



CHETRA Mechanical Seals

for Oil & Gas

In the oil & gas industry – with the areas of on-shore and off-shore – operating under extreme conditions places the highest demands on reliability and longevity of equipment components.

Central units such as crude oil recovery and pipeline pumps, multiphase pumps, water injection and MOL pumps require mechanical seals that display high abrasive resistance, safety reserves and fail-safe characteristics as a result of their design and the materials that they employ.

As early as the basic concept stage of the mechanical seal CHETRA takes account of the sealing technology requirements presented by high pressure (>100 bar), high speed, contaminated/mixed media such as crude oil/gas, sand/water mixes, additional demands caused by sea water and the sometimes unmanned platforms encountered in off-shore operations.



The results are innovative, often tailor-made solutions, based on decades of experience in the industry with in-depth consulting for optimally-suited mechanical seals and the matching accessories.

The CHETRA delivery range contains both tailor-made products and high-quality standard seals, characterised by:

- » Robust design with extensive safety margins.
- » Protection of sensitive components.
- » Solid rotary seal rings and stationary seats in self-aligning arrangements.
- » Stationary design, if applicable.
- » Special seal face geometry.
- » Controlled circulation guidance for optimal heat removal.
- » Material optimisation; use of suitable materials, some with patented surface treatment – use of API 682-approved materials.



“Made in Germany” quality and international experience.

CHETRA is an international specialist for advanced and efficient mechanical seals. We offer “Made in Germany” quality with mechanical seals in complex and demanding applications for well-known customers in the oil and gas industry both in Germany and abroad.

The mechanical seals are designed in compliance with API 682, ISO 21047, TÜV rules and the respective factory standards and local regulations.

Our claim to high quality is reliably underpinned: since 1996 we have been working in conformance to DIN EN ISO 9001:2008 and are certified by DQS/IQ NET.





Example Seals

CHETRA type 201



This mechanical seal model is specially designed for applications with high pressures up to 130 bar acting on the mechanical seal and high rotational speeds (highest pv factors). In addition it is extremely resistant to soiled media and media that are loaded with solids such as crude oil with a 30% proportion of wax. Mainly used in pipeline pumps.

In terms of its structure the 201 model is designed as a cartridge mechanical seal in a stationary design and in accordance with API standard, "Multipoint-Injection", safety throttle bushing and quench and flushing connections (API plans 11/61-62).

The use of optimised materials, special seal surface-geometries and the constructional design secure the achievement of the highest possible service lives (MTBF > 4 years).



CHETRA types 351 FHD / 881 DHD

These "heavy duty" double mechanical seals (double balanced) are specially designed for applications in water injection pumps (WIP). They are designed to withstand the highest pressure, speed and media property loads (sand-water-crude oil compound). A typical example of WIP use are pump pressures of up to 300 bar and rotational speeds of 6000 min⁻¹ set against a barrier fluid pressure of 90 bar.

The 351 FHD and 881 DHD models fulfil these requirements by means of special design characteristics as well as the use of optimised materials. Examples of this are the double-acting fluid circulation feed-screw, the design that is stationary on both sides as well the exclusive use of solid rotary seal rings and stationary seats in a self-aligning arrangement as well as the special surface finishing of the seal faces. Depending on application conditions and method of operation the respective seal style is chosen.



CHETRA type 807 AS

This double mechanical seal, an assembled cartridge unit that is ready for service has "high-tech" design features such as: stationary design (internal and external), double balance feature (API Plan 52 or 53), exclusive use of solid, self-aligning rotary seal rings and stationary seats, guided circulation, integrated feed-screw as well as the required API features.

In this way this mechanical seal is used in a broad range of applications. e.g. in MOL pumps, pipeline pumps, transfer pumps, in media that are loaded with solids, as a safety seal, in the case of environment safety provisions such as TA Luft (clean air act) etc.





Experience

Innovative supply systems and accessories.

- » **CHETRA individual supply systems and central systems:** A complete range for the supply of mechanical seals consisting of **barrier fluid pressure** and **quench containers** in accordance with the EC directives and the pressure vessel directive including API vessels (in accordance with ASME).
- » **CHETRA vessel accessories:** p/t measurement devices, level switch, manual refill pump, cooling coil, pressure measuring switch.
- » **CHETRA heat exchanger:** water or air cooled.
- » **CHETRA cyclone separator.**
- » **CHETRA pressure transmitter.**
- » **CHETRA loop systems and central barrier fluid systems:** For the optimum supply of the mechanical seals, with the monitoring and signalling to a control room. Up to 50 loop systems with an accumulator bladder can be supplied from a CHETRA **central barrier fluid system** with an output of 100 bar.
These facilities offer the highest levels of operational dependability and are also increasingly used in TA-Luft (clean air act) applications.

CHETRA International Services.

- » **CHETRA mechanical seal service centres** in Europe, the Middle East and Asia as well as service supervisors of the company headquarters who can be called out at short notice ensure the rapid use of CHETRA mechanical seals, regardless of whether they are new or used.
- » **CHETRA repair and maintenance service:** Damage analysis, suggestions of potential areas of improvements, expert corrective maintenance and optimisation of in-house and third party seals, worldwide logistics.
- » **CHETRA maintenance agreements:** Tailor-made fixed costs contracts and maintenance agreements.
- » **CHETRA spare parts service:** A high level of warehouse availability and sophisticated logistics for the worldwide supply of mechanical seal spare parts. Spare part kits for all the cartridge mechanical seals (all the parts that are subject to a dynamic load) as well as the individual spare parts can be obtained in accordance with the parts unit.
- » **CHETRA CAS® Computer Aided Seal Selection:** An application review developed by us for 1000 media relating to the mechanical seal type and materials whilst taking account of the pressure, temperature and speed, including a recommendation in terms of seal type, material and the appropriate method of operation and the determination of the frictional power.



Solutions

Technology

Quality in detail – including for major projects.

In the Far East CHETRA fitted mechanical seals to the pipeline pumps and booster pumps in over 700 stations.

Special requirements due to the high pressure of up to 130 bar on the mechanical seal. The characteristics of the media – crude oil with up to 30 % wax content, sulphur content, contamination and solid matter must all be managed securely.

In addition, there is also the outdoor location, with extreme temperature fluctuations.

Innovative solution – new off-shore project.

The "Sanha FPSO Project" is the first project in which the complete facilities for processing approximately 37,000 barrels of LGP per day in "portable" propane-butane products are arranged on a ship. The term FPSO stands for Liquefied Petroleum Gas – Floating Petroleum Storage and Off-Take Vessel. This method means that the routine flaring of gas is dispensed with.

The processing ship "Sanha" lies off the coast of West Africa and is operated by a global oil group. CHETRA was fitting-out the 5 main compressors with mechanical seals and supply facilities. In view of the "explosive" environment, the highest safety standards were required to be met, with this involving the employment of new – unconventional – components.

Tailored solution – high standing time in "WIP" application.

In the Algyö oil field in southern Hungary the high abrasiveness of the medium and severe axial movements of the 8-stage "WIP" water injection pumps resulted in low standing times for the seals originally employed.

To keep production downtime caused by replacement to a minimum, the operator decided to switch to stationary CHETRA mechanical seals, designed specifically to deal with a high pv operating factor including the use of solid tungsten-carbide and silicon-carbide rings. The live time (MTBF) was subsequently improved by a factor of 4.

Oil & Gas

The mechanical seals listed here are without exception cartridge seals, available in compliance with **API 682** and **customer-specific standards** and **adapted** to the respective unit.

Additional mechanical seal designs are available.

Mechanical seal type / Series:	Typical applications:	Technical data (physical parameters):
Single mechanical seals		
201	Pipeline-pumps; booster-pumps; crude oil, finished products,	p _{max} : 70 / 130 bar
201 A	WIP-Water injection pumps; cavern pumps, loading area –	t _{max} : +200° C
201 S	diesel, petrol, gasoline, heating oil light/heavy	v _{max} : 35 m/s
Double mechanical seals		
351F	Compressor-applications (liquid barrier fluid medium); LPG-projects; refrigeration. Media: Propane, butane, natural gas, HCL, gas mixtures / process gases, ammonia, helium	p _{max} : 25 / 50 bar t _{max} : +100 / 200° C v _{max} : 25 m/s
351 FHD / 881 DHD	WIP-Water injection pumps (up to a pump ultimate pressure of: 300 bar) Media: formation water (sand-water-crude oil mixture)	p _{max} : 150 bar / 200 bar t _{max} : +200° C v _{max} : 35 m/s
807 807 AS 807 S	Transfer pumps, MOL pumps, universal double mechanical seals; TA-Luft (clean air act) environmental applications	p _{max} : 35 bar t _{max} : -100° C up to +200 / 250° C v _{max} : 25 m/s
857TG	Double tandem-mechanical seal / external gas lubricated; safety seal; offshore applications	p _{max} : 100 bar t _{max} : +200° C v _{max} : 35 m/s
881 881 A 881 D	Double mechanical seal (double balanced) for pumps in applications subject to particularly difficult conditions: Solid matter, frequently changing operating conditions.	p _{max} : 50 / 150 bar t _{max} : -163° C up to +260° C v _{max} : 35 m/s
887 887 A 887 S	Double mechanical seal for applications combining elevated temperatures with slurries; bitumen, waste oil – heavy duty gas oil	p _{max} : 50 bar t _{max} : +320° C v _{max} : 35 m/s

All mechanical seals can be supplied in versions **conforming to ATEX**. Dimensions shaft diameter: from 20 mm to 300 mm, also available in inch.

Safety instructions relating to the field of application and the technical specifications:

The information in this pamphlet corresponds with the latest technological findings as well as comprehensive tests and experiences gained. However, please note that the technical specifications have a mutual influence upon each other and that our products can therefore not be used in the maximum range in terms of all the technical specifications at the same time. Amongst other things the temperature ranges stated are dependent upon the type of secondary seal, accessory equipment and the other technical parameters. In view of the variety of application options available and the technical facts and information they merely provide an indication of how to beneficially apply them and cannot be completely applied in every single case. We can therefore not be held liable for this information. We always recommend that you carry out tests prior to general use.