Kvenna

The preferred partner for advanced engineering and machining

METAL SEALS

DESCRIPTION OF METAL SEALS

Metal seals designed by Kvenna AS for subsea application fully qualified according to API 6A (ISO 10423) PR2 and class 2 sandy service.

Metal Seals were introduced early to improve reliability of subsea valves and connections. Increase in pressure and temperature ratings have further enhanced the need for metallic sealing solutions. Kvenna has proven designs for multiple sealing needs, including stem seals and radial body/bonnet seals for low pre-tension solution.

ABOUT KVENNA

Kvenna supplies services within engineering, manufacturing, assembly and testing for subsea, marine and power projects.

We have a range of our own-developed products which includes Soft Landing Cylinders, Torque Tools and Metal Seals.

Kvenna AS

Kjøpmannsgata 23
6005 Ålesund, Norway

Contact

Tel:+47 70 10 11 00| post@kvenna.no
www.kvenna.no

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METAL SEALS

Ø180mm – 10K LX Double lip

KVENNA METAL LX-SEAL

Application of Kvenna Metal Seals of LX-seal type:

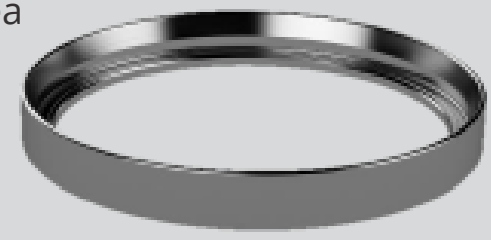
Subsea valves and pressure API 6A ratings(K=1000 psi):

- Insert Gate valves (MIG) for Draugen , Norske Shell, 3K
- Insert Gate valve (MIG) for Statfjord/Loke, Statoil, 5K
- Insert Ball valves for Equinor and Norske Shell , 5K
- Insert Choke valves for Tordis, Vigdis & Troll Olje, Statoil, 5K
- Light Weight Insert Choke (Saga Petroleum), 10K
- DEG (Double Expanding Gate) Valve – Equinor, 5K Other Equipment:

6 inch LX-7.5K Double lip

Other Equipment:

- Flowline Connectors for Equinor
- Riser top Safety Hubs for Norske Shell , Draugen
- High Pressure Caps, Norsk Hydro & FMC Kongsberg Subsea



Ø150mm – 5K LX Single lip

Benefits:

- Kvenna has extensive experience with metal seals
- Proven designs
- Robust solutions

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CHARACTERISTIC DATA

Qualification testing Metal LX Seals

PROJECT	APPLICATION	DIAM (mm)	DP (bar)	DT (°C)	BACK PRESS (bar)	QUALIFICATION TESTING	
Draugen Prototype	Subsea MIG Gate Valve	290	345	+6/ +29	30	API 6A PR1 3 cycles	API 14D Class 2 500 cycles
Statfjord Prototype	Subsea MIG Gate Valve	290	345	-15/ +93	30	API 6A PR1 3 cycles	API 14D Class 2 500 cycles
Prototype	Subsea MIK Ball Valve	551	345	-15/ +90	30	API 6A PR1 3 cycles	API 14D Class 2 500 cycles
Tordis	Insert Choke Choke Valve	220	345	2/ +120	30	API 6A PR2 200 cycles	Installation test with ROT
SSH Prototype	Light Weight Choke Valve	180	690	0/ 145	200	API 6A PR2 200 cycles	Installation test with WROV
FMC	HP caps	2”, 6”, 7”, 8”, 9”, 11”, 12”	517 & 345	150	180	Max/Min 200 cycles M&B test	Hyperbaric Pressure 180 bar

DP= Maximum Rated Working Pressure

Materials according to NORSOK M - 001:

- *UNS NO7718 w/ Silver Coating Material UNS NO7718 has been subject to heat treatment (solution annealing and ageing) to keep hardness within requirement of NACE MR0175, which is defined to HRC = 40 (approx. 362 HB).*
- *Body seal face TC coated or cladded with Alloy 625 (insert valves only).*
- *Optional materials Alloy UNS NO7725, and API 6A – 718.*
- *LX seal lips have been PTFE or Silver coated.*

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METAL SEALS

KVENNA METAL STEM STEAL

Application:

- Insert Gate valves for SPS (Subsea Prod. Systems) incl. water Injection
- Ball valves for SPS and STS (Subsea Transport Systems)
- Intervention BOB.

Experience:

Kvenna has been working with development of valves and metal seals since 1983. Over the last 30 years several hundred units have been installed subsea with Kvenna Metal Seals of the LX type. Metal stem seals with TC on seal face & stem were first developed for Norske Shell in 1989-90.

Materials:

Stem seal and stem material: API 6A 718 or UNS NO7725 Seal face of stem seal and stem is coated
with Tungsten carbide by HVOF method according to NORSOK M-630 EDS NHF2 and Equinor TR2000 ZH201. The outer seal-lip against the bonnet is based on the Kvenna LX-seal design with silver coating applied to the seal-lip to provide a fully gas tight metal seal.

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METAL SEALS

CHARACTERISTIC DATA

Qualification testing Metal Stem Seals

PROJECT	APPLICATION	DIAM (mm)	DT (°C)	DP (bar)	QUALIFICATION TESTING
STATFJORD STATOIL	5 inch MIG insert gate valve	40	-15/ +93	345 API 5k	API 14D Class 2
STATFJORD STATOIL	Intervention BOP Drexel	54	-29/ +121	690 API 10k	API 6A PR2 API 14D
DRAUGEN NORSKE SHELL	5 inch MIG insert gate valve, WI	40	+6/ +29	345 API 5k	API 14D Class 2
TROLL PROTOTYPE	Drexel Intervention BOP	54	-29/ +121	690	API 6A PR2 200 Cycles/ API 14D Class 2 500 Cycles
SNORRE STATOIL	3 inch DEG Insert Gate Valve	40	-25/ +80	345 API 5k	API 6A PR2 & endurance test (API 17D)
AMPO POYAM	8” Ball Valve ASME Class 1500	77	-29/ +21	255.3	According to client specification
AMPO POYAM	10” Ball Valve SPS	150	-29/ +150	517	According to client specification

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