



ITINERO®



Infrastructure Drainage

Surface water collection for civil engineering structures and bridges

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A well designed bridge deck surface water collection and drainage are key:

- Towards road safety ensuring good adherence.
- And helps extend the lifespan of the bridges.

With a solid experience in civil works and drainage pipe systems, **Pam Building offers a dedicated range for civil engineering structures and bridges: ITINERO®.**

Watertight wastewater drainage systems respect the environment, preventing leaks to the water bodies.

Infrastructures

ITINERO®



A solution that meets the high drainage technical demands of infrastructure projects, factors in the specificities of a project and guarantees excellent performance to accommodate different stress levels (weather constraints or exposures).



Recommended use

Suitable for many bridge and tunnel designs and adapted to renovation projects
Collecting and draining surface water from bridges, tunnels and viaducts, for new builds or renovation projects.

Long lifetime with high resistance to climatic stresses due to the zinc coating and low thermal expansion coefficient of cast iron



Certified performance

→ Compliant with standard EN 877

→ Guaranteed performances by quality marks delivered by third party



Easy maintenance & installation

→ Low maintenance due to the best in class resistance to shocks and crushing

→ Easy to install due to mechanical couplings assembled with simple tools.



Chemical & corrosion resistance

→ Hot water resistance: 24 h at 95°C

→ Thermal cycle resistance: 1,500 cycles between 15°C and 93°C

→ Chemical resistance for $2 \leq \text{pH} \leq 12$

→ External coating corrosion resistance test to neutral salt spray according to standard NF-EN ISO 9227_2017: 4500 hours.



Environment

→ Recycled content: 99%

→ Fully recyclable



Fire safety

→ High level of fire safety with excellent A2,s1-d0 reaction to fire

pam building

ITINERO® EN 877

CE A2-s1, d0 DIN EN

NF1-3 DN100

The advantages of ITINERO®



Corrosion resistant thanks to zinc and epoxy coating



Preventive fire protection - non flammable



Long service life



Insensitive to heat, cold and high



Pressure resistant



Robust



Simple to install



Concrete colour (RAL 7030)

Major application areas



Reaction to fire: **A2,s1-d0**



Bridges

The drainage system is exposed to the weather and experience additional corrosion due to snow-clearance salts in winter and atmospheric pollution.

The robustness of the cast iron in case of overloads during heavy rain events, and the **high corrosion resistance** of ITINERO® meets to the special requirements for drain pipe systems for bridges



Tunnels

ITINERO® pipes and fittings are resistant to external corrosion due to aggressive vehicle exhaust gases and contaminated fine dust.

The cast iron ITINERO® coefficient of linear expansion is comparable with concrete, allowing the structures and the pipe systems to move and expand together without damage.



Buried Systems

Underground, in addition to their corrosion resistance, sewage pipes must be **resistant to static loads** due to traffic and ground movements.



Car Parks

Due to the special requirements for drain pipe systems in multi-storey car parks, a particularly corrosion-resistant outer coating is necessary. ITINERO® cast iron pipe systems are often used in parking lots due to their **high impact resistance**.

Durability

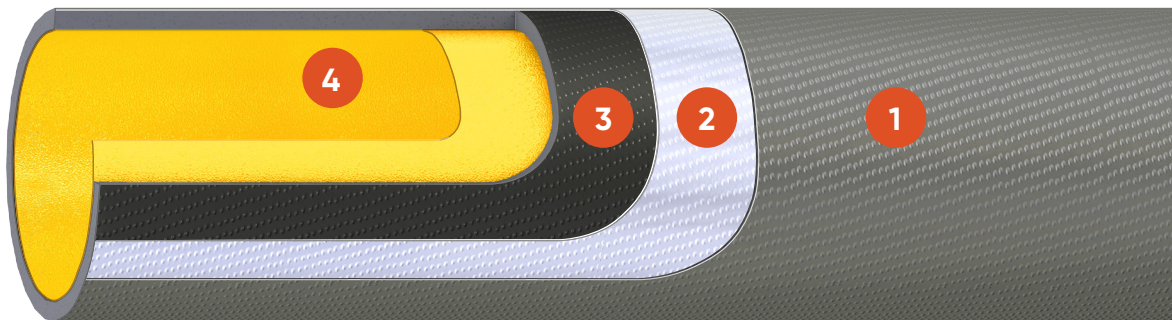


Life expectancy of bridges and civil engineering structures is generally set around 50 years, with limited maintenance, but ideally for much longer. Drainage pipe systems being integral installations, are expected to be fit for purpose over the same period of time without any failure from chemical and environmental stresses. ITINERO® is designed to efficiently meet the application requirements over time.

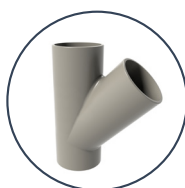
Chemical Resistance

Surface waters can potentially contain small debris, waste materials, heavy metals or traces of hydrocarbon and in winter, in some cold regions, deicing salts. ITINERO® epoxy inner linings for pipes and fittings are well adapted to this type of collection: It withstands a **pH ranging from 2 to 12**, and has a **good resistance to road salts and hydrocarbons**. Where the ITINERO® pipe systems are exposed, **we recommend complete stainless steel couplings equipped with nitrile gasket (NBR) to withstand hydrocarbons**.

Coating



- 1 External Protection:** Grey (approximate RAL 7030), epoxy coating, average dry film thickness of 80 µm
- 2 Anti-corrosive layer:** Zinc coating of 260 g/m² (about 40 µm)
- 3 Cast iron:** Made with the de Lavaud process
- 4 Internal Protection:** Epoxy coating, average dry film thickness of 130 µm.



Fittings are externally and internally coated with a mat grey powder epoxy (approximate RAL 7030), to an average thickness of 300 µm.

Resistance to climatic stress

Bridge deck drainage pipe systems can be installed within the archstones, inside the bridge itself or exposed underdeck. The pipe system can be submitted to severe climatic stresses for example: damp, wind, ultra-violets radiations, saline mist, condensations or freezing-thawing cycles... ITINERO® range offers varying levels of coating performance to be selected to

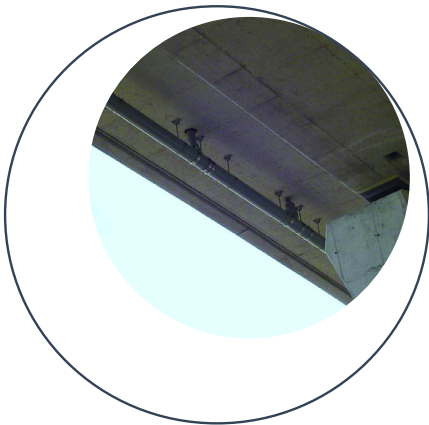
Cast iron stability
Pam Building's cast iron, unlike plastics, is **not sensitive to thermal or U.V ageing**, it is not liable to creep under temperature rise. Its mechanical properties won't deteriorate over time, which will ensure the **stability of the pipe** system and long lasting operational safety.

Thermal expansion coefficient
Thermal expansion coefficient of cast iron is **very low** and close to that of steel or concrete. The concrete structures and the pipe systems will move and expand together without damage.

Corrosion resistance
The ITINERO® drainage pipe system is particularly **resistant against external corrosion** thanks to the combination of a zinc layer and a thick epoxy outer coating.

Thermal expansion of cast iron and other materials for a temperature rise of 50°C and 10 m			
Thermal expansion coefficient			
0.0104 mm/m°C → 5.2 mm	Cast iron		
0.07 mm/m°C → 35 mm	PVC		7 times more
0.150 mm/m°C → 75 mm	PP		14 times more
0.17 mm/m°C → 100 mm	HDPE		19 times more

The thermal expansion coefficient for cast iron – 0.01 mm/m. °C – is very low and very similar to that of steel and concrete; the building and pipe systems will move and expand together.



Fire safety



On the roads, accidents might occur involving cars or trucks and their loads. The risks are then very high. In confined spaces like bridges or tunnels, difficult to access, the rescue conditions can be made even more difficult. Drainage pipe systems must not feed the fire and exacerbate the risks.



Non-combustibility

Cast Iron as a material itself is positioned A1 in the Euroclass classification for reaction to fire. In tests carried out by the CSTB accredited laboratory, the ITINERO® cast iron ranges (pipes, epoxy powdered fittings and accessories) received the following excellent Euroclass ranking A2 -s1, d0 which corresponds to the lowest possible levels for smoke emission and production of flaming droplets.

In case of a fire, ITINERO® does not feed the fire, or emit either gases or smoke liable to delay fire fighters or jeopardize people lives.

Limited maintenance



Maintenance operations on engineering structures or bridges are often made difficult by special conditions on site: difficult access, traffic disruption, safety precautions...These particular features also make maintenance and repairs more costly due to precautions to be taken.



Robustness & easy maintenance

Due to its stable outstanding mechanical properties, Pam Building's cast iron drainage systems are less likely to fail and need minimal maintenance over their lifetime. In case of accidental blockages, different access components provide easy access to the pipework. ITINERO® easily withstands all maintenance operations including highpressure jetting. Pam Building's cast iron is strong, robust, and resists vandalism. Unlike plastics, ITINERO® does not require very cautious handling or storage.

Ease of installation



Easy Access

On bridges and tunnels, drainage pipe systems can be difficult to install because of specific site conditions. On renovation sites, speed of installation is required to limit traffic or service disruption. Bridge deck drainage systems have to be robust, easy to install and to maintain.

During the installation phase, the accesses to the underdeck are generally limited. The **3 meter long** ITINERO® pipes accommodate installation through manholes, and hence perfectly meet bridges building specificities.



Mechanical Assembly

ITINERO® is a modular cast iron range, assembled traditionally using mechanical couplings, without time constraints such as welding (no fire permit required) or gluing. Traditional mechanical assembly with simple tools is more likely to achieve 100% of the expected performance than other materials.

Unlike some plastic pipework, **ITINERO® can be installed whatever the weather conditions** (heat, cold, rain, etc).

The mechanical couplings allow precise adjustment onsite or can be retrofit. The low expansion coefficient of the range eases the design stage with simple bracketing requirements. It also means savings on thermal limiters and no risk of errors onsite.



Accommodation to site conditions

ITINERO® is available in a wide range of diameters **from 100 up to 600 mm** for consistent drainage pipe systems. ITINERO® pipe system is adaptable:

- Spigot pipes are easily cut to length onsite,
- A wide range of fittings
- Angular deflection of the couplings (3° or 1,5° cording to DN) to follow large curvatures without additional fittings.

Sustainability



Environmental protection and sustainability are key in building projects everywhere. This is particularly true where they are bridging rivers or wetlands. Drainage systems are collecting surface waters containing silt, debris and contaminants (heavy metals...) from the pavement. Perfect water tightness of the pipework is thus a strong requirement to prevent leakage to the nature.



Watertightness

Pam Building's cast iron is totally impervious and the joints are **perfectly watertight**. The couplings are designed to withstand high levels of hydrostatic pressure. The careful selection of elastomer and the mechanical assembly make it easy to reach the required performance. Unlike plastic pipe systems which are glued or welded, cast iron assemblies are **not dependent on demanding process control**. In case of defective installation, causing a leaking coupling, it can be easily removed and reinstalled so that ITINERO® pipe systems are watertight instantly and over time.

Safe
& forever
circular

No waste, fully recyclable

Pam Building's cast iron is made of an alloy of iron, carbon and silicon. It is made from **99% recycled raw materials**, sourced in a perimeter of 150km around our Bayard-sur-Marne plant, and is **fully recyclable** through well-organized trade and harmless process.

Bridges often straddle rivers or wet lands, therefore, the drainage systems that drain silt, debris and contaminants (heavy metals...) from the pavement need to be perfectly watertight to prevent leaks and their contamination.

Each year, we recycle the
equivalent of 18,000 cars



Aesthetics

There is always a concern for bridges not to ruin the landscape. Therefore, designers are very sensitive about their aesthetic features. For this reason, the concrete grey coloured ITINERO® range will be perfectly fit and forgotten. For specific requirements, ITINERO® components can be over-painted by the installer with any alkyd resin, or glycerophthalic paint dedicated to metal care.

Integration into the structures

According to the aesthetics desired by the designer, ITINERO® can be colour-matched for a **perfect integration into the bridge**. Angular deflections achievable by the couplings to follow the curvatures of the structures, contribute to the harmony of the project.



Certified performance & Quality

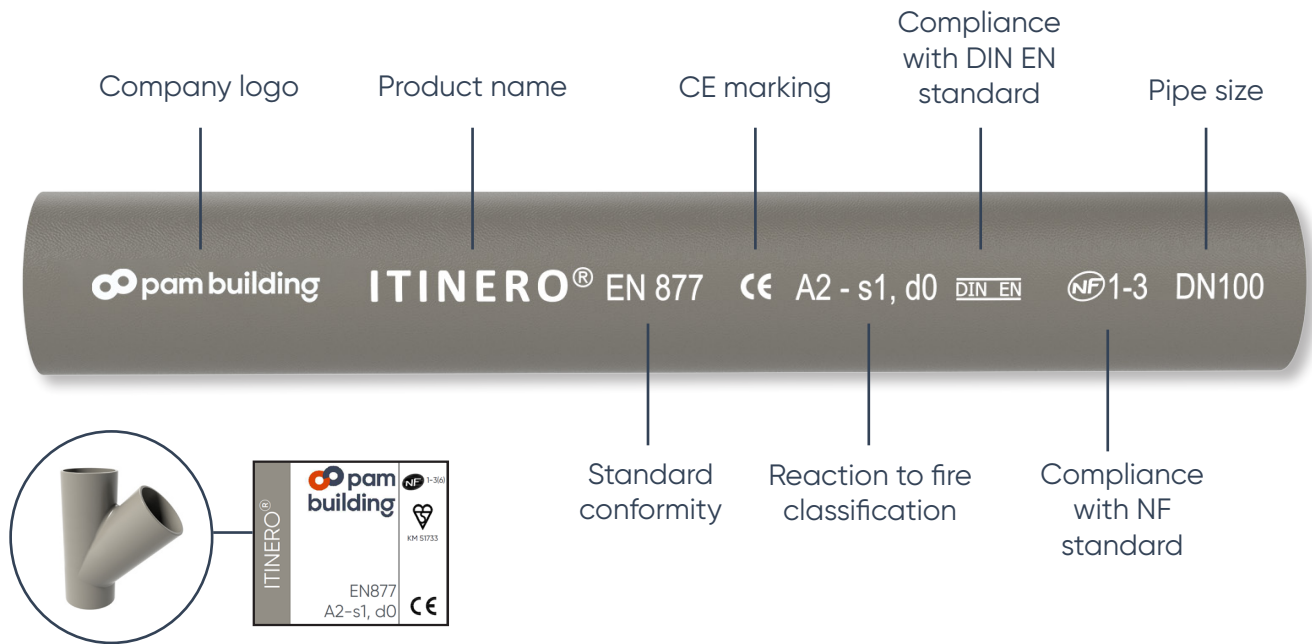
Pam Building's pipe systems comply with the European standard **EN 877**, applicable to a system: cast iron pipes and fittings, couplings and accessories for building drainage.

Only compliance with EN 877, which is validated by a third party for all criteria and periodically tested, can guarantee the performance of the systems you specify.

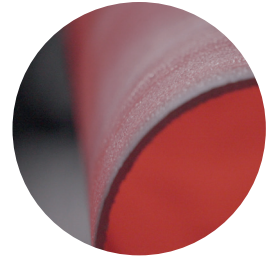
To comply with the CE mark, our cast iron drainage systems bear **quality marks**.



Product Marking



Cast Iron a long lasting and noble material



COMPLIANCE

Manufacturing process and products are in compliance with international standards.



LONG LIFE

Durable and long lasting products saving long term financial resources. Watertightness, resistance to thermal expansion and internal pressure.



CHEMICAL AND CORROSION RESISTANCE

Resistant to aggressive and non aggressive effluents thanks to their coatings performances.



MINIMAL MAINTENANCE

Minimal maintenance during the lifetime of the building in normal conditions.



EASE OF INSTALLATION

Resistant to aggressive and non aggressive effluents thanks to their coatings performances.



FOREVER CIRCULAR

Our cast iron is made from 99% of recycled material and fully recyclable.

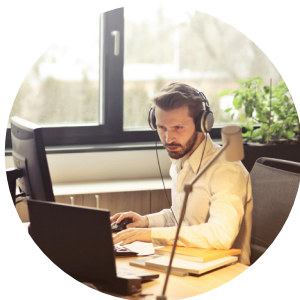
10 YEARS SYSTEM WARRANTY

100% Pam Building System

100% Guaranteed Performances

Only the exclusive combination of Pam Building products (pipes, fittings, couplings) and the respect of the implementation rules guarantees you results in accordance with the test reports from Pam Building and allows you to benefit from the 10 years warranty.

YOU HAVE A PROJECT? ASK OUR EXPERTS



Technical support

We can provide you bill of quantities, recommendations, information about acoustics, fire protection, or any other topic you have.



Design study

Send us the drawing of the bridge and the drainage location (outlet and collector) in DWG format. We will provide you with a design recommendation, the discharge system's set-up, a bill of quantities.

We will support you with the



BIM library

- Generic cast iron EN 877 BIM library
- Plus range EN 877 BIM library

www.pambuilding.com

tc@pambuilding.com • Tel: +33 (0)3 66 88 19 47



For 500 years, we have been designing, manufacturing and supplying high-quality drainage systems for residential and commercial buildings and engineering structures.

We work exclusively with cast iron, a noble and durable material, of which we are a specialist and leader.

As a leading manufacturer, we claim excellence in our processes, products and services.

As a responsible manufacturer, we are at the forefront of sustainable performance to help reduce the carbon footprint of the construction sector.

As an innovative manufacturer, we put all our creative audacity into developing new, more specific and more efficient technologies, to deliver better products for your future needs.



Over **400**
employees

Sales in more than
50 countries

+38 : our indicator
« Employee Net
Promoter » that
reflects the number of
staff willing to become
Ambassadors of the
company (on a scale of
-100 to +100)

2 manufacturing sites
for our products:

- Bayard sur Marne in France
- Telford in England

35%
female managers

1st business in the
cast iron industry to
have published a third-party
validated Environmental
Product Declaration (EPD)

1/3
internships and
work-study contracts
converted to full
employment contracts

Committed to reducing our impact on the environment



Our mission: the safety and durability of buildings

Our cast iron solutions and systems contribute to ensure the comfort, safety and durability of the most demanding residential and commercial buildings. Their characteristics allow them to contribute to HQE, BREEAM, LEED and other international environmental certifications.



Recycling of metal waste

Our products are made of 99% recycled materials (mainly scrap metal), which can be recycled indefinitely. Cast iron is a simple and sustainable material that allows a smart reuse of materials. Resistant, reliable and durable, cast iron has a bright future ahead of it. In 2021, we recycled the equivalent of 21,000 cars.



Our ambitious goals for 2028-2030

Reducing carbon emissions directly linked to the cast iron pipe manufacturing process: a project for a electric furnace, a low-carbon energy source in France, was opened in 2024 for commissioning by 2028-2030 at our Bayard-sur-Marne site. A key step in pursuing the company's ambitions in terms of circular economy and environmental responsibility



Customer service

Opening hours : 8.30am -5.30pm (french time)

Pam Building

130, Impasse du Chêne
54700 BOUXIERES-SOUS-FROIDMONT
www.pambuilding.com

