

Game-Changing Innovation for PIPES

NEW-CONCEPT CORROSION-FREE CONCRETE PIPES, SUPERIOR IN COST, FUNCTIONALITY AND DURABILITY TO THAT OF OTHER PIPES



4CP (Circumferentially Compressed Composite Concrete Pipes)

is a new Corrosion Free Concrete Pipe option from 150 mm ID (6") that weighs significantly less than conventional Reinforced Concrete Pipe (RCP), is stronger and more tolerant of soil settlement, and has improved sealing at the pipe joints.

What the FSC Tech brings to the world of concrete products is:

1. **Increased Strength** - a massive increase in flexural strength is provided, not achievable with current technologies.
2. **Reduced Cost** – the FRP system is substantially less costly than traditional steel reinforcement and allows for reduced product thicknesses.
3. **Longer Service Life** – the FRP is corrosion resistant and has higher operating service temperatures than steel.
4. **Drastic Reduction in CO2 footprint** – eliminate steel, reduce concrete sections, replace or reduce OPC with low CO2 binders, enables a large reduction in environmental footprint compared to the current steel reinforced concrete practice.

4CP PIPES OVERCOME THE LIMITATIONS OF RCP, PLASTIC, AND GRP

This new innovation is a standard Concrete Pipe with **no steel reinforcement cage**, that is **wrapped on the exterior with FRP "in tension"**.

This puts the concrete core in a status of post compression, and provides an envelope that protects the pipe, eliminates leakage through the wall, and enables a very watertight joint.

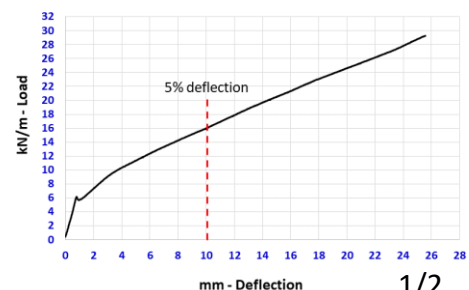
The 4CP pipes can be produced with a **much thinner wall section** with a corresponding weight reduction, longer lay lengths, and lower cost. [Wrapping video link](#)

FIRST CRACK DOES NOT AFFECT THE STRUCTURAL AND FUNCTIONAL BEHAVIOR

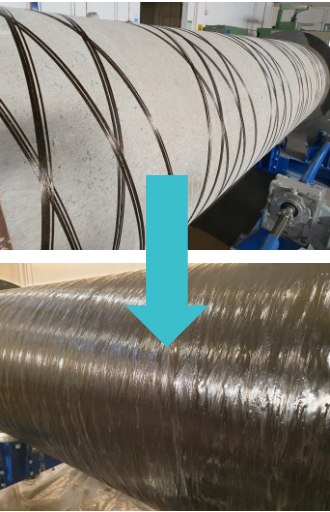
The first crack at 0 and/or 180 degrees **does not affect the structural behavior** of the 4CP Pipes, because the pipe is still able to carry the same load without long term creep.

Also, it **does not affect the functional features**, as the pipes do not leak, they are protected by the FRP wrapped in tension and remain capable even in pressure applications. [Deflection video link](#)

4CP Post Compressed Composite Concrete Pipe
D Load Test - DN200 8mm Thickness



4CP MAIN FEATURES



Spiral Wound FRP

Starting from DN 150 mm (6"), with a thickness from 1/25 of the ID, the **4CP** Pipes have the following main features:

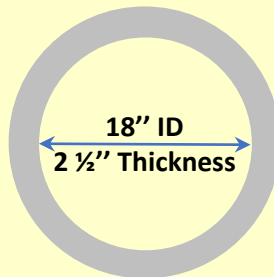
- **They do not leak**, because the spiral wound FRP that is applied in tension with a small amount of resin prevents any leaks.
- **They are capable of pressure applications**, theoretically without any limit. It is just a matter of sizing the **4CP** pipe correctly.
- **They can be laid on aggressive soils**, because the FRP protects the concrete and there is no embedded steel to protect.
- **They can be built with a Corrosion Resistant Liner**, or a Thin PVC Liner on the ID.

4CP Cost and CO₂ Savings vs RCP

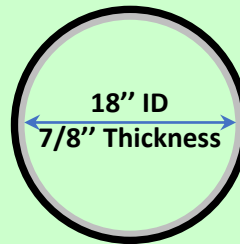
**C76 Reinforced
RCP Concrete Pipe**
18" ID (450 mm) – 2 1/2" (63 mm) Thickness
Class III – Wall B



**4CP Pipe
(no steel reinforcing)**
18" ID (450 mm) – 7/8" (22 mm) Thickness



Raw material CO₂ Footprint Saving 70%
Raw Material Cost Saving 66%
Weight Savings 67%



The above figures show a comparison between an RCP Concrete Pipe DN450 (18") with the corresponding 4CP Pipe. The 4CP Pipe shows a Raw Material Cost Saving of about 66%, Raw Material CO₂ Footprint Savings of about 70% using Low Carbon Binders. Weight Saving about 67%.

FSC TECHNOLOGIES

FSC is a US company with R&D in Italy. Its core business is to help Customers develop solutions based on its Innovation in Structural Engineering by replacing embedded steel reinforcement with a system of wrapping concrete elements with pretensioned FRP and a small amount of resin.

4CP Structural Behavior

The **4CP Concrete Pipes** can be designed as **Rigid, Semi-Rigid, and Elastic**. In the case of Elastic Behavior Design the **4CP** will have a stiffness several times higher than Plastic / GRP pipe and be able to carry the load without relying on the soil load for support.