



Tunnelling steel pipe systems.
Cost-efficient, flexible, reliable.



You tunnel. We supply the flexible pipe systems.

Tough environment, tough conditions, maximum operating reliability and simple installation. Alvenius FlowMax® complete steel pipe systems are unrivalled in tunnels, and the corrosion-protected system comprises complete solutions with pipes, couplings and fittings.

Short lead times, fixed project finish dates and defined commissioning of the tunnel mean that great demands are placed on consultants and partners. You can rely on us to deliver from start to finish.

On time, with the right functionality and at an overall level of quality that eliminates stoppages or standstills in the system.

Pipe systems with many advantages

Alvenius FlowMax® pipes are available in dimensions 48 – 508 mm for both low-pressure and high-pressure systems up to 100 bar. All pipes are pressure-tested at up to 1.5 times the nominal pressure.

FlowMax® pipes have a number of advantages over plastic pipes. For the same pressure class, for example, steel pipes are considerably lighter. At just 10 bar working pressure, a plastic pipe becomes heavy and difficult to handle. And above all else, steel pipes are fireproof.

FlowMax® pipes comply with quality standards EN 10217-1, ISO 9001 (quality) and ISO 14001 (environment) and the Pressure Equipment Directive (PED 2014/68/EU).

- Easy to handle during installation, assembly and disassembly
- Shorter maintenance and repair times
- Improved ergonomics for fitters
- Optimised transport

Low flow resistance – lower operating costs

The high steel quality and spiral welding of the pipes allow thin material to be used. The thin pipe walls provide a range of advantages as the internal diameter is maximised in relation to the external diameter:

- Lower flow resistance as a result of the larger internal diameter
- Ability to use smaller pumps or pumps with lower power as a result of the lower flow resistance
- The lower flow resistance may also make it possible to reduce the number of pumps in the system

Flexible financing solutions

With Alvenius, we can create a tailored financial solution that is optimised to suit your operations. Purchase, rental or buy back agreements are examples of the solutions we can offer.





Reliable couplings Recommended for Tunnel Drilling

One of many advantages with Alvenius solutions is that installation is very easy due to the quick-coupling systems.

No welding. No special tools. No time-consuming training plus entirely without hot work.

K10/K70

Our metric standard quick coupling system for pressure up to 40 bar, depending on dimensions.

The K10 system is very flexible, easy to assemble and each coupling can manage deflection up to 4°.

K70 is an articulated coupling for even quicker, more flexible installation – you only need to tighten one bolt.

- K10 dimensions Ø48 – 355 mm
K70 dimensions Ø76 – 152 mm
- Self-sealing gasket. Also suitable for vacuum under certain circumstances
- Deflection up to 4°
- Standard gasket of EPDM rubber, also resistant to chemicals
- Working temperature -35 to + 110°
- Option to use nitrile or silicone gaskets for long-term contact with petroleum
- Insensitive to vibrations
- Absorbs axial movement in the pipe system thanks to the design of the coupling



Our range of couplings

– when needed

Choose the right couplings for the system parameters
– pressure, temperature, bend angles, and types of media.
Alvenius has the solutions that match your needs!

Quick couplings (Victaulic type)

For road tunnel systems Alvenius offers quick coupling systems in ISO standards for pressure from 15 bar up to over 100 bar.

Different types of rigid or flexible quick coupling are available, depending on the type of installation, the dimensions and the pressure class.

- Standard gasket of EPDM rubber
- Working temperature -35 to + 110°
- Deflection up to 2.5°
- Insensitive to vibrations
- Absorbs axial movement in the pipe system thanks to the design of the coupling

Ten times faster assembly

No welding. No special tools. No time-consuming training.

All you need are pipes, gaskets, couplings and a box spanner. Compared with welding, assembly goes at least ten times faster and entirely without special training or hot work.



Plain end couplings (Straub)

Plain end couplings eliminate the need for any pipe end preparation and are available in different types, depending on the type of installation, the dimensions and the pressure class.

- Self-anchoring
- Resists axial force
- Detachable
- Reusable

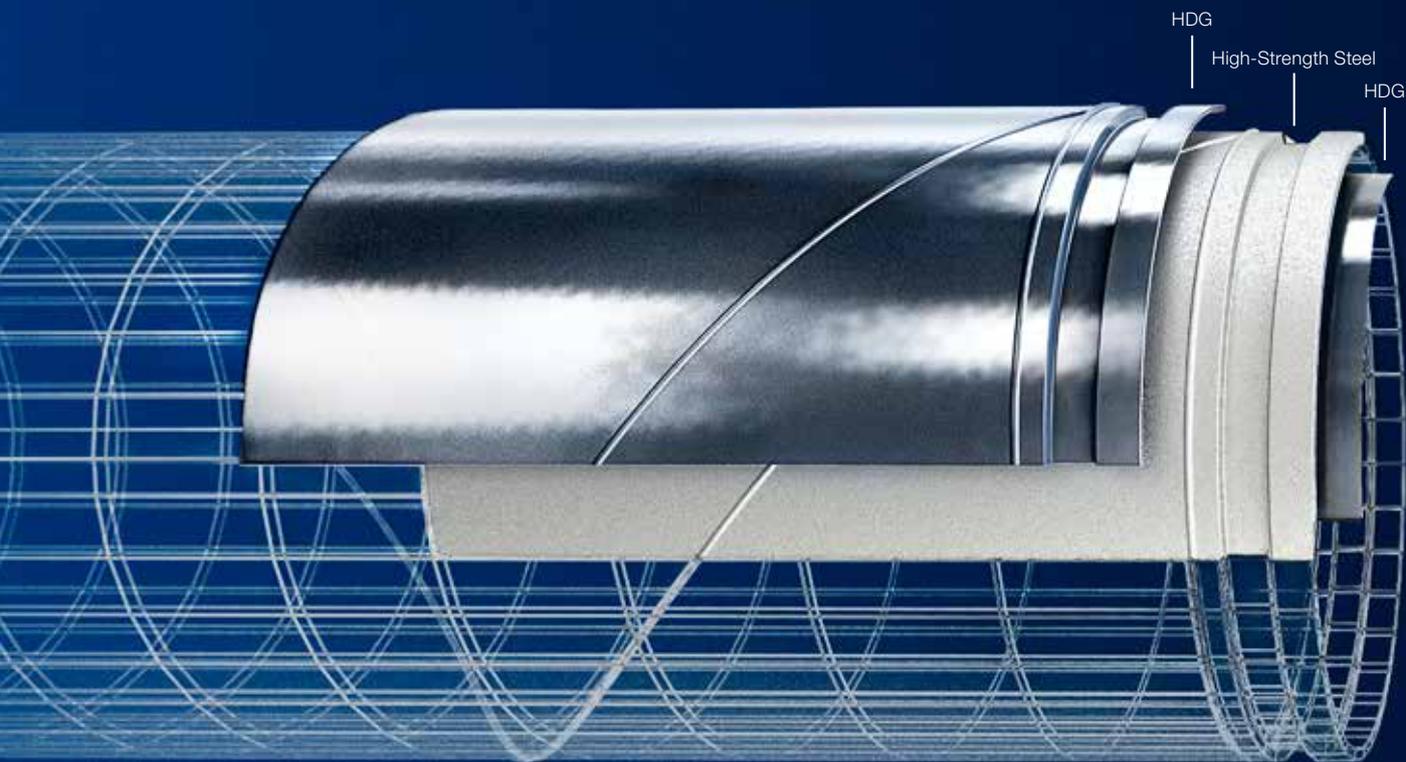


Flanges

Alvenius pipes are available with flanges welded onto the pipe ends. The flanges are available in ANSI and DIN standards with different pressure classes.

- Strong due to better impact resistance
- High safety factor against pressure fluctuations, water hammer and outside impacts





A coated pipe is a reliable pipe Recommended for Tunnel Drilling

Effective surface coating enhances the performance dramatically. Especially in environments where corrosion and aggressive environment can be an issue.

That's why the FlowMax® piping system for tunnel drilling is completely covered and coated with highly effective HDG.

HDG

HDG (hot-dip galvanization) is ideal for pipes that are fitted and subsequently removed thanks to the very robust coating.

The deep protection makes HDG pipes more impact-resistant and more resistant to wind and weather than untreated pipes. The zinc layer also has a unique 'self-healing' property if the surface layer becomes damaged.



Additional coating solutions

– when needed

No matter what media you pump in your piping system, a surface coating enhances the performance dramatically.

Different situations and applications requires its tailor-made coating solution.

Alvenius provides what you need!

CorroFlo® overall facts

- Very good adhesion – no risk for cracking or flaking
- High chemical resistance against acids and alkalis
- Proven outdoor properties – UV resistant, flexible down to -70°
- Working temperature in air – continuously up to $+60^{\circ}$
- Electrical insulating
- Eco-friendly
- C5-Marine environment compliance. Meaning extreme protection against corrosion in environments with high salinity.
- Extremely low flow resistance. Absolute surface roughness: 0.05 mm
- Layer thickness 500 μm
- Bisphenol-A free
- Elongation at break 800%



RocShield®

For additional durability and resistance to abrasion and impacts, the exterior of FlowMax® pipes can be coated with RocShield® = 500 μm LDPE on top of the CorroFlo® coating.

RocShield® produces a stronger, harder surface with greater resistance to weather and chemicals, with many advantages:

- Simpler, safer handling due to rougher surface for better grip
- Very high resistance to abrasion and mechanical impact
- Very high resistance to impacts





World-leading steel. Made in Sweden.

It's not a coincidence that Alvenius pipes are of the highest quality on the market. They are made of steel from the Swedish company SSAB, optimised for our specific requirements.

High strength, smooth surface, good flatness and extremely narrow thickness tolerances are typical properties of the steel grades.

For Alvenius, this means steel that is light, strong and durable. Alvenius is certified according to the quality standard ISO 9001, the environmental standard ISO 14001 and the welding quality standard ISO 3834-2.

The FlowMax[®] pipes are designed and manufactured according to the pressure equipment directive PED 2014/68/EU and SS-EN 13480 series. Tolerances according to SS-EN 10217-1. This means FlowMax[®] pipes are of the highest possible quality.

Low CO₂ footprint

SSAB is also committed to continuous environmental work aimed at minimising the adverse environmental impact of its operations. SSAB is one of the best in the world in iron ore-based steel-making when it comes to CO₂ efficiency – 7% better than the European average.

And this is totally in line with Alvenius' dedication to green production.



Swedish steel - nothing comes close

| Steel grades | | | | |
|--------------|------------------------|----------------------------|-------------------------|-----------------------|
| SSAB | Yield point, ReH [MPa] | Tensile strength, Rm [MPa] | Elongation at break [%] | EN 10149-2 equivalent |
| Domex 240 YP | 240 | 360 – 460 | 28 | S235 |
| Docol 260 LA | 260 | 350 – 430 | 16 | N/A |
| Domex 420 MC | 420 | 490 – 620 | 20 | S420 MC |

| Available pressure ratings | | | | | |
|----------------------------|------|---------|------------------------|----|----|
| Pipe dimension (K10) | | | Working pressure [bar] | | |
| DN | Inch | DY (mm) | 16 | 25 | 40 |
| 65 | 3 | 76.1 | x | x | x |
| 100 | 4 | 101.6 | x | x | x |
| 125 | 5 | 133.0 | x | x | x |
| 150 | 6 | 152.4 | x | x | x |
| 200 | 8 | 203.2 | x | x | x |
| 250 | 10 | 254.0 | x | x | |
| 300 | 12 | 318.0 | x | x | |
| 350 | 16 | 355.6 | x | | |

| Available pressure ratings | | | | | | | |
|----------------------------------|------|---------|------------------------|----|----|----|----|
| Pipe dimension (Victaulic style) | | | Working pressure [bar] | | | | |
| ISO DN | Inch | DY (mm) | 16 | 25 | 40 | 63 | 80 |
| 80 | 3 | 88.9 | x | x | x | x | x |
| 100 | 4 | 114.3 | x | x | x | x | x |
| 125 | 5 | 139.7 | x | x | x | x | x |
| 150 | 6 | 168.3 | x | x | x | x | x |
| 200 | 8 | 219.1 | x | x | x | x | x |
| 250 | 10 | 273.0 | x | x | x | x | x |
| 300 | 12 | 323.9 | x | x | x | x | x |
| 400 | 16 | 406.4 | x | x | x | | |
| 500 | 20 | 508.0 | x | x | | | |

Complete system

Alvenius FlowMax® and Alvenius K10 pipe systems contain all that is needed for all types of installation – pipes, couplings, valves, bends, T-pieces, transition pieces, threaded sockets, etc.

We can also supply feed pipes in different dimensions. This is a good example of special solutions that we can develop uniquely for each project.

Dimensions

89 – 508 mm (FlowMax®)

48 – 355 mm (K10)

Lengths

6,000 mm

Pressure class

SS-EN 13480

Steel quality

SSAB Domex 240 YPD-ALV, 420 MCD-ALV

Precision-lathed rings for welding on

Surface coating

HDG

Accessories/fittings

Complete system with pipes, fittings, couplings, etc

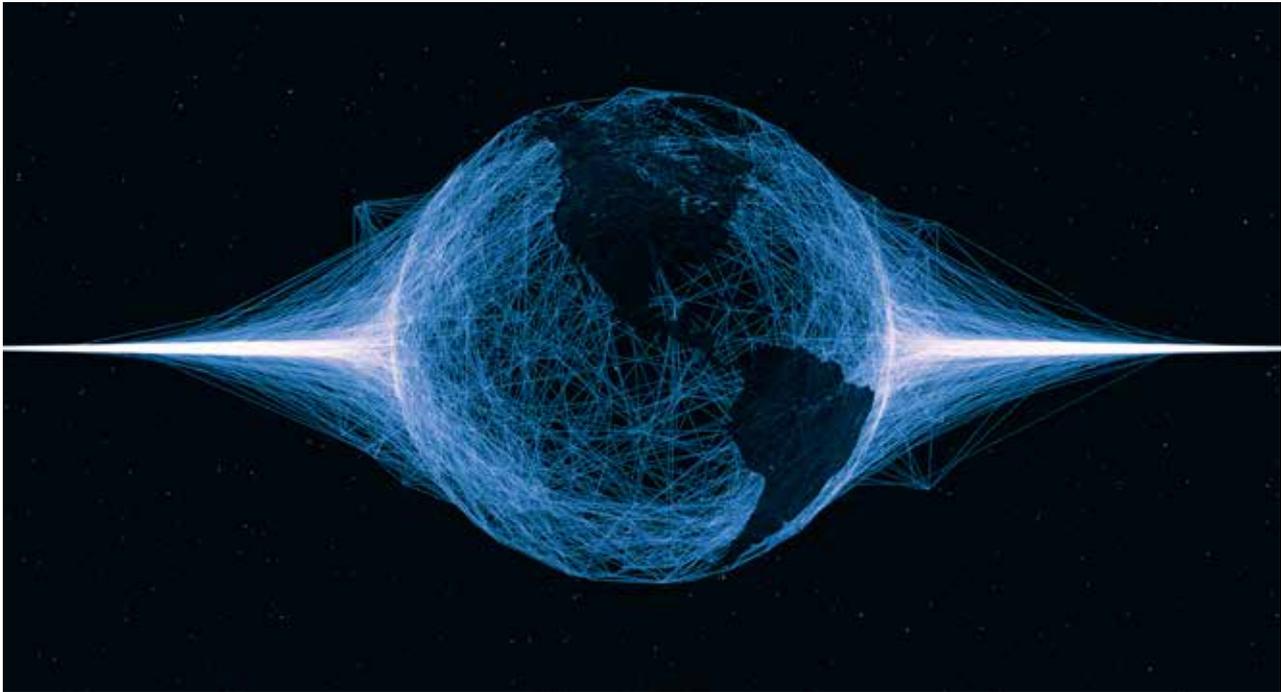
Weight savings

Up to 30 - 50% compared with standard pipes

Installation times

Up to 10 times faster than using traditional methods





Alvenius was founded in 1951 and ever since we have focused on supplying the global market with high-quality quick coupling steel pipe systems.

Today, Alvenius focuses its expertise on the segments tunnels, mines, industry, fire protection and extinguishing, water and wastewater systems and artificial snow making.

We have a presence in Asia, Africa, the Middle East, North and South America, Europe and, of course, our domestic market Sweden.

Our international approach offers many advantages.

Above all else, it means that we understand the conditions and demands of your particular market – wherever that may be.



Member of Boxholm Group



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