HIGH PRESSURE PIPING SYSTEMS
FOR POWER PLANTS
Expert advice to our customers is the bedrock of the growing relationship with a large number of companies from all sectors of the economy which in some cases has been ongoing for decades. Endeavouring to achieve the best possible solution for our customers tailored to their particular needs is always uppermost in our minds.

Our project management guarantees the economic on-time execution of orders from all sectors of pipe construction. SAP tools and the independent development program “BHR Manager” underpin planning and execution. Our project managers undergo continuous training at specialist seminars and are familiarised with the latest methods in project management. We can provide a team of qualified people for each project, and of course we also take on general contractor assignments.
Planning and construction

Bilfinger Piping Technologies has many years’ experience in engineering and appropriate references. Its engineering portfolio comprises research and development, conception and process engineering, planning (basic and detailed), commissioning, business support and monitoring. Bilfinger Piping Technologies is a member of all the relevant professional associations and committees. The use of state of the art planning tools such as PDMS for 3D plant planning and calculation programs such as Rohr 2 or Caesar II is standard. The design and construction of individual components, the planning of piping systems through to complete water-steam cycles or full thermal plants are our business. The requirements of thermo- and fluid dynamics, stability and materials technology together with process engineering are catered for and covered in planning.

Since Bilfinger Piping Technologies is also involved in prefabrication and assembly, our technicians and engineers are both familiar with and comply with the fabrication and assembly requirements in the planning process.

Basic engineering:
- description of function and process
- energy and material flow balances
- R&I flow charts with process data
- setting up of pipe classifications
- installation of piping plans
- setting up of flow isometrics and support concepts

<table>
<thead>
<tr>
<th>Systems</th>
<th>LBA Main Steam</th>
<th>LBC Cold Reheat</th>
<th>LBB Hot Reheat</th>
<th>LAB Feedwater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>X10CrWMoVNb92</td>
<td>16Mo3</td>
<td>X10CrWMoVNb92</td>
<td>15NiCuMoNb5-6-4</td>
</tr>
<tr>
<td>Design press.</td>
<td>295 bar</td>
<td>75 bar</td>
<td>90 bar</td>
<td>430 bar</td>
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<tr>
<td>Design temp.</td>
<td>610 °C</td>
<td>415 °C</td>
<td>623 °C</td>
<td>290 °C</td>
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<tr>
<td>Operating</td>
<td>pressure</td>
<td>280 bar</td>
<td>60 bar</td>
<td>56 bar</td>
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<tr>
<td>Operating</td>
<td></td>
<td>340 bar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>temperature</td>
<td>600 °C</td>
<td>315 °C</td>
<td>605 °C</td>
</tr>
<tr>
<td>Operating</td>
<td></td>
<td>192 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>355 Di x 97 Mmth</td>
<td>762 Di x 31 Wth</td>
<td>720 Di x 43 Mmth</td>
<td>500 Di x 44 Mmth</td>
</tr>
<tr>
<td>Pipe-m</td>
<td>1,180 m</td>
<td>1,300 m</td>
<td>2,060 m</td>
<td>1,500 m</td>
</tr>
<tr>
<td>Pipe weight</td>
<td>1,064 mt</td>
<td>880 mt</td>
<td>1,300 mt</td>
<td>780 mt</td>
</tr>
</tbody>
</table>
In-house fabrication

Bilfinger Piping Technologies operates both its own modern in-plant fabrication in Germany for the requirements of current projects in-house and for external customers. This gives us unrivalled flexibility and reliability in providing all the components.

**SAW Socket Welding**
For quality and economic reasons, the Submerged Arc Welding process (SAW) is preferred by Bilfinger Piping Technologies for the welding of rotating circumferential and branch weld seams. The process provides a melt-off capacity that can be up to ten times higher than SMAW. This means it achieves a higher productivity with a high quality seam.

**SAW Narrow-Gap Welding**
SAW Narrow-Gap Welding increases the productivity even further if compared to standard SAW welding. After a development process of many years, SAW Narrow-Gap welding is now used at Bilfinger Piping Technologies for thick-walled components up to 500 mm. The cost-effectiveness is achieved through the increased melt-off capacity during SAW welding and in addition through welding material savings.

**Narrow-Gap Orbital Welding** *(e.g. P91, P92, Alloy 617, etc.)*
For current power plant new build projects with wall thicknesses of more than 100 mm, the narrow-gap type TIG orbital welding method has been further developed since 2005. This guarantees a regular positional structure and excellent welding properties with a much lower risk of welding errors, so that both the required weld quality is met and the risk of time delays can be reduced.

**Single layer Internal Cladding**
The internal cladding with CrNi alloys of pipes for the primary cooling cycle of nuclear reactors puts high demands on quality and execution. For example, the requirements for intercrystalline resistance, crack resistance and for a dentfree and smooth cladding surface can only be met if certain bands and weld powders are used and if the appropriate welding parameters are achieved. After many years of research and development work, the welding, annealing and NDE processes were being optimized and the achievement of the tough requirements proven through a series of tests.

**Induction bend**
Bending with induction heat input is an advanced procedure using a highly automated and continuous forming process. During the process the pipe will be pushed into a narrow zone which is heated by a ring shape inductor.

**Heat treatment**
Induction bends and welded constructions may be heat treated, as per requirements of material and application. We have furnaces with accurate temperature control up to 1200 °C. After the heat treatment the options of cooling with air or quenching with water are available.

**Testing**
All destructive and non-destructive tests can be performed in our own laboratory in the factory. In the case of special tests we co-operate closely with certified testing institutes. Representatives of the most important Third Party institutes are present every day at our works.

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We create excellence based on quality:
- manufacturing
- fabrication
- service
Construction
The installation specialists are in demand globally, dealing with demanding work worldwide. When it comes to quality and meeting deadlines, people turn to Bilfinger Piping Technologies.

Bilfinger Piping Technologies is a market leader in power plant construction in the HP and IP/LP packages and deals with critical tasks everywhere to the satisfaction of the customer. Our references also include the biggest power plants in the world, installed using the most up-to-date tools such as orbital welding.

All power plant steels and dimensions are used, for example X10Cr-WMoV Nb92 with 355 Di x 97 mm Mwth. The as yet unresearched steels of future power plants are being tested now by Bilfinger Piping Technologies for use in installation in a community project of the power generators.

Maintenance
More and more plant operators are concentrating on the actual ethos of the company and are looking to outsource maintenance. With its extensive experience, Bilfinger Piping Technologies GmbH is the ideal partner in this. For availability and reliability, your plant is in safe hands with us.

In the power plants sector, our maintenance service enjoys an excellent reputation for piping systems. This service includes on-site inventory, system analysis, thermal calculations for the start-up and shutdown procedures, water hammer and vibration calculations and determination of residual life. Finally, we assess the results on the basis of the regulations in place and in the context of the specific plant situation and produce an overall analysis and proposals for optimisation. In new power plants, our HP pipelines are delivered including on-line life monitoring. In industrial pipeline construction, the wide range of all the work involved there is covered.
References
Energy conventional e.g.
- RWE Power Plant Neurath, Germany, 2 x 1100 MW
- Residual Waste Thermal Power Plant Stuttgart, Germany, tie-in to existing power plant
- Waste incineration plant Uppsala, Sweden, water and steam cycle
- CCPP Hamm Uentrop, Germany, 2 x 400 MW water-steam-cycle

Energy nuclear e.g.
- 1600 MWe (EPR) Olkiluoto 3, Finland, Nuclear Island
  Detail planning, prefabrication and erection of all piping inside Nuclear Island
- 1600 MWe (EPR) Olkiluoto 3, Finland, Turbine Island
  Planning, delivery, prefabrication and erection of main steam and feed water lines