand chain

macromolecule that can be described by *constitutional units* (3.47) joined so as to form an uninterrupted sequence of rings through two atoms

3.50

double-strand polymer

polymer, the molecules of which are *double-strand chains* (3.49)

3.51

dynamic stress

stress resulting from forces the value and/or direction of which vary in the course of time

3.52

expandable plastic

plastic formulated in such a way that it can be transformed into a cellular plastic by thermal, chemical or mechanical means

3.53

internal plasticizer

flexibilizer

co-reactant which, when incorporated into a polymer, confers improved flexibility and resilience to the polymer

Note 1 to entry: A flexibilizer gives an adhesive film a greater extension at break, a lower modulus and a lower temperature at which it becomes brittle. A flexibilizer is not extractable and will not migrate from the adhesive film.

3.54

ionomer

polyelectrolyte with very few ionic groups

3.55

isotactic polymer

regular polymer, the molecules of which can be described in terms of only one species of configurational base unit (having chiral or prochiral atoms in the main chain) in a single sequential arrangement

3.56**ladder polymer**

polymer that has a double-stranded main chain

3.57**long chain polymer**

linear polymer or a linear portion of a polymer

3.58**main chain****backbone**

linear portion of a macromolecule to which all other chains (long, short or both) may be regarded as being pendant

Note 1 to entry: In the case of two or more chains equally could be considered to be the main chain, the one selected leads to the simplest geometrical representation of the molecule.

3.59**plastic deformation**

part of the strain in a stressed plastic which remains after the applied stress has been removed

3.60**plasticate**, verb

render a thermoplastic compound more processable by means of mechanical working and/or heat

3.61**polyester**

polymeric reaction product of polyols and polycarboxylic acids having the repeating linkage -CO-O-

Note 1 to entry: The resulting polyester can be saturated or unsaturated depending on the polycarboxylic acid used.

Note 2 to entry: Typical examples of polyester are poly(butylene terephthalate) (PBT) or poly(ethylene terephthalate) (PET).

3.62**polymer**

substance composed of molecules characterized by the multiple repetition of one or more *constitutional units* (3.47) linked to each other in amounts sufficient to provide a set of properties that do not vary markedly with the addition or removal of one or a few of the constitutional units

Note 1 to entry: The nature of these constitutional units, their sequence and the average number per molecule influence the physical and mechanical properties of the polymer.

3.63**poromeric**

having properties similar to leather, essentially waterproof, but capable of transmitting water vapour to some practical degree

3.64**reinforced plastic**

plastic with materials embedded in the composition, resulting in properties superior to those of the base resin

3.65**short-chain branch**

oligomeric offshoot from a polymer chain

3.66

strain amplitude

ratio of the maximum deformation, measured from the mean deformation, to the free length of the unstrained test specimen

Note 1 to entry: The strain amplitude is measured from zero to peak on one side only.

3.67

test atmosphere

atmosphere to which a test sample or test specimen is exposed throughout a test

3.68

toughness

property of a material which can absorb energy, generally implying relatively high elongation at break and absence of brittleness

3.69

urea-formaldehyde resin

amino resin made by the polycondensation of urea (carbamide) with formaldehyde

3.70

irradiance

E

radiant flux per unit area incident on a surface

Note 1 to entry: The irradiance is measured in watts per square metre.

3.71

global solar irradiance

solar radiant flux, both direct and diffuse, received on a horizontal plane unit area from a solid angle of 2π steradians

Note 1 to entry: The irradiance is measured in watts per square metre.

3.72

spectral irradiance

E_λ

radiant flux per unit area per wavelength interval

Note 1 to entry: The irradiance is measured in watts per square metre per nanometer.

3.73

radiant exposure

H

time integral of irradiance

Note 1 to entry: The exposure is measured in joules per square metre.

3.74

diffuse solar radiation

total of the sky- and (if within the field of view) ground-reflected radiation within the 2π steradian field of view of a plane surface, excluding the radiation from within the 5° to 6° solid angle centred on the sun's disc

Note 1 to entry: For incidence angle α , between the normal to the plane and the direct beam, diffuse hemispherical radiation is determined by subtracting the component of the direct radiation in the plane [$\cos(\alpha)$ times the direct radiation] from the total hemispherical radiation.