ADAMS
ARMATUREN

Triple eccentric Butterfly Valves for LNG

MAK

Made in Germany

ADAMS valves since 1960

The ADAMS Headquarters in Herne

Founded in 1960 by Karl Adams, the ADAMS Armaturen GmbH has continuously developed valves according to national standards with the help of modern technology. With the focus on innovation, reliability and durability, ADAMS has grown to a leading valve manufacturer. We ensure the reliability through our systematic trainee program, which enables us to guarantee constant quality in the future.

Expertise through innovative development

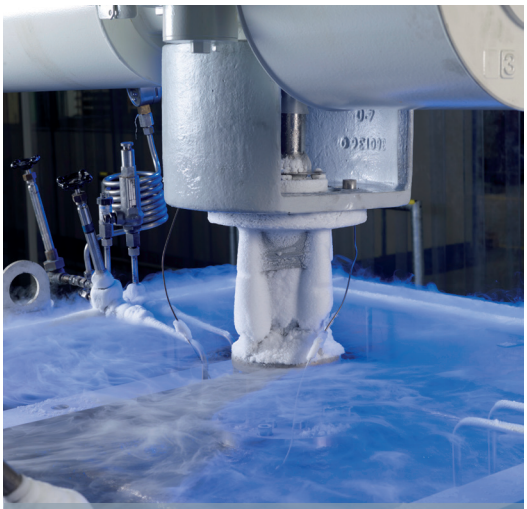
The innovation already began in 1960 when Karl Adams had registered the first patent for the triple eccentric sealing system, followed by the patent for metallic sealing systems. Due to our longstanding expertise and constant redevelopment, our engineers are able to design valves for special and critical requirements. This is the reason why our valves are as individual as our customers plants.

ADAMS valves for LNG switching at -196°C without problems

Our valves are often used in the gas industry for liquid gas applications (LNG). They are mounted amongst others in gas liquefaction plants, LNG terminals and LNG storage tanks.

Our first valves for use at extremely low temperatures were manufactured in the 1980s. We combine selected materials with innovative engineering and high-quality manufacturing. The result is reliability even at a temperature of -196°C and high pressure.

To guarantee a reliable operation, we carry out extensive function and tightness tests in accordance with international standards and specifications to ensure that our valves operate reliably, even at extremely low temperatures. With the help of our in-house testing facility for low temperature applications, we continually develop the valves to meet special requirements. This enables us to react quickly to the individual needs of our customers



A valve tested in our in-house cryogenic test facility.

LNG - Liquefied Natural Gas

Natural gas is liquefied in order to reduce risks during transportation and storage. This liquefied natural gas (LNG) consists primarily of methane (around 90%) but also contains ethane, propane and heavier hydrocarbons. During the liquefaction, the oxygen, carbon dioxide, sulfur compounds and water are removed.

Storage

An advantage of LNG is, that it can be stored easier than natural gas. The liquefied natural gas is stored in cylindrical tanks with a domed roof. These tanks have double-walls, between which there is an efficient insulation. The pressure within them is extremely low (<5 psig) and has to be maintained at least at -117°F / -83°C or lower. During the storage, the liquefied natural gas is kept at a constant pressure, which generates steam (evaporation). In order to keep the pressure constant and hence the natural gas liquid, the steam needs to leave the tea kettle. Otherwise, the temperature and pressure would rise.

The valves handling the LNG need to be able to control the pressure and temperature and have to stay completely tight. It is therefore important to mount valves that operate reliably, even in extremely low temperatures.

MAK Facts

ADAMS has designed the MAK butterfly valve for extremely low temperatures like in LNG applications. With the expertise of more than 40 years, we are able to offer high quality valves in different types. Our MAK butterfly valve is also available as Side-Entry Design, which gives the advantage of doing maintenance without cutting the valve from the pipeline. All parts are reachable only through the Entry Port.

Nominal pipe sizes

DN80 - DN2400 / NPS 3" - 96"

Temperature range

-196°C - 600°C / -320°F - 1112°F

Pressure stages

PN10/16/25/40/64/100
ANSI 150/300/600/900/1500

Valve design in accordance with

AD technical instructions, ANSI, API, ASME, ATEX, BS, PED, DIN EN / ISO, GOST, KTA, MSS, NACE, RCC-M

Construction length in accordance to

ISO 5752 BS13 (F16)
ISO 5752 BS14 (F4)
ISO 5752 BS8 (F32)
SIDE ENTRY ISO 5752 BS15 (F5)

Design

Flanged, Buttweld ends, Cryogenic

Operation

Manual, pneumatic, electric, hydraulic
Triple offset design

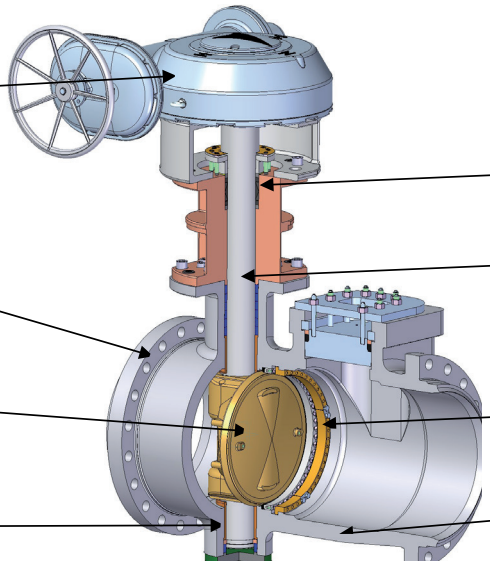
MAK with side-entry

Actuator
Manual / Electric / Hydraulic / Pneumatic / Quick closing

Flanges
Full faced / RTJ & special seals
Meet all flange specifications

Disc
Rigid / spehrical design
Nickel plated / Hard faced
Field repairable / replacable

Bearings
Robust Ni-Resist
Maintenance free
Special coating available



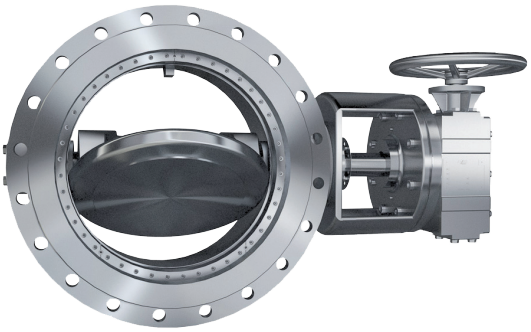
Stuffing box
Safety design / Life loaded
With lubrication
With lantern ring

Shaft
Large diameter / One piece
Fully keyed / Blowout protected
Conservative shaft sizing

Seat in the body
Laminated SS, Solid metal seal, Resilient Seal, Field replacable

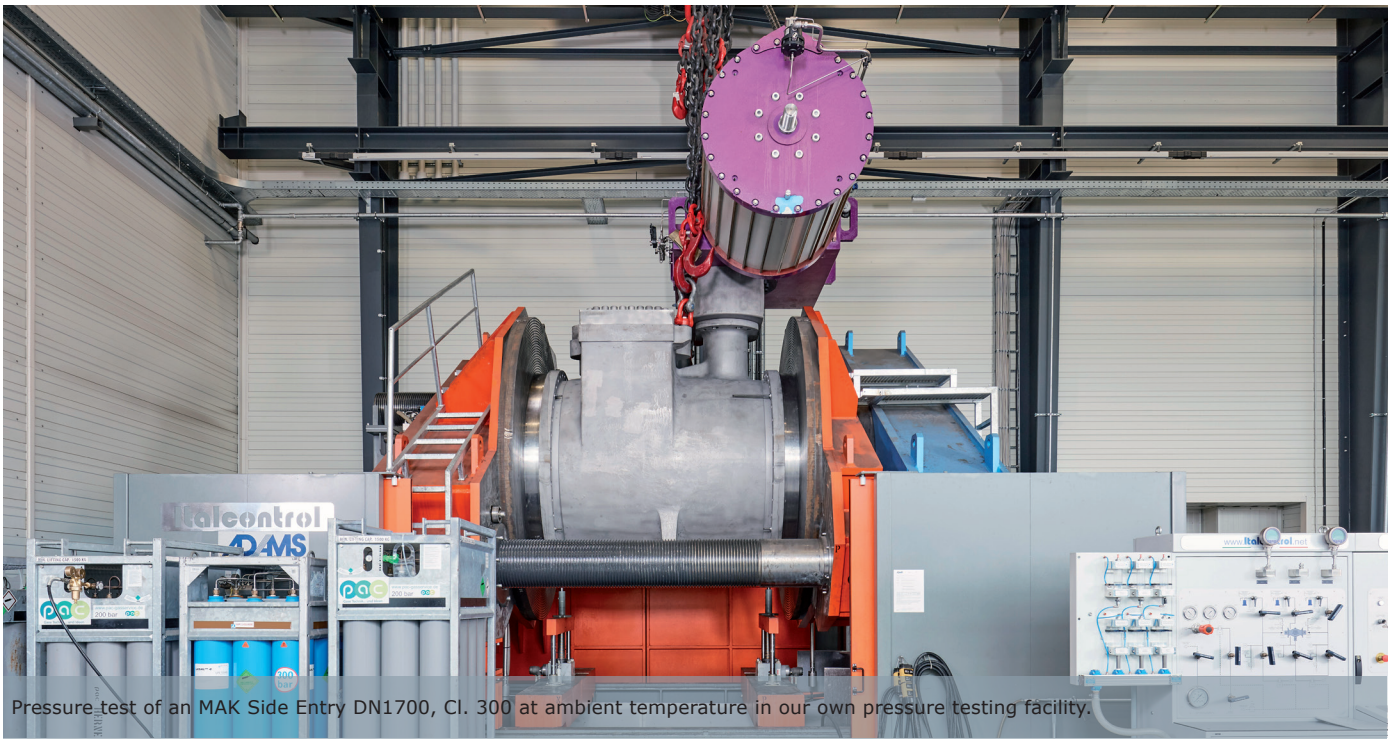
Robust body
Double Flange
Butt Weld Ends

Advantages of the MAK



- Tightness on both sides
- Low-friction function
- High resilience to temperature
- Fireproof design
- Low actuation torques
- Excellent control characteristics
- Minimal pressure loss
- Compact, robust design
- Simple to maintain, even on site/replacable interior parts
- Optional installation length
- Protection against emission
- „TA LUFT" specification

Cryogenic testings



Pressure test of an MAK Side Entry DN1700, Cl. 300 at ambient temperature in our own pressure testing facility.

ADAMS has established the largest indoor test facility for cryogenic testing. It is capable of handling valves from NPS 3" - 80" / DN80 - DN2000 and pressure ratings up to Cl.600. Our test equipment includes several cooling tanks and internationally accepted instrumentation.

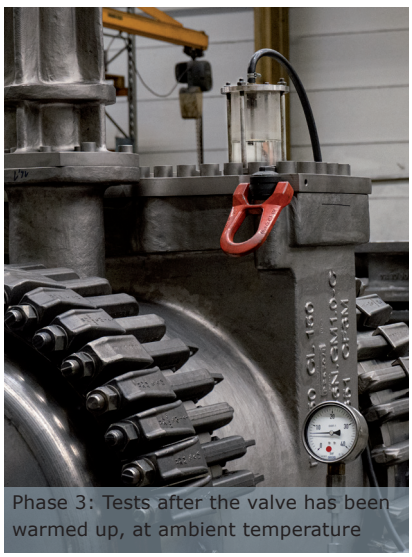
Stages of cryogenic testing

We offer two different types of cryogenic testing. The first one is a low temperature test at temperatures of -46°C / -51°F, the other one is at -196°C / -320°F.

During the first stage, the valve is tested at ambient temperature. This includes testing of the shell before the assembly, operational and seat leakage test, body pressure test and function test. This is followed by the second stage, the cooling down of the valve. Again, an operational and seat leakage test is done, as well as an body pressure and function test. In the last stage, the valve is warmed up again and the seat test is performed again at ambient temperature.


Phase 1: Tests at ambient temperature

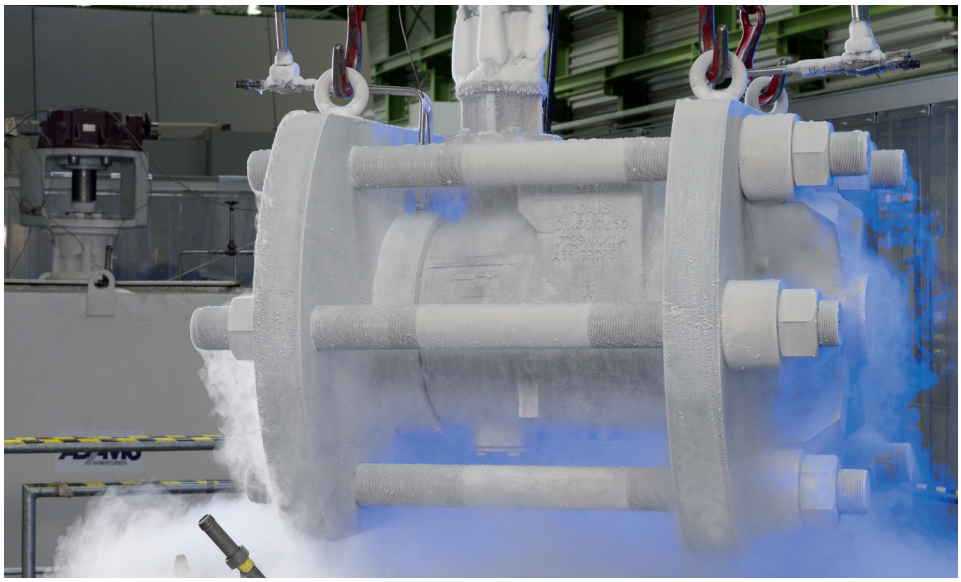
Phase 2: Tests after the valve has been cooled down


Phase 3: Tests after the valve has been warmed up, at ambient temperature

ADAMS valves reduce the risks

Although LNG is less dangerous to handle than natural gas, some risks remain. Leakages can lead to explosions with disastrous consequences. In the majority of the cases, they occur in the seat or the body. The valves need to be completely tight to avoid the liquefied natural gas to leak out of the valves. Another risk is malfunction of the valve. If the valves do not operate on demand, the LNG may expand which leads to deformation and rupture of the body.

During the years of research and innovation, ADAMS has developed expertise in the development of valves for LNG applications. This expertise, reduces the risks of leakages and malfunction. Our valves are especially designed for each project and therefore completely aligned to the requirements of the particular plant. By choosing the safe and reliable valves of ADAMS, a trouble-free operation can be ensured.

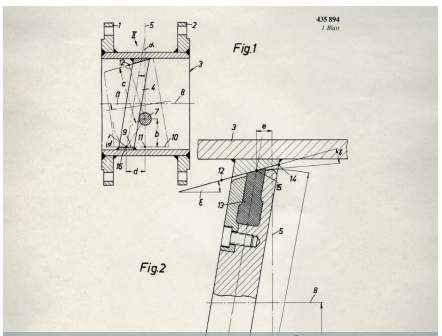


Leakages in body and seat

The most common cause of leakage is wear. This is often caused through friction between the disc or ball and the seat. Due to the eccentric motion of the ADAMS valves, friction is avoided and the risk caused by friction is eliminated.

Another reason for leakages in the seat can be low pressure. If the closing of the valve depends on the pressure, leakages can occur because the low pressure does not close the valve completely. This leads to an additional leak path. By using torque seated valves like the ADAMS valves, this risk is eliminated, as the mechanical sealing from the stem does not depend on the pressure.

If the body consists out of more than one piece, leakages may occur at the connection points. To avoid this, the body of the ADAMS valves consists out of one piece with a top- or side-entry.



Original patent for the triple-eccentric, torque seated butterfly valve

Failure to operate on demand

If there are trapped cavities of fluid in the valve body, the LNG trapped within these cavities can execute enormous forces which lead to expansion and consequently to deformation and rupture of the valve body. These forces arise because the volume occupied by the liquid is 1/600th of the gaseous state. These risks often occur in gate valves and conventional ball valves. To ensure the pressure relief, a hole connecting the cavity to the upstream piping can be used.

The ADAMS torque seated valves do not have any cavity and therefore do not require pressure relief strategies. The design of the valves is single seated and bidirectional and the seat is fixed to the body with a static gasket.This reduces many risks like inoperability, seal failure or malfunction.

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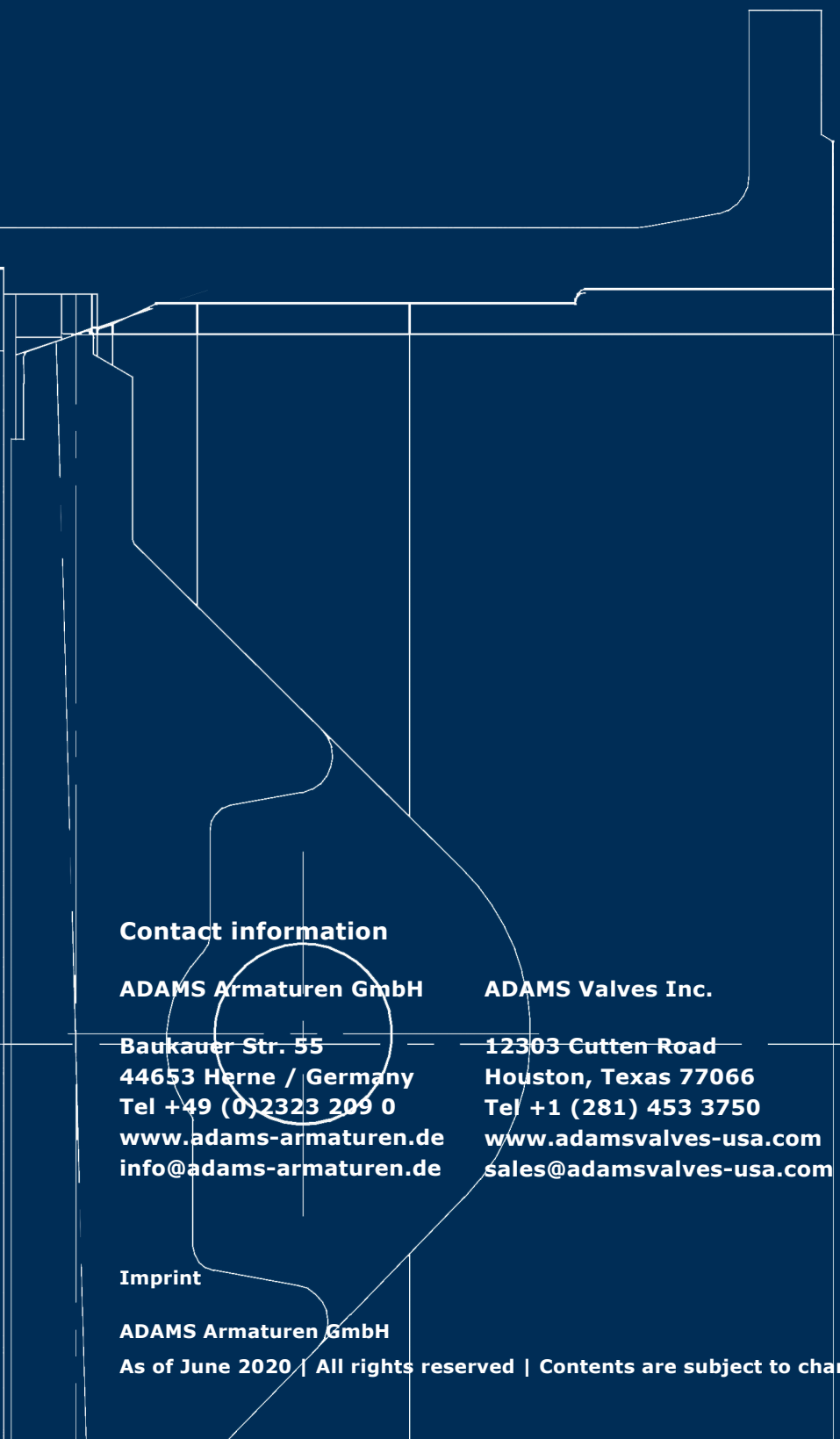

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