

Subject : Technical / Economical Comparison Between Rigid Passive Fire Protections And Flexible Passive Fire Protections

TO Whom It May Concern

Dear Sirs,

The purpose of this letter is mainly to give the necessary elements for a correct selection of the best passive fire protection between flexible, rigid and semi rigid solutions available in the market.

Of course being our company manufacturer of the four under listed products. Our report is totally free of any type of interest towards one solution or another one

Salerno Passive Fire Protection Industry is manufacturer of:

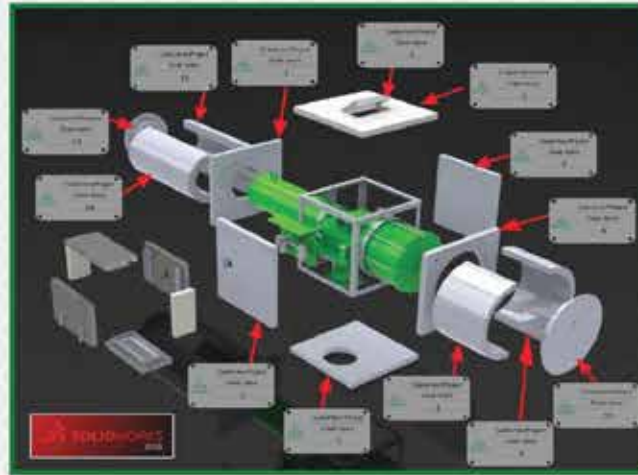
OGFlex	Flexible passive fire protections
OGShell	Rigid stainless steel fire protections
OGSemiShell	Semi-Rigid fire protections
OGEfties	Sound + Thermal + Fire Protection
OGRigiFlex	Semi-Rigid fire protections

And we are ready to come for a visit in order to better detail the difference of the product in order to assist you in proper selection.

In view of entering in a proper way is important to do a little backward when the only flexible protections available in the market where the components protections has to be added and sewn by the customer inserting the lancets and assembling each part of the protection.

The disassembling/reassembling phases difficulties are evident and then in case of maintenance to the actuators, or for normal control, the disassembled pieces remain on the floor specially because for assembly are needed needle/pliers/hacksaw and blade/tape/marker pens/snips/clamping ratchet and straps/scissors.....

These have been the main reasons for giving the preference to rigid protections respect the flexible in the past years !



Salerno PFP Industry has made treasure of these experience and different technologies and has studied developed and produced a flexible protection, fully certified, allowing to everybody the assembly and disassembly in a very easy and quick way by the use of special belts and buckles without any tools.

In fact the assembly is very easy and thanks to exploded drawings. All the components are numbered and these indicate the sequence for the installation.

Bilco Me has also developed a hybrid solution that is the semi-rigid protections and the technology has been directed toward two different applications.

The first is the construction of a stainless steel frame having same dimensions of a rigid box covered with Bilcoflex panels.

TOTAL



SAIPAM



The units may have almost all the accessories of a rigid box that are:





OGFlex, OGShell and OGSemiShell have same performance in case of hydrocarbon fire but, thanks to the belts and buckles solution, patented by Salerno PFP Industry, the performance goes toward the flexible.

Concerning the comparison between flexible Salerno PFP Industry and rigid OGShell PFP there's not much to say. The new OG Rigidflex is the right combination for reducing weight and costs but the arguments for the comparison are the followings:

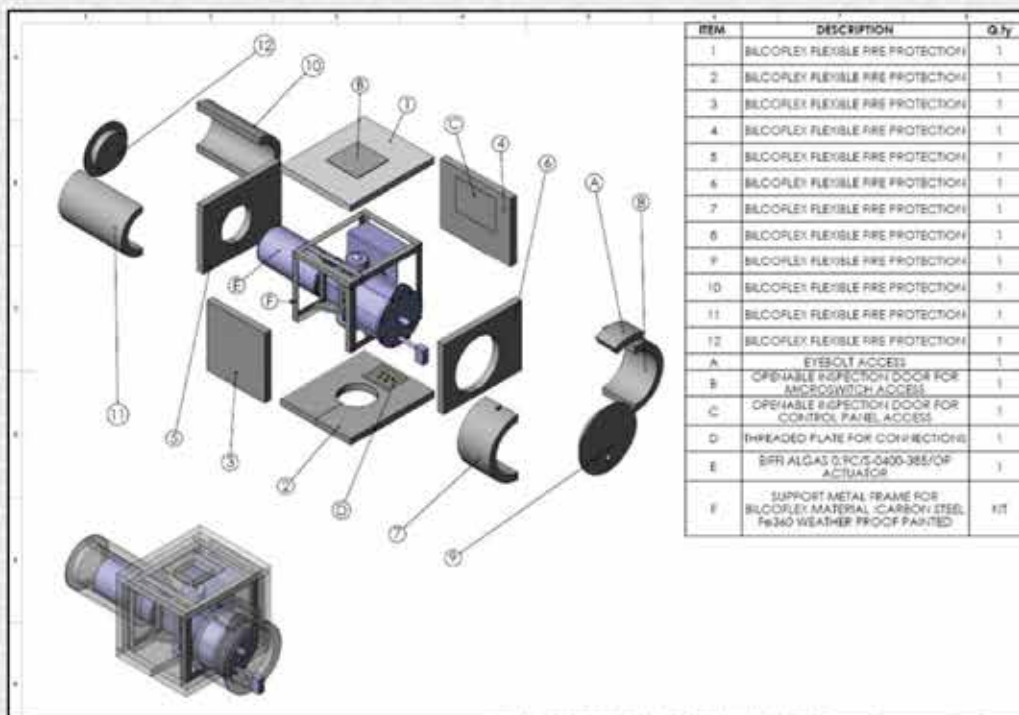
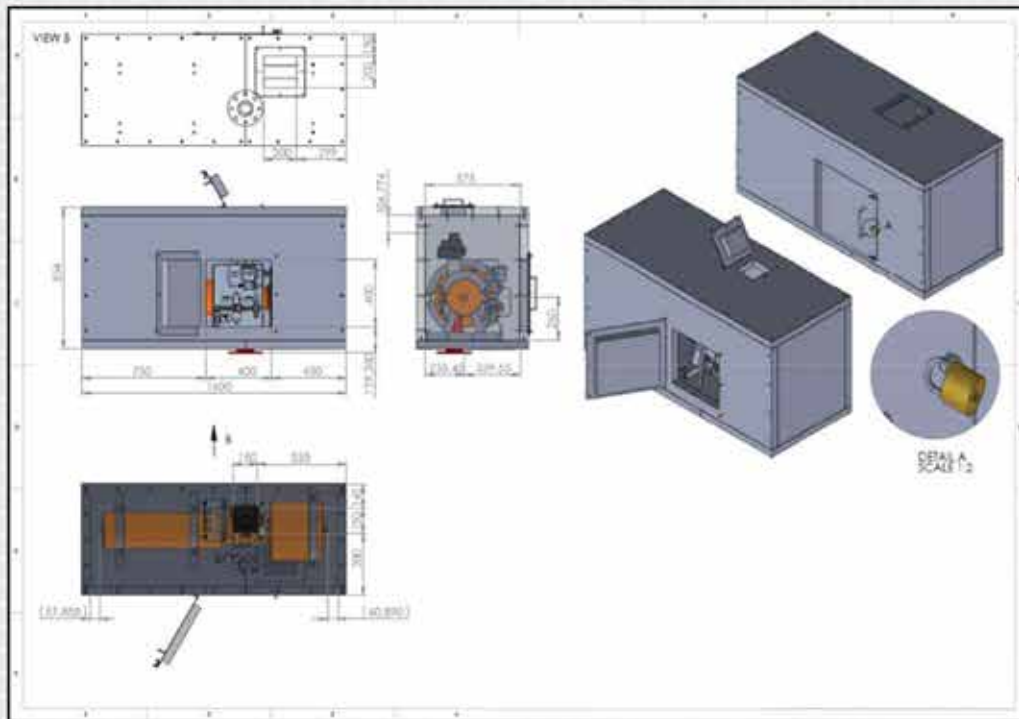
- Rigid protections are more expensive in respect to the flexible ones.
- Shipment costs and handlings are higher in respect to the flexible ones.
- The rigid elements need tools for assembly while no tools are needed for the flexible ones.
- Packing costs are higher in respect to the flexible ones for weight reasons and for the necessity to avoid scratches and slipping between the panels.
- It is more complicated the installation for weight reasons and for handling the components especially at high levels.
- In case something at site is different from the drawings the unit has to be replaced while the flexible may be modified at site.
- Thanks to the internal structure, to be installed over the units to be protected, supplied by Bilco Me with the panels, no supporting is needed from the bottom with no effect on the spool pieces.
- Rigid need space around, the flexible maybe installed even in narrow space and may be compressed up to 70% incase obstacles are present, without changing the fire protection value.

This cannot be done with the rigid.



In the picture is evidenced how is easily made the overlapping and opening maybe done wherever is necessary.

OGSHELL AND OGFLEX EXAMPLES





Normally the oil and gas plants must be built in accordance with API 2218 for the PFP, this means that electrical ducts, air pipes and air tanks has to be protected if are in the dangerous area the cost for doing all in rigid are terrific while with flexible (see document attached) is very simple and for the electrical ducts air circulation is also granted thanks to our certified grills.

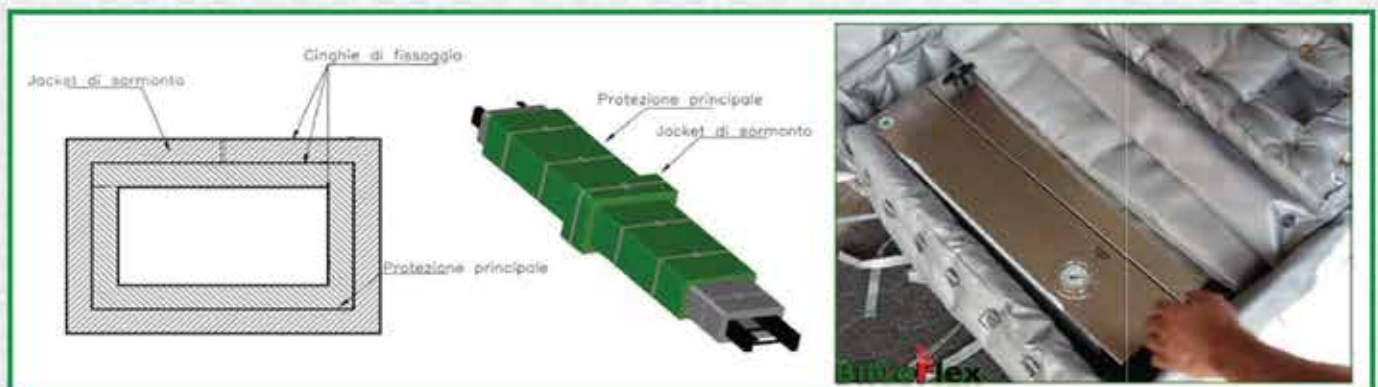
The cables and tray may be protected with our OGflex against hydrocarbon fire up to 120 minutes. The system supplied is able to provide fire coverage without damaging the cable in fact thickness and no toxic fiber density are selected to meet the temperature in the unexposed portion of coverage to less than 100°C, which is the tolerance temperature of PVC cable while butyl and other coverage have higher working temperature levels. The same protections built in a suitable way may be used even for blocking the fire entry in the closed area from outside creating a barrier to the fire penetration.



The supply may be in conformity either with UL 1709 or for jet fire as per ISO 22899-1 and a certificate issued by TUV SUD will certify this resistance whose test have been done at the presence of TUV SUD in accredited test laboratory.

The UL1709 are much more restrictive of the as per ASTM-E 119/UL1724 actually normally no more used but under request we may interface the values.

Thickness and composition will be determined by the specific **Salerno PFP Industry® software** elaborated only for our use. All our products are certified by TUV SUD.



المكتب الإيطالي للصناعة والتجارة في دولة الامارات العربية المتحدة



The proposed blankets don't need any further protections, as cladding or roofing, and are maintenance free and may be equipped also of glasses thermal resistant for inspection of control elements installed inside.

As conclusion we may take the example of BOROUGE refineries, initially it were used flexible protection with lancets and rigid protections, after with BOROUGE-2 it has been used our OGflex® protections and result is the following



Subject: our order for Antifire Protections for our project TECNIMONT – BOROUGE 2

Dear sirs,

It is our pleasure to confirm you our satisfaction for what supplied for our project above indicated.

We have had the possibility to appreciate, finally, a new system for the assembly.

Your way of components joining is really simple and everybody will be capable to assemble and disassemble even thanks to the professional documentation provided by you.

Hoping in a future new contact we please you to accept our best regards.


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DTY. PROJECT DIRECTOR



Based on previous experience the new project BOROUGE 3 indicate in the specification for the fire protections what follows.

 	INSTRUMENT SPECIFICATION FOR FIRE PROTECTION SYSTEM	CONTRACTOR IDENTIFICATION CODE 3583-KK-SE-P3000380	
	POLYOLEFINS UNIT BOROUGE 3 PROJECT – RUWAI, U.A.E.	Sheet 3 of 8	Rev N
 SAVING IN DESIGN - IN PLASTIC	Abu Dhabi Polymers Company Limited (Borouge) شركة أبو ظبي للبلاستيكية المحدودة (بروج)	BOROUGE IDENTIFICATION CODE P3-IE-573-000380	

1. SCOPE

Scope of this specification is to define the materials and the system suitable to fireproof the actuator of valves or actuator + valve as required.

Fireproofing is considered as a passive fire protection system providing temporary protection during a fire development and also to protect the equipment from damage caused by fire.

Accessories, actuators and valves shall be protected from fire by means of a protective enclosure.

2. FEATURES

Passive fire protection provides localized protection around critical equipment against the effects of fire and carries out two main functions in the event of fire : to prevent contacts of the operating equipment with fire and to guarantee its functionality maintaining their required operation for a time not less than 30 minutes.

The fireproof system shall have the following features :

- The system will protect the actuator or actuator + valve and related control system from hydrocarbons fire generation. Valves not to be fireproofed are certified fire-safe type by tests results and documented according to API-607 or other approved recommendations.
- The system has to provide continued functionality of valves for a minimum required period. The enclosure shall be rated for a minimum of 30 minutes fire ring of hydrocarbons (mainly propane & ethylene) without increasing internal temperature above the maximum allowable limit for the actuator and accessories (102C); as per Borouge specification BGS-IU-001, point 15 "Fire Proofing & Insulation".
- The system has to be lightweight, flexible and completely demountable : both for the initial installation and for the periodic dismantling and replacing of protective enclosures.

The enclosures have to be installed and fitted when the equipment and all its service have been fully installed without disturbing existing electrical or pneumatic connections, and suitable space must be request.

In addition, when disassembly and reassembly of the enclosures is required, it can be done without disconnection of cables, conduits and everything is connected to the actuator or valve.

The enclosures shall be provided with suitable windows for inspections, operations and maintenance to avoid the disassembling of the enclosure itself : for example as showed in the following picture.

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- The system must be strength with a good resistance to corrosion, vibration and mechanical shocks, maintaining its performances in fire protection during its life.
- The system have to be designed to fot close to the equipment to be protected, for instance to fit around obstacles which can be close to valves.
- Vendor will supply every kind of documentation and the list of all special tools and accessories that can be used for each installation of the fire protection device. Vendor will also give instructions for material storage in site.
- Vendor will submit to Tecnimont for approval all the relevant sketches showing how the enclosures fit around every actuator or actuator + valve and showing the service windows.
- The system has to be certified according to the BS476 Part 20 or equivalent, describing a procedure for laboratory test, to determinate the fire resistance of the construction elements, and must be fully tested for the mentioned use.

In addition, the hydrocarbons fire is defined in UL 1709, as for Borouge specification BGS-CU-012.

3. FIRE-PROTECTION REQUIREMENTS

The actuator or actuator + valve to be fireproofed are listed in the followings four tables in which the valves are divided for Area.

Here are specified the tag of the valve and the manufacturer and the dimension.

The maximum temperature permissible on every actuator inside the enclosure must be 102C during the fire and according to Borouge environmental conditions.

The type of fire that can be developed around the valves is generates by hydrocarbons (mainly propane & ethylene).



And then you may check that the pictures and specifications have been taken out from our main catalogue as demonstration of really what SAMSUNG, BOROUGE and TECHNIMONT want.

To do a proper comparison for your investment comparison in view also to have easy installation and maintenance.

With my best regards,

Thanks for the attention.



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