

Tubería de poliéster reforzada con fibra de vidrio (PRFV)

Traviesas de hormigón monobloque para ferrocarriles

Dovelas de revestimiento de túneles de hormigón

Tubería de hormigón postesado con camisa de chapa

Tubería de hormigón armado con camisa de chapa

Todo tipo de  
prefabricados  
de hormigón



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## **INTRODUCTION**

Prefabricados Delta, S.A. operates four factories, two of them are situated in Humanes (Madrid), which manufactures concrete pressure pipe, fiberglass pressure pipe and other precast concrete such as precast tunnel lining segment. Another two factories are located in Puente Genil (Cordoba) and there are manufactured concrete pressure pipe and concrete sleepers for railways.

There are two types of concrete pressure pipe:

- Reinforced Concrete Pressure Pipe with Steel-Cylinder
- Prestressed Concrete Pressure Pipe with Steel-Cylinder

The four factories have the most modern technology and equipment that allow us to develop a manufacturing capacity market leader. Each factory has its own laboratory where the products are subjected to several tests to its full approval by the technical team responsible for quality control.

Prefabricados Delta, S.A. as first-line Company in its sector takes into account as a priority the Quality of its products, respect for the Environment and Prevention of Occupational Hazards of its workers. Due to this interest, it is the implementation of a Quality System and Environmental Management System certified by AENOR, based on the UNE-EN-ISO 9001 and UNE-EN-ISO 14001, and the introduction of a Prevention System Certified Occupational Hazards, based on the specification OHSAS-18001.

## **PREFABRICADOS DELTA PIPING SYSTEM**

Prefabricados Delta offers customers the most appropriate solution for each pipeline project, Concrete Pressure Pipe with Steel-Cylinder (reinforced or prestressed and gasketed or welded joint) and fiberglass pressure pipe (GRP), with the advantage of complementarity of both materials to cover current supplies and irrigation needs and its experience in the water sector, since it has installed over 1.550 kilometers of concrete pressure pipe over 45 years of activity, in addition to over 750 km GRP pipe manufactured in its first 8 years of activity.

## **ADVANTAGES OF CONCRETE PRESSURE PIPE**

- Manufacture in series with customer demand.
- Highly resistant to impact effects.
- Great durability.
- No need of conservation or maintenance.
- Reduced pressure drop over time.
- There aren't contaminants.
- Protection of permanent passivation of the metal parts from corrosion.

- Do not alter the organoleptic characteristics of water.
- These types of pipes are not sensitive to the effects of fatigue produced by pressure variations.
- The concrete pipe with steel-cylinder is not affected by corrosion caused by induced currents (tramps).
- The behaviour of concrete pressure pipe towards ovalize efforts is much better than for other materials because it has a lot of transverse stiffness.
- Pipes comply with all requirements listed in the UNE-EN 639, 641 and 642.

## **PRESTRESSED CONCRETE PRESSURE PIPE WITH STEEL-CYLINDER**

Prestressed concrete pipe with steel-cylinder is one of our most competitive products with about 1000 km. installed, this type of pipe have 6 m. useful length that is used for pipes under pressure from 1 to 25 atm. and diameters between 500 and 2000 mm.

This pipeline consists of a concrete core with high-strength covered with steel-cylinder that gives tightness, and active armor (wire) rolls around the core prestress it. This set, called primary (element resistant), it takes a last outer layer of concrete whose mission is the protection of active armor.

The gasketed joint of concrete pressure pipe is manufactured with a metal heads that are welded to steel-cylinder. This joint consists of a steel bell and spigot ring combined with a rubber O-ring gasket. This volumetrically sized rubber gasket is enclosed by steel rings in a completed joint with sufficient compression to form a pressure-tight seal. The joint is watertight, flexible, easy to assemble, self-centering, economical and versatile.

Prefabricated Delta has made some 1000 km of pipes of this topology.

## **REINFORCED CONCRETE PRESSURE PIPE WITH STEEL-CYLINDER**

Reinforced Concrete Pressure Pipes with Steel-Cylinder are formed by a concrete wall that contains a steel-cylinder, which provides tightness and gives resistance capacity, and a cross armor stiffened with another longitudinal.

These type of pipes, like prestressed concrete pipe, can be manufactured with two types of joint: welding (rigid) and elastic (gasketed joint with a steel bell and spigot ring). The length effective of this type of pipe usually is 6-7 meters, and diameter range is manufactured between 1000 and 2500 mm.

Prefabricated Delta has made some 525 km of pipes of this topology.



## **GLASS REINFORCED PLASTIC PIPES (GRP)**

First we emphasize the complementarity between GRP pipes and Concrete Pressure Pipe, perfectly valid in each area of use.

GRP pipes manufactured have high resistance to corrosion, making them particularly suitable for use in environments or aggressive fluids (industrial applications). However, its use is more common in water pipes to supply, irrigation, sanitation and so on., due to its competitive prices mean diameters.

The pipes are classified by their DN (Nominal Diameter), PN (Nominal Pressure) and SN (Nominal stiffness). These values are normalized in the UNE-EN 1796.

The advantages offered are:

- Competitive prices average diameters.
- It is a lightweight material so that the pipes are light.
- The usual length of supply, 12 meters, favours a quick assembly.

### ***Materials used in the pipe.***

The GRP pipes (Glass Reinforced Plastic) are primarily made up of three materials:

1. A matrix is formed by an unsaturated polyester resin of the type suitable for the fluid to be transported.
2. A glass fiber reinforcement located within the matrix.
3. An inert material (usually quartz / silica dried) that is incorporated into the matrix as a structural load.

### ***Composition of GRP pipes for water and sanitation.***

1. Inner layer or barrier: the layer which should provide resistance to potential chemical, abrasion resistance, an absolute tightness and finally a little roughness.
2. Resistant core or structural: it is the middle layer that provides mechanical strength characteristics of the pipe.
3. Outside layer: it provides resistance to external agents.

### ***Joint system.***

We use the joint through GRP couplings. This system allows for cutting pipes in different lengths if needed. The joint's gasket is made up of elastomer employed, REKA type system to get the seal.



## **OTHER PRODUCTS**

### ***Fittings for hydraulic lines.***

Besides pipes, Prefabricated Delta can supply fittings (elbows, tees, taps, man entries, sanitation wells, etc.) that are required to complete conduction. Fittings can be manufactured according to the pipe material, we are able to supply fittings in GRP and reinforced concrete with Steel-Cylinder for these types of pipes.

Another possible option, and valid in both materials, is the supply of fittings made of steel and painted the inside with epoxy resin and external coated concrete.

### ***Railway sleepers.***

Prefabricated Delta has at its factory in Puente Genil a highly automated plant for manufacturing prestressed monoblock concrete sleepers.

Prefabricated Delta is one of the largest manufacturers of this type of precast with more than four million sleepers supplied.

### ***Precast tunnel and bridge lining segment.***

Two types are made of reinforced precast lining segment, pieces that form a bridge or viaduct and pieces that make up the lining of the tunnels with shields. In our facilities were built more than 160,000 items (40 kilometers of tunnel and 4 kilometers of bridges) of various sizes, including the M-30 in Madrid, which are the largest made so far.

### ***Precast concrete beams***

Prefabricados Delta offers, a wide range of the highest quality prefabricated products combined with a great service. In 2015 it designed and built the prefabricated concrete beams production plant for the Riyadh Metro in Saudi Arabia, capable of delivering beams of up to 40 meters in length.

Prefabricados Delta has designed, built, supplied and assembled prefabricated concrete beams of up to 40 meters in length for the Riyadh Metro in Saudi Arabia.

The initial scope of the project is more than 10000 meters of viaduct.



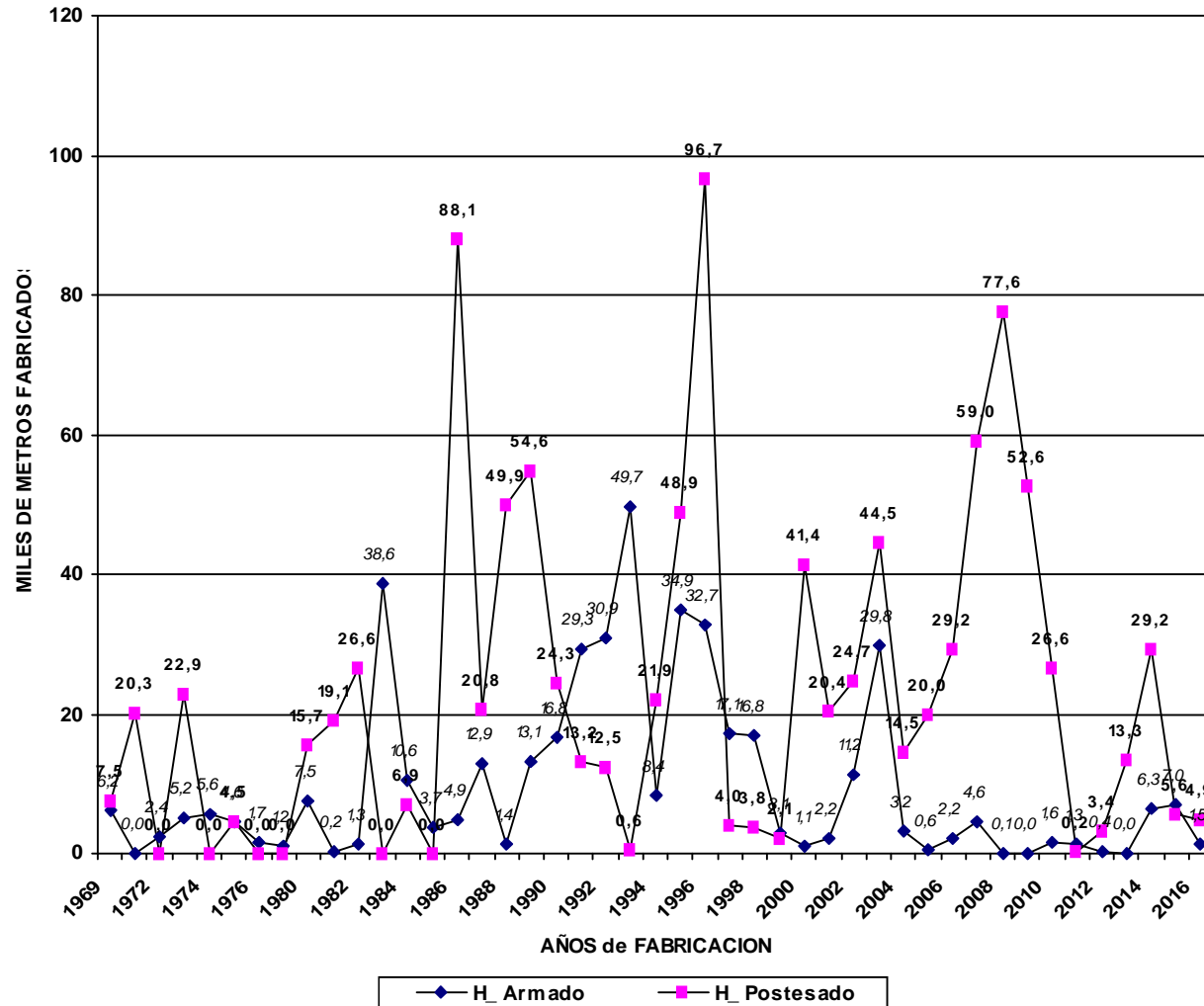
## FACTORIES



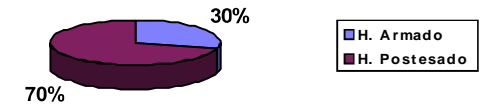
## **PICTURES CONCRETE PRESURE PIPE**

## TUBERIAS DE HORMIGON CON CAMISA DE CHAPA.

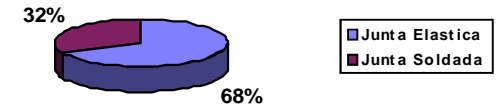
FABRICACION DE TUBERIA POR AÑOS



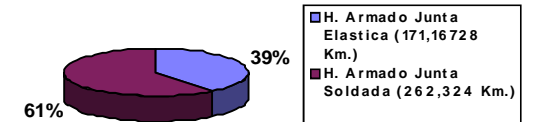
Distribucion por TIPO DE TUBERIA.



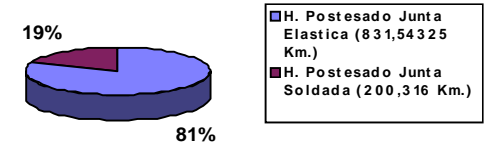
Distribucion por TIPO DE JUNTAS.



H. Armado Distribución por TIPO DE JUNTA

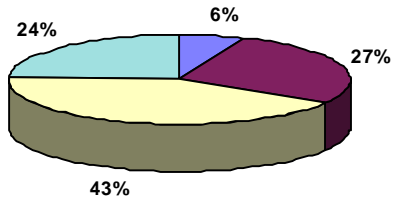


H. Postesado Distribución por TIPO DE JUNTA



## TUBERIA FABRICADA POR USOS

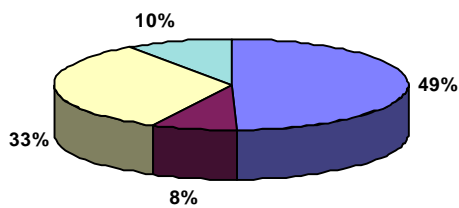
**ABASTECIMIENTOS  
DISTRIBUCION POR CLASE**



**ABASTECIMIENTOS.-**

H. Armado Junta Elastica	44.328,00
H. Postesado Junta Elastica	301.994,00
H. Armado Junta Soldada	194.393,00
H. Postesado Junta Soldada	172.263,00
<b>Total</b>	<b>712.978,00</b>

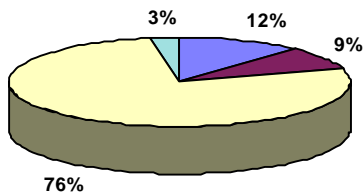
**SANEAMIENTO DISTRIBUCION  
POR CLASE**



**SANEAMIENTOS.-**

H. Armado Junta Elastica	48.799,50
H. Postesado Junta Elastica	32.550,00
H. Armado Junta Soldada	7.600,00
H. Postesado Junta Soldada	9.654,00
<b>Total</b>	<b>98.603,50</b>

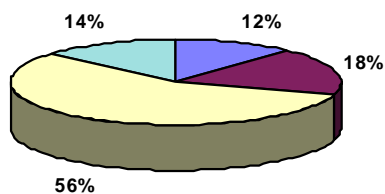
**RIEGOS DISTRIBUCION POR  
CLASE**



**RIEGOS.-**

H. Armado Junta Elastica	77.778,78
H. Postesado Junta Elastica	496.861,25
H. Armado Junta Soldada	56.359,00
H. Postesado Junta Soldada	18.399,00
<b>Total</b>	<b>649.398,03</b>

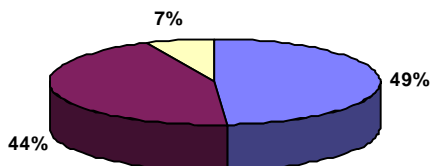
**TOTALES DISTRIBUCION POR  
CLASE**



**POR CLASE DE TUBERIA**

H. Armado Junta Elastica	171.167,28
H. Armado Junta Soldada	262.324,00
H. Postesado Junta Elastica	831.543,25
H. Postesado Junta Soldada	200.316,00
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**DISTRIBUCION POR USO**



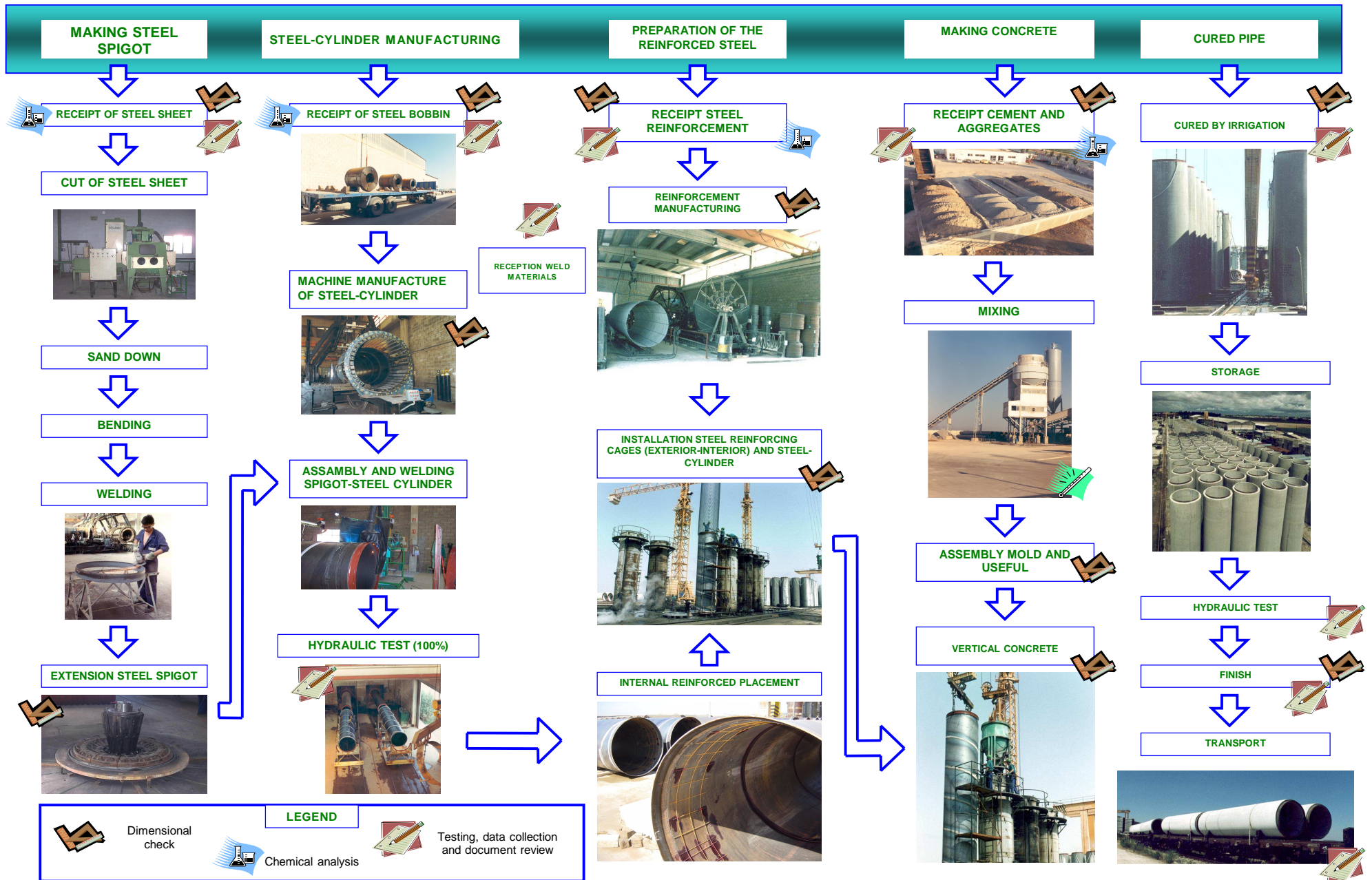
**POR USO.-**

ABASTECIMIENTO	712.978,00
RIEGO	649.398,03
SANEAMIENTOS	98.603,50
<b>Total</b>	<b>1.460.979,53</b>





**REINFORCED CONCRETE PRESSURE PIPE WITH STEEL-CYLINDER**





## **PICTURES CONCRETE PRESURE PIPE**

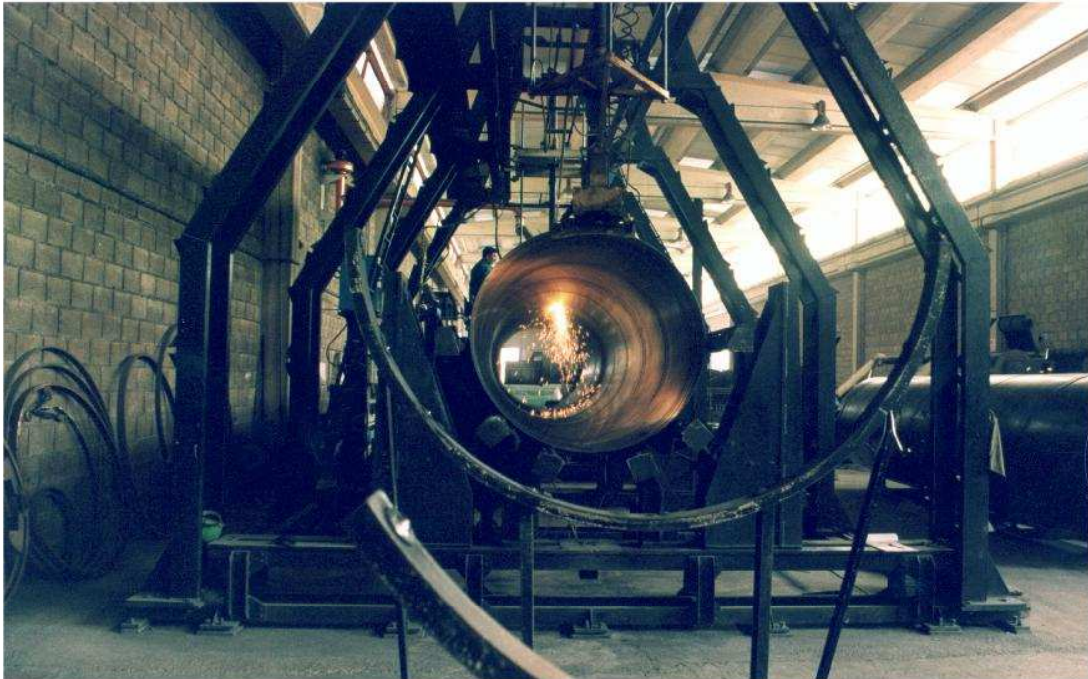
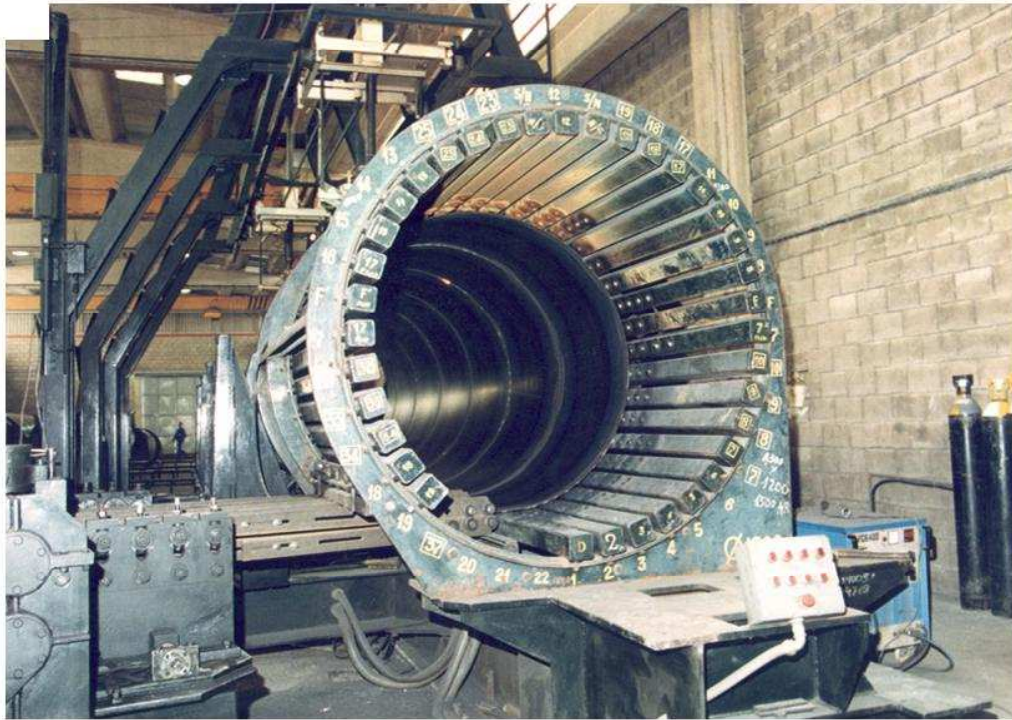




























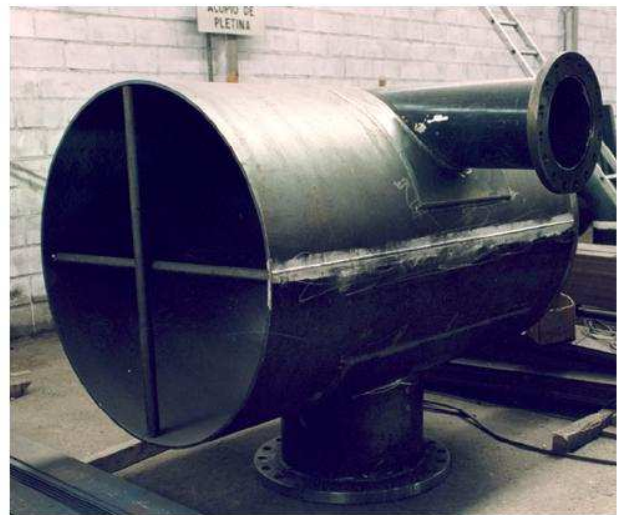
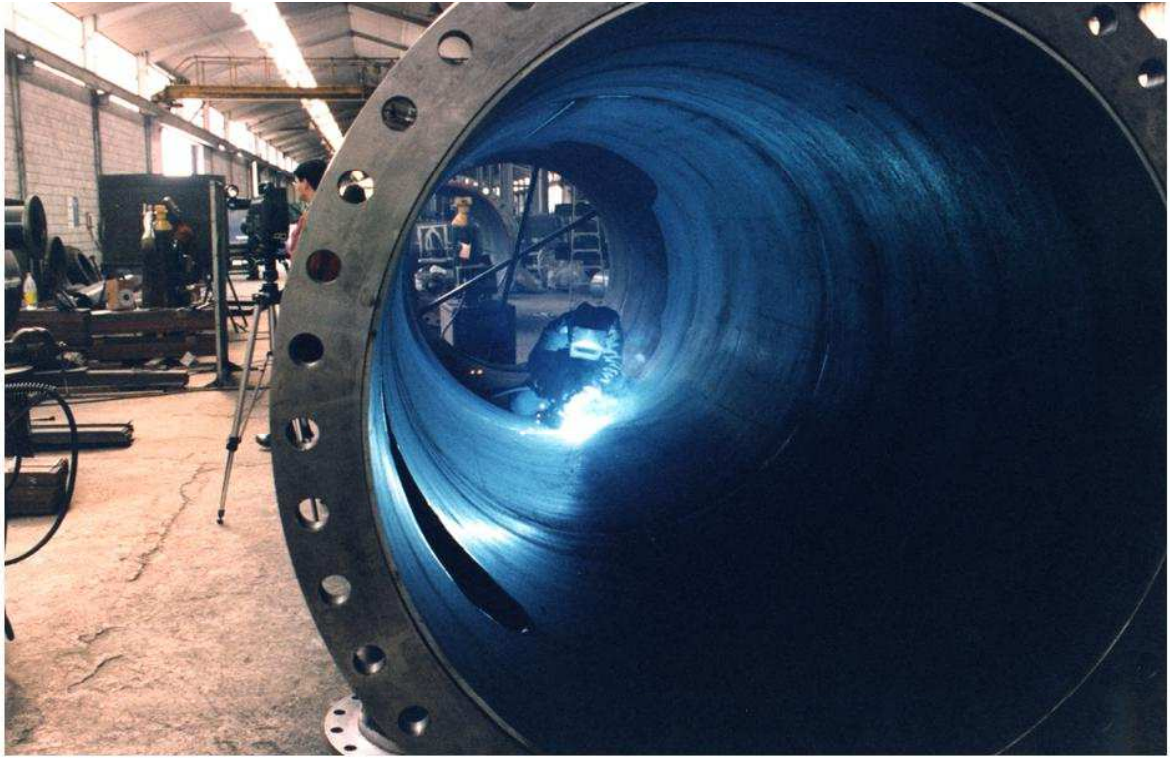






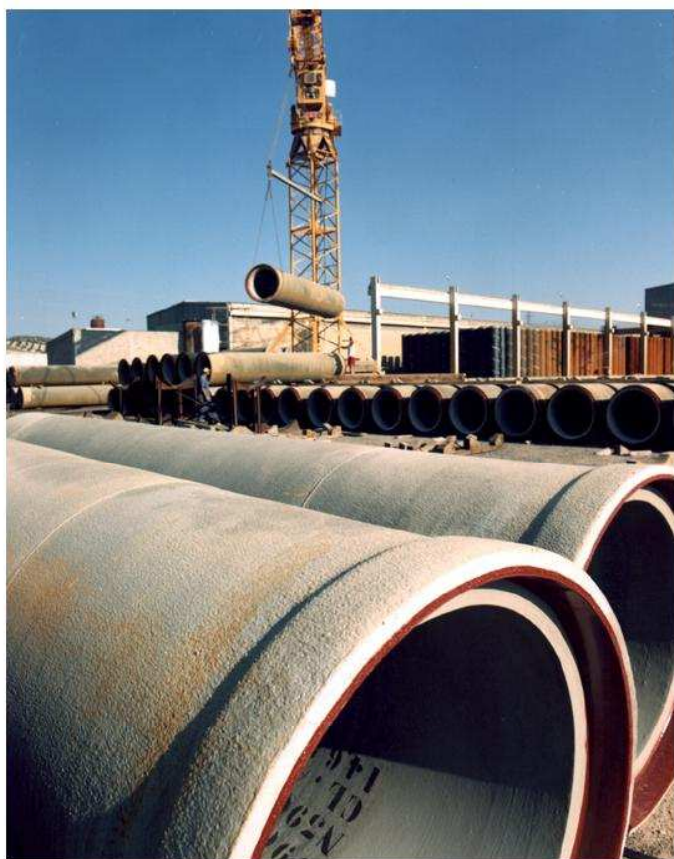














## **PICTURES GRP PIPES**



**FACTORY    GRP    PIPES**  
**Humanes (Madrid)**







**GRP Pipe manufacture  
Filament Winding**







## GRP Couplings







**Laboratory**



**Check stiffness(SN)**



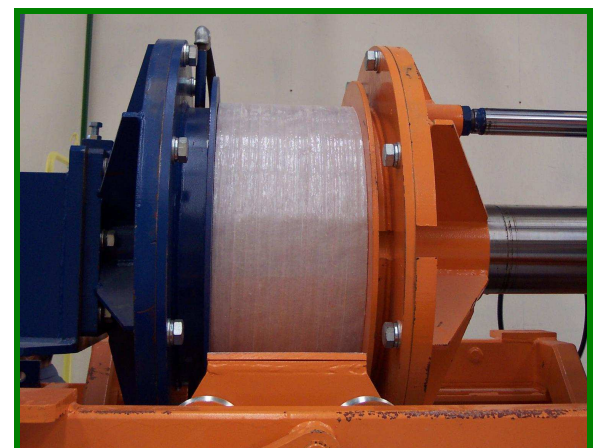
**Split disk**



**Long term tests**



**Hydraulic tests**



**Hydraulic tests of couplings**













## **PICTURES SLEEPERS**









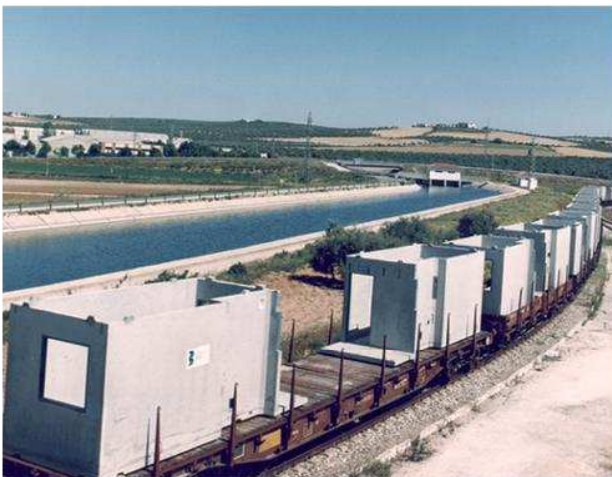
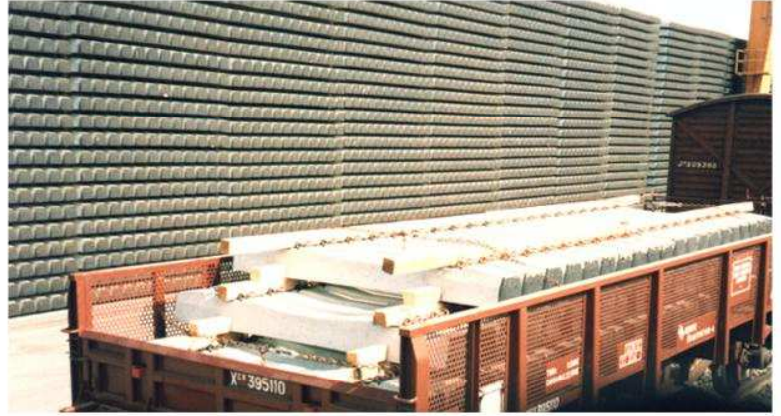
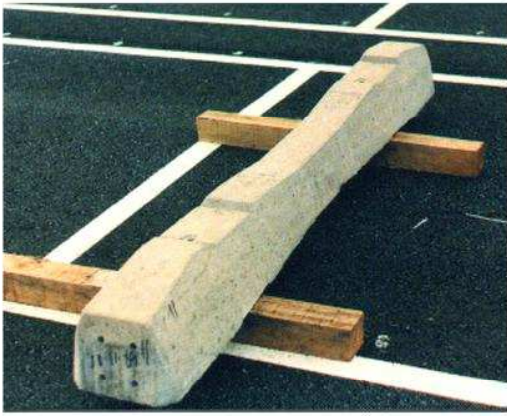




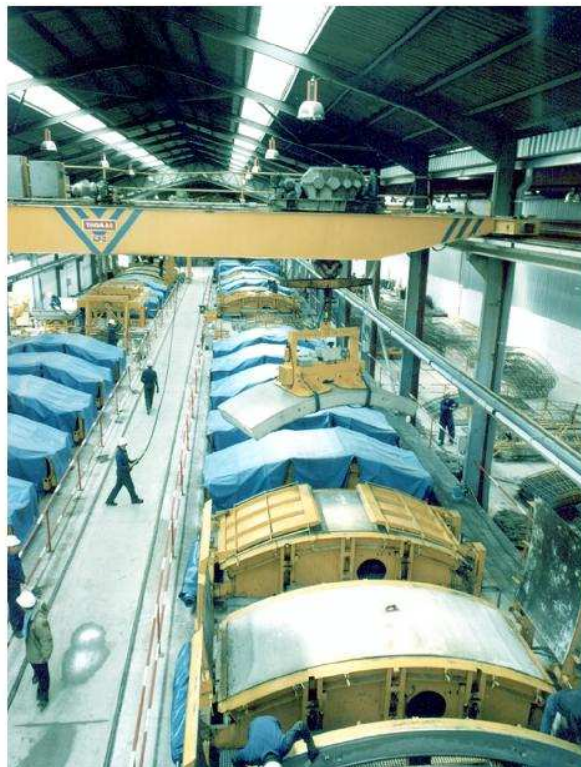


**PICTURES ANOTHER PRECAST CONCRETE**



















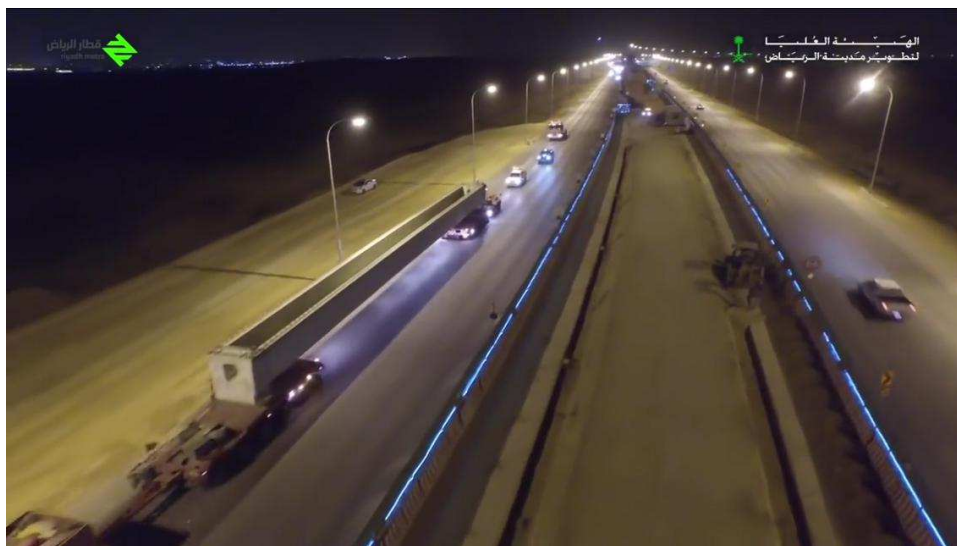
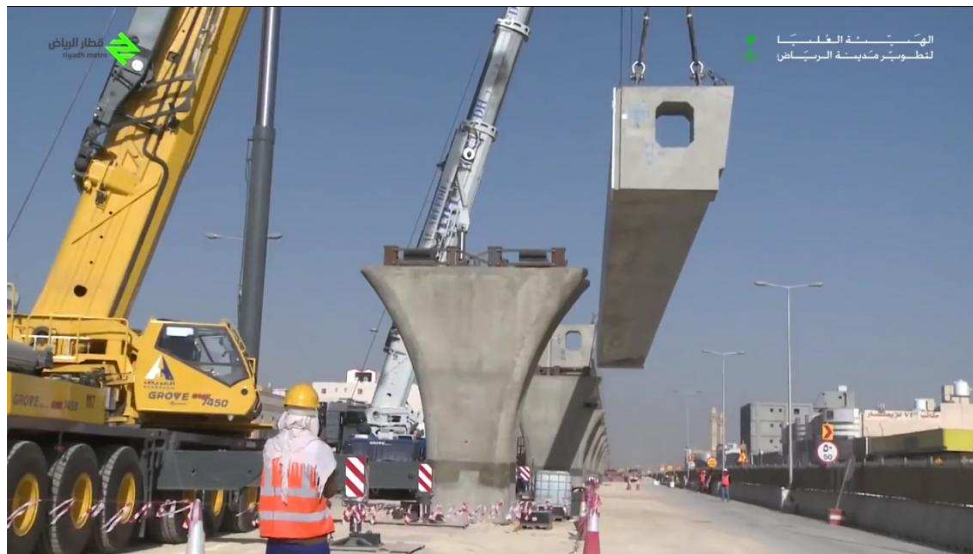


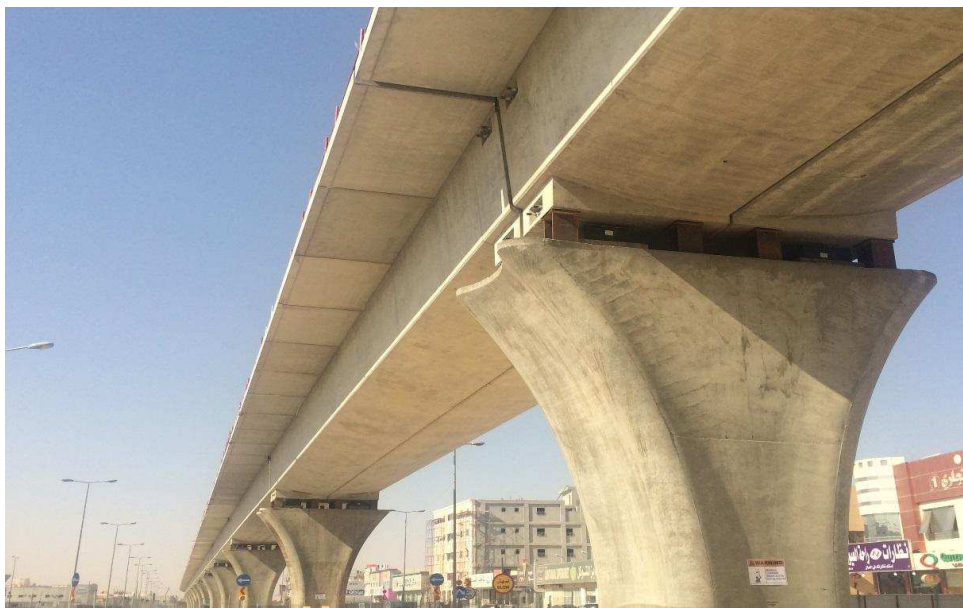
PREFABRICADOS  
DELTA S.A.















## **QUALITY CERTIFICATES**

# SELLOS CERTIFICACIONES



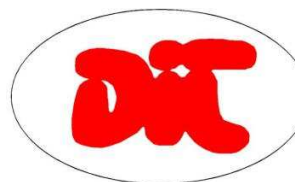
**EMPRESA REGISTRADA**  
**ISO 9001**



**CERTIFICACIÓN SISTEMA IQNET**  
**ISO 9001**  
**ISO 14001**



**GESTIÓN AMBIENTAL**  
**ISO 14001**

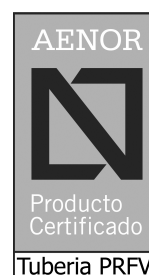


**DOCUMENTO IDONEIDAD TÉCNICA**  
**PARA TUBERÍA DE HORMIGÓN**  
**ARMADO Y POSTESADO CON CAMISA**  
**DE CHAPA.**

**INSTITUTO EDUARDO TORROJA**



**PREVENCIÓN RIESGOS LABORALES.**  
**EMPRESA AUDITADA según RD 39/1997**  
**PREVENCIÓN RIESGOS LABORALES.**  
**EMPRESA CERTIFICADA según OHSAS 18001**



**TUBERÍA DE POLIÉSTER**  
**REFORZADO CON FIBRA DE VIDRIO**  
**SEGÚN UNE EN 1796 y UNE EN 14364**