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# European Association for Ductile Iron Pipe Systems

## Fachgemeinschaft Guss-Rohrsysteme

# NEWSLETTER

02/2020

Dear Readers,

Covid-19 has shown us how important the regional supply of systemically important products can be in times of crisis. This includes not only protective masks but also quality products for supply and disposal. Even before the outbreak of the Corona crisis, the increasing sensitivity for climate and environmental issues has led to the fact that dogmas of our economic life have to be questioned:Does it make sense to transport products halfway around the world if they can be produced locally in a resource-saving manner? It is from this changed perspective that I am pleased to present to you today two exciting applications of cast iron pipe systems and a technical advancement:

Inner-city, large-dimensioned interim pipelines made of ductile cast iron pipes have proven themselves sufficiently in practice, so that Berliner Wasserbetriebe are preparing the draft of a works standard so that interim pipelines can soon be planned and built in accordance with the generally recognised rules of technology. This impression was again confirmed in the Hermann-Hesse-Strasse construction project.
Ductile cast iron pipe systems in anergy networks for heating and cooling buildings also reflect the state of the art in the thermal use of sea and river water. Starting with the range of applications for anergy networks with ductile cast iron pipes, through the classification in the Swiss Energy Strategy 2050 to technical details, you will find information in our second article.
The product description „New generation of strainers" deals with a small but fine component for the protection of control valves and water meters. A reinforced strainer guide reliably prevents deformation during maintenance of the strainer, whose surface area is at least twice as large as the nominal size, so that pressure loss is minimized. The inclined position of the strainer minimizes its risk of clogging.

Enjoy and inspire reading
Yours

Christoph Bennerscheidt
Managing Director (MD) of EADIPS FGR

## Always topical, always informed

The online Newsletter published periodically provides professionals in the field with up-to-date information about interesting European pipeline projects as well as the many and varied activities of EADIPS®/FGR®.

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# Large-dimension interim pipeline with cast iron systems

Positive locking and flexible thrust-resistant systems have extended the range of application of **ductile cast iron systems** and shown that they can withstand all loads produced by internal and external forces. In the construction and during the operation of pipelines with restrained joints in tunnels and under bridges, when used with the application of trenchless installation techniques and when laying in open trenches, the planning engineer is working in the realm of generally accepted codes of practice.

**Interim pipelines** are also constructed using **thrust-resistant ductile iron pipes**. They are not makeshift measures but offer transitional or workaround solutions for an urgent engineering problem: by using them, supply or disposal can be ensured over limited periods while sections of pipeline are being repaired or newly constructed. Generally speaking, interim solutions have to secure problem-free continued operation even under changing operating conditions.

The construction and operation of **interim pipelines** have sufficiently proved themselves in practice; they were planned individually and were achieved successfully and to the satisfaction of the clients. Building on this, Berliner Wasserbetriebe is preparing the draft of a works standard so that **interim pipelines** will soon be able to be planned and constructed according to generally accepted codes of practice.

## Big sizes – big challenges

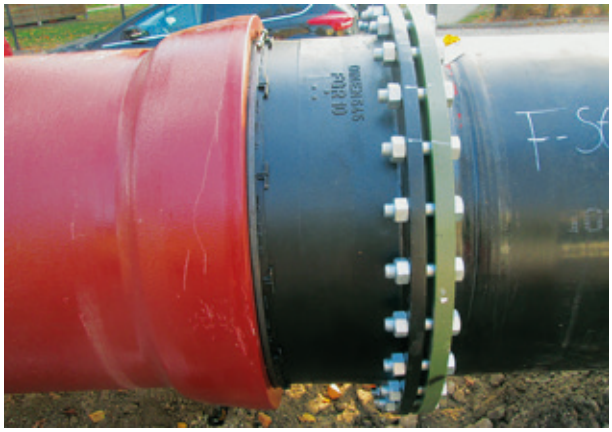
In its investment planning up to the year 2023, Berliner Wasserbetriebe is directing its main focus on **sewage disposal** and especially on the replacement of **pressure pipelines**, which will be reflected in very high investment costs. In inner-city areas, large-dimension pipelines in particular mean that planning and execution are faced with big challenges if disruptions are to be kept as low as possible. In addition to new constructions with steel and **cast iron pipes**, renovation procedures will also be used. The choice of material and construction process and coordination with all relevant legal entities is a prerequisite for a successful construction project. In addition to implementation according to engineering standards, the chosen construction project must also represent the best option from the point of view of costs.

## Practical example of a construction project: Hermann-Hesse-Straße

In the Berlin district of Pankow, in Hermann-Hesse-Straße, an old **DN 1200 grey cast iron pipeline** was to be replaced along the same route by new **ductile cast iron pipes** of the same nominal size. To do this, it was necessary to set up a 378 m long emergency or **interim pipeline** with **ductile iron pipes** above ground along the central reservation (parking strip) between the traffic lanes of Hermann-Hesse-Straße. To achieve this, clearance had to be secured for execution with at least one side of the street being able to take traffic (one-way traffic regulation).

In addition, the measures taken had to consider the interests of a hotel, a children's nursery and a school. This meant that the school bus and delivery vehicles had to have access to certain areas of the closed carriageway for short periods and a corresponding stopping point had to be set up for the bus. The interim route also had to be culverted to make it possible to drive over it.

Despite the stable and robust pipe material and the thrust protection, a pipeline laid above ground along with its components must present a high level of security against external mechanical stresses (vehicle accidents, vandalism, fire control or falling trees and branches) and guarantee safe operation. A careful risk analysis had to be carried out.



Flanged spigot assembled in the pipe socket using the BLS® system.

Assembled BLS® joint with pipe supports.

## Cast iron pipe systems meet all requirements

For the construction of the new **sewage pressure pipeline**, it was planned to use DN 1200 thrust-resistant **cast iron pipes**. For the **interim pipeline, DN 1000 thrust-resistant cast iron pipes** to EN 598 with **BLS® push-in joints** for easy assembly and dismantling were selected. Being a temporary measure, this reduction in dimension was justifiable. The ductile material of the pipe is impermeable and it is sufficient to provide a bracket or the corresponding saddle as a support every 6 m in the socket area.

For **cast iron pipelines** laid above ground it is obligatory to use a positive locking thrust protection system as friction-type thrust protection systems, such as **TYTON SIT PLUS®**, only offer the corresponding guarantees for installation underground. Regardless of the length of the section of pipeline, it is also basically necessary that each **push-in joint** is resistant to tensile forces.

It was precisely the ease of handling, secure operation and ease of assembly and dismantling which were decisive as regards the use of **ductile cast iron pipe systems**. Their 6 m length makes the pipes easy to transport and install.

It is clear that, as compared with welded steel pipelines, installation using the **push-in joint** saves a considerable amount of time, in contrast to welds and the subsequent corrosion protection which they need. Separating welded steel pipelines when dismantling them afterwards also takes time and is associated with real nuisance factors (noise, dust, smell) for the surrounding area. The dismantled pipes can be used again multiple times without problem. The **cast iron pipes** are robust and joined together every 6 m by the flexible restrained joints.

For changes of direction in the area of the route and for the culverts (making it possible to drive over the pipeline) the client decided to opt for welded steel pipe sections which have been joined to the pipeline using fittings (flanged spigots and flanged sockets) from the full **BLS® range**.

## Completion made to measure

Hardwood cradles were used to support the **interim pipeline**. The upper part was designed as a saddle with a steel sheet strip inserted in it as a kind of bearing so that, in case of any longitudinal expansion, the saddle could not tip over. Beneath the wooden elements, a square, 1 cm thick steel plate was applied to the subgrade to distribute the load.

The pipeline was installed along precisely straight lines, both horizontally and vertically. The weight of a DN 1000 pipe when completely full is 4.7 tonnes with a permissible tractive force for the **BLS® push-in joint** of 1,560 kN. The pipes were then assembled according to the manufacturer's specifications by means of chain hoists, with the BLS® segments in the crown of the pipe being plugged into the windows of the the socket face, distributed around the circumference and then moved along. The position of the BLS® segments is additionally secured using fixing brackets supplied to the site.

After assembly, the joint has to be stretched by jacking (or with a hydraulic ram) between the socket face and the bracket of the assembling tool so as to reduce possible subsequent longitudinal expansion to a minimum, but also to exclude any excess stretching of the pipe string during pressure testing.

Once the pipes had been assembled, the sections of pipeline underwent pressure tests using fittings, which were the same as the fittings required for assembly. Tightness testing of pressure pipelines laid above ground has two purposes:

– the final stretching of the restrained joints,
– at the same time, to provide evidence of the integrity and tightness of the pipeline.

Because the pipeline is laid above ground, the highest safety levels must be guaranteed for construction personnel and the surrounding environment. Subsequent operating conditions will rely on these pressure testing parameters and thus be safeguarded.

## Everything went perfectly

Once the replacement **DN 1200 pressure pipeline** was commissioned, the **interim pipeline** was able to be dismantled and taken away.

As regards time taken, handling characteristics, sustainability (they can be reused and are environmentally compatible) as well as security during operation, **ductile iron pipe systems** with **BLS® push-in joints** are the best alternative for the construction of **interim pipelines**. The corresponding technical rules and regulations are being prepared by Berliner Wasserbetriebe; they also contain theoretical principles for planners.

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The article was slightly shortened by the editors. You can find the complete article with various illustrations as a PDF in the **download area** under Downloads Annual Issues EADIPS FGR.

# Anergy networks with ductile iron pipes

The main focus of the so called Swiss Energy Strategy 2050 lies in the use of local, **renewable energy sources**. Their most important aims are a sustainable guarantee of **energy supply**, consistent development of existing energy efficiency potentials, reduction of $CO_2$ emissions and full utilisation of existing potentials of new **renewable energy sources**. So, in Switzerland, the final energy consumption (final energy = primary energy after energy conversion and transmission losses) per person should decrease in the medium term to 2035 by 43 % and in fact in the long term to 2050 by 54 % as compared with the base year of 2000.

When considering new **renewable energy sources**, the thermal utilisation of water and wastewater – in so-called **Anergy networks** for heating or cooling buildings – offers enormous potential. With the continued technical development of heat pumps and heat exchangers, a serious improvement has been achieved in their efficiency levels, which makes these technologies very interesting for the **utilisation of heat** from water and wastewater.

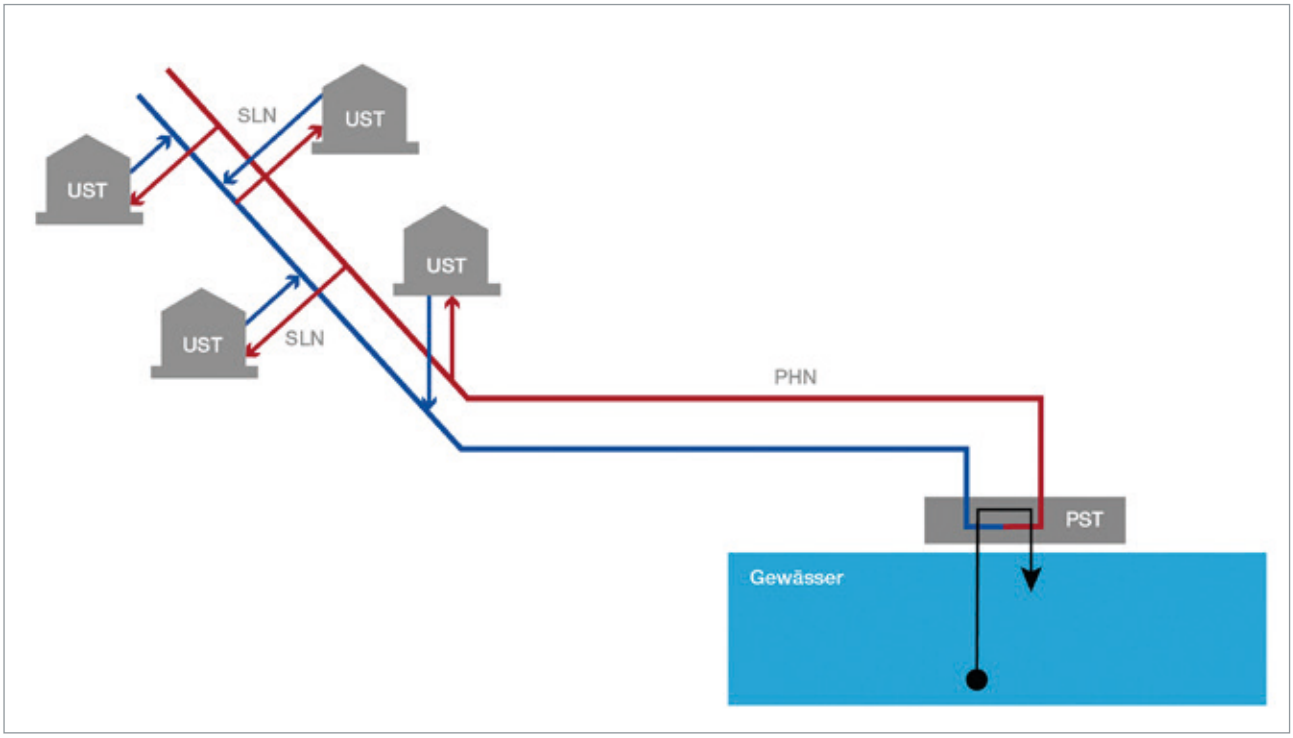


Diagram showing an example of an Anergy network.

## Thermal utilisation of lake and river water

With the aims of a **sustainable supply of energy** and a reduction of $CO_2$ emissions, the **use of heat or cold** from lakes or rivers is increasingly attractive. Since the larger Swiss lakes – such as Lake Constance, Lake Neuchâtel, Lake Zurich, Lake Lucerne or Lake Geneva – are also the locations of larger towns, it is precisely here that using the enormous heat potential of the lakes is a must.

## Utilising heat from wastewater or industrial process water

Wastewater is considerably warmer in winter and cooler in summer than the air outside and so can be used for heating or cooling buildings. A precondition for an economical **use of energy from wastewater and process water** is the proximity of the energy consumers to a large sewer, a sewage treatment plant or the industrial plant using the process water.

## The technology of heat and cold recovery

**Anergy networks** are a combination of pumping stations, heat exchangers, a network of pipelines and heat pumps, by means of which the energy in water or wastewater can be used. These days the **recovery of heat and cold** respectively by heat exchangers and the recovery by compression and expansion by heat pumps into heating energy and for water heating are simple, tried and tested technologies which, in many cases, are very economical and competitive.

In order to **generate power**, a lot of energy is needed to drive the pumps in the piping network, which places high requirements on energy efficiency and particularly on the hydraulic capacity of the pipe material used. Pressure and/or energy losses can be reduced to a minimum by selecting the ideal pipeline dimensions and by the choice of pipes with a hydraulically smooth internal lining.

## Anergy network – energy production in the low temperature range

An **Anergy network** is a low temperature network for supplying low-temperature energy from waste heat or from renewable sources. It consists of a closed-circuit system, often designed as double pipelines for feed and return flows as well as inlet and outlet pipelines to the heat pumps in the buildings.

## Ductile iron pipes with polyurethane lining promote energy efficiency

For the construction of the **pipeline system**, high operational reliability, economical operation and a long service life are decisive criteria when selecting the suitable pipe material. **Cast iron pipes** with **polyurethane (PUR) lining** are perfectly suited for energy-efficient use in **Anergy networks**. The proven, innovative vonRoll PUR lining has unbeatable performance levels.

DUCPUR **ductile iron pipes** with active zinc-aluminium **corrosion protection** and final coating to EN 545 can be laid in many types of soil. Soils of different aggression classes require special attention. Therefore, **ductile cast iron pipes** ECOPUR or CEMPUR with reinforced coating can be used under difficult conditions. These two **full protection pipes** are the solution for every installation situation, they

- give lasting protection against mechanical and chemical attack
- are suitable for all types of soil with any level of aggressiveness
- allow the ballast grain sizes permissible for the pipe coating of 0 – 63 mm, maximum size 100 mm
- have passive and active **corrosion protection** and are stable over their entire working life
- are resistant to galvanic corrosion due to stray currents (e.g. by earthing, along railway lines or by mixed soils).

## Optimised installation with flexible push-in joints

With full protection ECOPUR and CEMPUR pipes, the **pipeline system** is effectively and integrally protected against all underground influences. At the same time, the **HYDROTIGHT and BLS® flexible push-in joints** guarantee the best possible operational reliability in **Anergy networks**.

The **ductile iron pipes**, often used in **Anergy networks** as double, feed-and-return pipelines, often have to be provided with multiple fittings and valves due to limited space. With the flexible **HYDROTIGHT and BLS® push-in joints**, the installation process is massively accelerated, reliability is extremely high and laying quality is at its best. As proven and secure connection techniques, they offer enormous advantages resulting in high cost savings in civil engineering and pipe laying work.

The vonRoll ECOSYS pipe system is perfectly matched to the area of application in **Anergy networks**. The ECOPUR, DUCPUR and CEMPUR type pressure pipes are available from DN 80 to DN 700. Integral full-protection ECOFIT fittings in HYDROTIGHT and BLS® versions, protected with epoxy coating, as well as **full-protection fittings** complete the range.

DUCPUR double DN 700 pipeline with feed and return flow.

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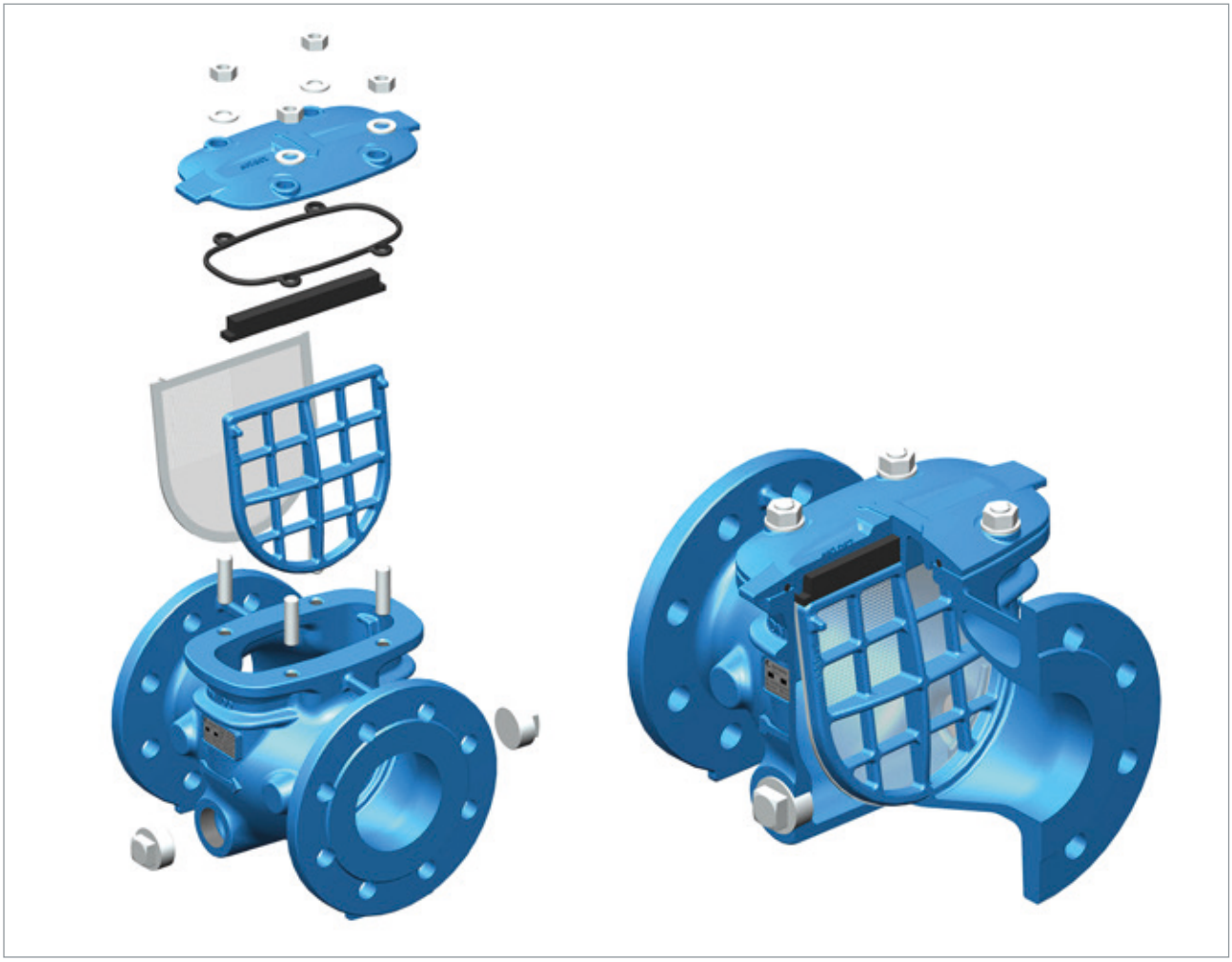
The article was slightly shortened by the editors. You can find the complete article with various illustrations as a PDF in the **download area** under Downloads Annual Issues EADIPS FGR.

# Briefly introduced: New generation of strainers

The ERHARD Strainer F3 10 in straight seat design is suitable for the protection of control valves, water meters, etc. It is used in water supply, water treatment, irrigation networks and pumping stations. It is offered in the nominal widths DN 50 to DN 250 and in the pressure stages PN 10, PN 16 and PN 25 (larger nominal widths and pressure stages are of course available on request).



The design is compact and allows uncomplicated, easy maintenance.

## Features and benefits

The design of the strainer is compact and allows easy maintenance thanks to the cover fixed with four screws from above. A reinforced strainer guide reliably prevents deformation during maintenance of the strainer, whose surface area is at least twice as large as the nominal size, thus minimizing pressure loss. The inclined position of the strainer minimizes the risk of clogging. The mesh size in the standard model is 2 mm. Other mesh sizes, such as 0.5 mm, 1 mm or 8 mm are available on request.

Double-sided sealing plugs made of A2 with a thread of 1 ½" allow cleaning without shutting off the line; a drain valve is optionally available. An additional flange hole on the top helps to install the valve in or out of the pipeline.

There is often little space at the bottom of the chamber; here, maintenance access from above is a major advantage.

## Materials and dimensions

**Materials (standard)**
Housing, cover and strainer guide: ductile cast iron EN-GJS-450-10
Flat screen: stainless steel 1.4401
Seals: EPDM
Screws and sealing plugs: A2

**Proven corrosion protection with powder coating**
Inside and outside seamless and pore-free epoxy plastic coating (EKB), layer thickness at least 250 µm

**Operating temperature**
Permissible operating temperature: max. 60 °C

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