



Flexible Connections for Hydrogen

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About Ayvaz

Established in 1948, Ayvaz has been at the forefront of flexible connection parts manufacturing for over seven decades. Our extensive range of products includes various types and customized designs tailored to meet the specific needs of different industries.

Our company's reputation remains high, built on a foundation of providing innovative and reliable solutions to our partners. This steadfast commitment to quality and innovation has earned us the trust and loyalty of cooperators worldwide.

At Ayvaz, we are dedicated to supporting our partners around the clock, ensuring that they feel the presence and expertise of our "flexible solutions" no matter where their businesses are located. Our global reach and unwavering dedication to excellence make Ayvaz a name synonymous with reliability and innovation in the industry.

Consulting

At Ayvaz, we offer a wide range of products catering to various industries, ensuring that we meet the diverse needs of our clients. Our services go beyond just providing products; we also offer comprehensive engineering activities from product specification to project estimation, ensuring that we deliver the most specific solutions for each unique case.

Our team of experts is dedicated to sharing their knowledge and expertise with potential clients. We take pride in assisting those who encounter challenges with calculations for piping systems and product selection in new plants. Whether you are dealing with complex projects or need precise product recommendations, Ayvaz is here to provide the support and guidance you need.

Globally Local

Ayvaz employs over 800 people worldwide and operates production plants in Turkey, Bulgaria, Poland, and China. Our global presence is further strengthened by 18 sales offices and distribution centers strategically located in different parts of the world. To ensure we are always close to our customers, Ayvaz continually opens new offices around the world and employs local individuals who are trained at our competence center in Istanbul. These individuals play a key role in maintaining our vision of “think global, be local.”

Our pre-sales operations enable our sales team to identify and analyze customer needs and problems effectively. We highly value gathering feedback and suggestions from our customers, which helps us continuously improve our products and communication skills. By listening to our customers, we ensure that we are always evolving and meeting their expectations with precision and care



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Design & Technical Expertise

Ayvaz is the largest metal hose manufacturer in Europe, producing over 20 million meters of flexible metal hose annually, ranging from DN4 to DN300. Our commitment to innovation and excellence is reflected in our state-of-the-art R&D department, which employs over 20 skilled engineers. We continually invest in R&D activities to develop solutions that meet the complex needs of our business partners.

Our technical expertise extends to designing and producing special corrugated hoses for high-tech applications, including nuclear power plants, research centers, and hydrogen applications. By leveraging cutting-edge technology and industry knowledge, Ayvaz delivers products that adhere to the highest standards of quality and performance.





Quality

Ayvaz is committed to exceeding industry quality standards through our dedicated Quality Control (Q/C) department. We adhere to a comprehensive set of quality requirements as outlined by numerous industrial and international standards, including PED 2014/68/EU, ASME Sec. VIII Div.1, and ASME B31.3, among others.

Our in-house testing laboratory is equipped to perform a variety of rigorous tests to ensure the highest quality of our products. We conduct micro welding controls and non-destructive tests such as X-ray, dye penetrant, and ultrasonic tests, all managed by our own Level 3 personnel.

Our testing facilities also enable us to verify hydrostatic pressure resistance, vacuum resistance, and leakage capacity through helium leakage tests. Additionally, we conduct fatigue safety tests and material tests, including salt spraying, to ensure our products can withstand the most demanding conditions.

By maintaining stringent quality control measures and continually investing in advanced testing capabilities, Ayvaz ensures that our products deliver unmatched reliability and performance.

Flexible Connections for Hydrogen



Ayvaz produce and supply flexible connections often to be used in hydrogen applications to facilitate the safe and efficient transfer of hydrogen gas. These connections are crucial for a variety of applications, including

Hydrogen Refueling Stations

Flexible connections play a critical role in transferring hydrogen from storage tanks to vehicles at refueling stations. These connections must withstand high-pressure hydrogen and accommodate the movement of vehicles during refueling. Hydrogen refueling stations are engineered to handle high-pressure hydrogen gas and come equipped with components to manage the compression and dispensing of hydrogen. Ayvaz produces multi-layer corrugated metal hoses with multiple layers of stainless steel braiding specifically designed for these high-pressure applications. Our hoses ensure safe and efficient transfer of hydrogen, meeting the stringent demands of hydrogen refueling infrastructure. By leveraging our expertise in flexible metal connections, Ayvaz provides reliable solutions that enhance the safety and functionality of hydrogen refueling stations worldwide.





Hydrogen storage systems

The operating conditions for hydrogen storage systems can vary based on the storage method. For example:

Compressed Hydrogen: Tanks are designed to withstand high-pressure conditions (350-700 bar) and maintain the structural integrity of the stored hydrogen. In this method, hydrogen gas is compressed and stored at high pressures, typically between 350 and 700 bar (5,000 to 10,000 psi).

Liquid Hydrogen: Cryogenic conditions (around -253°C or -423°F) are required to keep hydrogen in a liquid state.

Ayvaz flexible connections are employed in hydrogen storage systems to allow for the expansion and contraction of the gas as it is stored and released. These connections help maintain the integrity of the storage system. Liquid hydrogen storage systems are used in some fuel cell vehicles and aerospace applications.



Hydrogen Fuel Cells

In fuel cell systems, flexible connections are essential for routing hydrogen gas from storage to the fuel cell stack. These connections must be designed to minimize gas leakage and withstand the operating conditions of the fuel cell.

Fuel cell vehicles operate under conditions similar to internal combustion engine vehicles. Ayvaz produces specialized flexible metal hoses for hydrogen connections to fuel cell stacks. These stacks typically operate with a maximum efficiency of 80%, with the remaining hydrogen energy converting into heat. As a result, fuel cell stacks require constant cooling to maintain optimal performance.

To address this need, Ayvaz also supplies metal hose assemblies for cooling fluids connected to the stacks. Our products ensure reliable hydrogen transfer and effective cooling, supporting the efficiency and longevity of fuel cell systems.



Hydrogen Transport

For transporting hydrogen in mobile containers or pipelines, flexible connections are necessary to accommodate movement and changes in pressure. They are also used at connection points when transferring hydrogen between different systems.

Flexible connections used in hydrogen applications need to meet strict safety and performance standards. They must be designed to minimize hydrogen leakage and withstand the high-pressure conditions associated with hydrogen gas. Additionally, materials used in these connections must be compatible with hydrogen to prevent embrittlement or other issues.

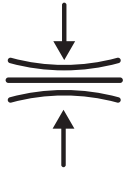
Corrugated Hoses

- Corrugated metal hose production is based on forming seamless or longitudinally welded pipes using special mechanical and hydraulic tools. With their flexible structure, corrugated hoses provide systems with an absolutely leak-proof character.

- These hoses are designed to carry fluids and gases in both pressured and vacuum systems, which is why they are also known as pressure hoses. Corrugated hoses can be used as flexible connection elements that absorb movement, vibration, and thermal expansion, offering a cost-effective solution for various applications.

- In addition to their use in fluid and gas transfer, corrugated hoses serve as reliable movement and vibration absorbers, ensuring system integrity and stability. Their flexibility and pressure resistance are directly related to the shape and spring ability of the corrugations. This unique design feature makes them indispensable in a wide range of industrial applications, delivering reliable performance and durability.

Advantages



Resistance to Twisting Tension: Corrugated hoses resist well against twisting tension that arises from sudden pressure changes



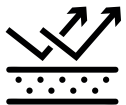
High Temperature Application: They can be effectively applied at very high temperatures.



Perfect Sealing: They provide perfect sealing features for high-pressure applications, ensuring system integrity.



Elimination of Connection Inaccuracies: Corrugated hoses eliminate connection inaccuracies, enhancing overall system performance.



Corrosion Resistance: The stainless steel structure is highly resistant to corrosion, ensuring durability.



Long-Service Life: Easy-to-apply connectors with a long service life provide significant financial benefits to users.



Vibration Prevention: They prevent vibration in pipelines, boosting the security and stability of connected systems.

Design

- * Parallel Corrugated Flexible Metal Hose (DIN EN ISO 10380)
- * Hose Material: Stainless Steel AISI 316L, DIN 14404
- * Temperature Range: Between -270 °C and 600 °C (only for the hose)
- * Braiding Material: Stainless Steel AISI 304, DIN 14403

Hose braiding is tightly secured to the connection elements at both ends to compensate for the longitudinal force resulting from internal pressure. The flexibility of the braiding significantly influences the movement capacity of the hose. Braiding is constructed by crossing right- and left-handed wire coils over and under each other.

In addition to its structural role, hose braiding helps protect the hose from external damage by absorbing external tensions. The hoses can be produced with single or multi-layered braiding, enhancing their durability and performance in various applications





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