

Classification fire reaction of RUREDIL X MESH GOLD system according to UNI EN 13501-1

In accordance to European regulation UNI EN 13501-1 structural reinforcement Ruredil X Mesh Gold has been classified:

B – s1, d0	
B	no smoking
s1	limited smoke emission
d0	Absence of burning drops and/or red-hot particles

Certification by Giordano Institute (the classification report is attached)

In order to understand and compare the classification of PRO-FRC reinforcement, that's a table that connects Euroclasses to common terms fire-reaction properties of commonly used materials in building industry.

Material	Euroclasses According to UNI EN 13501-1	Observations	
Glassfiber between two galvanized metal boards	A1	Not burning	No smoke emission and absence of burning drops/particles
Lightened brick block	A1	Not burning	No smoke emission and absence of burning drops/particles
Gypsum fiber slab	A2-s1, d0	Not burning	Limited smoke emission and absence of burning drops/particles
RUREDIL X MESH GOLD	B – s1, d0	Fire-proof	Limited smoke emission and absence of burning drops/particles
Polycarbonate alveolar plate	B – s1, d0	Fire-proof	Limited smoke emission and absence of burning drops/particles
Expanded perlite and bituminous binders heat-insulating plate	D-s1, d0	Burning	Limited smoke emission and absence of burning drops/particles
Sinthesized expanded polystyrene plate	E, d2	Burning	Not applicable
Thermosetting polyester resin	F	Easy burning	Not applicable

Observations

As we can deduce, Ruredil X Mesh Gold is assimilable to fire-proof elements thanks to limited smoke emission and drops/praticles

To expand on this subject see the attached.

Maggio 2008



COMMENT TO THE CLASSIFICATION
REPORT ABOUT SYSTEM FIRE
REACTION

Ruredil X Mesh Gold

In accordance to UNI EN 13501





The publication of regulation 89/106/CEE about construction products has defined the basic requisites that construction works and civil engineering must fulfil.

If a fire breaks out, security is the basic requisite that a construction work and engineering must guarantee to avoid fire-damaged, pets and goods.

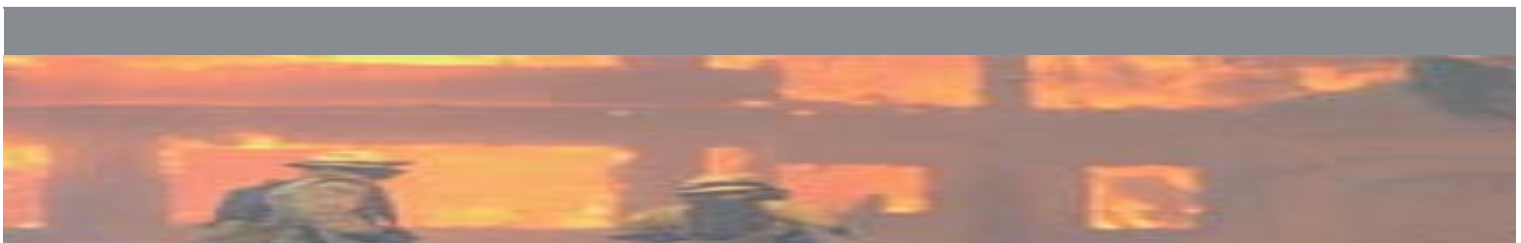
To fulfil this requisite, a building must guarantee:

- Stable bearing elements to assure the rescue;
- Limited fire spread (even in the nearby buildings)
- The possibility for occupants to leave the building without damages or the possibility to be rescued in a different way.
- The possibility for rescued team to work in safe circumstances

Consequently the materials we use to build must guarantee specific properties.

These properties are the same in whole European Union; they have been established by classification procedures and system tests.

Therefore we must follow the regulation EN 13501-1 "Fire classification of construction products and building elements-Part 1: Classification using test data from reaction to fire test" in order to classify any kind of construction products.





European classes rule the European Classification System about all building elements but floor and covering products.

Details:

A1- A2	no stoking/non combustible	no flash-over
B	no stoking/non combustible	no flash-over
C	limited stoking	risk of flash-over
D	limited stoking	risk of flash-over
E	lack of fire-reaction properties	risk of flash-over
F	lack of fire-reaction properties	risk of flash-over

We call the change in a widespread fire of all combustible materials in a confined area "flash-over" or "widespread fire".

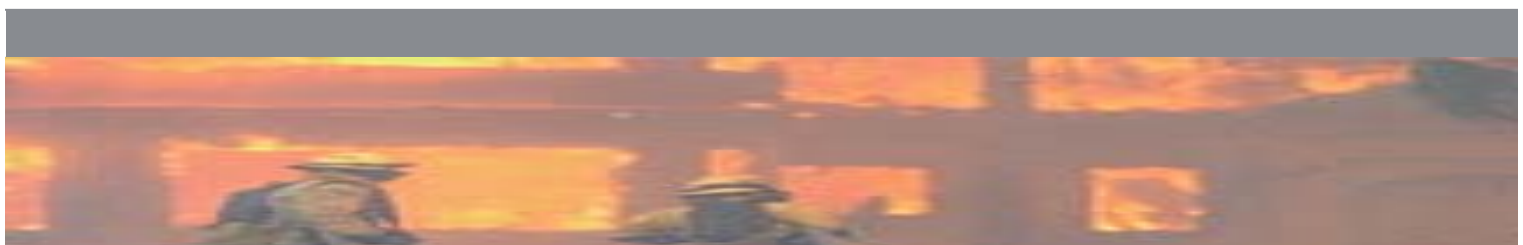
As we can see in the table below, there is a strong division among products classes according to some materials properties in order to guarantee a total absence of flash-over if a fire would break out.

Non combustible or just a little combustible materials will be classified in A1, A2, B classes.

Combustible materials or increasing dangerous ones will appear in C, D, E classes.

These materials could stoke the fire broke out causing a "flash-over" case.

Euroclasses F products will not be evaluated because they are not fire-proof.



New European regulations consider two other important standards in order to guarantee security:

1. when a fire breaks out, about 2/3 of people die because of smoke emanation that can hamper the escape.

According to the regulation, the smoke classification is about smoke quantity and smoke speed of emission from a material while it is burning.

We have 3 different classes:

- **s1** limited smoke emission
- **s2** slight smoke emission
- **s3** heavy smoke emission

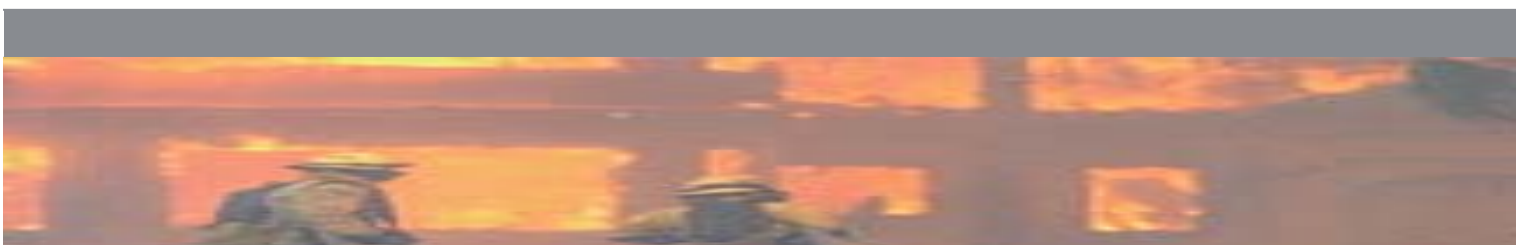
2. there could be presence of drip or red-hot particles developing in other areas.

We have 3 different classes:

- **d0** absence of burning drops
- **d1** a few burning drops and/or red-hot particles
- **d2** a lot of burning drops and/or red-hot particles.

The following table shows the classification concerning smoke emission that is applicable to some, not all, Euroclasses.

EUROCLASSES	A1	A2	B	C	D	E	F
Opacity smoke standard							
Drip standard							



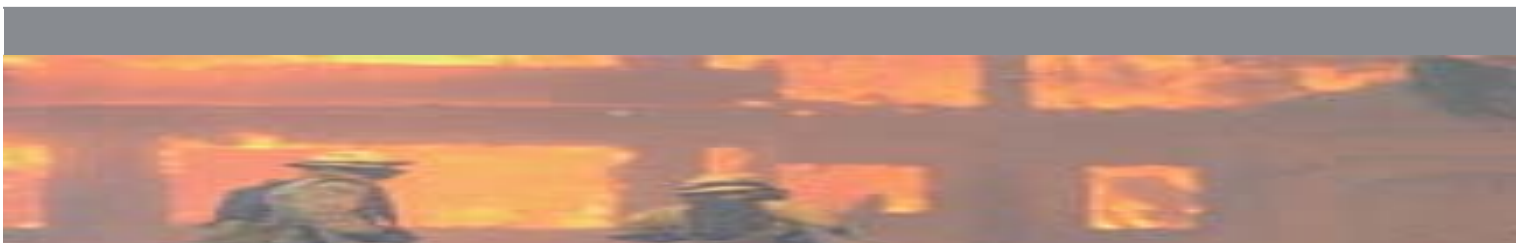


According to the European regulation UNI EN 13501-1 requisites, the structural reinforcement Ruredil X Mesh Gold has been tested and classified by Girdano Institute.

The result is:

CLASSIFICATION OF FIRE REACTION: B - s1, d0

B	no smoking
s1	limited smoke emission
d0	absence of burning drops/ red-hot particles





Ruredil X Mesh Gold

GIORDANO INSTITUTE CERTIFICATION REPORT





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Registro Imprese di Rimini n. 00 549 540 409
Organismo Europeo notificato n. 0407
Accreditamenti: SINCERT (057A e 082B) - SIT (20)

RICONOSCIMENTI UFFICIALI MINISTERI ITALIANI:

- Legge 1066/71 con D.M. 27/11/82 n. 22913 "Prove sui materiali da costruzione".
- D.M. 09/11/89 "Certificazione CE per le unità da dipinto".
- D.M. 04/09/84 "Certificazione CEE sulle macchine".
- Notifica n. 757890 del 15/12/88 "Certificazione CEE per gli apparecchi a gas".
- D.M. 08/07/93 "Certificazione CEE in materia di recipienti semplici a pressione".
- D.M. 08/07/93 "Certificazione CEE concernente la sicurezza dei giocattoli".
- Incarichi di verifica della sicurezza e conformità dei prodotti nell'ambito della sorveglianza sul mercato e tutela del consumatore.
- D.M. 02/04/98 "Rilascio di attestazioni di conformità delle caratteristiche e prestazioni energetiche dei componenti degli edifici e degli impianti".
- Legge 818/84 e D.M. 26/03/85 con autorizzazione del 21/03/86 "Prove di reazione al fuoco secondo D.M. 26/06/84".
- Legge 818/84 e D.M. 26/03/85 con autorizzazione del 10/07/86 "Prove di resistenza al fuoco secondo Circolare n. 91 del 14/09/81".
- Legge 818/84 e D.M. 26/03/85 con autorizzazione del 03/07/92 "Prove di resistenza al fuoco secondo Circolare n. 7 del 02/04/91 norma CNVVF/CGI UNI 9723".
- Legge 818/84 e D.M. 26/03/85 con autorizzazione del 12/04/88 "Prove su estintori d'incendio portatili secondo D.M. 20/12/82".
- Legge 46/82 con D.M. 09/10/85 "Immissione nell'albo dei laboratori autorizzati a svolgere ricerche di carattere applicativo a favore delle piccole e medie industrie".
- Protocollo n. 116 del 27/03/87 "Iscrizione allo Schedario Anagrafe Nazionale delle ricerche con codice N. E049079Y".
- Decreto 24/05/02 "Certificazione CE di rispondenza della conformità delle attrezzature a pressione".
- Decreto 14/02/02 "Certificazione CE di conformità in materia di emissione acustica ambientale per macchine e attrezzature".
- Decreto 05/02/03 "Esecuzione delle procedure di valutazione della conformità dell'equipaggiamento marittimo".
- G.U. R.L. n. 236 del 07/10/04 "Certificazione CE sugli ascensori".
- Notifica per le attività di attestazione della conformità alle norme armonizzate della Direttiva 89/106 sui prodotti da costruzione.

ENTI TERZI:

- SINCERT: Accreditamenti n. 057A del 19/12/00 "Organismo di certificazione di sistemi di gestione per la qualità" e n. 062B del 12/04/06 "Organismo di certificazione di prodotto".
- SIT: Centro multisede n. 20 (Bellaria - Pomesio) per grandezze termometriche ed elettriche.
- ICIM: "Prove di laboratorio nell'ambito degli schemi di Certificazione di Prodotto".
- IMQ: "Prove di laboratorio nell'ambito degli schemi di Certificazione di Prodotto per carne fumata".
- UNCSAAL: Riconoscimento del 26/03/85 "Laboratorio per le prove di certificazione UNCSAAL su serramenti e facciate continue".
- IMQ-UNI: "Prove di laboratorio nell'ambito degli schemi di Certificazione di Prodotto per termocammetti a legna con fluido a circolazione forzata".
- CSI-UNI: "Prove di laboratorio in ambito degli schemi di Certificazione di Prodotto per serramenti esterni".
- KEYMARK per isolanti termici: "Misure di conduttività termica per materiali isolanti".
- IFT: "Prove di laboratorio e sorveglianza in azienda nell'ambito degli schemi di Certificazione di Prodotto per porte, finestre, chiusure oscuranti (antifurto) e serramenti".
- EFSG: "Prove di laboratorio su casseroi e altri mezzi di cottura".
- AENOR: "Valutazione della conformità ai fini della marcatura CE per alcuni prodotti inerti alla direttiva prodotti da costruzione".
- VTT-Finlandia: "Valutazione della conformità ai fini della marcatura CE per alcuni prodotti inerti alla direttiva prodotti da costruzione".
- C.C.I.A.A. Rimini: 28/01/04 "Verifica periodica dell'affidabilità metrologica di strumenti metrici in materia di commercio".

PARTECIPAZIONI ASSOCIATIVE:

- AIA: Associazione Italiana di Acustica.
- AIAIR: Associazione Italiana Condizionamento dell'Aria Riscaldamento Refrigerazione.
- AICO: Associazione Italiana per la Qualità.
- AIPID: Associazione Italiana Prove non Distruttive.
- ALF: Associazione Laboratori Italiani Fuoco.
- ALPI: Associazione Laboratori di Prova Indipendenti.
- ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers Inc.
- ASTM: American Society for Testing and Materials.
- ATIG: Associazione Tecnica Italiana del Gas.
- CTE: Collegio dei Tecnici della Industrializzazione Edilizia.
- CCI: Comitato Termotecnico Italiano.
- EARMA: European Association of Research Managers and Administrators.
- EARTO: European Association of Research and Technology Organisation.
- EGOLF: European Group of Official Laboratories for Fire Testing.
- UNI: Ente Nazionale Italiano di Unificazione.

CLAUSOLE:

Il presente documento si riferisce solamente al campione o materiale sottoposto a prova.
Il presente documento non può essere riprodotto parzialmente, salvo approvazione scritta del laboratorio.

CLASSIFICATION REPORT No. 237540

Place and date of issue: Bellaria-Igea Marina - Italy, 11/03/2008

Customer: RUREDIL S.p.A. - Via B. Buozzi, 1 - 20097 SAN DONATO MILANESE (MI) - Italy

Order number and date: 39591, 19/12/2007

Purpose: Classification of reaction to fire of construction products in accordance with standard UNI EN 13501-1:2007

Sample origin: sampled and supplied by the Customer

Introduction

This classification report details the reaction to fire class assigned to the product called "RUREDIL × MESH GOLD".

Definition of classified product

The product RUREDIL × MESH GOLD is defined as a "flexural and shear structural reinforcement system for concrete".



Comp. AV
Revis. *AW*

This classification report consists of 4 sheets and the manufacturer's technical documentation.
This document is the English translation of the classification report No. 237540 of 11/03/2008 issued in Italian
Date of translation: 13/05/2008

Sheet
1 of 4



(Classification Report No. 237540 dated 11/03/2008)

sheet 2 of 4 follows

ISTITUTO
GIORDANO**Description of classified product**

	Characteristic	Declared by Customer	Recorded by laboratory
Product	Material type and composition	Structural reinforcement system comprising PBO-fibre mesh and stabilised inorganic matrix	//
	Thickness	//	approx. 3 mm.
	Mass per unit area	//	2,7 kg/m ²
	Colour	//	grey
	PBO-fibre mesh (Ruredil × Mesh Gold)	126 g/m ²	//
	Inorganic matrix (Ruredil × Mesh M750)	specific weight of fresh mortar 1,5 g/cc	//

Description of substrate used and type of fixing

	Characteristic	Declared by Customer	Recorded by laboratory
Substrate	Type	fibre-cement sheet	fibre-cement sheet
	Density	//	1800 kg/m ³
	Thickness	//	6 mm
	Type of fixing:	applied on-site	applied on-site

Normative references

Classification was determined in accordance with the requirements of standard UNI EN 13501-1:2007 dated 05/07/2007 "Classificazione al fuoco dei prodotti e degli elementi da costruzione - Parte 1: Classificazione in base ai risultati delle prove di reazione al fuoco" ("Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire tests").



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Test reports and results to support classification

Test reports

Laboratory name	Customer name	Test Report No.	Test method
Istituto Giordano S.p.A.	RUREDIL S.p.A.	237539	UNI EN 13823: 2005
Istituto Giordano S.p.A.	RUREDIL S.p.A.	237538	UNI EN ISO 11925-2: 2005

Test results to support classification

Test method	Product	No. tests	Parameters	Results	
				Continuous parameter average	Compliance parameter
UNI EN ISO 11925-2 Surface attack with exposure 15/30 s	RUREDIL × MESH GOLD	6	Fs ≤ 150 mm	(-)	Yes
			Ignition of filter paper	(-)	Yes
UNI EN 13823	RUREDIL × MESH GOLD	3	FIGRA _{0,2MJ} (W/s)	16,072	(-)
			FIGRA _{0,4MJ} (W/s)	15,421	(-)
			LFS	(-)	Yes
			THR _{600s} (MJ)	1,866	(-)
			SMOGRA (m ² /s ²)	0,750	(-)
			TSP _{600s} (m ²)	34,119	(-)
Flaming droplets/particles	(-)	Yes			

(-) not applicable

Classification and field of application

Classification reference

This classification is assigned in accordance with standard UNI EN 13501-1:2007.





Classification

The product known as "RUREDIL × MESH GOLD" in relation to its reaction to fire behaviour is classified: **B**

The additional classification in relation to smoke production is: **s1**

The additional classification in relation to flaming droplets/particles is: **d0**

Therefore, the final reaction to fire classification of the construction product is:

Reaction to fire classification: B - s1, d0

Field of application

This classification is valid for the following product parameters:

- thickness: 3 mm;
- mass per unit area: 2,7 kg/m²;
- colour: grey.

This classification is valid for the following end-use conditions:

- type of substrate: material class A2 or A1, density ≥ 1800 kg/m³ and thickness ≥ 6 mm;
- type/s of fixing: applied on-site.

Limitations

This classification report is valid so long as product composition and structure remain unaltered.

This classification report does not represent type approval or certification of the product.

Test Technician
(Dott. Gian Luigi Baffoni)

Manager, Reaction to Fire
Laboratory
(Dott. Gian Luigi Baffoni)

Chairman or
Managing Director
Dott. Ing. Vincenzo Iommi

