

# TOP ENTRY BUTTERFLY VALVE

## EXTREMELY SAFE AND RELIABLE

LNG/LPG SYSTEMS  
LOW TEMPERATURES  
OXYGEN  
CHEMICAL PROCESSES  
SHIPBUILDING  
AEROSPACE  
HYDROGEN



[www.quadax.de](http://www.quadax.de)

# QUADAX® TOP ENTRY

## FOR A RELIABLE PROCESS

### RELIABLY TIGHT

A cryogenic test according to BS 6364 carried out by an external testing institute in connection with an endurance test according to EN 12567 confirm a tightness which are far above the requirements of the standard. After 500 switches there could not be measured any leakage any more.

- Distribution, customer service & production
- Distribution & customer service
- Distribution

### LOW FUGITIVE EMISSIONS



Thanks to the special shaft and top flange seal, only low to hardly measurable fugitive emissions can be detected and thus clearly lie below the requirements of the standards.



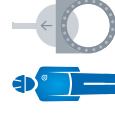
### REDUCED MAINTENANCE COSTS

Quadax® butterfly valves are low-maintenance items. Control and maintenance work can take place with a minimum of effort while the valve remains in the pipeline.



### SAFETY FOR YOUR PERSONNEL

Efficient replacement of all parts including shaft bearings in a safe environment with free access for the service personnel is possible regardless of the valve size.



### LIGHTER AND MORE COMPACT

than a ball valve leading to lower weight and thus facilitating installation in pipelines. Lower torques enable more compact actuators.



### SATISFIED CUSTOMERS

The large number of satisfied customers worldwide confirm the top quality and the functional advantages of the QUADAX® butterfly and control valves.



### TRIMMED FOR PERFORMANCE

The 4-off eccentric butterfly valve provides a completely round seat and sealing geometry. Advantages:

- All around identical material thickness
- Uniform expansion in case of temperature fluctuations
- Bubble-tight also at -196 °C
- Frictionless
- Long service life



### CREATED FOR EXTREMES

Temperatures  
**-270 °C up to +800 °C**  
PN 10 – 160 / ANSI cl.  
150 – 900, experience  
with high-quality alloys



### CERTIFIED

**BAM** certification

**EAC** certification

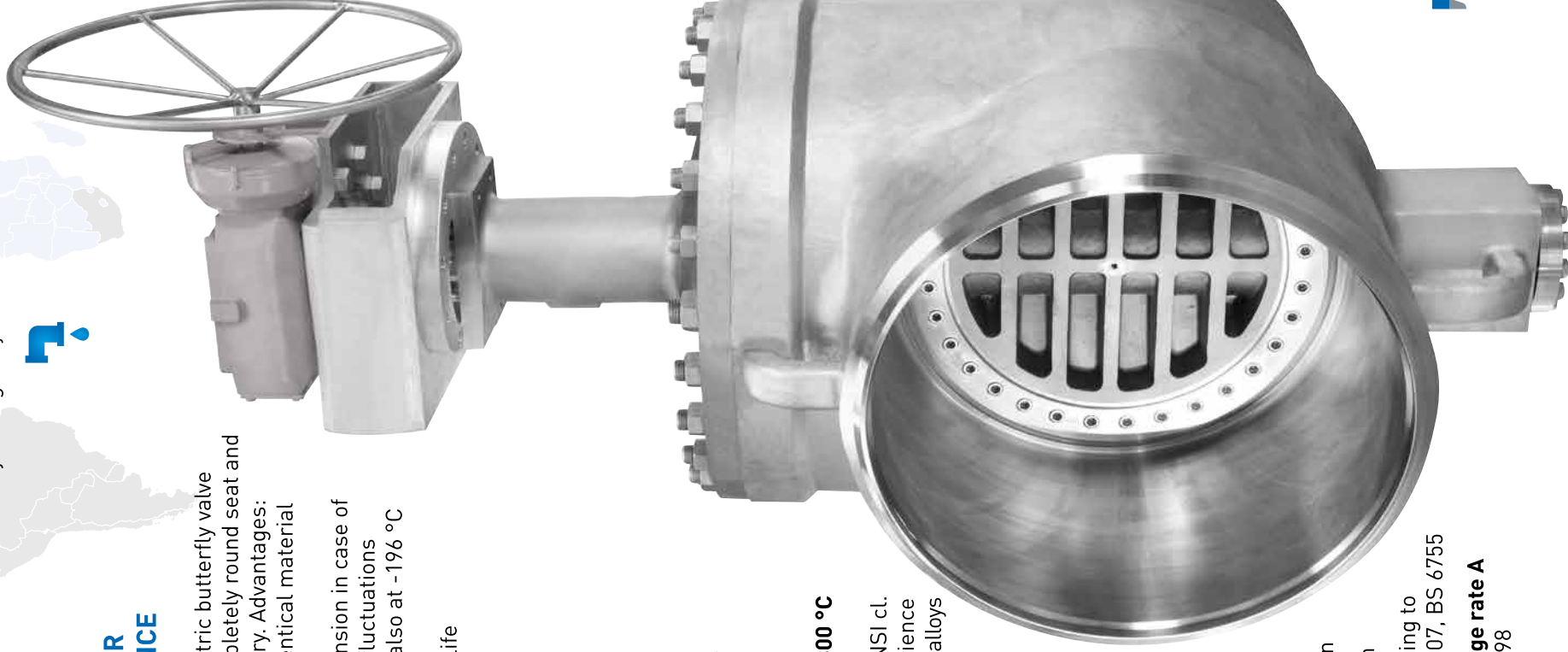
**Fire safe** according to  
ISO 10497, API 607, BS 6755

**Tightness leakage rate A**  
EN12266 / API 598

**SIL 3**

**ATEX** certification

**DNV type** approval  
QUADAX® complies with the legal requirements  
EN 1473-2016 for "Installations and Equipment for Liquefied and Natural Gas - Design of Onshore Installations". Confirmed by various order-specific test reports.





# MADE IN GERMANY

## QUADAX® PRECISION

In our production, quality, expertise and experience all come together – Made in Germany.

Our innovative butterfly valves are produced on modern, fully equipped 5-axis machining centres. Our manufacturing facilities cover an area of 10,000 m<sup>2</sup> production, assembly and storage. Furthermore, we also have comprehensive state-of-the-art testing facilities. Every single work step, from the technical drawing to the final inspection before delivery to the customer, is subject to a clearly defined procedure. This ensures that we can always achieve our own high quality standards.

Only the best equipment can provide the basis for products that set standards!



Technical  
data - PDF  
TOP ENTRY





# MADE FOR THE EXTREME

## QUALITY AND SAFETY

### KEY DATA

**Butterfly valve:**  
4-offset eccentric

**Pressure range:**  
PN 10 - 160  
ANSI cl. 150 - 900

**Nominal width:**  
DN 100-1000 mm

**Connection:**  
Welding ends

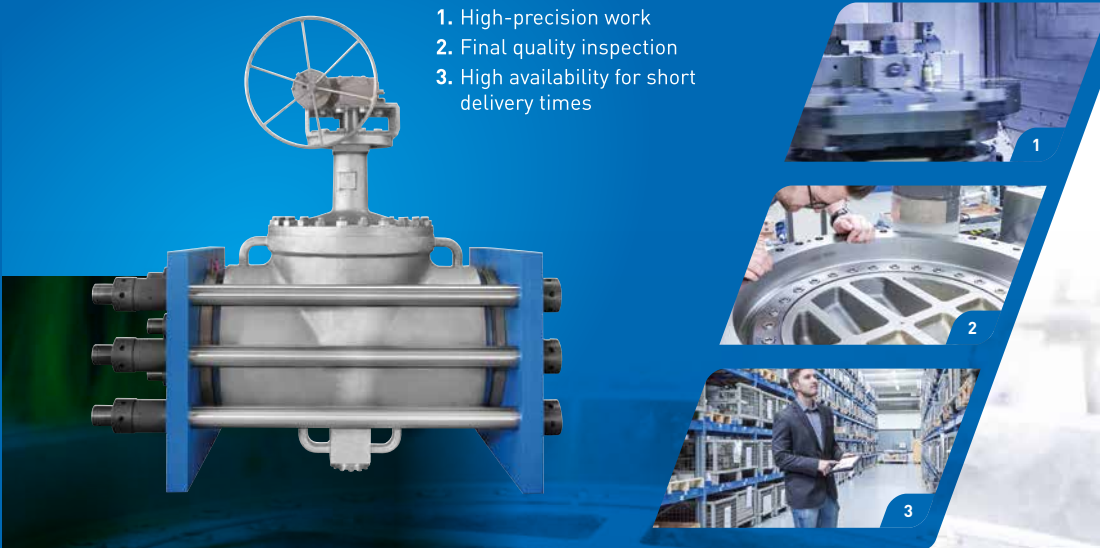
When it comes to controlling, regulating and monitoring a wide variety of media, also under extreme conditions, it is important to have a reliable partner. Innovation and expertise make us to be the reliable partner. State-of-the-art production technologies make it possible for us to implement the innovative design principle of the 4-offset eccentric butterfly valve. Extreme temperatures from -270 °C to +800 °C and pressure ranges up to 160 bar are no challenge for QUADAX®.

Many critical media such as hydrogen are colourless, odourless and tasteless. Furthermore, hydrogen in connection with oxygen reacts flammable to explosive. With such critical and safety-relevant applications, 100% tight and safe valves are needed. QUADAX® has repeatedly proven this 100% tightness with international large-scale projects and special endurance tests with external testing institutes. Our 4-offset eccentric butterfly valves verifiably offer the lowest fugitive emission values in the market.

Our Top Entry butterfly valves additionally comply with all the requirements of EN 1473-2016 for valves and provide full tightness also with clean, liquid and gaseous cryogenic applications with extreme temperature differences.

-270 °C up to  
+800 °C

-450 °F up to  
+1472 °F

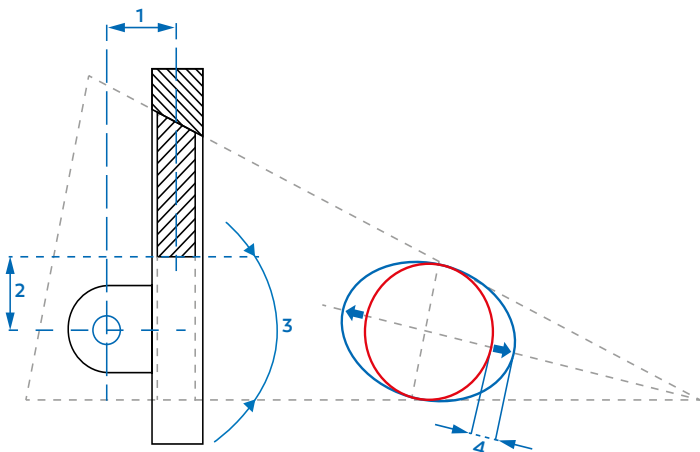


# THE COMPARISON

## 4-OFFSET VS. 3-OFFSET PRINCIPLE

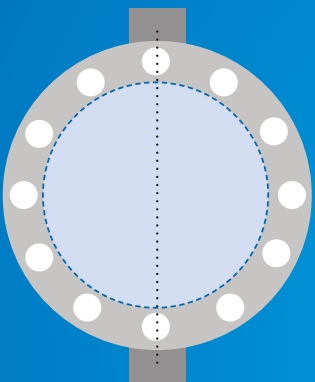
### 4-OFFSET ECCENTRIC BUTTERFLY VALVE

The 4-offset butterfly valve has an elliptical output cone. The cut at a specific angle results in a rounder and thus larger sealing seat.



### 4-offset eccentric QUADAX® butterfly valves

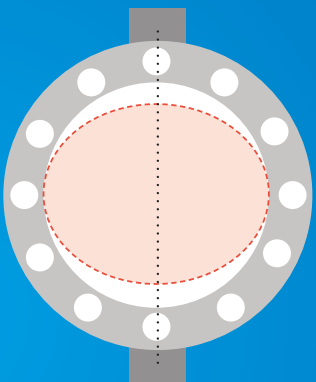
The 4-offset eccentric butterfly valve provides a completely round seat and sealing geometry.



- Frictionless
- Higher KV/CV values
- Highest tightness / no leaks (even in the most extreme conditions)
- Lower torques

### Conventional 3-offset eccentric butterfly valves

A conventional 3-offset eccentric butterfly valve functions with an elliptical seat and sealing geometry.



- Wear due to friction
- Danger of leakages
- More maintenance prone

# THE EFFICIENT AND SAFE SOLUTION!

## TOP ENTRY

Although the butterfly valves are basically low-maintenance for clean, liquid and gaseous cryogenic applications, maintenance intervals or extraordinary repairs might be required. With the QUADAX® Top Entry, the central upper flange can be removed and the internal components can be easily pulled out of the valve body.

Efficient replacement of all parts including shaft bearings in a safe environment with free access for the service personnel is possible regardless of the valve size.

### INDUSTRIES

- ✓ LNG/LPG SYSTEMS
- ✓ LOW TEMPERATURES
- ✓ OXYGEN
- ✓ CHEMICAL PROCESSES
- ✓ SHIPBUILDING
- ✓ AEROSPACE
- ✓ HYDROGEN



### Quadax® butterfly valve TOP ENTRY

Especially developed  
for  
LNG applications

Maintenance and  
repair work  
can take place with a  
minimum of effort while  
the valve remains in the  
pipeline.

100% tight -  
no leaks

### CUSTOMERS



ExxonMobil

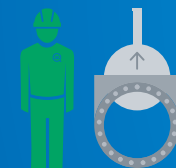


## THE COMPARISON

### QUADAX® TOP ENTRY VS. SIDE ENTRY

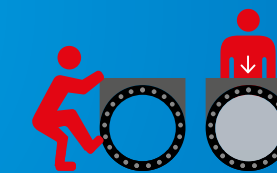
The QUADAX® Top Entry has been especially developed for LNG applications and ensures that control and maintenance work can be carried out safely and easily without further risks occurring for the service personnel.

Our Top Entry with  
4-offset eccentric butterfly valves:



VS.

Side Entry from a  
competitor:



- The unit consisting of shaft and disc is pulled out
- Safe maintenance outside the built-in body
- No residual risks for the service personnel
- Unlimited accessibility in all nominal widths

- The unit consisting of shaft and disc remains in the housing
- Maintenance within the built-in body
- Additional safety measures for the service personnel required
- Accessibility with small nominal widths made difficult



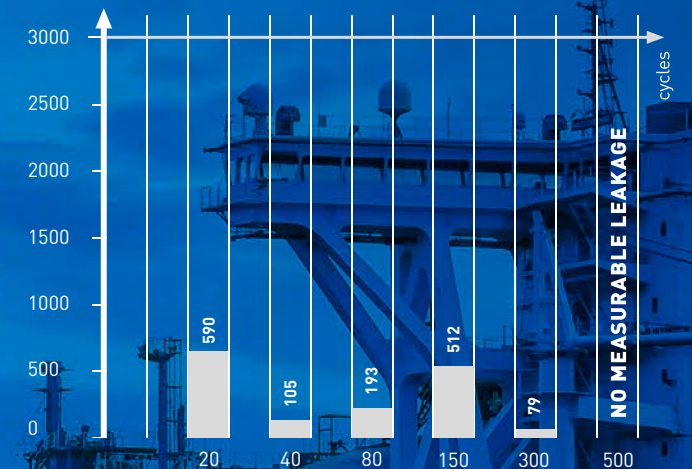
# SURPASSED!

## ENDURANCE TEST WITHOUT LEAKAGE REFERENCE PROJECT LNG TERMINAL

At LNG terminals, the imported liquid natural gas at a temperature of  $-165\text{ }^{\circ}\text{C}$  is unloaded at special docking fixtures by gas tankers and stored in large LNG storage tanks. Prior to delivery to the supply network, the liquefied gas is then uniformly heated and thereby gasified again.



Max. allowable internal leakage acc. to BS6364 for DN 500 = 3000 ml/min.



Measured leakage in ml/minute at  $-196^{\circ}\text{C}$  with helium after each of the indicated cycles.

The müller quadx gmbh has been awarded a contract for a large-scale order for Top Entry butterfly valves as replacement for Side Entry butterfly valves in an existing LNG system and for an extension with a new LNG terminal. Along with the LNG tanker loading ramps, this terminal located in Europe also comprises 3 loading ramps for trucks and a special jetty for small (bunker) ships. During storage and transport, natural gas could enter the atmosphere especially at critical components such as measuring devices and process valves. Apart from the negative effects on the environment, these

fugitive emissions could also affect the safety. The operating company of this LNG terminal has demanded an individual performance test for the approval of cryogenic part-turn valves which shall be installed in their terminals and storage tanks. For this purpose, the cryogenic test according to BS 6364 was combined with an endurance test according to EN 12567. An additional requirement was to pass an endurance test, where after 500 mechanical switching operations at  $-196\text{ }^{\circ}\text{C}$ , the internal and external leakage was measured

after particular cycles. The guide value with regard to the seat leakage is less than 3,000 ml/min for a valve of DN 500 on the basis of the standard BS 6364 and a maximum permissible fugitive emission of  $>1.0-10-3\text{ mbar}_L\text{ s}^{-1}$  at any point in time of the cycles. The testing institute ITIS BV attested that the seat leakage never exceeded the already low value of 590 ml/minute and no leakage at all was detected after 500 cycles! In the process, the fugitive emissions were clearly below the standard and hardly measurable.



# LIGHTER AND MORE COMPACT

## ADVANTAGES OF THE TOP ENTRY VS. BALL VALVE AND GATE VALVE

The QUADAX® butterfly valve Top Entry is far lighter and more compact than a ball valve leading to a lower weight and thus facilitating installation in pipelines.

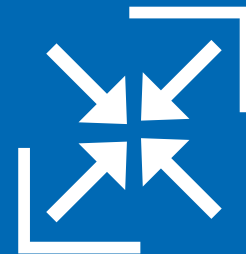
### COMPARED WITH OTHER DESIGN PRINCIPLES AND OTHER VALVE TYPES, THE QUADAX BUTTERFLY VALVE PROVIDES THE FOLLOWING ADVANTAGES:

- No wear on seat and seal
- Maintenance-free, longer service life
- Homogenous shrinking and expanding of materials, also with high  $\Delta T$
- 100% tight, also with high temperature fluctuations
- **Less material, lower weight**
- Lower torques -> more compact actuators
- Better controllability



light

+



compact

=



TOP CHOICE!  
Quadax® butterfly valve  
TOP ENTRY

### FURTHER SUITABLE PRODUCTS

- QUADAX® 01 double flange type
- QUADAX® 02 lug type
- QUADAX® 03 gate valve replacement version
- QUADAX® 04 Butt weld type
- QUADAX® 05 Top Entry

MADE FOR THE EXTREME  
FURTHER PRODUCTS



01  
**QUADAX®-  
DOUBLE FLANGE TYPE**

**Butterfly valve:**  
4-offset

**Pressure range:**  
PN 0-160 bar

**Nominal diameter:**  
DN 50-1800 mm

**Connection:**  
flange

DETAILS



03  
**QUADAX®-  
GATE VALVE REPLACEMENT**

**Butterfly valve:**  
4-offset

**Pressure range:**  
PN 0-160 bar

**Nominal diameter:**  
DN 80-1800 mm

**Connection:**  
flange

DETAILS



02  
**QUADAX®-  
LUG TYPE**

**Butterfly valve:**  
4-offset

**Pressure range:**  
PN 0-63 bar

**Nominal diameter:**  
DN 50-1800 mm

**Anschluss:**  
flange

DETAILS



04  
**QUADAX®-  
BUTTWELD TYPE**

**Butterfly valve:**  
4-offset

**Pressure range:**  
PN 0-160 bar

**Nominal diameter:**  
DN 80-1800 mm

**Anschluss:**  
welding ends

DETAILS





## YOUR CONTACT PERSON

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Quadax<sup>®</sup>  
Butterfly valve  
TOP ENTRY  
ONLINE



## FURTHER PRODUCTS

QUADAX<sup>®</sup> 01 double flange type

QUADAX<sup>®</sup> 02 lug type

QUADAX<sup>®</sup> 03 gate valve replacement version

QUADAX<sup>®</sup> 04 Buttweld type

QUADAX<sup>®</sup> 05 Top Entry

