BRITISH STANDARD

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General principles of design of fibrous (gypsum) plaster works

The European Standard EN 15319:2007 has the status of a British Standard

ICS 91.100.10

National foreword

This British Standard is the UK implementation of EN 15319:2007.

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

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General principles of design of fibrous (gypsum) plaster works

Principes généraux de conception des ouvrages en staff

Allgemeine Grundsätze der Planung von Arbeiten aus Formteilen aus faserverstärktem Gips

This European Standard was approved by CEN on 7 June 2007.

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Foreword

This document (EN 15319:2007) has been prepared by Technical Committee CEN/TC 241 “Gypsum and gypsum based products”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by January 2008, and conflicting national standards shall be withdrawn at the latest by January 2008.

This European Standard is one of a series of European standardization documents including:

— construction products standards, concerning gypsum and gypsum based products;

— works design standards, providing general principles for the design of works to realise with these products;

— technical reports, providing rules and recommendations for installation of works on site realised with these same products.

NOTE 1 The fibrous plaster products are the subject of EN 13815.

NOTE 2 The rules and recommendations for installation of fibrous (gypsum) plaster works on site are the subject of the European Technical Report "Installation rules of fibrous (gypsum) plaster works".

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

Introduction

This European Standard applies to works carried out using fibrous (gypsum) plaster products made by the moulding of thin reinforced gypsum.

The fibrous plaster work is installed by positioning these products and fastening them to the appropriate part of the built construction. Then they are sealed or screwed and jointed with plaster to form continuous surfaces without apparent joints.

Fibrous plaster is used to enhance the architectural effects and the decorative effects to the interior of buildings, and to provide technical solutions.

Examples of types of buildings where fibrous plastering works are often installed include: public buildings, banks, department stores, shopping malls, hotels, buildings for cultural and leisure activities, and churches.

NOTE The figures used to illustrate this European Standard are intended to make the text easier to understand. Therefore, they should be taken as indicative and non-restrictive examples of the work described in the text.

1 Scope

This European Standard defines the principles for the design of works carried out using fibrous (gypsum) plaster products as defined in EN 13815.

Fibrous (gypsum) plaster casts from the three categories of production below (see Clause 4 of EN 13815:2006) should be involved:

a) ”cpp” allowing regulatory marking CE;

b) “cppv” allowing regulatory marking CE;

c) “ipp” either when CE marking is required;

or without CE marking (see Annex D – Note 2 of EN 13815:2006).

This European Standard applies to both new constructions and to the refurbishment, restructuring or conversion of existing buildings.

The common fields of application of fibrous plaster are as set out in Table 1 below.

Table 1 — Common fields of application of fibrous plaster

Fields of application	Examples
Architectural effects	— decorating: cornices, pilasters, columns (see exception below); — on the ceiling: flat or shaped ceilings (included suspended ceilings), coffered ceilings, vaults, domes; — in a vertical position : flat or shaped surfaces (partitions, linings); — encasements, casings; — embellishments for direct or concealed lighting; — structures to improve acoustical performance (insulation, absorption, diffusion).
Technical functions	— shafts and ducts for ventilation, air conditioning, smoke extraction; — ceiling voids and chambers for pressurization; — structures to enhance fire safety.
NOTE 1 This classification is not exclusive, as the same fibrous plaster work can have several functions. NOTE 2 Table 1 does not mention the use of fibrous plaster externally; as it can only be used under certain conditions (see 4.3.1.2).	

Fibrous plastering work should be capable of having the usual finishes applied directly to them (e.g. paint, wallpaper) subject to the normal preparatory work applicable for the type of finish.

This European Standard should not apply to:

- works formed from fibre reinforced gypsum sheet products, that are the subject of prEN 15283;
- suspended ceilings formed from gypsum units and/or tills, installed dry in a framework, that are the subject of EN 14246;
- works formed of solid casts;
- run moulded plaster works formed in situ;
- works formed from plaster based stucco casts, carton-pierre decors, resin decors;
- fibrous plaster works which, by their nature, do not from an integral part of the structure by the use of permanent fixing (e.g. exhibition stands);
- fibrous plaster works consisting of casts and embellishments, when they are to be applied directly to either new or existing wall or ceiling surfaces, for purely decorative applications (see Figures 3 and 4). Works of these types should be carried out in accordance with standard practice.

This European Standard does not contain the regulatory requirements with which fibrous plaster works e.g. ceilings need to comply in certain buildings.

NOTE In the field of safety, the main regulations relate to certain types of buildings, for example:

- public buildings (PB);
- high rise buildings (HRB);
- buildings for educational purposes;
- buildings for sanitary purposes.

This European Standard does not deal with the ability of fibrous plastering works to comply with particular technical requirements (e.g. acoustical) needed in order for the works to comply with the requirements of the particular building contract.

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 13279-1, *Gypsum binders and gypsum plasters - Part 1: Definitions and requirements*

EN 13501-1, *Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire tests*

EN 13501-2, *Fire classification of construction products and building elements - Part 2: Classification using data from fire resistance tests, excluding ventilation services*

EN 13815:2006, *Fibrous gypsum plaster casts - Definitions, requirements and test methods*

EN 20140-9, *Acoustics - Measurement of sound insulation in buildings and of building elements - Part 9: Laboratory measurements of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it (ISO 140-9:1985)*

EN ISO 140-3, *Acoustics - Measurements of sound insulation in buildings and of building elements - Part 3: Laboratory measurements of airborne sound insulation of building elements (ISO 140-3:1995)*

EN ISO 354, *Acoustics - Measurement of sound absorption in a reverberation room (ISO 354:2003)*

EN ISO 717-1, *Acoustics - Rating of sound insulation in buildings and of building elements - Part 1: Airborne sound insulation (ISO 717-1:1996)*

EN ISO 6946, *Building components and building elements - Thermal resistance and thermal transmittance - Calculation method (ISO 6946:1996)*

EN ISO 10456, *Building materials and products - Procedures for determining declared and design thermal values (ISO 10456:1999)*

3 Terms, definitions, symbols and abbreviations

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

3.1 General definitions

3.1.1
fibrous (gypsum) plaster work
completed work formed from the installation of fibrous plaster casts

3.1.2
fibrous (gypsum) plaster surface
whole surface formed from fibrous plaster casts (e.g. ceiling, wall lining)

3.1.3
fibrous (gypsum) plaster cast
product made by casting specified gypsum plaster mixed with water and reinforced with fibres, cloth, grilles, lathwork, lath or profiles. It may contain admixtures, fillers or aggregates as long as they will not contribute in any stage of the fire and they are not classified as dangerous substances in European regulations

3.1.4
fibrous (gypsum) interior architectural cast
cast of any shape and configuration, intended for interior architecture works similar to those in Table 1

3.1.5
fibrous (gypsum) plaster technical function cast
cast of any shape and configuration, intended for technical function similar to those in Table 1

3.1.6
fibrous (gypsum) plaster unit; slab
flat rectangular cast

3.1.7
suspended ceiling
ceiling hung at a distance below the floor or roof above (see Figures 1 a), 1 b), 1 c))

3.1.8
partition
self-supporting dividing wall, non load-bearing

3.1.9
wall lining
dry covering to any internal building surface (see Figure 1 d))

3.1.10
independent wall lining
lining fixed independently from background

3.1.11
shaft
space formed for carry air or smoke (e.g. ventilation)

3.1.12
duct
space formed for the passage of cables, pipes etc.

3.1.13
ceiling void; plenum
space between the suspended fibrous plaster ceiling and the soffit of the floor or roof above, allowing ducts, pipes and cables to be run (see Figures 1 a), 1 b), 1 c))

3.1.14
depth of suspension
distance between the point of fixing or anchoring to the background and the finished surface of the fibrous plaster cast in ceiling works, measured at the position of the fixing (see Figures 1 a), 1 b), 1 c), 2)

3.1.15
spacing from the background
distance between the point of fixing or anchoring to the background and the finished surface of the fibrous plaster cast in vertical position works, measured at the position of the fixing (see Figure 1 d))

3.1.16
background or supporting structure
existing or specially constructed work of one of the two following types:

a) backgrounds having a continuous surface such as masonry walls or reinforced concrete flooring (see Figures 1 and 2);

b) metal, timber or other framed structures

3.2 Technical definitions

3.2.1
face
visible surface of the fibrous plaster cast in the completed work

3.2.2
back
non-visible surface of the fibrous plaster cast in the completed work

3.2.3
edge of the cast
boundary of the cast

3.2.4
edge of the work
peripheral limit of the fibrous plaster work

3.2.5
thickness
distance between the face and the back of the fibrous plaster cast

3.2.6
fixing to the background
device for securing the fibrous plaster casts or the spaced fixing accessories directly to the background (see 5.2.2)

3.2.7
anchor
fixing to the background which is partially or totally embedded in it (see Figures 1 and 2)

3.2.8
accessories for fixing and spacing from the background
devices to ensure that the fibrous plaster casts forming the work are held in position (see 5.2.2) such as:

a) hanger: spaced fixing accessory connecting horizontal fibrous plaster work (e.g. a ceiling) to the background (see Figures 1 a), 1,b), 1 c), 2);

b) supporting lug: spaced fixing accessory connecting vertical fibrous plaster work (e.g. wall lining) to the background (see Figure 1 d));

c) intermediate framework: spaced fixing accessory formed from a lightweight intermediate framework generally made of primary and secondary framed parallel laths or sections (see Figures 1 and 2);

d) attachment: spaced fixing accessory fixing the fibrous plaster cast to a hanger, a supporting lug or an intermediate framework (e.g. wad, screw)

3.2.9
handling framework
separate component used to provide temporary rigidity and/or support to products during removal from its mould, handling and assembly, usually removed after use

3.2.10
wad; fixing pad
scrim comprising natural fibres usually jute or sisal fully impregnated with plaster and extended to form a grip or handle, specially used for sealed fixing of fibrous plaster work.

Glass fibres can be used too (long fibres weave or mat)

3.2.11
fibrous plastered rope
long scrim comprising natural fibres usually jute or sisal, or strip of Hessian, fully impregnated with plaster and extended to form a grip, specially used for complementary reinforcement.

Glass fibres can be used (long fibres weave or mat)

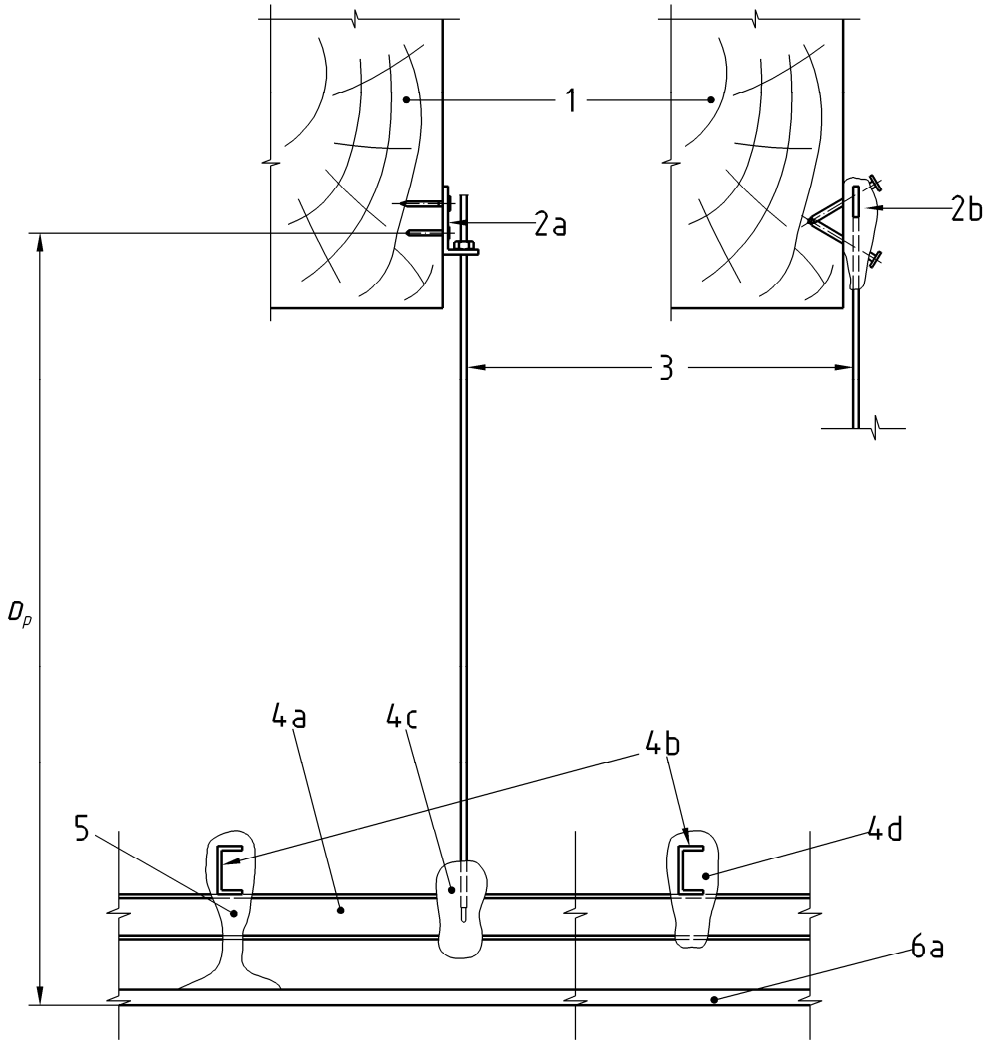
3.2.12
fibrous plastered
coated with fibrous plaster or made from fibrous plaster

3.2.13
sealed system
installed system using mainly wads and fibrous plastered ropes

3.2.14
screwed system
installation system prioritizing screwing on standard frames

3.2.15
GRG (glass fibre reinforced gypsum) cast
specific product made from plaster – calcium sulphate hemihydrate alpha based or specially modified beta based - mixed with water and in which the elementary reinforcement is glass fibre

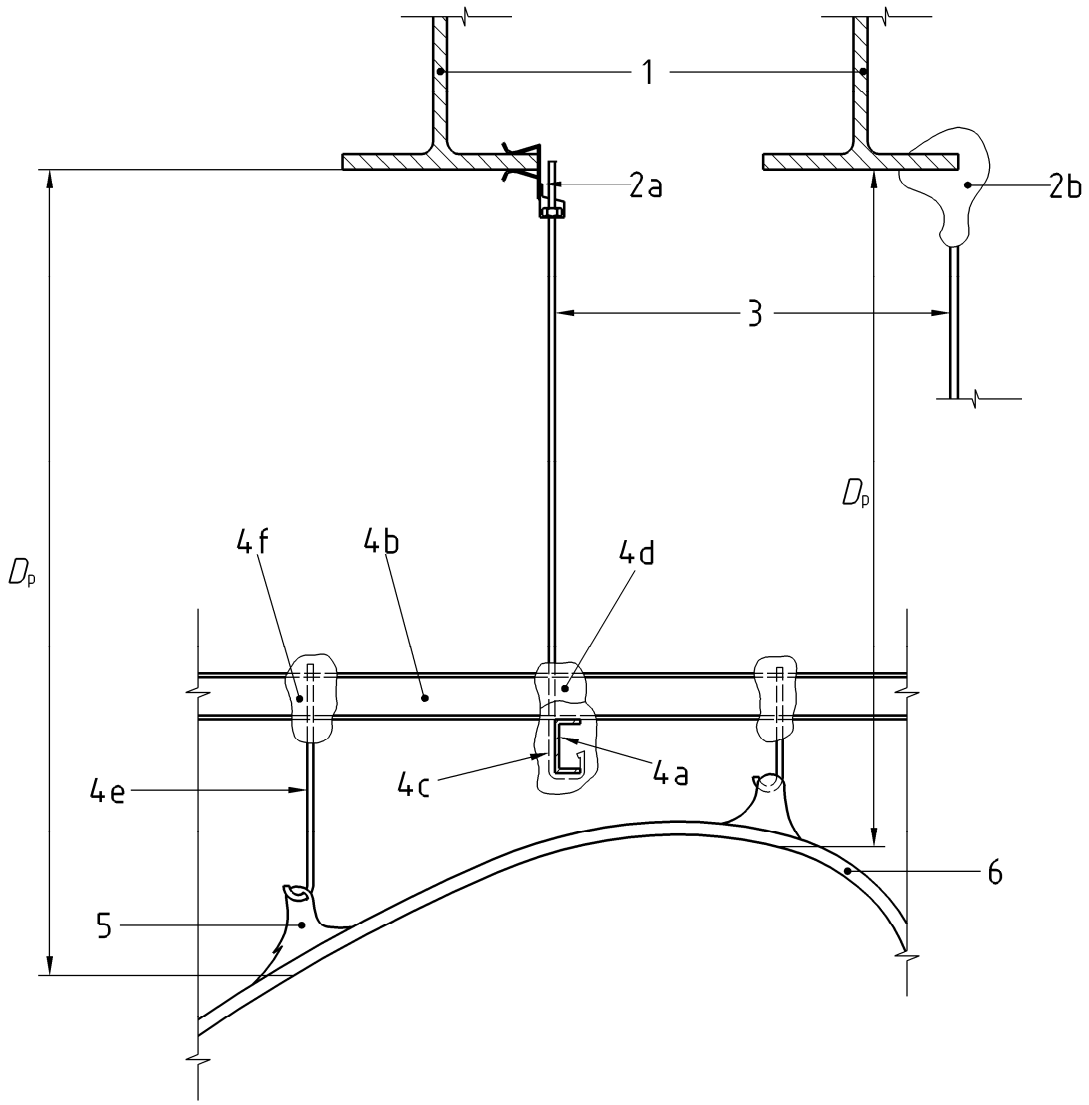
3.2.16
PMGRG (polymer modified glass fibre reinforced gypsum) cast
specific product made from plaster - calcium sulphate hemihydrate alpha based or specially modified beta based - mixed with water with addition of resin and in which the elementary reinforcement is glass fibre.



Key

Background	1	timber
Anchors - fixings	2a	screws + corner plate
	2b	2 nails driven in diagonally + securing wads
Hangers	3	threaded rod - round wire
Intermediate framework	4a	primary: U section
	4b	secondary: U section
	4c	fibrous plastered collar fastening primary to hanger
	4d	fibrous plastered collar fastening secondary to primary
Attachment	5	wad
Cast	6a	ceiling

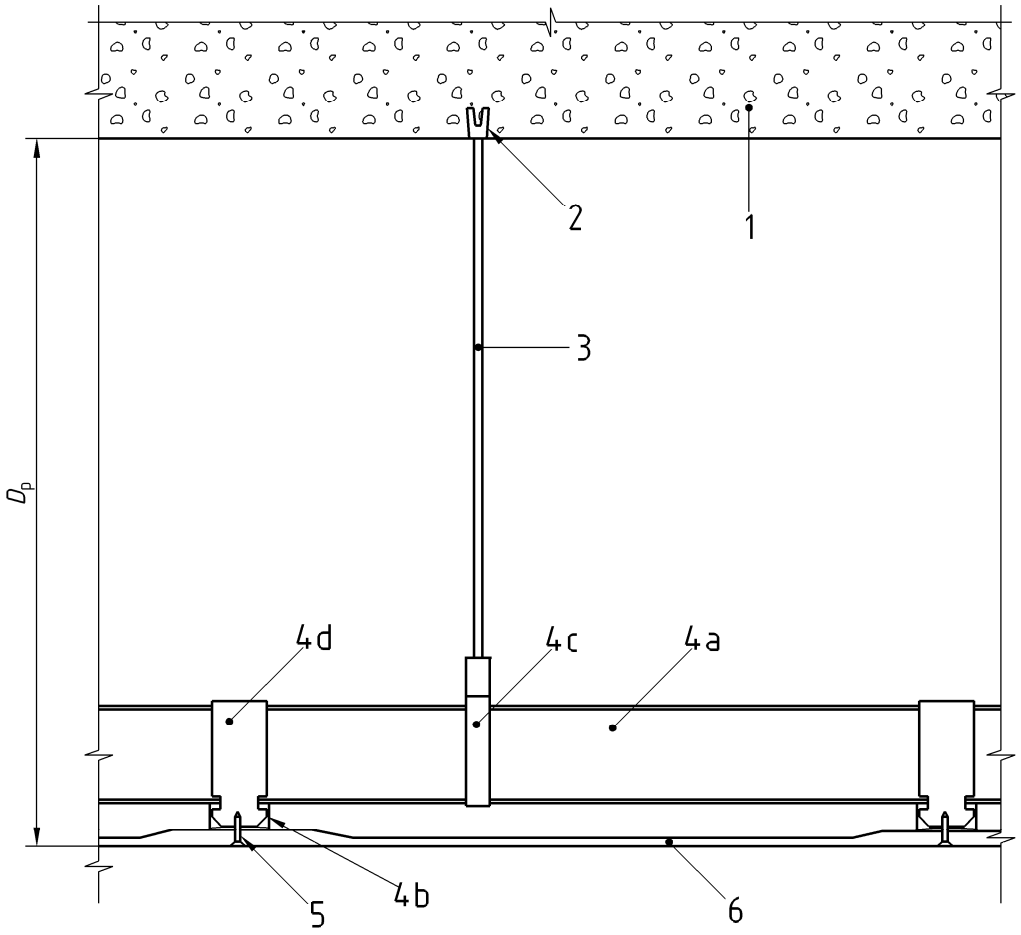
Figure 1 a) — Example of diagrams for the installation of fibrous plaster suspended ceilings (sealed system)



Key

Background	1	metal
Fixings	2a	crocodile clip
	2b	wad
Hangers	3	threaded rod - round wire
Intermediate framework	4a	primary: U section
	4b	secondary: U section
	4c	fibrous plastered collar fastening primary to hanger
	4d	fibrous plastered collar fastening secondary to primary
	4e	round wire
	4f	fibrous plastered collar fastening round wire to secondary
Attachment	5	wad
Casts	6	shaped ceiling

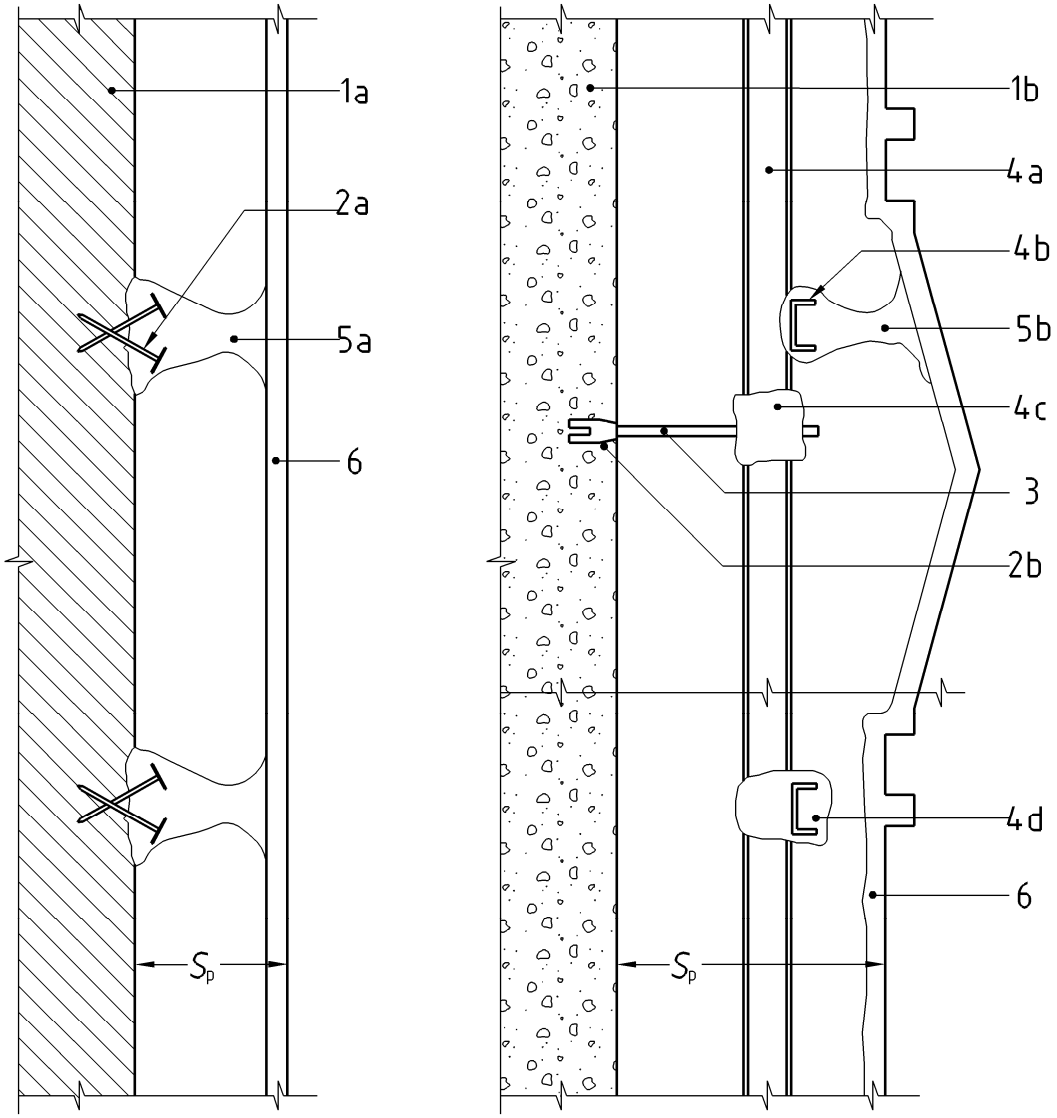
Figure 1 b) — Example of diagrams for the installation of fibrous plaster shaped ceilings (sealed system)



Key

Background	1	reinforced concrete
Fixings	2	threaded bolt
Hangers	3	threaded rod
Intermediate framework	4a	primary channel
	4b	secondary: furring channel
	4c	bridle
	4d	stirrup
Attachment	5	screw
Casts	6	ceiling

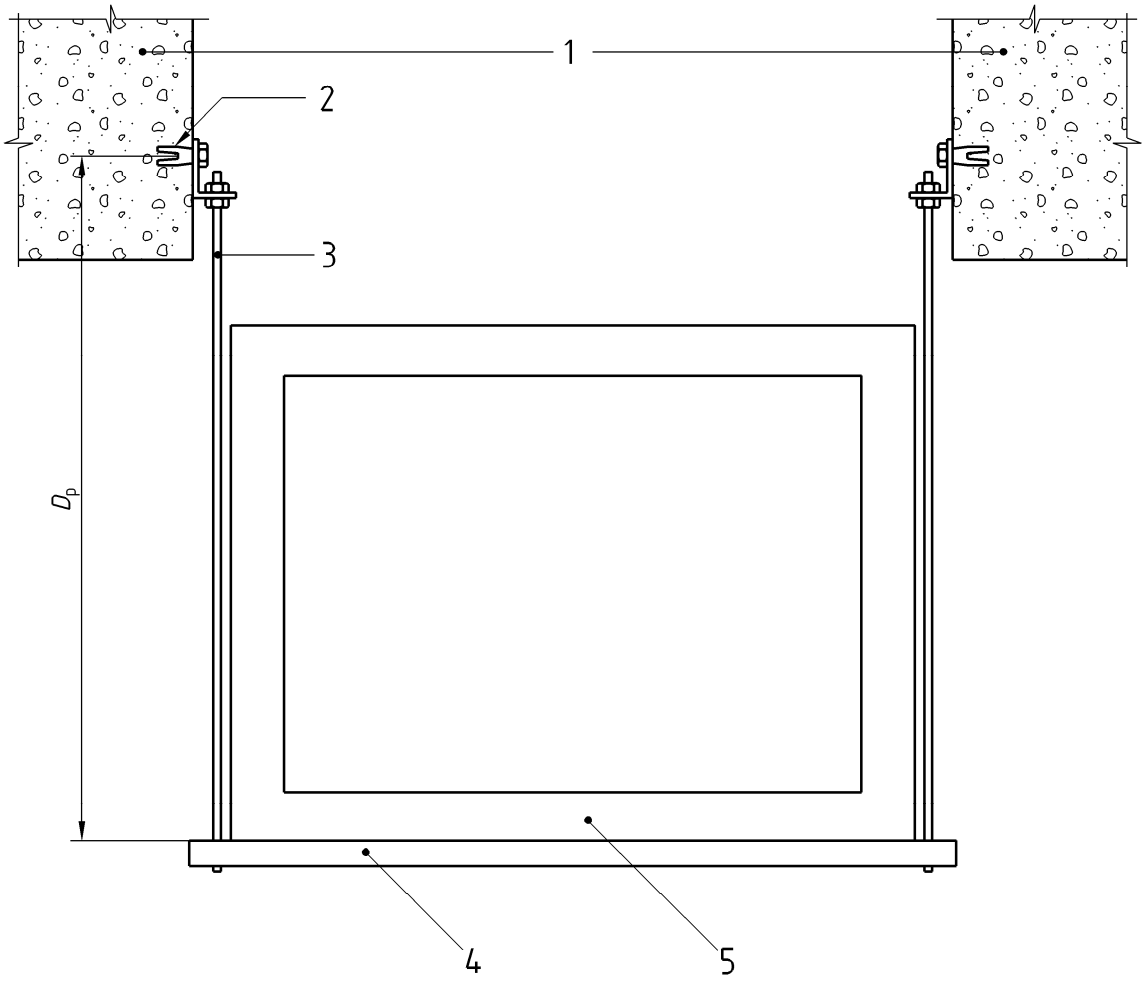
Figure 1 c) — Example of diagrams for the installation of fibrous plaster suspended ceilings (screwed system)



Key

Background	1a	masonry
	1b	reinforced concrete
Anchors	2a	2 nails driven in diagonally
	2b	anchor
Supporting lug	3	threaded rod or bracket
Intermediate framework	4a	primary : U section
	4b	secondary: U section
	4c	fibrous plastered collar fastening primary to hanger
	4d	fibrous plastered collar fastening secondary to primary
Fixing	5a	wad
Attachment	5b	wad
Casts	6	wall linings

Figure 1 d) — Example of diagrams for the installation of fibrous plaster wall linings (sealed system)



Key

Background	1	reinforced concrete
Anchors - Fixing	2	threaded bolt + angle bracket
Hanger	3	threaded rod
Framework	4	U section
Casts	5	shaft

Figure 2 — Example of diagrams of the installation of fibrous plaster shaft for smoke extraction

3.3 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply.

3.3.1 Reminder about abbreviations of standard EN 13815 useful during design of fibrous (gypsum) plaster works

cpp: indicates conventional series production;

cppv: indicates series production of products with varying properties;

ipp: indicates individual (and non-series) production;

f: reinforcement class - Consecutive number indicates the type of elementary reinforcement (see Table 2 of EN 13815:2006);

f…m: indicates presence of complementary reinforcement by lightweight steel sections e.g. f2m;

f…w: indicates presence of complementary reinforcement by softwood laths e.g. f3w.

3.3.2 Particular abbreviations to the present standard

PB: public building;

HRB: high rise building;

GRG: glass fibre reinforced gypsum (see 3.2.15);

PMGRG: polymer modified glass fibre reinforced gypsum (see 3.2.16);

Dp: depth of suspension;

Sp: spacing distance from the background.

4 Design

4.1 General

4.1.1 Information to be provided to the designer of the fibrous plastering works

This designer of the fibrous plastering works should be provided with or obtain all the information listed as being required for the design in Table 2.

Table 2 — Non-exclusive summary of the topics to be taken into account during design

Topics	Information required	Comments and references
a) Selection of the product	The function(s) of work, its position in building, the technical circumstances, the requirements and local tradition; these will determine the choice of: — product (e.g. GRG); — type of reinforcement; — some additions (e.g. additives, admixtures, aggregates).	The fibrous plastering contractor would normally choose product and the type of reinforcement.
b) Selection of the installation system	The function(s) of work, the nature and conditions of the background or supporting structures, the technical requirements, the need to allow for the passage of services equipments, the possible regulations (e.g. PB), the local tradition, may determine the installation system as well as the choice of spaced fixing accessories.	The fibrous plastering contractor would normally choose the installation system.
c) Moisture and humidity conditions	Determination or measurement of the moisture conditions in the adjoining spaces when in normal use.	See 4.3.1.1.1 See 4.3.1.1.2
d) Temperature of the areas	Determination or measurement of the temperature conditions in normal use in planned areas.	See 4.3.1.1.3
e) Exterior works	Appraisal of the climatic conditions.	See 4.3.1.2
f) Background or supporting structure	Considering if the background or supporting structure will be robust enough to: — with stand the resultant mechanical stresses of the installation work, — allow direct anchorage or fixing of the fibrous plaster casts or space fixing accessories. This is especially important when installing fibrous plaster casts in an existing building.	See 4.3.1.3
g) Passage of services	Determination of the possible passage of services through voids in the work. To define implications for the work.	See 4.3.2.1 To liaise between concerned trades.
h) Item to be inserted into the work	Determination of, nature, specification and position of possible planned insertions. Definition of implications for the work.	See 4.3.2.2 To liaise between concerned trades.
i) Point loads on the work	Definition of suitable strengthening devices for the installation system.	See 4.3.2.3 To liaise between concerned trades.
j) Joints in the work	Determination of the need for and the spacing/positioning of movement joints around the edge of the works and around penetrations and insertions. Also intermediate joints within the area of the works.	See 4.3.2.4

"to be continued"

Table 2 (*concluded*)

k) Compatibility with materials in contact	Checking for compatibility between materials, e.g. wood, cast iron, steel, plastic etc. as appropriate.	See 4.3.2.4.3 To liaise between concerned trades.
l) Compatibility with adjacent construction units	Checking for non-compatibility. This can determine the need for separation at abutments.	See 4.3.2.4.4 To liaise between concerned trades.
m) Junctions with adjacent construction units	Definition of junction details of the work with adjacent building units: doors, windows, stone, marble, woodwork, glass, mirror etc.	To liaise between concerned trades.
n) Exposure to damage	Consideration of protection necessary against risk of damage e.g. abrasion, impact.	See 4.3.2.6 and Clause 7
o) Compatibility of fibrous plaster with the planned finish or decoration of the work surface	To be checked.	
p) Lighting of work	Checking the lighting conditions, natural and/or artificial, on the site and the appearance of the completed work e.g. angle of illumination.	See 5.1.4 To liaise between concerned trades.
q) Durability and maintenance	In normal temperature, humidity and conditions of use, fibrous plaster is as durable as other building materials e.g. masonry.	See Clause 7
r) Safety in case of fire	Consideration of the regulatory requirements, according to the type and position of the fibrous plaster casts and the use of the building e.g. PB, HRB: — Euroclass; — fixed protection, fire compartimentation, specific ducts etc.	
s) Protection against noise	Consideration of the acoustic requirements of the work taking consideration of the use of the surrounding spaces.	See 4.4.5
t) Treatment of the acoustics	In areas which the purpose requires a faultless acoustics e.g. recording studio, concert hall: Definition of the objects of the work.	See 4.4.5 To liaise with acoustic engineer if necessary.
u) Energy economy and heat retention	Definition for the work the consequences of contractual requirements in accordance to its purpose.	See 4.4.6
v) Seismic risks	Determination of the risk. Definition of the particular arrangements especially about the reinforcement and the installation system.	See 4.3.2.5
w) Site inspection	Considering whether a site inspection is necessary when undertaking work is an existing building.	

4.1.2 Programme for fibrous plastering works

4.1.2.1 Stages for carrying out a fibrous plastering work

Once the fibrous plastering contractor has been notified of the agreement of the contract and the drawings and working details have been submitted to him, the work of the fibrous plasterer is likely to consist of the phases existed in Table 3 below.

Table 3 — Common stages for execution and examples of the assumed time required

N°	Stages	Examples of periods (weeks)	
		200 m^2 flat (decoration and some ceilings)	Auditorium (ceiling and walls: 2 500 m^2)
1	Preparation: — analysis of the project by those responsible for manufacture and installation, in consultation with the estimator; — if required: request for additional information; — planning of the project in consultation with the Master of works and the trades affected; — if required: preparation of additional working details not shown in the tender documents and seeking of the Master of works approval; — technical organisation of the installation work; — if required: preparation of the site organisation chart; — site inspection (suitability and progress)	4	16
2	Fibrous plastering models and fibrous plastering moulds: — preparation of special models and moulds required for manufacture	2	8
3	Manufacture: — casting of the fibrous plaster casts in the contractor's workshop, or in a temporary workshop on site, and drying	2	12
4	Site installation: — setting up on site and arrangements; — if required: erection of scaffolding; — installation of the fibrous plaster work; — if required: dismantling of scaffolding; — drying natural or artificial (to a temperature less than 50 °C);	— — 4 — 2	— 3 12 — 4
5	— total period (allowing for possible overlap of tasks)	10 to 12	40 to 50

NOTE 1 The assumed periods of time shown in Table 3 are hypothetical; these periods should be defined for each project, depending on the complexity of the works and the conditions of execution.

NOTE 2 The erection and dismantling of large scaffolds, together with the supply of related plant, may be included in the work to be carried out by the fibrous plaster contractor or may be covered in a special contract with a qualified contractor.

4.1.2.2 Conditions required before undertaking the installation of fibrous plaster work (see 5.1)

4.1.2.3 Programme content and work periods

The work programme for the fibrous plastering works will form part of the general building programme for the whole project. It should be agreed with the fibrous plastering contractor and the other trades affected before any work starts.

If appropriate, the work programme for fibrous plastering should be provided by the fibrous plastering contractor.

NOTE The trades affected by the fibrous plastering work may be those responsible for:

— the background (structure, carpentry and others);

— adjacent works (plasterwork, partitioning, joinery, metalwork, glazing, mirrors, marble work and others);

— services installations (lighting, heating, air conditioning and others).

The works programme for the fibrous plastering should give the relevant critical dates as detailed in Table 4.

Table 4 — Suggested critical programme dates

Scheduled clauses	Comments
a) Date of the start of the period of preparation;	See 4.1.2.1
b) dates of making available to the fibrous plastering contractor the areas of the site required for: — installation of welfare accommodation (cloakrooms, canteens, toilets etc.); — storage of material and plant; — manufacture, if required;	See 5.1.2
c) start date (start of the installation of the fibrous plaster works);	See 5.1.3 5.1.4 5.1.5
d) distribution, according to time and location, of the installation of the fibrous plaster works (e.g. by phases, areas, parts of the work etc.);	
e) date of handover of the fibrous plaster work;	
f) final dates for clearance of plant from site and release of the areas used for welfare, storage and manufacture.	
NOTE The contractual dates set out in Table 4 may be provisional. They should be confirmed in the written instruction to start work to be sent to the fibrous plastering contractor at least two weeks before the start of the period of preparation.	

4.2 Functions

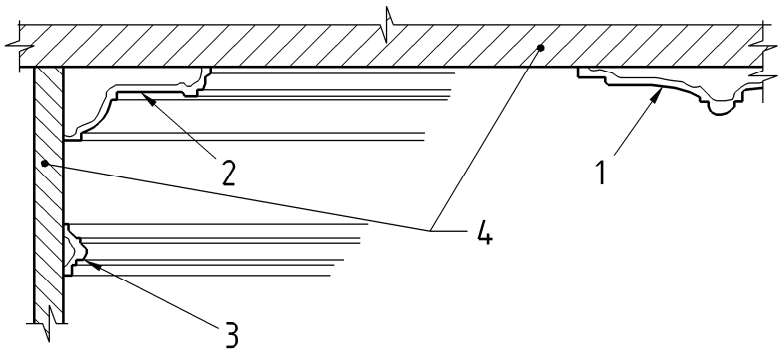
Table 5 below sets out the main (#) and secondary (+) functions and properties of fibrous plastering works depending on their common field of application (see Table 1).

Table 5 — Functions and properties of fibrous plastering works

Functions and properties	Comments	Architectural effects						Technical functions	
		Decorating	Ceiling	In vertical position	Encasements, casings	Embellishments for lighting	Acoustical structures	Shafts and ducts	Fire safety
		a	b	c	d	e	f	g	h
Decorating	In style or modern	#	+	+		+	+		
Building fabric and framework covering	Ceilings, suspended ceilings, vaults, domes, soffits, wall linings, independent wall linings		#	#	#	+	+		+
Spaces creation	Suspended ceilings, partition		#	#					
Partitioning	Partitions			#					
Fire protection	Reaction to fire (Euroclass A1)	#	#	#	#	#	#	#	#
	Compartimentation of voids and protection of structural elements		+	+	+				#
	Smoke extraction								#
Protection against noise	Direct airborne sound insulation	+		+			#	+	
	Impact sound insulation		#		+		#	+	
	Acoustic absorption						#		
Acoustics	Participation in acoustics improvement	+	#	+			#		
Thermal insulation	Participation in thermal insulation by insulating material combination		+	+					
Natural and artificial lighting	Skylights to provide lighting from directly overhead, chandeliers, and ceilings lights, cornices and troughs for indirect lighting, seatings and inserts for lighting modules	+	+			#			
Heating	Radiant heating ceilings		+						
Air conditioning	Shafts, ducts, ceiling voids		+					#	
Hiding and imitating	Capacity to hide (e.g.: pipes, technical equipments) and to imitate (e.g.: imitation beams, improvement of aesthetic defects)	+			#				

NOTE The column a "Decorating" concerns works consisting of casts set forward from background or supporting structure (see 3.1.16 and Figure 4).

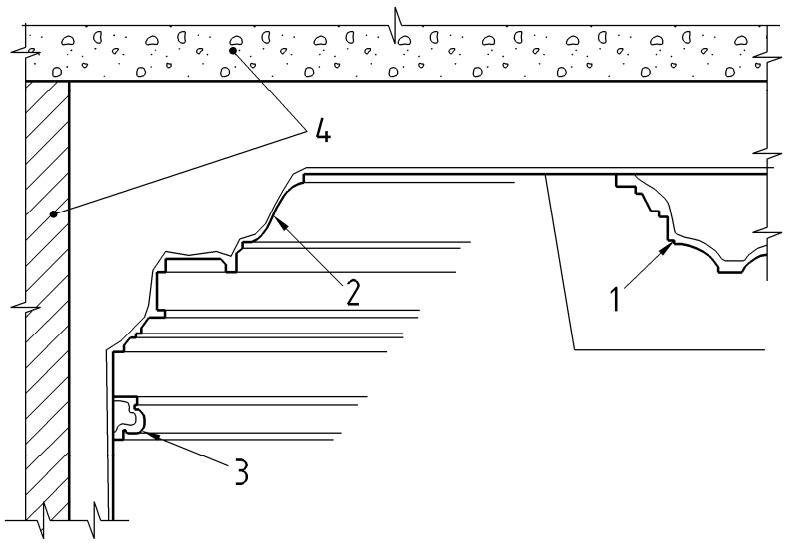
This European Standard should not apply to works consisting of casts and embellishments when they are to be applied directly to either new or existing wall or ceiling surfaces, for purely decorative applications (see scope-exclusion 7 and Figures 3 and 4).



Key

1 ceiling centre piece
2 cornice
3 moulding
4 background (continued surface)

Figure 3 — Examples of casts applied and fixed directly to wall and ceiling surfaces



Key

1 applied on suspended ceiling
2 spaced cornice
3 applied on wall lining
4 background or supporting structure

Figure 4 — Examples of casts applied and fixed directly to surfaces and works spaced from the background or supporting structure (see Table 5 - column a)

4.3 Technical requirements

4.3.1 General requirements

4.3.1.1 Compatibility with the intended use of the areas

4.3.1.1.1 Humidity and moisture conditions

a) Compatibility

The contract documents, together with the working drawings if necessary, should specify the classes of exposure in the areas according to Table 6.

Table 6 — Classes of exposure

Classes	Conditions
A	Buildings components generally exposed to varying relative humidity up to 70 % and varying temperature up to 25 °C but without corrosive pollutants.
B	Buildings components frequently exposed to varying relative humidity up to 90 % and varying temperature up to 30 °C but without corrosive pollutants.
C	Buildings components exposed to an atmosphere with a level of humidity higher than 90 % and accompanied by a risk of condensation.
D	More severe than the above.

Class A corresponds to common exposure for areas normally ventilated and heated (e.g. premises for residential use, offices, educational buildings, high street shops).

For areas with classes B, C or D, compatibility will be assessed, for each situation, after taking account the characteristics of the planned area.

The choice of gypsum casting plaster use for manufacture of casts and level of protection against corrosion of metal materials and accessories for installation, when exposed in the range of exposure conditions given above in Table 6, are contained in Technical Report “Installation rules of fibrous (gypsum) plaster works” (see 5.2.2).

b) Incompatibility

Fibrous plaster works shall not be permitted in areas where they will be permanently subjected to saturation or super saturation conditions (e.g. collective sauna, Turkish bath or Jacuzzi).

4.3.1.1.2 Exposure of walls to water

Parts of fibrous plaster works exposed to splashing or intermittent running water, should be allowed, following conditions:

— all areas with low or average humidity (e.g. lavatory);

— bathrooms and shower rooms in privates premises classified high humidity.

Appropriate private arrangements should be provided for these parts of works (e.g. use of waterproof plaster, mineral reinforcement, liquid water tightness, protective strip to foot, facing ceramic tiles).

4.3.1.1.3 Temperature

Fibrous plaster work should not be permitted in areas where it will be subjected to:

- long periods to a temperature greater than 50 °C;
- permanently to a temperature greater than 45 °C.

4.3.1.1.4 Corrosive atmosphere

Fibrous plaster work carried out in areas with a corrosive atmosphere (e.g. use of chemical compounds) together with its spaced fixing accessories, shall have the protection recommended for Class D (see Table 6).

4.3.1.2 Exterior works

Fibrous plaster work carried out externally should be protected from the direct action of water (e.g. cloister ceilings).

Work carried out externally in an industrial urban, marine, mixed or special atmosphere would require:

- a protective finish to the fibrous plaster (e.g. suitable paint);
- suitable protection of a higher quality of metal spaced fixing accessories (e.g. stainless steel).

According to geographic situation, orientation and exposure to the elements of the planned exterior works, durability criteria (e.g. risk of thermal shocks) should be appraised.

4.3.1.3 Characteristics of backgrounds

4.3.1.3.1 General

Backgrounds capable of receiving fibrous plaster works may be:

- existing supporting structures forming part of the structure or the frame of the building;
- various existing backgrounds of joinery, metalwork or plaster;
- special backgrounds, designed to support and hold the fibrous plaster work, constructed by qualified structure, carpentry or other contractors.

The use of services and their fixings as a background is allowed only in exceptional cases.

4.3.1.3.2 Conditions with which the backgrounds shall comply before the fibrous plastering contractor starts work

a) Effect of loads:

The backgrounds shall be capable to withstanding the mechanical stresses defined at 4.3.2.3 without causing any deformation capable of adversely affecting the completed work.

The backgrounds to ceiling works (e.g. suspended ceilings) shall, in particular, be capable of withstanding the stresses set out above without deforming (deflection) by more than 1/500 of their span.

b) Timber backgrounds:

The varieties of timber used and the conditions of its installation shall comply with the requirements of national or European regulations. A suitable treatment can be applied.

It is advisable to check that the treatment referred to above will not cause subsequent damage to the fibrous plaster works (stains). This may involve a consideration of the type of material involved and its drying time.

c) Metal backgrounds:

In areas of high or very high humidity and in areas with a corrosive atmosphere and /or externally situated, metal backgrounds should be protected against corrosion.

d) Reinforced concrete backgrounds:

For backgrounds which have yet to be built and, in particular, those which will have services built into them, it is advisable to arrange for anchoring devices for the spacing to be cast in when concreting.

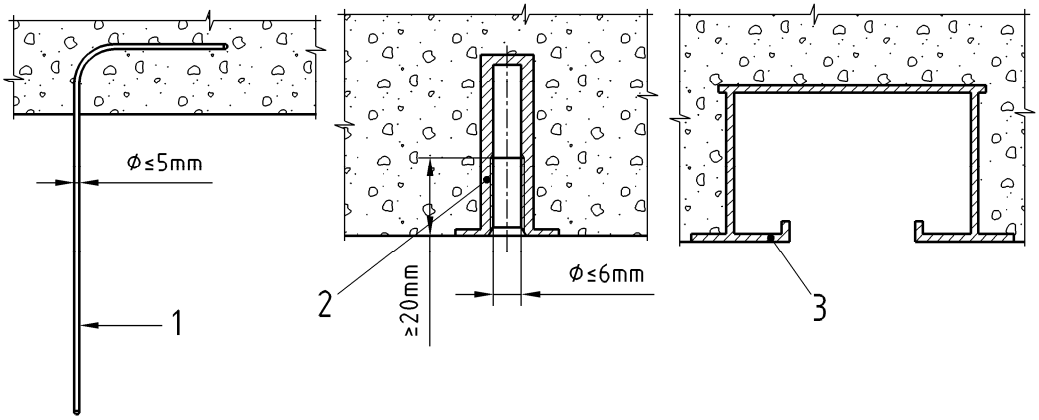
These built-in anchoring devices may be of one of the following types or their equivalent (see Figure 5):

— starter bars: these should be made from round rods with a minimum diameter of 5 mm and a projecting length equal to or greater than 20 cm;

— threaded inserts: threaded inserts of a minimum diameter of 6 mm shall have a minimum length of thread equal to or greater than 20 mm;

— fixing rails.

These anchoring devices should justify their ability to be used for this purpose by CE marking.



Key

1 Starter bar
2 Threated insert
3 Rail insert

Figure 5 — Examples of anchor devices built into solid reinforced concrete flooring

e) Prestressed backgrounds:

For prestressed units yet to be cast, it is advisable to allow for anchoring devices for the spaced fixing accessories to be built in during manufacture (see paragraph d) above).

f) Backgrounds consisting of existing ceilings:

The use of these old ceilings or of their frame as a background should only be permitted, after investigation and testing, depending on their construction and provided that they are stable.

Examples of such ceilings include:

— reinforced in situ plaster ceilings;

NOTE 1 These are ceilings formed from in situ plaster applied to elements fixed by nailing or stapling to a background or to elements which may be:

- timber or reed laths
- metal mesh or laths.

— fibrous plaster ceilings;

— plasterboard ceilings (cardboard faced boards).

NOTE 2 In general, these old ceilings should only be retained in cases such as:

— structural need;

— need or choice to contribute to thermal resistance;

— reasons of architectural and/or know-how preservation.

g) Backgrounds not to be used:

The use as a background of the following three types of old ceilings, including their framework, is not allowed:

— suspended ceilings formed from terra cotta units;

— suspended ceilings formed from plaster panels or tiles, laid dry in a special frame;

— suspended ceilings in materials of mineral or vegetable origin or metallic or artificial materials.

4.3.2 Particular construction requirements

4.3.2.1 Passage of services equipment

The contract documents, together with the working drawings and details should indicate where services equipment (e.g. ducts, lines, cables, pipework) pass through voids in the fibrous plaster work.

The information relating to this equipment shall be given to the fibrous plastering contractor in tender documents and shall contain:

— nature of the equipment;

— size;

— method of fixing;

— location;

— characteristics (e.g. temperature);

— if appropriate: method of access (e.g. hatches) for checks and maintenance (i.e. to identify areas where the background is observed).

In particular in areas accessible to the public and in circulation areas, these methods of access shall be fitted with a safety lock.

This services equipment shall be installed before the fibrous plaster work starts and shall be fixed to the background independently of the spaced fixing accessories of the fibrous plaster casts.

The passage of services equipment may require the fibrous plastering contractor, depending on the overall size and the characteristics of the equipment, to provide the following additional services:

— modification or point strengthening of the spaced fixing accessories (e.g. trimmers);

— separation at the edges and/or sub-division of the work (see 4.3.2.4.4 and 4.3.2.4.5).

In a particular technical situation, the fibrous plastering contractor may be requested to provide bearing and/or support for lightweight services equipment for the length of its passage through the fibrous plaster work (see 4.3.2.3).

4.3.2.2 Items to be inserted into the work

The contract documents, together with the drawings and working details, should show the items of services or other equipment to be inserted in the surface of the fibrous plaster work.

The information relating to these insertions shall be drawn to the attention of the fibrous plastering contractor in tender documents and shall consist of:

— nature of the equipment to be inserted;

— size;

— weight;

— method of fixing;

— location;

— characteristics (e.g. temperature);

— size of the cut-out required in the fibrous plaster unit;

— nature of this cut-out (moulded or cut away on site).

These items of services or other equipment shall be installed before the fibrous plaster work is fixed and shall be fixed to the background independently of the fibrous plaster spaced fixing accessories.

These items of equipment may, depending on their overall size and their characteristics, mean that the fibrous plastering contractor shall provide the following additional services:

— local modification or strengthening of the spaced fixing accessories (e.g. trimmers);

— separation at the edges and/or sub-dividing the works (see 4.3.2.4.4 and 4.3.2.4.5).

The fibrous plastering contractor may be requested to provide bearing and/or support for light weight items to be inserted into the fibrous plaster work (see 4.3.2.3).

Any work to form holes, cut-outs or chases in the fibrous plaster casts shall be carried out using a drill, a core drill or a saw.

Holes should not be formed using hammer drill.

No work shall be carried out without the agreement of the fibrous plastering contractor.

The insertions commonly requested in fibrous plaster works are those in connection with the works set out in Table 7 below.

Table 7 — Insertions in fibrous plaster works typically requested

Functions	Item of services or other equipment to be inserted	Fixing of items			Observations
		To background	To fibrous plaster cast (see 4.3.2.3)		
			Traditional	GRG and PMGRG	
Artificial lighting	Metal casing for strip lighting Metal ceiling lights: 1 200 mm x 600 mm, 600 mm x 600 mm or equivalent Metal spot	+ +	 +	 +	The fibrous plaster work and such electrical equipments may be supported on common special intermediate framework
Heating	Hot air vent: — on metal shafts; — on fibrous plaster shafts	 +	 +		
Air conditioning	Air vent and outlet: — on metal shafts — on fibrous plaster shafts or ceiling voids	 +	 +		
Public address system	Loudspeaker		+		
Fire detection and automatic extinguishing	Smoke alarm/sprinkler		+	+	
Break into detection	Break into alarm		+	+	
Information	Loudspeakers Boards, screens	 +	+	+	
Advertising	Boards, screens	+			
Decorating	Elements made of metal, wood, glass or other	+	+	+	The fixing devices shall be adapted to each particular situation

4.3.2.3 Spaced fixing accessories and point loads

The spaced fixing accessories shall be as defined at 5.2.2 and should be capable of absorbing the following stresses without any deformation likely to affect the completed work:

— weight of fibrous plaster casts and their accessories;

— weight of any low weight inserted equipment (see 4.3.2.2) that bas been agreed at design stage with the fibrous plastering contractor;

— weight of any applied insulation that has been agreed at design stage with the fibrous plastering contractor;

— weight of any applied finish or low weight surface mounted equipment that has been agreed at design stage with the fibrous plastering contractor.

All other elements should have fixings fully independent of the fibrous plaster work.

Generally, all insertions, applications and finishes should be agreed at design stage. The method of installing a spaced system, such as a suspended fibrous plaster ceiling, is not suitable for the later insertion or application of equipment which may compromise the fixing of the fibrous plaster works.

4.3.2.4 Joints in the work

4.3.2.4.1 General

In some situations joints defined later may need to be designed and constructed to accommodate the following specific requirements:

— safety in case of fire (specific fire seals);

— hygiene, health and environment (possible dustproofness);

— protection against noise (sound tightness);

— energy economy and heat retention (airtightness).

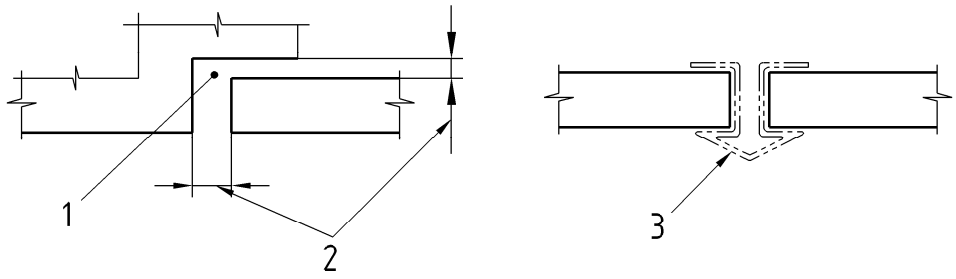
4.3.2.4.2 Expansion joints

The position and maximum movement potential of expansion joints in the structure or elsewhere should be noted and provision made for such joints to be continued through the fibrous plaster work. The spaced fixing accessories also need to be designed and installed to allow for such movement.

Two typical examples of expansion joint used in fibrous plaster works are set out below. The choice should be made depending on their location or on aesthetic considerations (see Figure 6):

— staggered joint in fibrous plaster;

— capped joint in metal, timber or other.



Key

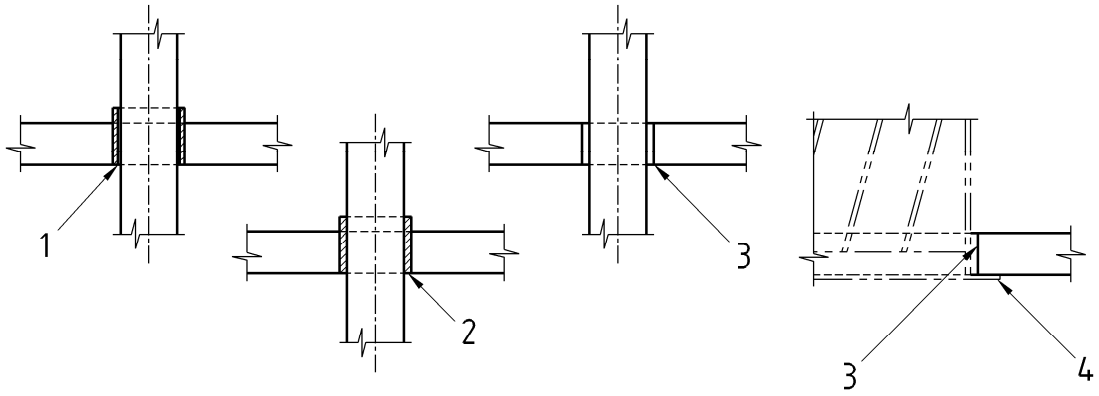
1 gap
2 variable depending on location
3 property expansive joint

Figure 6 — Examples of types of expansion joints

4.3.2.4.3 Separation around penetrations and insertions

A separation joint shall be formed around the penetrations of services ducts, lines, cables and pipework through fibrous plaster work, together with the insertions such as those set out in 4.3.2.2. Common methods of making such joints are listed below and are shown in Figure 7. The choice will depend upon their location and/or aesthetics:

- sleeve;
- resilient materials (e.g. mastic);
- gap;
- cover strip.



Key

1 sleeve
2 resilient material
3 gap
4 cover strip

Figure 7 — Examples of procedures for separation around penetrations or insertions

4.3.2.4.4 Separation at edges of the work

a) General

The edges of the fibrous plaster works should be separated from the adjacent construction to prevent problems caused by the transfer of any stresses. Examples of the cases of transferred stresses might be:

- deformation of the background;
- dimensional variations of the walls;
- passage of services equipment, ducts, pipework and other services through the plenums or the voids in the work;
- sharp variations in temperature, hygrometry or weather.

An examination of the project and /or a site investigation, in the case of work to an existing building, should be made to determine the possible risks involved (see Annex A).

If considered advisable separation at edges should be incorporated in the works to minimise situations where there is a perceived risk of movement.

The application of the processes defined below, which have aesthetic, technical and /or economic consequences, should be the subject of a stated specification in the particular contract documents.

b) Methods of providing edge separation

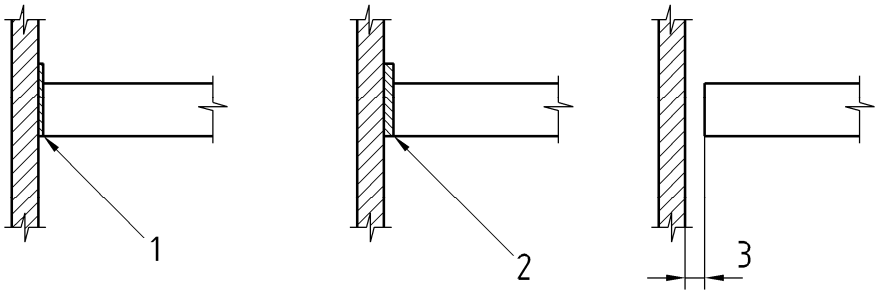
When edge separation is specified in the particular contract documents, it shall be carried out using one of the common processes set out below (see Figure 8) or by using an equivalent process.

These processes shall apply both to the peripheral edges of the work and to holes, shafts, projections etc.; they shall be selected depending on location and aesthetic requirements:

— insertion of a plastic separating membrane (e.g. sheet) or a cardboard-faced strip fixed to the wall;

— insertion of a resilient material fixed to the wall;

— forming of a gap of a width to suit the particular situation.



Key

1 plastic sheet or cardboard strip
2 resilient material
3 gap

Figure 8 — Examples of edge separation details

4.3.2.4.5 Sub-division of the works

a) General

In certain situations, intermediate joints in fibrous plaster works shall be provided in addition to the edge separation joints (see 4.3.2.4.4).

An examination of the design and/or a site inspection, in the case of work on an existing building, shall allow the particular situation of the work to be examined and the risks to be determined (see Annex A).

If considered advisable intermediate joints should be incorporated in the works to minimise situations where there is a perceived risk of movement.

The application of the processes defined below, which have aesthetic, technical and/or economic consequences, should be the subject of a stated specification in the particular contract documents.

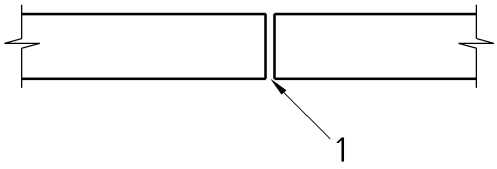
b) Types of intermediate joints

Typical examples of methods of forming intermediate joints are listed below:

— edge to edge (see Figure 9);

— staggered, in fibrous plaster (see Figure 6);

— with a metal, timber or other capping (see Figure 6).



Key

1 edge to edge joint to be maintained when painting is carried out

Figure 9 — Edge to edge separation joint

4.3.2.5 Seismic risks

The contract documentation should specify that the programme is implemented in area associated with seismic risks and should specify the coefficient due to gravity according to the area of seismicity and the type of building (e.g. hospital, PB).

Given this situation, decisions are implemented according to the technical solutions chosen for the structure of the building and the relevant regional, national and European administrative and normative rules.

The special arrangements apply to fibrous (gypsum) plaster works may concern components such as:

- joints in the work (see 4.3.2.4);
- use of casts with sheet reinforcements types f4 or f5 (see Table 1 of EN 13815:2006);
- use of built-in anchoring devices (see 4.3.1.3.2 - d) or appropriate fixing on background (see relevant European Technical Report.);
- possible strengthening of spaced fixing accessories (see relevant European Technical Report);
- use of hangers with elastic bracket.

4.3.2.6 Protection of work from damage

Fibrous plaster works or parts of works located within reach of those likely to cause damage should be made from casts complying with the requirements for minimum thicknesses in EN 13815:2006, 5.14 and 5.15.1.2.

This recommendation also applies to suspended ceilings fixed at a height of less than 2, 50 m above the floor.

When fibrous plastering works are exposed to exceptional risks (e.g. heavy traffic, passage of mobile equipment, waiting areas), it is recommended that suitable strengthening or protection is provided, such as:

- use of stronger types of plaster;
- increase in thickness of the fibrous plaster casts;
- surfaced with an appropriate finish;
- protective skirtings or downstands;
- projecting protective profiles;
- corner beads;
- handrails for horizontal separation from walls.

4.4 Essential requirements

4.4.1 Mechanical résistance and stability

Fibrous (gypsum) plaster works are self-stable, do not carry and have low surface mass. They do not participate in the global stability of the building structure.

The inner stability of the fibrous plaster works is provided by the application of setting-up and implementation principles regarding:

- compatibility of the works with the intended use of areas (see 4.3.1.1 and 4.3.1.2);
- characteristics of backgrounds and conditions with which the backgrounds shall comply (see 4.3.1.3);
- capacity of the spaced fixing accessories to absorb the stresses of the works (see 4.3.2.3);
- appropriate choice for equipment, accessories and devices to be used for fixing and spaced fixing (see relevant European Technical Report).

In situation of seismic risks, determine the possible application of relevant principles regarding 4.3.2.5.

4.4.2 Fire behaviour

4.4.2.1 Reaction to fire

When the intended use of fibrous (gypsum) plaster casts is for fire exposed for which there are regulatory requirements, and when the products contain less than 1 % by mass or volume of organic material (the higher level to be taken into account), fibrous (gypsum) plaster casts are classified A1 according to decision 96/603/EC as amended (non contribution to fire) without testing.

Where subject to regulatory requirements, and the product contains more than 1 % by mass or volume, it shall be tested and classified according to EN 13501-1, mounted and tested in conditions representative of the product's intended use.

4.4.2.2 Fire resistance

Where relevant, the performances of a work composed of fibrous (gypsum) plaster casts shall be determined and classified according to EN 13501-2.

4.4.3 Hygiene, health and environment

Fibrous (gypsum) plaster works:

- do not give off, spread or emit dangerous items, neither particle nor dangerous radiations;
- provide a regulation of relative humidity;
- improve acoustic properties (e.g. comfort);
- improve the aesthetic environment;
- fit with large surface cleaning.

4.4.4 Safety in use

Use of fibrous (gypsum) plaster works is not linked to any risk, when these are set up according to the principles written in Clause 4 and installed according to relevant European Technical Report; possibly they improve security in case of fire.

Requirement of stability is handled in 4.4.1.

4.4.5 Protection against noise

4.4.5.1 Airborne insulation

4.4.5.1.1 Direct airborne sound insulation

Where relevant, the direct airborne sound insulation performance of a work composed of fibrous (gypsum) plaster casts-partitions, ceilings, wall linings, independent wall linings and other shall be determined according to EN ISO 140-3, with the sound rating (k) being determined according to EN ISO 717-1.

4.4.5.1.2 Insulation of a suspended ceiling with a plenum above it

Where relevant, the airborne sound insulation performance of a suspended ceiling composed of fibrous (gypsum) plaster casts shall be determined according to EN 20140-9, with the sound rating (Dnc) being determined according to EN ISO 717-1.

4.4.5.2 Acoustic absorption

Where relevant, the acoustic absorption performance of a work composed of fibrous (gypsum) casts with an absorbent surface shall be measured according to EN ISO 354.

4.4.6 Energy economy and heat retention

4.4.6.1 Thermal resistance

When the intended use of a work composed of fibrous (gypsum) plaster casts is to contribute to thermal resistance in building construction works, its thermal resistance shall be determined using the formula given in EN ISO 6946.

The values of thermal conductivity necessary for this calculation are indicated in 4.4.6.2.

4.4.6.2 Thermal conductivity

Design values of the thermal conductivity of gypsum plaster used in fabrication of fibrous (gypsum) plaster casts are given in Annex B.

5 Setting up on site and arrangements

5.1 Conditions required prior to commencing the installation of fibrous plaster works

5.1.1 General

Before starting the installation work on site, the following conditions should be provided:

5.1.2 General site conditions

5.1.2.1 Access roads within the area of the site

Roads which can be used by delivery lorries shall allow access to the buildings where the work is to be carried out and to the storage areas.

5.1.2.2 Storage

A clear, clean area, sheltered from the risk of damp from rain or other accidental water ingress, close to with the location of the installation site and volume of the works should be made available to the fibrous plastering company.

5.1.2.3 Hoisting

In buildings with several floor levels, a method of hoisting (e.g. site hoists) for the equipment, the materials and, possibly, staff (e.g. in high rise buildings) should be made available to the fibrous plastering company.

5.1.2.4 Waste

Facilities to safety store waste, or an area where such facilities may be installed.

5.1.2.5 Welfare areas

Welfare areas for staff (cloakrooms, canteens, sanitary accommodation), or clear areas allowing them to be installed, shall be made available to the fibrous plastering company.

5.1.2.6 Manufacturing area

If required, on request, an area to allow the installation of a temporary workshop for the manufacture of fibrous plaster casts shall be made available to the fibrous plastering company.

5.1.3 Particular conditions for the site of the installation

5.1.3.1 Humidity

The progress of construction work on the building shall be such that the area where the fibrous plaster is to be installed is sheltered from the risk of becoming wet because of rain or the accidental spillage of water.

NOTE The precautions shall concern mainly the fixing of the roof, the blocking of exposed openings or, in the case of buildings having several storeys, a lag of at least three storeys behind the progress of the structural work.

On a case by case basis, it may be necessary to require:

— the temporary blocking of doors and windows before glazing is fixed;

— render or cladding to be carried out on exposed elevations (wind, rain etc.).

5.1.3.2 Frost

The site of the installation shall not be liable to frost.

It is accepted that fibrous plaster installation work may be carried out when the site temperature is equal to or greater than 4 °C.

Work requiring the application of plaster (e.g. wad, fibrous plaster rope) should not take place on frozen backgrounds.

5.1.3.3 Condition of the site

The areas on site for the installation shall be free of all furniture, plant, materials, packaging or rubbish and shall be swept clean.

5.1.3.4 Water

A water supply point with a drain shall be available at the site of the installation or within a distance of 40 m for small works.

5.1.3.5 Electricity

A connection box having an earth fault protection device and four power connections shall be available on the site of the installation or within a distance of 25 m for small works.

5.1.3.6 Level line

The site of the installation shall be provided with a level line or a dimensioned reference level.

5.1.3.7 Scaffolding

When the installation of scaffolding, together with the supply of the related equipment, has been the subject of a particular contract awarded to a qualified contractor:

The checks and tests relating to safety have been carried out.

5.1.4 Lighting conditions – recommendations

5.1.4.1 General

The general level of lighting can have a critical effect on the appearance of a finished surface. The temporary lighting conditions on site for the fibrous plastering should simulate the same or higher lighting conditions as those produced by the final permanent, installation.

The appearance of a surface can also be affected by the angle of illumination, which can accentuate minor deviation from line. Hence the direction of the temporary lighting should be adjustable.

Examples of critical lighting are:

— natural light from window(s) coming from one single side;

— artificial light from close wall / ceiling fittings, cornice lighting.

5.1.4.2 Light falling generally perpendicular to the surface

For the reasons given in 5.1.4.1, normal working and acceptance conditions in many countries are limited to those in which lighting and viewing are from positions perpendicular to the surface.

5.1.4.3 Glancing light conditions

The designer should specify in the contract documentation if the final permanent lighting of any surface is to fall at glancing angles.

In these conditions installing fibrous plaster under glancing light would constitute working under special conditions.

Under critical lighting conditions minor imperfections in the surface may become visible even though the work has been carried out in accordance with this European Standard.

5.1.4.4 Viewing position (see 6.1 - surface appearance of the works)

When assessing their appearance for acceptance, surfaces should be viewed from positions relevant to the intended use of the adjacent area.

For example (viewing with the naked eye, while standing):

— viewing from the entrance doorway and from the centre of the room in small or average areas (e.g. normal domestic room, administrative office);

— viewing from about 2 m away from the wall surface in larger areas; for ceilings, this would be from the floor under or on the floor close to, the area involved (e.g. theatre, lecture room).

5.1.5 Technical conditions

5.1.5.1 Suitability of backgrounds

5.1.5.1.1 Existing backgrounds

The backgrounds shall comply with the conditions of 4.3.1.3.

5.1.5.1.2 Specially constructed specific backgrounds

The backgrounds shall be complete and shall comply with the conditions of 4.3.1.3.

5.1.5.1.3 Reinforced concrete or prestressed backgrounds

The built-in fixing devices (see 4.3.1.3.2 d) and e)) shall be suitable.

5.1.5.2 Runs of services equipment

Services equipment installed in the plenums and voids in the work shall be complete and approved (see 4.3.2.1).

5.1.5.3 Insertions

Heavy insertions fixed directly to the background shall be complete (see 4.3.2.2).

5.1.5.4 Special intermediate frameworks for point loads

The frameworks shall be complete and shall comply with the conditions of 4.3.2.3.

5.1.5.5 Compatibility with adjacent works

The adjacent works of other trades, already carried out, shall comply with the requirements relating to setting out and routes and shall be compatible with the fibrous plaster work.

5.1.5.6 Protection of existing works

Existing works and works of other trades shall be protected.

5.1.6 Conditions for the work to progress

The general state of the site and the progress of the works of previous trades shall allow the installation of the fibrous plaster work to proceed and to be carried out under normal conditions.

5.2 Materials, equipment, accessories and other devices

5.2.1 Materials and accessories forming part of the fibrous plaster work itself

5.2.1.1 Fibrous plaster (gypsum) casts

The range of fibrous (gypsum) plaster casts used shall comply with requirements of Clause 5 of EN 13815:2006.

There are three products:

— traditional (fibrous) plaster casts

and two specific products:

— GRG casts;

— PMGRG casts.

There are three ranges of casts, defined by their principal functions, shapes and configuration (see 4.2 of EN 13815:2006):

— casts for interior architecture;

— casts for technical functions;

— units.

5.2.1.2 Plasters used for installation

The plaster used shall be gypsum casting plaster - calcium sulphate hemihydrate - for fibrous plaster manufactured according to EN 13279-1 (Class C1).

5.2.1.3 Water

The mixing water shall be clean and free from contamination and impurities.

NOTE Normal tap water is normally used.

5.2.1.4 Fibres and Hessian used for installation

The fibres and Hessian used shall comply with the specifications shown in 5.6.3.1 and 5.6.3.2 of EN 13815:2006.

5.2.1.5 Scrim tapes

The scrim tapes (e.g. rough textured cotton, linen tapes or paper as 3.5 of EN 13963:2005) should be used into the bases of rebates for reinforce the joints.

Their use should only be permitted for joints between fibrous plaster casts which have jointing rebates.

5.2.1.6 Fibrous plaster ropes (see 3.2.11)

These should be used, among other purposes, to join two fibrous plaster casts together in the work (sealed system) and to fix the work at the edges.

5.2.2 Equipment, accessories and devices to be used for fixing and spaced fixing

Equipments, accessories and devices are defined in European Technical Report “Installation rules of fibrous (gypsum) plaster works”.

6 Characteristics of the completed works

6.1 Surface appearance of the works

The condition of the exposed face of the work shall be such that it allows the application of the usual finishes without any other preparatory work than that which is normal for the type of finish being considered (see Annex C).

The exposed finished surface of the fibrous plaster work should be substantially free from:

- oil or lubricants stains;
- efflorescence;
- inscriptions by coloured pencil or felt-tip;
- streaks;
- mould bubbles (small balls of plaster);
- spalls and chips on sharp edges;

— cavities or lacks of plaster on details;

— possible fissure or crack which should not be allowed.

The exposed face should be checked with lighting conditions defined in 5.1.4.

6.2 Flatness of work surfaces

6.2.1 Local flatness

This shall be checked with a studded rule 200 mm long L comprising three studs, shown on Figure 10 (the isolated stud is positioned in the middle of the rule).

The studs high h being:

— 1 mm for common flatness;

— 0, 6 mm for superior flatness.

The studs width l being 5 mm.

It should be possible for the two end studs of the rule to come into contact with the surface of the work at the same time and it should be possible to see the rule rocking when the central stud is in contact with the work.

For lack of studded rule, use of metal rule with feeler gauges should be allowed.

6.2.2 General flatness

Same procedure as above, with a rule 2 m long L.

The studs high h being:

— 5 mm for common flatness;

— 3 mm for superior flatness.

The studs width l being 25 mm.

For lack of studded rule, use of metal rule with feeler gauges should be allowed.

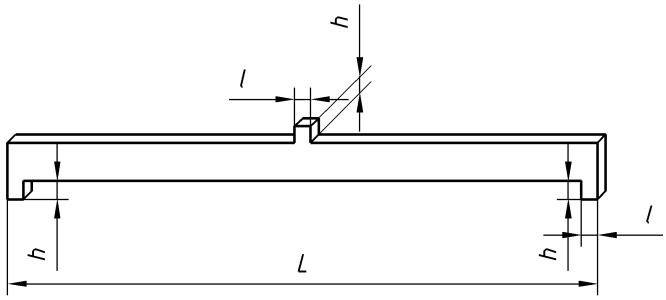


Figure 10 — Studded rule

6.3 Verticality of flat work surfaces

A tolerance of 1 mm in the verticality shall be acceptable for each section or part section of 0,5 m height (e.g. for a height of 3,60 m, the tolerance shall be 8 mm).

7 Maintenance and repair

On completion of the fibrous plaster work, in order to facilitate any future work (e.g. alterations, adaptations, strengthening, the passage and installation of services equipment, insertions or repairs following damage) it is recommended that an outline diagram of the installation system, including the spaced accessories, be provided to the building owner.

NOTE Submission of this diagram shall not be necessary when the installation system can be seen (e.g. when there is access to the plenum or to the voids in the work).

As the material is able to be cut and made good easily, such work and repairs can be carried out on fibrous plaster work without affecting its characteristics. Repairs will be more difficult to make on previous by decorated work. This work should be done by suitably experienced professionals.

The inspection of the work maintaining is advised with a frequency determined by the use of the work and the circumstances of use.

Probing inspections by suitably experienced professionals should be carried out on fibrous plaster itself, as well as on fixings to the background and accessories for fixing. They may be carried out when repairs (e.g. paint) are finished, using disposal of access (e.g. hatches) to plenum and work void (see 4.3.2.1).

Hypothesis for frequency of inspection visit for work maintaining:

— fibrous plaster works for technical functions with continuous use (e.g. shaft for smoke extraction) 10 years;

— fibrous plaster works in special conditions (e.g. 4.3.1.1 – classes of exposure B, C or D) 15 years;

— fibrous plaster works for architectural effects in spectacle areas (e.g. auditorium) 20 years;

— fibrous plaster works for architectural effects in public areas (e.g. public sales office) 40 years;

— fibrous plaster works for architectural effects in private areas unjustified.

Annex A
(informative)

Separations at abutments and within the area of the works

A.1 Examples of situations likely to require separation at edges of work

1) Size of the work:

   — fibrous plaster surfaces of large size;

   — fibrous plaster surfaces in which the largest size several many times the smallest (e.g. suspended ceiling on a corridor).

2) Layout:

   — fibrous plaster surfaces works with a complicated general assembly plan;

   — fibrous plaster surfaces comprising insertions of very long electrical rail or air vent;

   — fibrous plaster ceilings comprising one or several penetrations of structural elements : post, pillar or one or several large openings: flight of stairs;

   — fibrous plaster ceilings in which the edges have several acute corners following walls;

   — fibrous plaster ceilings in which the edges take on the shape of one or several salient structural elements.

3) Adjacency of structural element:

   — fibrous plaster ceiling fixed level and/or adjoining independent structural elements (see Figure A.1).

4) Nature of backgrounds:

   — fibrous plaster works supported by timberworks or girders likely to differential movement.

5) Nature of walls:

   — fibrous plaster works abutting against wood or metal wall face.

6) Particular use of ceiling void:

   — fibrous plaster works in which the ceiling void are used for:

      — passage of non-insulated fresh air ducts;

      — passage of non-insulated heating or air conditioning ducts;

      — passage of non-insulated pipes for fluid.

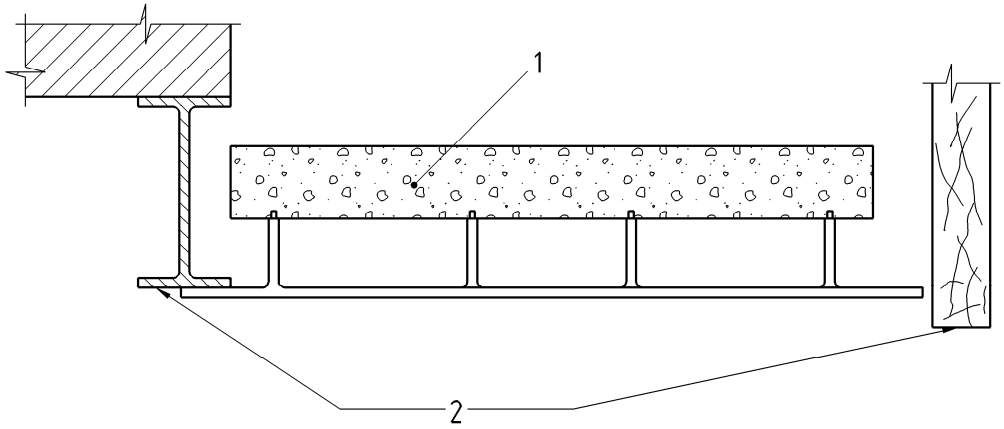
   — installation of services equipment which may generate varied physical disturbances (e.g. vibrations).

7) Thermal and / or hygrometric conditions:

— fibrous plaster ceilings on areas with strong thermal and hygrometric variations;

— fibrous plaster works carried out externally.

This list is non-exhaustive.



Key

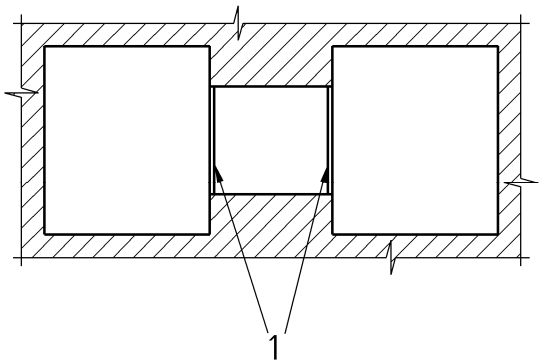
1 background
2 independent structural elements

Figure A.1 — Example of a fibrous plaster ceiling fixed level and/or adjoining independent structural elements

A.2 Examples of situations likely to require sub-division

a) Size: fibrous plaster works of very large size.

b) Layout: fibrous plaster works in which there is a constriction in the surface (see Figure A.2).



Key

1 intermediate joints

Figure A.2 — Example of intermediate joints on a ceiling whose surface has a constriction

Annex B
(informative)

Design values of thermal conductivity of gypsum plaster

Table B.1 — Design values of thermal conductivity of gypsum plaster

P kg/m^3	λ 23-50 $W/$(m·K)
900	0,30
1 000	0,34
1 100	0,39
1 200	0,43
1 300	0,47
1 400	0,51
1 500	0,56

The values in Table B.1 are those of EN 12524. The reference values concern dry material used indoors. In order to take account of moisture, these values have to be adjusted in accordance with EN ISO 10456.

Annex C
(informative)

Painting works

Table C.1 — Summary of preparation and finishing after completion of fibrous (gypsum) plastering works

Preparation works and finishing works	Smooth face		
	Types of finish : — matt — satin — gloss		
	Level of finish:		
	C Basic	B Standard	A High
Trueing up	X	X	X
Dusting	X	X	X
Primer	X	X	X
Filling (for small defects)		X	X
Filler (one pass)		X	
Filler (two passes with rubbing down between)			X
Rubbing down and dusting		X	X
Intermediate coat		X	X
Touching up			X
Finishing coat	X	X	X
NOTE 1 The level “C-basic” is only suitable for a “matt” finish; The level “B-standard” could be used for “satin” or “matt” finishes; The level “A-high” only is recommended for “gloss” finish; The finishes C and B have a “poché” look; The finish A has a finely “poché” or smooth look. A specific finish (e.g. gloss paint) should be the subject of a special specification in the contract document.			
NOTE 2 The preparation and the painting should only take place after the final permanent lighting is in place (see 5.1.4).			

Bibliography

[1] EN 12524, *Building materials and products — Hygrothermal properties — Tabulated design values*

[2] EN 13963:2005, *Jointing materials for gypsum plasterboards — Definitions, requirements and test methods*

[3] EN 14246, *Gypsum elements for suspended ceilings — Definitions, requirements and test methods*

[4] prEN 15283 (all parts), *Gypsum boards with fibrous reinforcement — Definitions, requirements and test methods*

[5] ISO 7892, *Vertical building elements — Impact resistance tests — Impact bodies and general test procedures*

[6] European Technical Report *"Installation rules for fibrous (gypsum) plaster works"*

[7] 96/603/EC: Commission Decision of 4 October 1996 establishing the list of products belonging to Classes A *'No contribution to fire'* provided for in Decision 94/611/EC implementing Article 20 of Council Directive 89/106/EEC on construction products (Text with EEA relevance)

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