

ROAD SAFETY starts with planning





SYSTEM GROUP

- foundation date: 1979
- 20 Companies
- 15 production plants
- in 4 different nations
- specialized production units
- 156 extruders
- 2 logistic Companies
- > 5.000 Customers supplied
- in 34 different countries
- 816 direct workers
- SG turnover 2022: € 523,000,000



SYSTEM GROUP

Today SYSTEM GROUP is made up of the following Companies (in chronological order):

1. 1979 – CENTRALTUBI S.p.A.
2. 1987 – PEBO S.p.A.
3. 1991 – FUTURA S.p.A.
4. 1993 – Sa.Mi Plastic S.p.A.
5. 1995 – Mecsystem S.r.l.
6. 1996 – ITALIANA CORRUGATI S.p.A.
7. 1998 – FUTURA SYSTEMS S.L.
8. 1999 – ROTOTEC S.p.A.
9. 1999 – Sa.Mi Plastic Romania S.A.
10. 2000 – HB Boscarini S.p.A.
11. 2003 – SAB S.p.A.
12. 2004 – UNILINE S.r.l.
13. 2005 – SYSTEM GROUP FRANCE S.a.S.
14. 2005 – LUCANIA RESINE S.r.l.
15. 2008 – HB SERVIZI S.r.l.
16. 2013 – UNILINE FRANCE S.a.S.
17. 2015 – SYSTEM GROUP PVC S.r.l.
18. 2017 – DERIPLAST GROUP S.r.l.
19. 2017 – REPLAST GROUP S.r.l.
20. 2019 – SYSTEM GROUP SICILIA S.r.l.

More detailed informations of all System Group companies can be found in the website at the following address: **www.tubi.net**

TUNNELS FIRE FIGHTING SYSTEM

T.E.R.N.

(Trans-European Road Network)

Mandatory fire-fighting system in the tunnel

2.6. Drainage

- 2.6.1. Where the transport of dangerous goods is permitted, the drainage of flammable and toxic liquids shall be provided for through well-designed slot gutters or other measures within the tunnel cross sections. Additionally, the drainage system shall be designed and maintained to prevent fire and flammable and toxic liquids from spreading inside tubes and between tubes.

CLICK or SCAN the
interactive QR CODE



Therefore

NO FIRE system target is:

- avoiding **fire + smoke propagation** in the tunnel for **SAVING LIVES**
- **environment protection**

 **SYSTEM GROUP**

30.4.2004

EN

Official Journal of the European Union

L 167/ 39

DIRECTIVE 2004/54/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2004

on minimum safety requirements for tunnels in the
Trans-European Road Network

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 71(1) thereof,

Having regard to the proposal from the Commission,

Having regard to the Opinion of the European Economic and Social Committee¹,

Having regard to the Opinion of the Committee of the Regions²,

Acting in accordance with the procedure laid down in Article 251 of the Treaty³,

After some bad experiences of accidents in road tunnels, some technical directives for safety in tunnels were issued.

Smoke poisoning has proven to be the major cause of death of people during tunnel fires.

2.6.1 determine that *a well-designed slot gutters or other measures within the tunnel cross sections SHALL BE PROVIDED when the transport of dangerous goods is permitted.*

.... shall be designed and maintained to prevent fire and flammable and toxic liquids from spreading inside tubes and between tubes.

Futura S.p.A. has developed a solution based on indications from road and motorway infrastructure Managing Companies to meet the safety law parameters and to satisfy all the conditions set out in the Directive 2004/54/EC regarding the safety of the drainage system

SAFETY IN THE TUNNELS

NO FIRE

FIRE-FIGHTING SAFETY

flame arresting system
for preventing fire-propagation in drainage collectors
caused by spilling of inflammable liquids

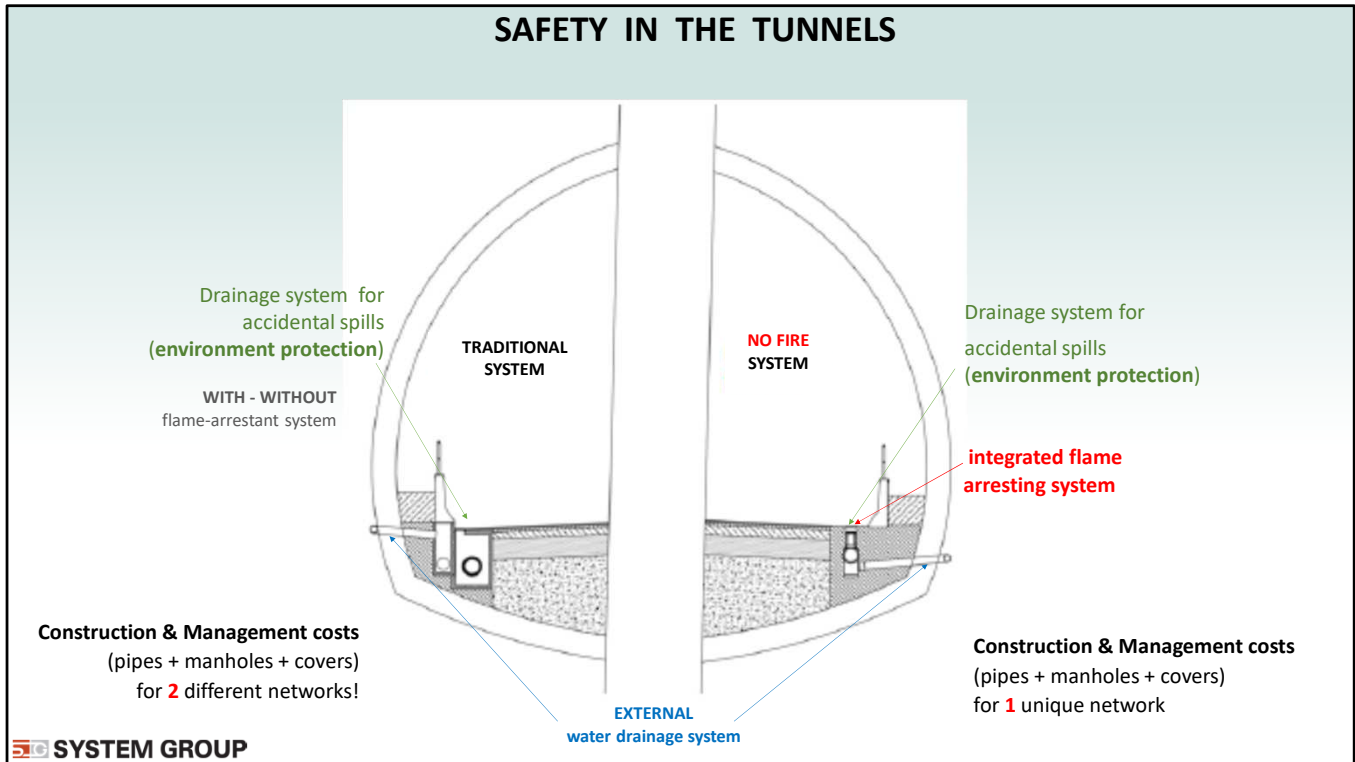
ENVIRONMENTAL SAFETY

tunnel road surface drainage system
containing final liquid storage
for preventing environmental pollution from accidents
or accidental spillage

NO FIRE was developed to meet the technical safety requirements set by the new European directives, as well as reducing the economic impact compared to existing alternative solutions capable of satisfying all the same requirements.

NO FIRE becomes part of both the fire protection system and the environmental protection system, unifying the services in a single infrastructure

SAFETY IN THE TUNNELS



Comparison between traditional fire and environmental protection systems (double infrastructure) in the tunnel, and the bivalent system achievable with NO FIRE.

NO FIRE system can also be used if you want to maintain the double infrastructure system in the tunnel

TRADITIONAL SYSTEM:

1. 2 different drainage systems to manage the waters in each side of the tunnel: one to internally manage the percolating water coming from the external tunnel vault, which will be discharged directly into the environment outside the tunnel + another to manage liquids falling on the road surface: flammable from accidents, waters dragged from circulating vehicles, waters from infiltrations, from rain and snow, from cleaning operations etc.
2. 1 collection tank for liquids from the road surfaces drainage system, to prevent the dispersion of polluting liquids into the environment.

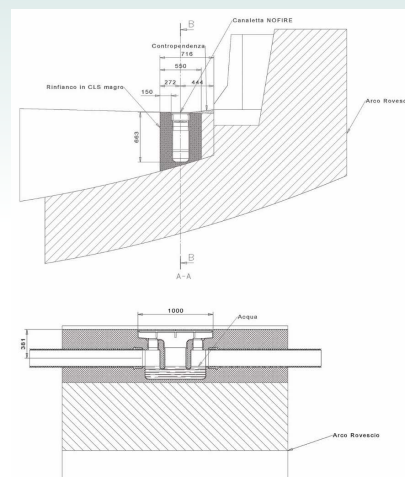
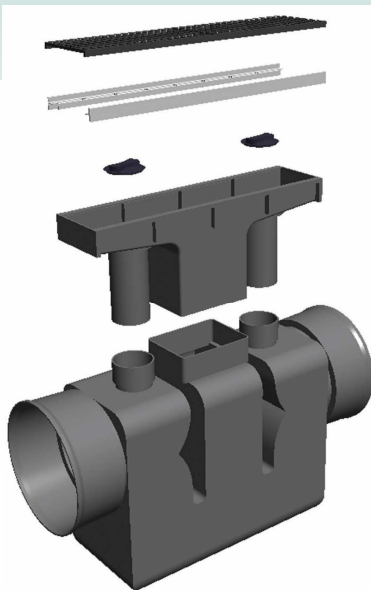
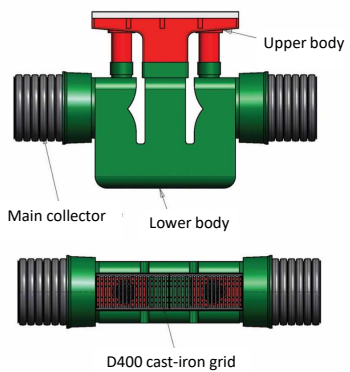
NO FIRE SYSTEM:

1. 1 drainage system to manage ALL WATERS over written (one network for all purposes)
2. 1 tank with gravity system of continuous separation of light liquids (like oils, petrol and diesel), able to collect all waters and keep only light liquids inside (in case of accidental spills, tunnel washing etc.)
3. the shape of NO FIRE gully allows the drainage surface liquids, but prevents the spread of flames inside the sewer in the event of a fire of flammable liquids, which occurs by preventing the entry of oxygen into the system. For this it is essential that the NO FIRE gully have the base tank always full of water, which normally comes from the water flowing of drainage system of the external vault of the tunnel

The main goal is to achieve a safety system for people into the tunnel during fire events, avoiding flame spreading and smoke producing that can kill the people.

The second benefit is to save money for construction of the systems (two in one).

NO FIRE COMPOSITION



SYSTEM GROUP

NO FIRE INSTALLATION and MAINTENANCE



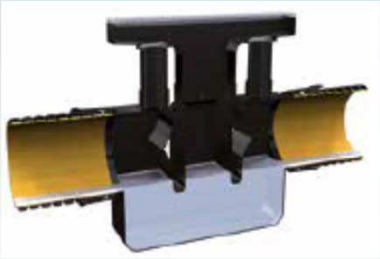
SD SYSTEM GROUP

NO FIRE SYSTEM FUNCTIONALITY



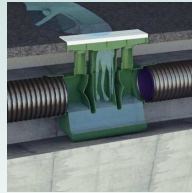
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ROAD SURFACE LIQUID DRAINAGE



bottom tank must to be always filled with water

barrier for **air** and **gas** entrance into the collector due to the density difference with water



infiltration brought-in waters, snow etc.



barrier for entrance of flame into collector



Accidental spills



Auto-extinguishing «CLOSED» system (prevents air entrance into collector)

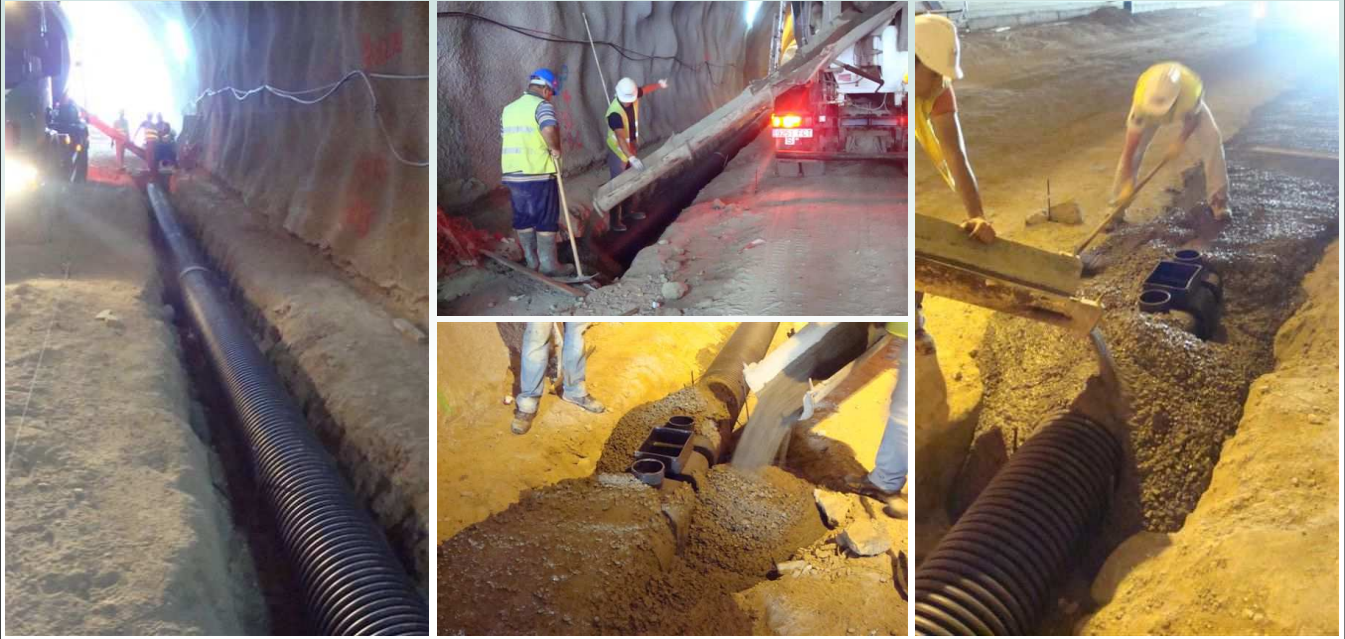
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The double siphon **NO FIRE** trap tank must always be full of water, in order to prevent air/gas from entering the system.

Therefore it is necessary to ensure the perennial presence of water inside each **NO FIRE** trap.

To achieve this, it is useful to provide for the drainage water of the external vault of the tunnel to be introduced into the **NO FIRE** system, which will deliver the water to a special tank where, in the event of accidental spillage of light liquids (e.g. hydrocarbons, washing soaps gallery etc.), physical separation from water will occur

NO FIRE INSTALLATION



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The **NO FIRE** system of the tunnel (pipes + gulley), made of plastic materials, must be completely coated with cement mortar in order to protect the structures from dynamic loads generated from road traffic, as well as to ensure continuity of operation in the event of strong destructive fire

CANARY ISLAND TEST: OCTOBER 2010



- Test Method and Condition redacted by Third Certification Body
- Accepted by Ministerio di Fomento (ES) + CS + Construction company + Fire-Fighting Department
- Performed under supervision and certified by Third Independent Certification Body

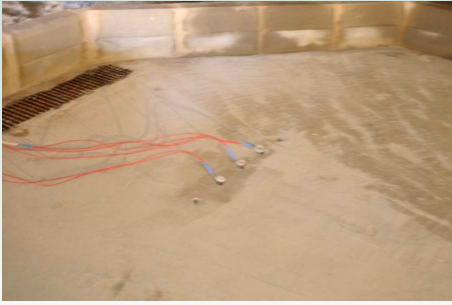
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On the slide above, one of the main references for the implementation and verification of the NO FIRE system.

Simulated real fire in the tunnel (1: 1 scale test) to verify the behavior of the NO FIRE system.
Artificially fueled fire lasting 20 minutes

CANARY ISLAND TEST: OCTOBER 2010



preparation and instrument
installation in testing area



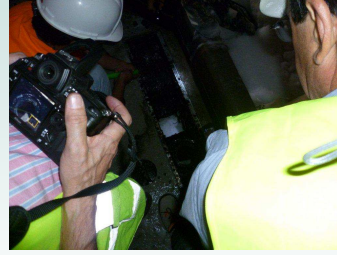
Accumulation and control tanks



CANARY ISLAND TEST: OCTOBER 2010



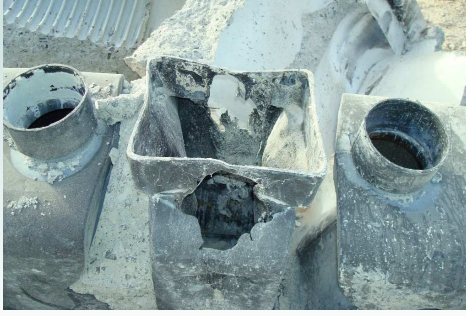
Verification
phase



cooling and
cleaning



CANARY ISLAND TEST: OCTOBER 2010



Superior part damaging



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The above slide shows the damage suffered only by the upper part of the NO FIRE trap door, which has not undergone such deformations as to compromise its functionality, however ensured by the double siphon shape of the "concrete shell" cast around it

CANARY ISLAND TEST: OCTOBER 2010

POSITIVE RESULT



CERTIFIED by

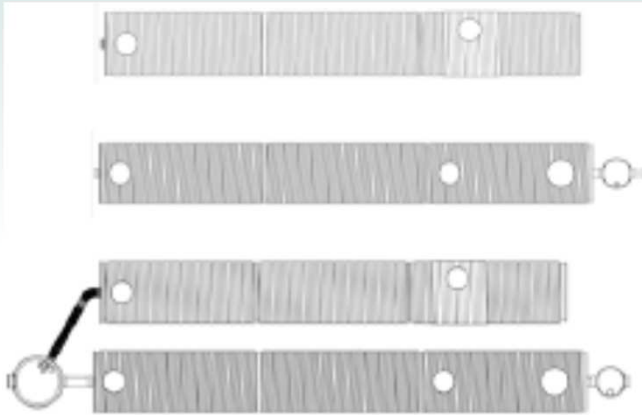


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The test was performed in the presence of persons in charge of the competent Spanish Ministry and in charge of Bureau Veritas, who also attended the subsequent checks, validating the results based on the protocol stipulated between all the parties previously

DRAINAGE SYSTEM MANAGING

THE GOAL **Accumulation and Management** of eventual **accidental spillings** of polluting liquids inside the tunnel



1. CLOSED accumulation system in the bottom of tunnel

2. Continuous SEPARATION & ACCUMULATION OF LIGHT LIQUIDS (and sand), with automatic gravitational shut-off valve

3. Continuous SEPARATION & ACCUMULATION OF LIGHT LIQUIDS (and sand) + parallel BLENDED/HEAVY LIQUIDS tank with effluent monitoring chamber

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NO FIRE system is completed with the delivery of the water coming from the double tunnel drainage system.

The delivery system can be made with one of 3 different types of operation.

System "1" provides for all the drainage waters from the tunnel road platform to flow into a closed storage tank. This solution is very simple but have some limits and need more maintenance (*tank control and emptying*) compare to the other systems

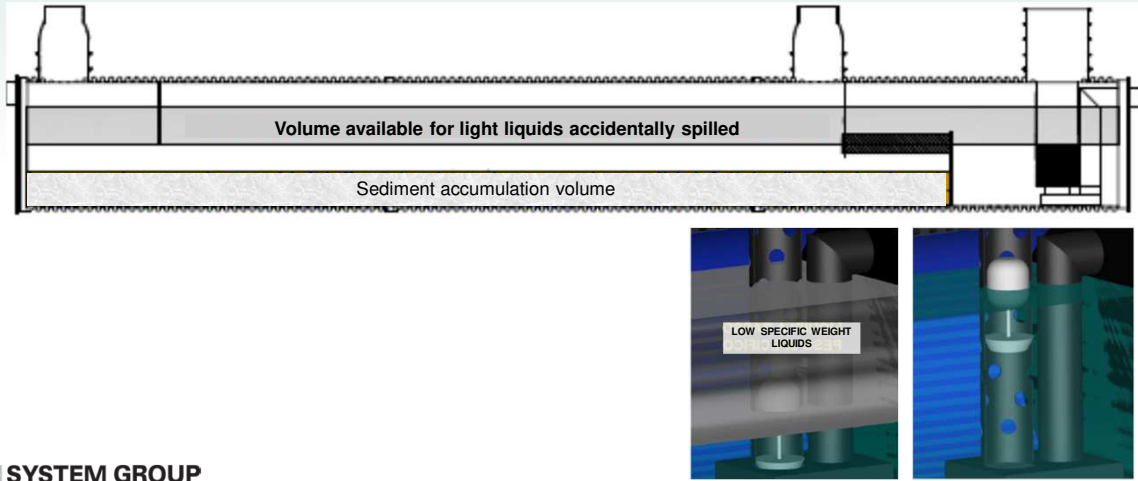
System "2" provides for the entry and passage of all the water coming from the NO FIRE system of the tunnel into the tank, specially designed to separate light liquids from the water (eg hydrocarbons, tunnel washing soaps, etc.). water will continue to flow out of the special openings, while light polluting liquids will be retained inside the tank. Its function is to carry out an activity of separation of light liquids (as the first flush rain systems do)

System "3" provides the same operation as the "2" system, which however is accompanied by a second tank intended for the accumulation of the mix of water and polluting liquids in case of accidental spillage, dependent on automatic systems for detecting the emergency condition which, thanks to a valve opening / closing system, directs the black wave into the second tank. This system is used when you want to create a protection system capable of being activated even in the presence of heavy liquids (= non-floating liquids)

DRAINAGE SYSTEM MANAGING

TARGET Accumulation and Management of eventual accidental spillings of polluting liquids inside the tunnel (**environmental protection**)

Continuous **SEPARATION** and **ACCUMULATION** of light liquids (and sands) with automatic gravitational shut-off valve



On the slide you can see the basic diagram of the NO FIRE tanks produced by the System Group, made up of large HD PE spiral pipes (usually DN 2000 mm), "light", pre-packaged and quick to install

The system functions properly as a first flush rain system, separating light liquids from water. Light liquids are arranged floating on the upper part of the tank, in a well-defined area that can vary in volume (based on design needs) by increasing / decreasing the diameter of the circular tank and / or its length.

To get out of the tank, the water must travel through a perforated tube, inside which a floating valve is located, calibrated to float on water but not on light liquids.

As the floating thickness of the light polluting liquids increases, from top to bottom, the floating valve will drop in level and, once the maximum volume limit of polluting liquids has been reached, it will automatically close (by gravity) the water outlet hole from the tank, preventing any leakage of polluting liquids.

Obviously the tank must be equipped with a special secondary water outlet (emergency by-pass) in case of automatic tank closure. This outlet can be made in the tank or in the manhole positioned before the tank

NO FIRE VIDEO CLIP



CLICK or SCAN the
interactive QR CODE



NO FIRE

FIRE SAFETY SYSTEM
for tunnels

 **SYSTEM GROUP**

 **CENTRAL TUBI**

 **ITALIANA CORRUGATI**

 **Futura**

 **SYSTEM GROUP**

NO FIRE SYSTEM ADVANTAGES

- safety system of lives according to last TERN European rules
- + environmental protection in a unique system
- less costs of construction
- less costs of managing
- **BIM available** free from our web site www.tubi.net



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TECHNICAL PROJECT SUPPORT



also place available

TECHNICAL STAFF

for free technical support

for *Network Managers – Planners – Construction Companies*

to support and create optimized and customized solutions



 **SYSTEM GROUP**



MORE DETAILS AND INFORMATION ON SYSTEM GROUP
AVAILABLE ON OUR CERTIFICATED SUSTAINABILITY REPORTS



CENTRALTUBI
ITALIANA CORRUGATI
PEBO
ROTOTEC



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System Group | PE PP PVC pipes

Thank You