

Presentation programme



- 1- Ebo Systems: 40 years in GRP transformation
- 2- Introduction to GRP
- 3- GRP in the Oil & Gas Sector
- 4- Ebo Systems UL Ladders & K² cable trays series
- 5- Benefit of Ebo Systems GRP solutions and expertise
- 6- Ebo Systems expertise and references
- 7- Conclusions

Our experience...

(*) = glass reinforced polyester



... 40 years in GRP (*)



Founded in 1959 in Adliswil / Switzerland

1972 : new production facility in Villers-La-Montagne

1980 : introduction of the pultrusion technique

1986 : new self-extinguishing composition (halogen free with low smoke and fume properties)

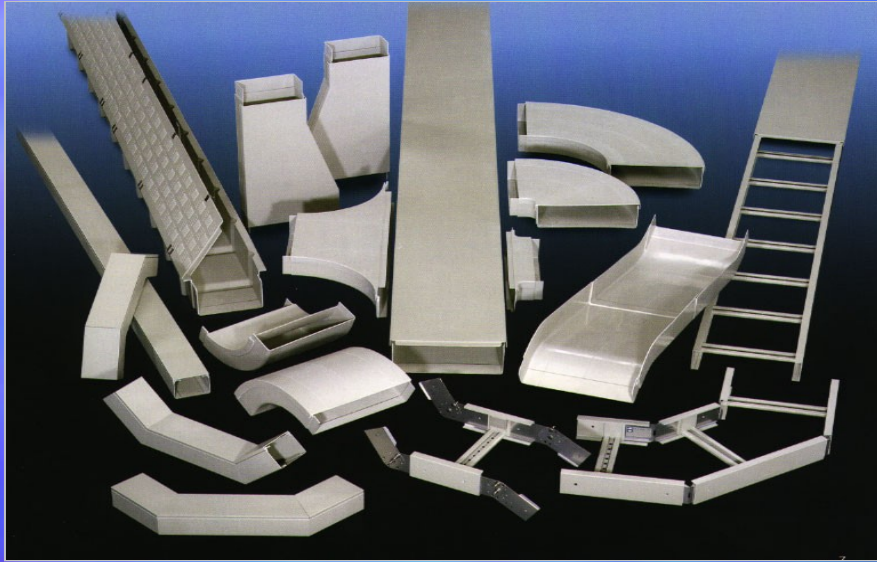
ISO 9001 registered since 1994

1998 : commitment to the ISO 14001 certificate



Today Ebo Systems has the most complete range in Europe and is one of the world leaders in this field of work.

Our products...

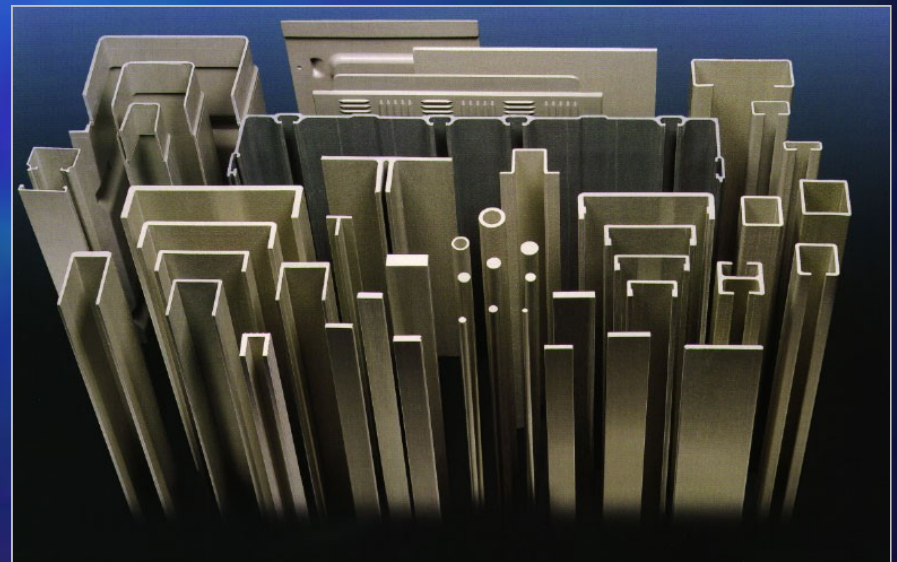


... a complete GRP system



- Special profiles for the construction of gratings, light structures, hand rails, stairs, ladders and safety cages...

- Cable trays, cable ladders, ground ducts, accessories and fittings, fixing and supports.



Introduction to GRP and Composite Materials ?

Mechanical resistance

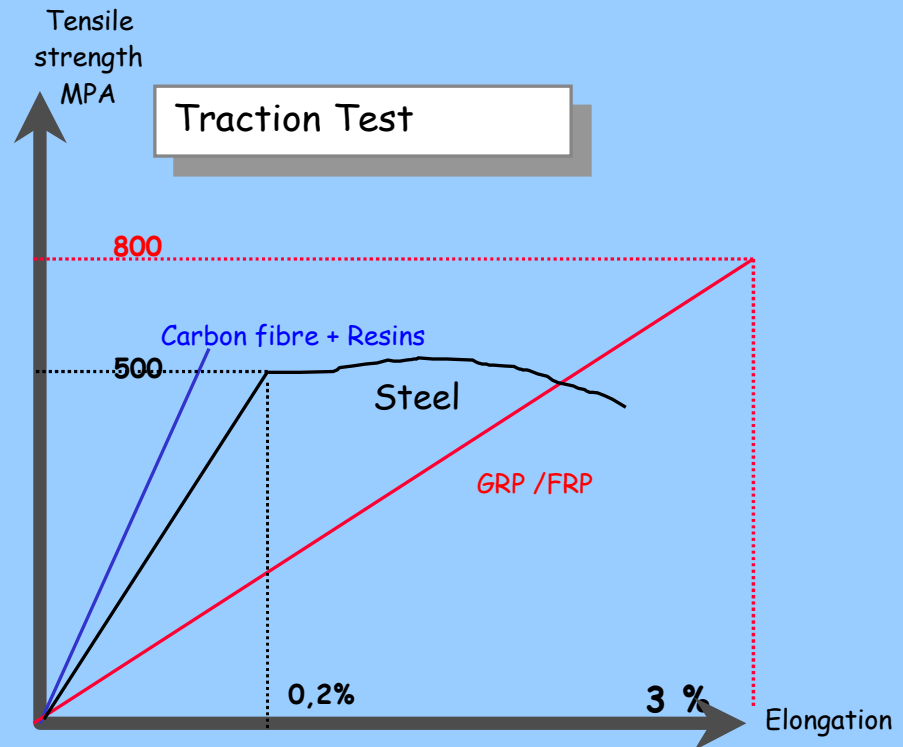
The mechanical resistance is mainly governed by the type of reinforcing fibres and the fibre content.

One should note that, due to the inherent properties of the fibres, GRP is usually **not as stiff as steel** but it can demonstrate a **higher breaking strength** as shown on the diagram.

The *strength to weigh* ratio is usually in favour of composite compared to traditional material :

Steel S/W ~ 60

GRP S/W ~ 140



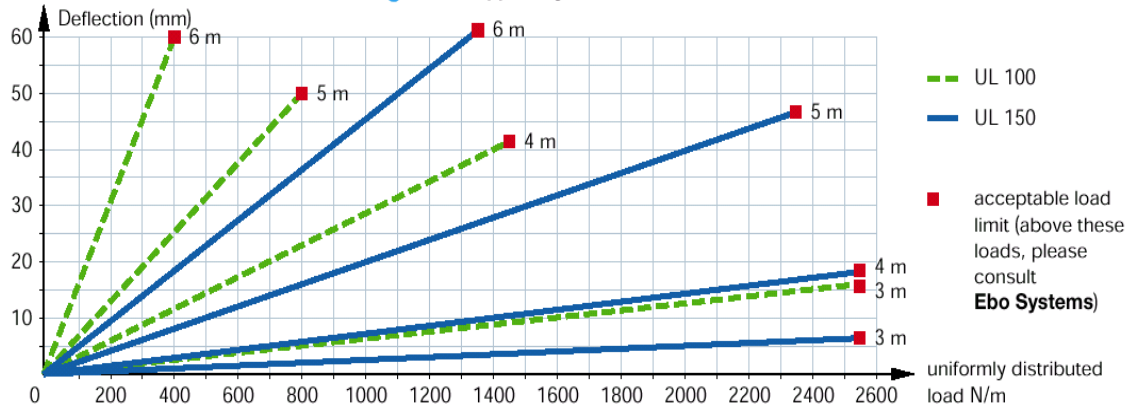
Outstanding mechanical resistance and light weight

Introduction to GRP and Composite Materials ?



For heavy loads of cables, the Ebo Ladder system is securing the strength you require with ladders up to NEMA 20C rating

Series UL100 and UL150 load diagram : supporting distances from 3 to 6 m



Remarks :

Above $f_{l1} = 1/200^{ème}$, one can clearly see mechanical distortion of the product.

All our cable ladders are tested in accordance with the project of international norm CEI 61537, at an ambient temperature of 25° C, and in accordance with our installation instructions.

Introduction to GRP and Composite Materials ?

Corrosion resistance & reaction to fire

The corrosion resistance as well as the fire behaviour are directly link to the matrix.

Corrosion resistance

By **matrix** it is meant **resin and additives** which can be chosen to match the project requirements.

Among the **most common resin** we can mention the **Polyester**, the **Acrylic** and the **Vinylester** resins.

Fire reaction

Fire reaction is a characteristic that is governed by the type of additives poured into the resin system.

The fire behaviour of a material can be characterised by the following factors:

◆ The **flammability** of the material.

This term relates to the ability of the material to ignite and propagate the fire.

◆ The **toxicity & the darkness of the smoke** released in case of a fire.

Halogen free products do not contain significant toxic or harmful elements.

◆ The **thermal conductivity**.

It indicates how easily the product will spread the heat and the fire.

Introduction to GRP and Composite Materials ?

Reaction to fire

So far, two major approaches have been found to produce fire retardant GRP:

By using halogens (mainly chlorine and / bromine)

The oxygen on the surface of the product is quickly captured by the halogen preventing the combustion from growing.

The major **disadvantage is the release of dark, toxic and corrosive smoke** which is a great hazard for **human safety**. Additionally, **metallic parts and electric / electronic equipment** even not directly exposed to the fire might still be destroyed by the corrosive HCL gas which is occurring during the combustion.

By using mineral fillers such as Alumina Tri Hydrate ATH.

During the combustion, the **ATH will absorb energy** from the fire and will **release meanwhile H₂O** which will have a cooling effect at the surface of the product.

Adding mineral fillers will slightly reduce the corrosion resistance as well as the mechanical properties



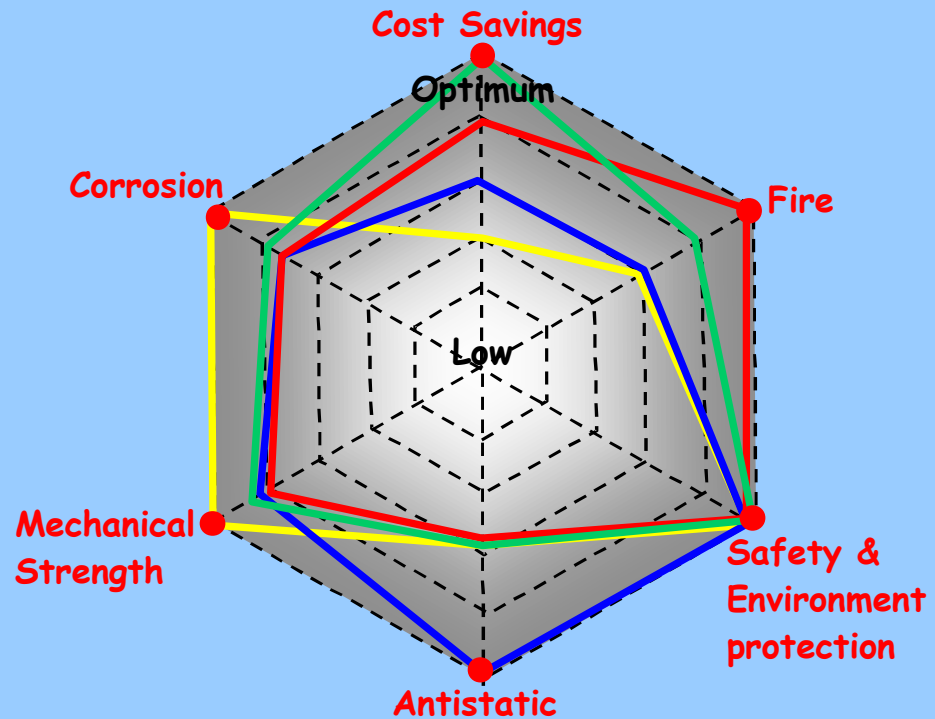
Introduction to GRP and Composite Materials ?

Key factors for the choice of the right composite material

GRP materials can be specifically designed to meet specific criteria and a wide range of GRP products can be derived from it. Nevertheless, all the properties can not be maximised at once and one should make the optimum compromise according to its environment :

- desired mechanical strength and load
- bearing capacity
- degree of corrosion encountered and service life expectancy
- risk of fire exposure
- human safety concern and environmental awareness
- Capital investment & savings
- Anti-static property in case of high explosion risks for dry areas.

Polyester Resin	—
Acrylic Resin	—
Vinylester Resin	—
Highly Antistatic Resin	—



Why is GRP increasingly used in the Oils & Gas industry ?

- A growing number of applications :

Pipes, tanks, risers, anchors, lifeboats, gratings, handrails, electrical junction boxes, cabinets, cable management, ground ducts, support materials...uses GRP...

=

- **Greatest corrosion resistance** with less maintenance.
(no pitting or stress corrosion, no electrolytic corrosion when in contact with other materials),

Why is GRP increasingly used in the Oils & Gas industry ?

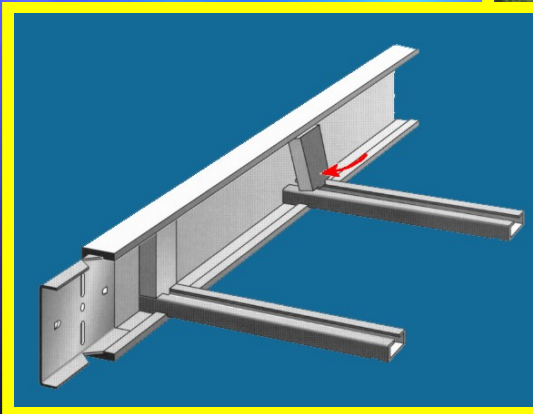
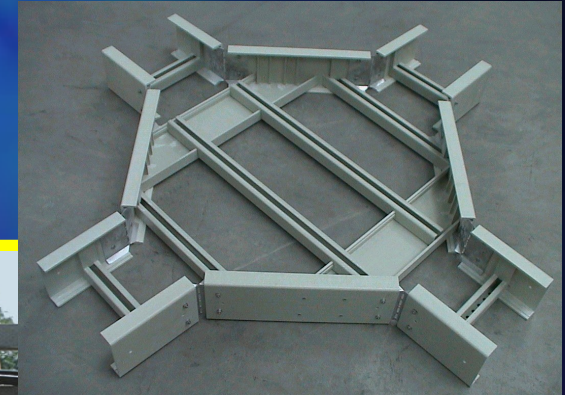


GRP cuts down corrosion costs and improves the "Life Cycle Cost"
(acquisition, installation, maintenance & replacement)

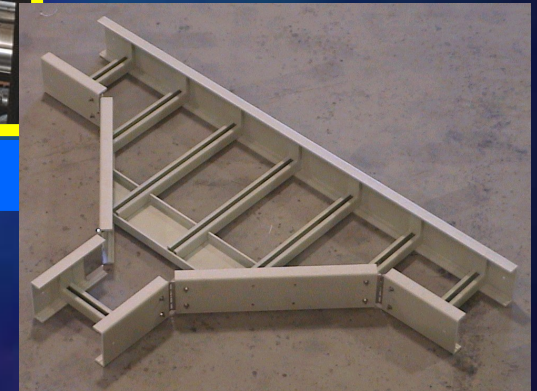
Cable ladders -UL series for your "Heavy Duty applications"

↪ Adapted products to 6 m supporting distances

↪ Available in 4 heights : 53, 80, 100 and 150 mm



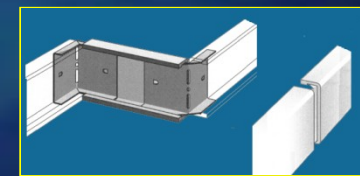
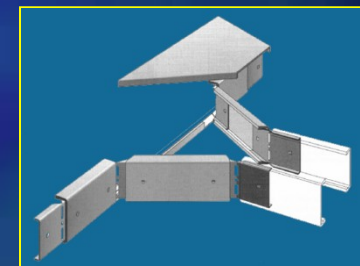
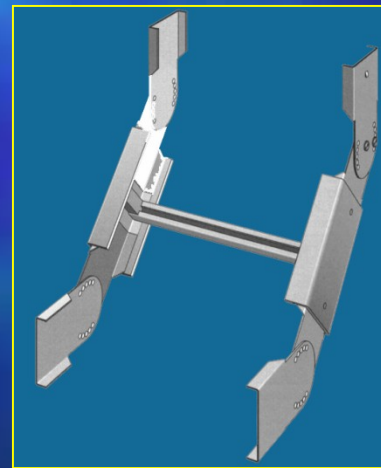
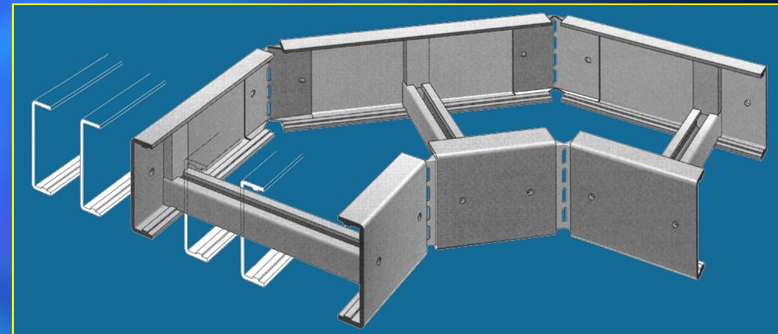
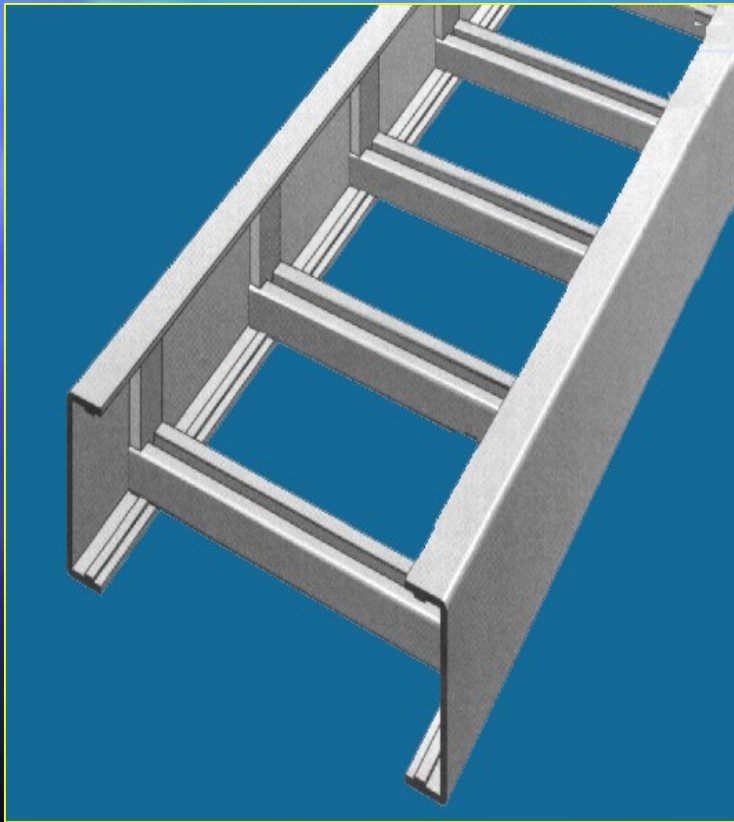
↪ Robust fittings for heavy loads



↪ on site mounting due to a clip-in and patented rung system

Cable ladders -UL series for your "Heavy Duty applications"

↪ a wide range of accessories to facilitate the implementation

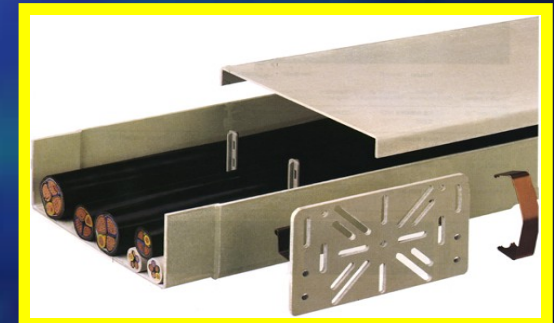
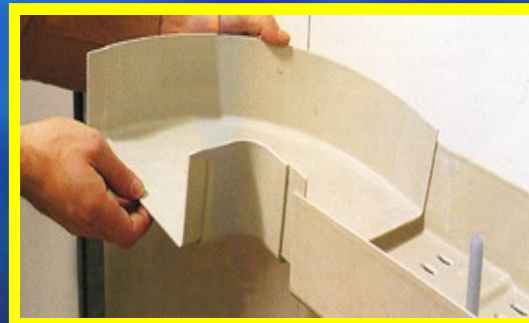
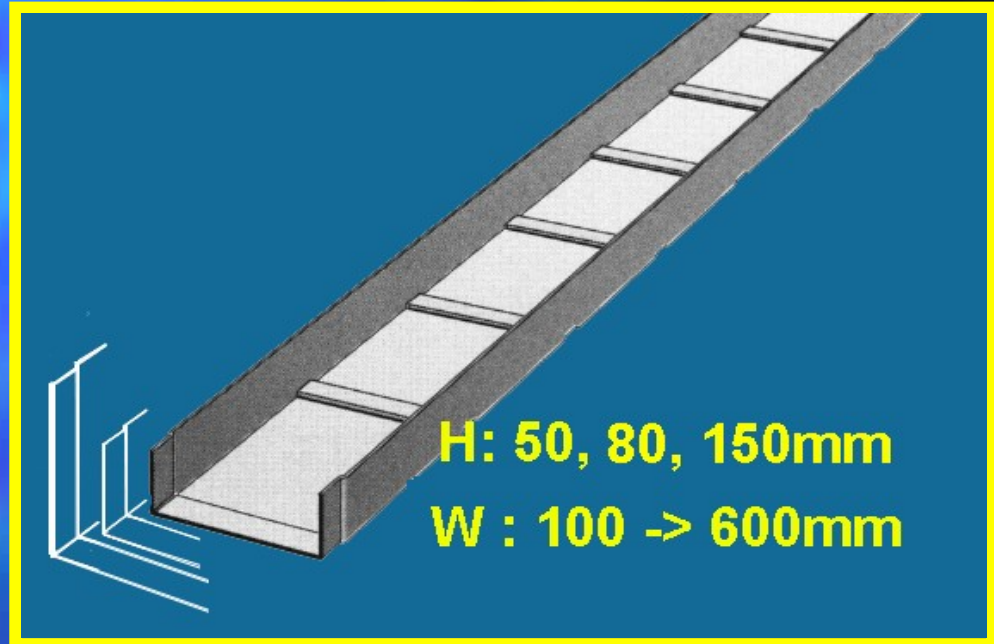


Cable trays -K2 series : a smart system

↪ **16 dimensions** in cable trays to adapt to your constraints

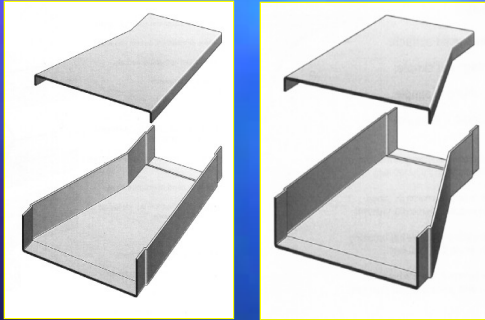
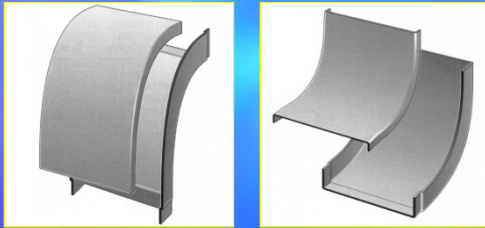
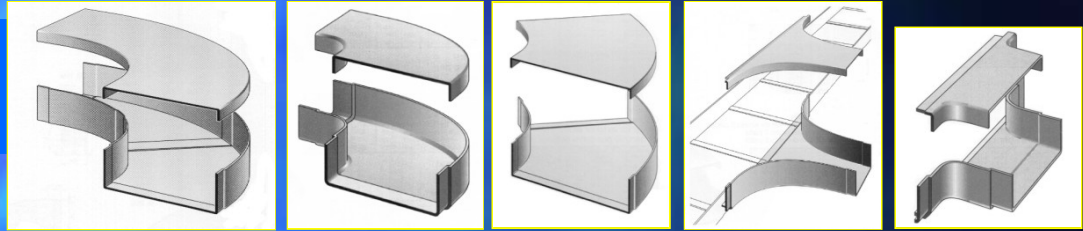
↪ **3 heights** available (50, 80, 110mm)

↪ an exceptionally **fast installation** due to interlocking spigot

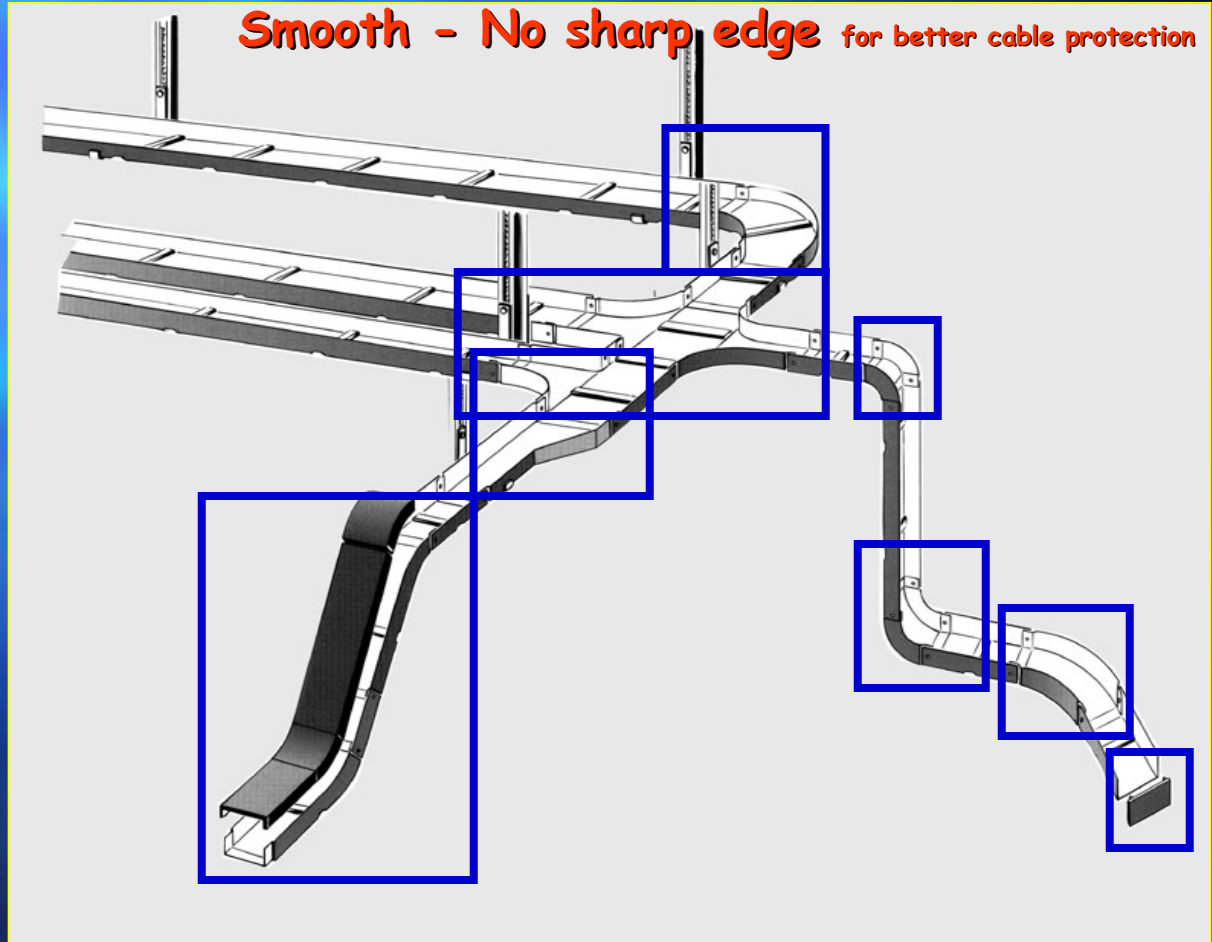


Cable trays -K2 series : a smart system

↪ accessories which allow for limitless configurations



Smooth - No sharp edge for better cable protection



Cable trays -K2 series : a smart system

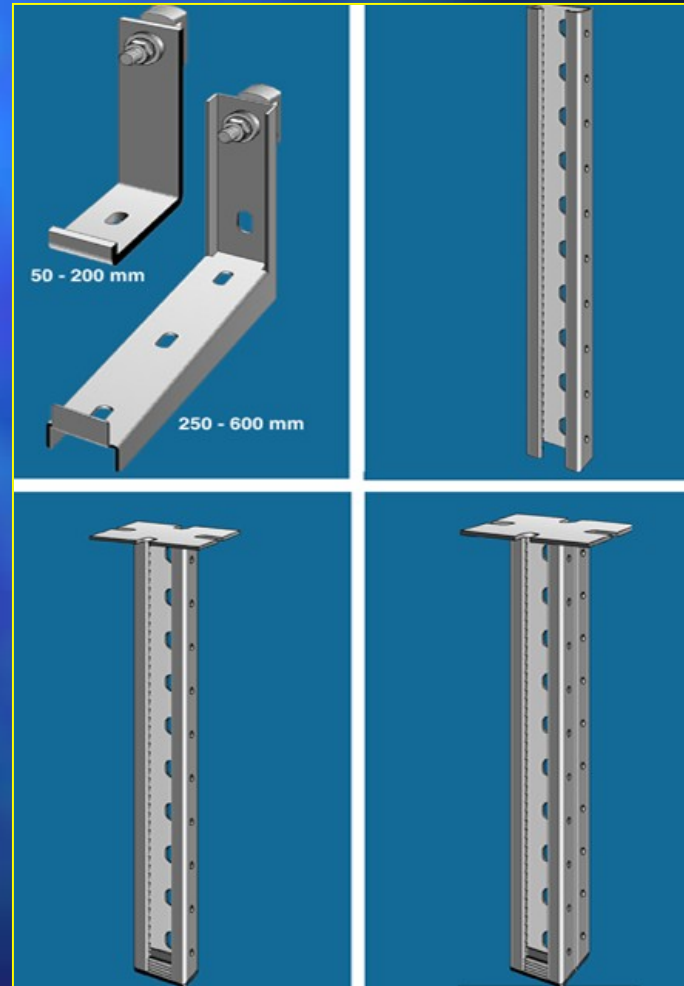
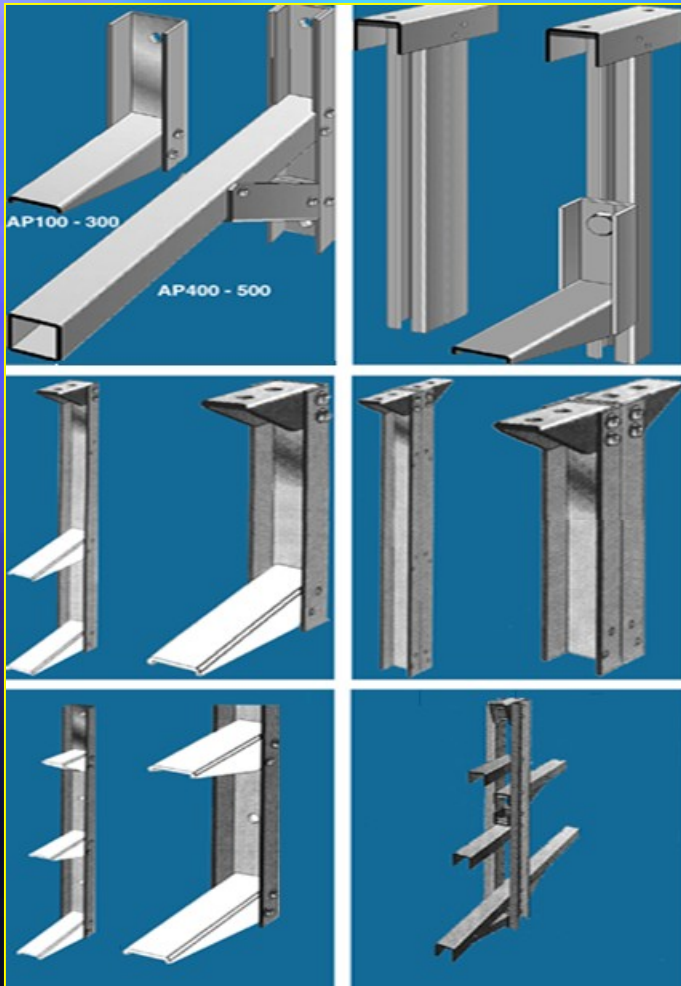
*A system which resists
U.V. aggressions...*



Fixing and supports...

... in GRP

... or in stainless steel



Benefits of Ebo Systems GRP cable management system

1- Material advantages

Fire

- Ebo GRP offers a much lower thermal conductivity refraining the fire from spreading. It is 100 less conductive than aluminium, it is self-extinguishing and 0% halogens.

Weight

- Ebo GRP allows weight saving compared to steel systems

Time saving

- Ebo GRP is easier to cut, quick to drill with no heat work permit
- Post treatment after cutting, and corrosion insulators are not required

Maintenance

- Ebo GRP is maintenance free and thus will optimise the Life Cycle Cost of your installation



Ebo Systems expertise through references



1999 Total South Pars	Abu-Dhabi UAE	Cable trays & supports	5.000m
1999 Total Tunu phase 7	Indonesia	Instrument cable trays	8.000m
1999 Sedco-Forex Energy	Brest	Hand rails	2000m
& Secdco-Forex Express	Brest	Ladders + safety cages	300m
& Sedco Forex Cajun	Singapore	Gratings	150m ²
1999 Westesrn pipeline	Baku	Cable trays & supports	500m
1998 ADMA OPCO Zakum gas	Abu Dhabi	Cable trays & supports	210m
1995 AGIP Raffinazione	S. Navarro	Cable trays & supports	150m
1994 DEA	North Sea	Cable trays & supports	1.000m
1992 LIQUIPIBIGAS	Livorno	Cable trays & supports	3.000m
1992 ZADCO	Abu-Dhabi	Cable trays & supports	6.000m
1991 ZADCO	Abu-Dhabi	Cable trays & supports	4.000m
1991 AGIP Raffinazione	S.Nazzaro	Cable trays & supports	630m
1990 Total ABK	Abu-Dhabi	Cable trays & supports	6.000m
1989 AGIP Raffinazione	Porto Marghera	Cable trays & supports	6.000m
1987 Total Hydra	Argentina	Cable trays & supports	1.000m
1987 Total	Cameroun	Cable trays & supports	9.000m
1986 Sarpom	Trecate	Cable trays & supports	300m
1986 Deutsche Texaco	North Sea	Cable trays & supports	300m
1984 ADNOC	Abu Dhabi	Cable trays & supports	3.000m
1984 KOC	Kuwait	Cable trays & supports	15.000m
1983 ELF	Gabon	Cable trays & supports	600m
1982 BP / Total Zakuum	Abu-Dhabi	Cable trays & supports	70.000m
1979 BP Sullom Voe	Shetland Island	Cable trays & supports	5.000m

Ebo Systems expertise through customer' recommendations



Yusif Najafov

Coordinator, Supplier Registration



BP Exploration (Caspian Sea) Limited
Villa Petrolia
2 Neftchilar Prospekti
Baku, Azerbaijan

Switchboard: (994 12) 978000
Central Fax: (994 12) 978602

29 December 2000

Ebo Systems SAS
Attention: Pascal Muller
Boulevard d'Europe
BP 10
67211 Obernai Cedex
France

Direct tel: 979578
Direct fax: 979653
najafovs@bp.com
www.bp.com

Dear Mr. Muller,

Information Update

Following your request we checked our records on your company.

Your company has been registered in our vendor system in October 1998 for supply of 'other electrical equipment and materials', 'cable products', 'steel, metal & non-metal materials', and other similar products.

Please note that this confirmation does not imply any special approval status or guarantee that a supplier/contractor is included on any tender list for the supply or provision of goods or services, but merely serves to record your business interests, experience and contact details which we will review on a case-by-case basis for future requirements.

Yours faithfully,

Yusif Najafov

Registered in England and Wales: No. 404247

Registered Office: Britannic House, 1 Finsbury
Circus, London EC2M 7BA, United Kingdom

GRP cable trays success story: 20 years of good services and more to come...



HOW AND WHY EBO GRP CABLE TRAYS SELECTED IN 1979

To build one of the largest oil terminals in Europe on the same latitude as St Petersburg is a formidable task. When it became apparent in 1979 that Shetland was the nearest land area to the North Sea oil discoveries, Sullom Voe was the choice to bring the oil ashore.

On the jetties which, in addition to power instrumentation, control and communication cables, also required navigation lights, it was obvious that a trunking to support the cables was necessary. High winter and strong winds (causing low temperatures) ruled out the use of metal or PVC trunking - the former corroding from salt-water, the latter becoming brittle in the cold. Natural conditions in Shetland are heavily salt-laden and humid.

Ebo Systems GRP was selected against traditional cable trays for its obvious life cycle costs advantages.

info@ebo-systems.com
www.ebo-systems.com
Tel +33 (0)3 88 49 50 61
Fax +33 (0)3 88 49 50 14

CUSTOMER FEEDBACK AFTER 20 YEARS

From: ebo systems
Sent: 16 October 1998
To: Mr Manson (BP Sullom Voe)
Subject: Your cable management systems

Dear Mr Manson,
... and we have supplied you in the 70's a large quantity of these trays to equip your Sullom Voe oil terminal. At this stage we would appreciate very much your expertise to comment on our material's behaviour in the Shetlands environment...
Best Regards,
P. Muller, Key Account MGR

From: Manson, Neil A
To: ebo systems
Subject: RE: Your cable management systems
Date: Thu, 12 Nov 1998



Dear Mr Muller,
As you rightly point out we have had a large quantity of your cable management systems on site, specifically on our jetties, our harshest environment for 20 years, we have had minimal problems during this period. I would have no hesitation in recommending this system for similar applications...

Regards
Neil

Ebo Systems expertise through customer' recommendations



HMM-UFCU ABUDHABI/UAE Fax:00971-2-6064888 17 Jan '01 16:01 P.01

Abu Dhabi Marine Operating Company (ADMA-OPCO)
P.O.Box 303, Abu Dhabi, United Arab Emirates
Telephone (9712) 6060000, Fax (9712) 6266005, Telex 22284 ADMA EM



Facsimile Transmission Sheet

Total Number of Pages (Including this sheet):	01	Our Ref. :	G/F/JAN/074 /#GEN.
		Your Ref.:	

To:

Fax No. : 6449350
Country : Abu Dhabi, U.A.E
Name :

Title : General Manager
Telephone : 6449921
Company : Int'l French Arabian Trading (INFRAAT)
C.C. : Fax No. 6658761,
Ebo Systems M.E., Abu Dhabi
: Fax No. 0033388495014,
Ebo Systems, France
Vendor # : NEW

From:

Fax No. : 606 4261 / 606 4887
Name : Munir Bou Kamel
Title : Senior Planning & Information Co-ordinator
Telephone : 6064825
Div./Dept. : Commercial Division/P&IU
Date : 17 JAN 2001

Internal Dist. : EM, HQIA & SP

Please indicate the Vendor No. in all your correspondence.

Subject: Prequalification of your Principal: Ebo TEHALIT, France Offered Products: Cable Trays	Authorisation
---	----------------------

Facsimile Message

With reference to meeting of Ebo Systems, Abu Dhabi Based Project Manager, Mr. Jacques Kraemer with our Registration & Prequalification Officer, today 17.1.2001, we are pleased to confirm to you that, your Principal is **approved to provide the products listed above**, and have already been included in our Approved Manufacturer's List.

Please note that this approval does not constitute an obligation to invite you to bid in any of ADMA-OPCO's future tenders.

Thank you for the interest you have shown in ADMA-OPCO.

Regards,

INFRAAT.SK (A)

17-01-2001 13:04

00971 2 6064888

93%

P.01



Nils-Oscar Ihlen
Engineering Manager

Azerbaijan International Operating
Company
Villa Petrolea
2, Nefchilar Prospekti
Baku, Azerbaijan
Telephones: (994 12) 979982
Facsimile: (994 12) 979462, 974480,
98-84-94, 98-93-14
e-Mail:
nihlen@aiocaz.com

03 September, 1998

Mr. Pascal Muller
Key Account Manager
Ebo Systems

Subject: AIOC - Cable Trays, Ladders Systems and Structures.

Dear Mr. Muller,

I refer to your letter dated 11.08.98 and confirm receipt of our Supplier/Contractor Registration form duly filled out by yourself.

We thank you for your effort and confirm also that your Company is registered in our Company Database.

Yours sincerely,

Nils-Oscar Ihlen
Engineering Manager

Ebo Systems expertise through customer' recommendations



TOTALFINA

Paris, la Défense,
le 5/10/1999

Subject : CERTIFICATE OF TECHNICAL CAPABILITY

Tour Total
24, cours Michelet
92069 Paris La Défense Cedex
Tél : (33) 1 41 35 40 00

TOTAL FINA S.A.
Siège Social :
24, cours Michelet
92069 Paris
542 051 180 RCS Nanterre
Capital Social :
3 443 739 700 euros

We certify to whom it may concern that the company Ebo-Systems S. A. S. based in Villiers la Montagne France (54920), performed satisfactorily in the areas of sales, delivery dates and technical assistance with respect to supply of the products listed below.

We mention too that we have been satisfied with the good performance of their products through the years.

Date of supply
1990 on TOTAL/ ABK platforms
(U. A. E)

Product
GRP cable trays and ladders

P LEROUX
TOTAL EXPLORATION PRODUCTION
HEAD OF ELECTRICAL ENGINEERING



Transocean SedcoForex Engineering

PO box 599, 50 av. Jean Jaures 92542 Montrouge Cedex France
Email: titreville@montrouge.sedco-forex.slb.com

URGENT FOR YOUR REVIEW REPLY ASAP PLEASE COMMENT REF: 0001121201

TO: EBO Systems Mr P.Muller
CC:

DATE: 28/02/2001

FROM: Bernard Titreville

NO. OF PAGES: 1

Subject: CERTIFICATE OF TECHNICAL CAPABILITY

We certify to whom it may concern that the company Ebo Systems SA based in Obernai (67211) France, performed satisfactorily in the areas of Quality and technicality , sales, delivery and technical assistance with respect to supply of the GRP Handrails & Gratings.

We mention that we have been satisfied with the good performance of their products.

Date of supply
2000 on Sedco Express deep water semi submersibles rigs

B. TITREVILLE
Head of machinery engineering section
At the construction of the SFX platforms

(33) 1 47 46 61 82 FAX (33) 1 47 46 69 12 OFFICE Mobile: 06 70 03 8689

Conclusion



Compared with Stainless Steel : Ebo Systems GRP / FRP is :

Lower weight (lower than 1 mm sheet metal)

Easier to cut and to drill with standard cutting tools (Diamond saw, carbide tipped drills)

Safer to work with. No dangerous burrs to cut hands or cables

Anti-corrosion treatment not necessary after cutting

Completely corrosion resistant. No rusting even when in contact with carbon steel or H₂S

Excellent cable protection against fire. Low thermal conductivity

Time saving : installation does not require earthing, may avoid heat work permit (hand tools)

Installation is quicker with less bolts (especially with the Ebo Systems K2 cable tray range)

Lower acquisition cost and lower Life Cycle Cost

(LCC : takes into account acquisition, installation, maintenance and replacements costs)

Conclusion



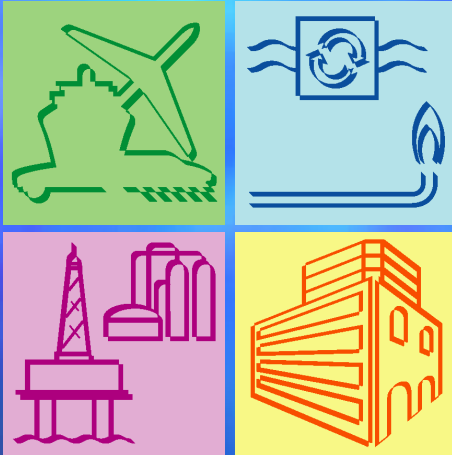
Compared with other GRP brand : Ebo Systems GRP / FRP is :

The world widest range with a complementary offer on both pultruded and press-moulded solutions with the advantage to use each process where it is the most appropriate

A manufacturing know-how acquired through more than 40 years of experience, assuring a real service in terms of products quality, certification, delivery service, after sales, and team qualifications

Only Zero halogens products. Halogens are the easiest but not the worst way of increasing the GRP fire behaviour

A significant base of international references and test certifications that assures future customer satisfaction



ebo

Your partner for the future

systems