Paints and varnishes— Coating materials and coating systems for exterior masonry and concrete—

Part 1: Classification

The European Standard EN 1062-1:2004 has the status of a British Standard

 $ICS\ 87.040$



National foreword

This British Standard is the official English language version of EN 1062-1:2004. It supersedes BS EN 1062-1:1997 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee STI/28, Paint systems for non-metallic substrates, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible 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.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Summary of pages

Amd No

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 16, an inside back cover and a back cover.

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Commonto

Amendments issued since publication

Doto

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 17 June 2004

(C)	RSI	17	June	2004

Ama. No.	Date	Comments

ISBN 0 580 43938 0

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2004

EN 1062-1

ICS 87.040

Supersedes EN 1062-1:1996

English version

Paints and varnishes - Coating materials and coating systems for exterior masonry and concrete - Part 1: Classification

Peintures et vernis - Produits de peinture et systèmes de revêtement pour maçonnerie et béton extérieurs - Partie 1:

Classification

Beschichtungsstoffe - Beschichtungsstoffe und Beschichtungssysteme für mineralische Substrate und Beton im Außenbereich - Teil 1: Einteilung

This European Standard was approved by CEN on 24 March 2004.

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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Foreword

This document (EN 1062-1:2004) has been prepared by Technical Committee CEN/TC 139 "Paints and varnishes", the secretariat of which is held by DIN.

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 December 2004, and conflicting national standards shall be withdrawn at the latest by December 2004.

This document supersedes EN 1062-1:1996.

The main changes are:

- classifications for water vapour transmission rate, liquid water permeability, crack bridging and carbon dioxide permeability are included;
- the description of a designation code of coating materials according to this standard is included.

Guidance for selection of coating systems for exterior masonry and concrete is given in informative annex A.

EN 1062 consists of the following parts under the general title *Paints and varnishes* — *Coating materials and coating systems for exterior masonry and concrete*:

- Part 1: Classification
- Part 3: Determination and classification of liquid-water transmission rate (permeability)
- Part 6: Determination of carbon dioxide permeability
- Part 7: Determination of crack bridging properties
- Part 11: Methods of conditioning before testing

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.

Introduction

EN 1062-1 identifies criteria that need to be considered when assessing the suitability of a coating system for a particular end use and provides a framework for communicating this information between manufacturer and user. This should assist in the removal of technical barriers to trade. It is the responsibility of the manufacturer of a coating system to designate the appropriate categories for end use and appearance.

NOTE 1 Where applicable, the relevant properties can also be used to describe products designed for use on interior surfaces of buildings.

NOTE 2 The characteristics of the coating material should conform to national regulations with regard to health, safety and the environment.

1 Scope

This European Standard specifies a general system for the description of coating materials and coating systems for the preservation, decoration and protection of exterior new and old, coated or uncoated masonry and concrete. It also includes a classification system based on certain physical properties.

This European Standard is applicable to all coating materials and coating systems for exterior masonry and concrete, including those for use in external thermal insulation systems.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 971-1:1996, Paints and varnishes — Terms and definitions for coating materials — Part 1: General terms.

EN 1062-3, Paints and varnishes — Coating materials and coating systems for exterior masonry and concrete — Part 3: Determination and classification of liquid-water transmission rate (permeability).

EN 1062-6, Paints and varnishes — Coating materials and coating systems for exterior masonry and concrete — Part 6: Determination of carbon dioxide permeability.

EN 1062-7, Paints and varnishes — Coating materials and coating systems for exterior masonry and concrete — Part 7: Determination of crack-bridging properties.

EN 1062-11, Paints and varnishes - Coating materials and coating systems for exterior masonry and concrete - Part 11: Methods of conditioning before testing.

EN ISO 1524, Paints, varnishes and printing inks - Determination of fineness of grind (ISO 1524:2000).

EN ISO 787-18, General methods of test for pigments and extenders — Part 18: Determination of residue on sieve — Mechanical flushing procedure (ISO 787-18:1983).

EN ISO 2813, Paints and varnishes — Determination of specular gloss of non-metallic paint films at 20°, 60° and 85° (ISO 2813:1994, including Technical Corrigendum 1:1997).

EN ISO 7783-2, Paints and varnishes — Coating materials and coating systems for exterior masonry and concrete — Part 2: Determination and classification of water-vapour transmission rate (permeability) (ISO 7783-2:1999).

ISO 787-7, General methods of test for pigments and extenders — Part 7: Determination of residue on sieve — Water method — Manual procedure.

ISO 3233, Paints and varnishes -- Determination of percentage volume of non-volatile matter by measuring the density of a dried coating.

3 Terms and definitions

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

3.1

coating material

product, in liquid or in paste or powder form, that, when applied to a substrate, forms a film possessing protective, decorative and/or other specific properties

[EN 971-1:1996]

3.2

coating system

sum total of the coats of coating materials which are to be applied or which have been applied to a substrate

[EN 971-1:1996]

3.3

coating system for masonry and concrete

coating system for the treatment of mineral substrates in order to preserve, decorate and/or protect them

3.4

decoration

treatments with the primary objective to change or restore the appearance of the substrate

NOTE Functions of these treatments are colour, gloss and texture. They can also include protective functions.

3.5

preservation

treatments with the primary objective to keep the substrate in a condition as near as possible to its original state and appearance of gloss, colour and texture

NOTE Functions of these treatments are, for example, water repellence and/or improvement of the integrity of the substrate. They can also include protective functions and may be used for pre-treatment.

3.6

protection

treatments with the primary objective to protect the substrate against one or more of the following influences: water, atmospherical, chemical, biological, mechanical or other actions

NOTE These treatments can also include decorative functions.

4 Description

4.1 Description by chemical type of binder

Description by chemical type of binder shall be derived from that component of the binder which is decisive for the characteristic properties of the final coating system.

The chemical type of the binder shall be given using, for example, the following terms for binders:

Acrylic resin, alkyd resin, bitumen, cement, chlorinated rubber, epoxy resin, hydraulic lime, oil, polyester, silicate, silicone resin, polyurethane, vinyl resin.

NOTE 1 This list of terms is not exhaustive to allow for additional binders to be described as coating technology advances.

NOTE 2 The quality of a masonry coating material is not dependent solely on the binder types used. The amount of binder(s) and/or other constituents can be of greater importance.

4.2 Description by the state of dissolution or dispersion of the binder in the coating material

Water-dilutable: binders dissolved or dispersed in water. Viscosity adjustment can be performed with water

according to manufacturers recommendations

Solvent-dilutable: binders dissolved or dispersed in organic solvents. Viscosity adjustment can be performed with

organic solvents according to manufacturers recommendations

5 Classification

5.1 General

Coating systems in terms of this standard have to be suitable for exterior masonry (e.g. facades) and concrete. The durability of the coating system on the substrate depends on the local climatic environmental conditions. Indications of the durability of the coating system on the respective substrate can be provided after conditioning according EN 1062-11. The conditioning according EN 1062-11 shall be adapted to the local climatic conditions at the usage site.

NOTE Assessment of the properties of the coating system after conditioning can be done according to EN ISO 4628-1, EN ISO 4628-2, EN ISO 4628-4, EN ISO 4628-6 and EN ISO 4628-7. Different criteria for the assessment of the change of the properties can be agreed between the parties involved.

Properties and characteristics of coating systems for masonry and concrete are classified in 5.2 to 5.8. The coating systems are assessed independently of the substrate to which the material is intended to be applied. Properties such as adhesion and texture that depend on the substrate have, therefore, not been included. It is essential that the coating system adheres properly to the appropriately prepared substrate to which it is applied.

Where applicable, the characteristics of the complete coating system, including method(s) of application, colour and opacity, should be agreed between supplier, specifier, applicator and end user. Requirements for substrate preparation shall also be specified and observed.

Coating thickness and texture are subject to the manufacturer's recommendations for use and can be affected by the method of application, the properties of the substrate and the formulation. These factors affect many important properties of the coating system such as dirt pick-up, water vapour and carbon dioxide permeability, liquid water permeability and general appearance.

To achieve an effective coating system, the materials shall be applied in line with manufacturer's recommendations. It is recommended that the coating system be applied to a trial area in order to determine whether it will require sealers and/or primers (reference surface).

5.2 Gloss

Specular gloss shall be determined in accordance with EN ISO 2813.

Class Angle of Incidence Requirement G_1 Gloss a 60° > 60 60° < 60 G_2 Mid-sheen b 85° > 10 G_3 Matt 85° ≤ 10 According the national preference, the designation of "gloss" can vary e.g. high sheen.

Table 1 — Classes for specular gloss (G)

According the national preference, the designation of "mid sheen" can vary e.g. semi-gloss, semi-matt, satin.

If the reflectance measured at 60° is less than 10, the measurement shall be repeated at 85° , the value obtained at 85° determines the class.

NOTE 1 In practice, the gloss level achieved will depend on the state and nature of the substrate.

NOTE 2 Gloss cannot be measured on textured coatings and coatings with coarse or very coarse granularity.

5.3 Dry film thickness

Dry film thickness *E*, in micrometres, shall be calculated from the consumption, using the following equation:

$$E = \frac{V \times NV}{100}$$

- NV is the non-volatile matter content, expressed as a percentage by volume, determined in accordance with ISO 3233;
- V is the consumption, in millilitres per square metre.

Table 2 — Classes for dry film thickness (E)

Class	Requirement
	μm
E ₁	≤ 50
E ₂	> 50
⊏2	≤ 100
E ₃	> 100
□ 3	≤ 200
E ₄	> 200
<i>∟</i> 4	≤ 400
E ₅	> 400

- NOTE 1 Due to the roughness of the surface of mineral substrates and due to the characteristics of the application methods, masonry coatings build up an uneven layer rather than a film of uniform thickness.
- NOTE 2 The film thickness is subject to recommendations of the manufacturer of the coating material, depending on the type and/or texture of the substrate, the application method used and/or special requirements.
- NOTE 3 The thickness E is calculated according to the theoretical consumption in laboratory. This value is used in all tests for the coating material or coating system.
- NOTE 4 For textured coatings and coatings with coarse or very coarse granularity (e.g. resin bound renderings) the classification E_5 should be used. The thickness should be calculated from the consumption and stated as an average thickness, where the minimum thickness of the film can be lower and the total thickness given by the maximum grain size.

Information shall be given in a data sheet. It may be expressed as the film thickness itself and/or as the consumption in litres per square metre or as the spreading rate in square metres per litre of the liquid coating material, preferably as a range of values.

5.4 Grain size

Grain size (granularity) shall be based on the size of the largest particles that are dispersed in sufficient quantity to influence the texture of the coating system.

Table 3 — Classes for grain size (S)

	Class ^a	Requirement µm	Test method
S ₁	Fine	< 100	EN ISO 1524
S ₂	Medium	< 300	ISO 787-7 or EN ISO 787-18
S ₃	Coarse	< 1500	ISO 787-7 or EN ISO 787-18
S ₄ ^b	Very coarse	> 1500	ISO 787-7 or EN ISO 787-18

The classification relates to the grain size and not to a description of the coating.

NOTE For the determination in accordance with ISO 787-7 and EN ISO 787-18 in the case of solvent-dilutable systems, a suitable solvent may be used in order to pour the dispersion through the sieve.

5.5 Water vapour transmission rate

Water vapour transmission rate shall be determined in accordance with EN ISO 7783-2.

Table 4 — Classes for water vapour transmission rate (V)

Class		Requirement	
		g/(m² · d)	m ^a
V ₀ No requirement		uirement	
V ₁	High	> 150	< 0,14
V	Medium	≤ 150	≥ 0,14
V_2		> 15	< 1,4
<i>V</i> ₃	Low	≤ 15	≥ 1,4
a Values in d	iffusion equivalent air th	ickness (s _d) in accordance with E	EN ISO 7783-2

NOTE This property is used to assess the influence of the coating system on the humidity behaviour of the substrate.

5.6 Liquid water permeability

Liquid water permeability shall be determined in accordance with EN 1062-3.

Table 5 — Classes for liquid water permeability (W)

Class		Requirement kg/(m² · h ^{0,5})
<i>W</i> ₀		No requirement
<i>W</i> ₁	High	> 0,5
W_2	<i>W</i> ₂ Medium	≤ 0,5
VV ₂	Medium	> 0,1
<i>W</i> ₃	Low	≤ 0,1

b This class includes textured coatings (e.g. resin bound renderings) where it is not possible to determine gloss.

5.7 Crack-bridging

Crack-bridging shall be determined in accordance with EN 1062-7 method A.

Class Requirement at a speed mm/min μm A_0 No requirement A_1 > 100 A_2 > 250 0,05 A_3 > 500 0,05 A_4 > 1250 0,5 A_5 > 2500 0,5

Table 6 — Classes for crack-bridging (A)

The test temperature for the classification A1 is 23 °C. As test temperature for classes A2 to A5 $\,$ -10 °C is recommended. Other test temperatures can be agreed between the interested parties, e.g. 10 °C, 0 °C, -10 °C, -20 °C, -30 °C and -40 °C. In this case the test temperature shall be included in parentheses after the class, e.g. A4 (-20 °C).

5.8 Carbon dioxide permeability

Carbon dioxide permeability shall be determined in accordance with EN 1062-6.

EN 1062-6

Table 7 — Classes for carbon dioxide permeability (C)

6 Designation code

A designation code for the product shall be given by the manufacturer at least on the product data sheet. The following shall be included as described in clause 5.

All properties have to be determined for the film thickness resulting from the consumption given by the manufacturer.

EN 1062-1 This European Standard

 G_{i} gloss

 $E_{\rm i}$ film thickness

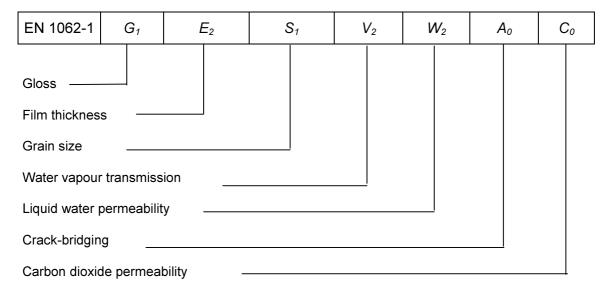
 S_{i} grain size

 V_i water vapour transmission

W_i liquid water permeability

- A_{i} crack-bridging
- C_{i} carbon dioxide permeability

The designation code for a coating with gloss, dry film thickness 50 μ m to 100 μ m, fine grain, water vapour transmission rate > 15 g/(m² · d) to \leq 150 g/(m² · d), liquid water permeability > 0,1 kg/(m² · h^{0,5}) to \leq 0,5 kg/(m² · h^{0,5}), no requirement for crack-bridging and carbon dioxide permeability, is illustrated by the following example:



Annex A (informative)

Guide to selection of coatings

A.1 Introduction

On the basis of this standard, which describes and classifies the properties and characteristics of coatings according to their use for preservation, decoration and/or protection (see clause 3 Definitions) the test methods listed allow the proposed coating systems to be qualified, in order that they correspond to the users' requirements.

For these tests, the products which make up the systems (the coating materials) are applied so as to conform to the specifications of the relevant standards, under very accurate, laboratory-controlled conditions.

The validation of coating performance so measured, which will also characterise the suitability for use of the selected coating, requires that general rules for use, which conform to the provisions of this standard, are respected, for the products chosen to be applied on site.

NOTE The term "performance" is only used here, to indicate the various properties that are indispensable for the general use of the coating.

These rules should in no way act as a replacement for the data sheets provided by the manufacturers of the materials.

In this respect, this annex, which summarises the main points of the rules under discussion and addresses the basic principles for use of the products making up the systems, is intended only as a guide. It is aimed principally, at owners/end users and their consultants (architects, engineers, work managers, etc.) to help them with the drafting of contractual documents, as well as for painting contractors, to help them with the presentation of their tenders.

A.2 Scope

This annex sets out the general criteria that should be taken into account by users and applicators of coatings for masonry and concrete. Consideration of these criteria will allow the coating materials to perform as indicated by the manufacturers in accordance with this standard.

The following applies to both water-dilutable and solvent-dilutable coating systems, for use in new or renovation work, and/or for basic surface maintenance. Such work would be undertaken on exterior masonry or concrete substrates, such as the walls and other elements found in building and civil engineering.

These elements should conform to the codes of practice and to the various standards that are applicable to them, which are not detailed here, given that they could concern national standards only. Furthermore, the repair of these elements is also not covered by this standard.

Amongst the elements affected, the following substrates fall within the scope:

- cement/lime renders or stucco.
- cementitious, calcareous and silicaceous materials or others (including cast, moulded or compressed forms),
- facing bricks or stone,
- boards or panels for cladding,

external thermal insulation systems.

The substrates may be uncoated or previously coated (in particular with a coating of a type specified in the standard). They may be new or old, sound or superficially deteriorated, clean or dirty.

A.3 Selection of coatings

When selecting a coating system, the following should be taken into account:

- The different suitability factors which can affect it and which are described in A.4.
- The properties and characteristics expected from the coatings are referred to in A.5.

A.4 Suitability factors

A.4.1 Substrate factors

Several factors relating to the substrate, are an important part of the coating selection process, in particular:

- the porosity of the material;
- the roughness or texture of the surface;
- the stability of the substrate (e.g. cracking);
- the stability of the surface (e.g. chalking);
- the moisture content;
- the alkalinity of cement-based materials;
- the surface cleaning to be provided;
- the presence of biological growth, to be eliminated;
- the existence of earlier paint coatings;
- the presence of surface deposits (e.g. efflorescence, in particular 'lime bloom').

A.4.2 Architectural factors

Many buildings, especially dwellings, generate moisture and a proportion is transmitted through the external walls. Coating systems, therefore, may require to have a degree of permeability to water vapour (see Table 4).

The main architectural factor affecting coatings will be the angle of elevation and in particular for surfaces which are horizontal (on string courses, cornices, etc.) or inclined at an angle of less than 45°.

NOTE It may be necessary to protect the edge of the coated area, such as where it joins other parts of the construction, so that rainwater does not gain access to the adhesion plane of the coating. This may be achieved using elements integrated into the substrate or built up (e.g. cornices, flashings, throatings) or by using sealants or other protective fittings, for construction joints, etc.

A.4.3 Environmental factors

The local environment of the surfaces to be painted, plays an important part:

- whether the surfaces are sheltered or not;
- climatic conditions (temperature, humidity, rain, sunshine) including the proximity to the sea and altitude;

- whether an urban or industrial environment with heavy or fairly heavy pollution;
- whether a semi-urban or rural environment with proximity to highly or fairly highly developed vegetation (trees, bushes, climbing plants, etc.).

A.4.4 Durability factors

The durability of a coating correctly applied on to a sound substrate is dependent on the degree of exposure, the environmental conditions to which the coating is subjected and whether or not the coating receives periodic maintenance during its life. The durability of a coating is enhanced by periodic preventative maintenance operations.

NOTE Normal preventative maintenance includes:

- a) Periodic cleaning to remove mould, fungi, algae and other deposits or foreign bodies;
- b) The maintenance of roofing (tiling, balconies, parapet copings, etc);
- c) The maintenance of rainwater goods (gutters, downpipes, etc);
- d) The maintenance of details that protect the building façade by shedding rainwater (cornices, flashings, drips, etc);
- e) The repair of coating damage which is not the result of fair wear and tear.

A.4.5 Specification factors

These factors correspond to:

- the specific requirements for the preparation of substrates (repairs, filling) and the sizing work (sealing, priming) that are involved;
- the method used to apply the coatings (brush, roller, spray) and the number of coats to be applied.

(See A.6 Coating application: basic principles, for further details).

A.5 Coating properties and characteristics

A.5.1 Classification

The classification of coatings includes various properties and characteristics. It is fully comprehensive, incorporating the criteria in clauses 4 and 5 for designating all possible coating types. This classification is important since it enables a 'common language' to be spoken in the different countries of European Union, to the benefit of all and in particular, the end user. It is the reason why it has been expressed as clearly as possible by a designation code for the properties and characteristics enabling immediate selection which can be improved upon later on the basis of special requirements.

A.5.2 Special requirements for coating systems for exterior masonry and concrete

For coating systems that have a special protective function it may be necessary for specific properties of the coating to be evaluated, such as:

- behaviour against mould, fungi, algae;
- alkali resistance.

At present, there are no European or International Standards concerning paints and varnishes which specify test methods and performance requirements for these properties.

A.6 Coating application: basic principles

A.6.1 General

Coating systems shall be applied in accordance with:

- The manufacturer's recommendations for use, such as indicated by his data sheets or other complementary documents:
- The existing codes of practice, where applicable, especially national standards, professional or accepted rules concerning their application and the set-working of the systems;
- The end user's requirements.

The constituent materials of a typical coating system may be of the following types:

- a) Products for priming, to penetrate or stabilise (penetrating primer for glazed surfaces, stabiliser for powdery surfaces, etc.);
- b) Products for priming, to control surface absorption. They may be a special product for this use, the same product as in a), or the coating material itself, diluted;
- c) Products for use as opacifying primers;
 - NOTE 1 The same product can encompass both the functions designated to materials b) and c).
- d) The actual coating product(s).

On surfaces which are to receive a special coating resistant to cracking, the selected class of coating will depend on the type of construction or substrate.

For surfaces which have already cracked, the selected class of coating should correspond to at least the maximum opening of the cracks visible on general parts of the surfaces.

In all cases, old substrates should be subjected to a preliminary inspection with a view to the need for any preparatory work (see A 6.2).

NOTE 2 In case of civil engineering works, it may be necessary to refer to EN 1062-7 for exceptional requirements for crack-bridging.

A.6.2 Conditions of use

a) Basic conditions

The substrate to be coated may require preparatory work depending on the characteristics of the coating materials to be applied, e.g. whether they are water or solvent-dilutable.

Substrates subject to elevated moisture contents due to capillarity, cannot be coated without preventative repairs or treatments unless special coatings suitable for the purpose are used.

The coating of masonry and concrete is usually carried out in three stages (see below) however, these are dependent on the condition of the substrate and therefore will need to be assessed by the applicator, contractor, architect etc:

- Preparatory work.
- Priming work.

EN 1062-1:2004 (E)

—	Carrying out of the coating work itself.
b)	Preparatory works
	On new substrates:
	e work generally consists of mechanical operations such as scraping, brushing, low or high pressure washing d dusting.
_	On old substrates:
	eparatory work, specifically adapted to the nature of the substrate concerned, should be defined at the time of preliminary inspection of the substrate.
surf	ependent of any possible necessary structural repairs, the composition of the work should be such that the faces obtained will be comparable to those of a new substrate before priming and coating work. It should in ticular, include localised rendering and filling operations.
—	On old substrates with an existing organic coating:
	he existing coating can be preserved, its condition shall be checked, for example, by carrying out adhesive ength testing on sample areas.
	e preparatory work will initially depend on the thickness of the existing coating, knowing that a thin coating can more easily maintained than a thick one.
c)	Priming work
	the end of the preparatory work outlined above, new or old substrates shall receive one or more of the products scribed in a, b and c of A.6.1, depending on the condition of the substrate or the type of coating to be applied.
d)	All works
_	The amount of product applied shall conform to the manufacturer's recommendations.
	Coating materials cannot be applied in the following weather conditions, unless there is a specific reference from the manufacturer on the product data sheet:
	— On frozen substrates;
	 If it is raining or foggy, in case of non protected substrates;
	— On wet substrates;
	— In strong, hot or dry wind;
	— If the temperature of the substrate is above 35 °C;
	 At temperatures below 5 °C, without special protection.



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