



# CHETRA Mechanical Seals for the Food Processing Industry

**In the food processing industry mechanical seals form an essential part of various installations. They are among the important components in centrifugal and eccentric screw pumps, agitators, mills, kneaders and homogenizers.**

In the application area of the food processing industry, the resp. mechanical seal must meet especially high requirements placed on hygiene and cleanness. They are used in dairy pumps, in breweries, in the production of margarine and butter, chocolate and juice and even in highly automated production units for the most diverse types of food.

In connection with this, the sterilisability of all surfaces is of utmost importance. Not only the mechanical seals used but also a part of the mechanical seal supply systems must completely fulfill CIP, SIP and GMP requirements to ensure efficient cleaning and the ability to sterilize without disassembly of the mechanical seal or its parts.



**The results are innovative and often custom-made solutions based on decades of experience in this area, with sound application technology advice for the optimum appropriate mechanical seal and the corresponding accessories.**

The CHETRA supply program covers special custom-made products and high-grade standard seals. Notable features and benefits:

- » robust construction with extensive safety reserves.
- » protection of sensitive components.
- » solid seal rings and stationary seats in self-aligning arrangement.
- » stationary design, if applicable.
- » special seal face geometry.
- » guided circulation flow for optimum heat dissipation.
- » optimization of material: employment of suitable materials – secondary seals and seal faces in compliance with FDA. Steel qualities 1.4435 / 1.4404 (316 L) or 1.4539 are used with surface finish Ra value: < 0.4 µm.



## **“Made in Germany” and International Experience**

CHETRA is an international specialist for high-quality and high-performance mechanical seals. We offer quality “Made in Germany” with mechanical seals for renowned customers in the food processing industry – original equipment manufacturers (OEM) as well as end users.

Our mechanical seals are designed acc. to the relevant DIN and ISO standards (DIN EN 12756, 28136 ff., ISO 3069 a.o.), TÜV regulations, factory standards and local regulations.

CHETRA mechanical seals are also available acc. to EHEDG stipulations (design fulfills hygienic requirements). Our claim to high quality is reliably underpinned: We have been working acc. to DIN EN ISO 9001: 2008 since 1996 and are certified by DQS/IQ NET.





## Example Seals



### CHETRA style 900 S

*This CHETRA mechanical seal type was especially designed for applications with cleaning and sterilizing processes CIP/SIP in the food processing industry.*

*Typical applications: in the production of juices, dressings, mustard and pastes. Style 900 S is especially suitable, e.g. for eccentric screw pumps or milling aggregates.*

*The installation of an innovative mechanical seal style 900 S makes it possible to lay out the product space of pumps and mills with no dead spots and gaps. This type of seal can be easily cleaned and flushed and it fulfills the highest hygienic requirements (EHEDG).*

*CHETRA style 900 S is balanced and designed with additional secondary seals optimized for cleaning. A protected spring assembly prevents contamination and impairment of sealing function. Top quality of the materials used and surface finishes (Pharmafinish) meet the highest requirements of the food processing industry.*



### CHETRA style 541 S

*This double mechanical seal offers convincing advantages for food manufacturers, especially with reference to sterilization in the seal. Barrier fluid spaces, the spring assembly and the metallic interior components are designed with a minimum of gaps.*

*Preferred application areas are agitators and vacuum process plants for liquid and semisolid media such as ketchup, mayonnaise and emulsions. In various applications the seals have been in operation for more than 5 years without maintenance.*

*Style 541 S is designed as a double mechanical seal, in compact design, as pre-assembled unit. An integrated bearing may also be chosen. Stationary seal design with optimized barrier fluid guidance provides good heat dissipation / circulation. For areas with extreme low-speed equipment, CHETRA Aktiv-Lub-System was developed to create a suitable lubricating film between the seal faces. (DGM 202.11805.3).*

*CHETRA mechanical seal style 541 S is also available for combined installations, mills and homogenizers, also in coaxial design. CHETRA mechanical seal style 541 S/L with EHEDG certificate (Cert. no. 89/240804).*

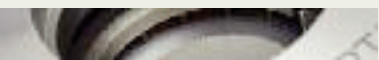


### CHETRA style 201 S

*The single mechanical seal in cartridge design was designed for agitator applications top drive in sterile design (CIP/SIP), minimal dead spot design. The parts in contact with the product are equipped with cleanable surfaces, e.g. polished ones.*

*Operation: with fluid quench and the use of special shaft sleeves and circulation guidance via guide sleeve. Thus the mechanical seal is "protected against dry running" and vacuum suited.*

*The stationary design with self-aligning, double O-ring mounted seal rings and stationary seats optimizes the seal in reference to balance of angular offset and deflections.*





# Experience

## Innovative Supply Systems and Accessories

- » **CHETRA individual supply systems and central installations:** An innovative and complete program for the supply of mechanical seals, consisting of **barrier fluid** and **quench fluid vessels**, acc. to EU guidelines and Regulation for Pressure Vessels (PED).
- » **CHETRA sterile vessels.**
- » **CHETRA special vessels for the food processing industry**
- » **CHETRA vessel accessories:** p/t measuring systems, level switch, manual refill pump, cooling coil, pressure gauge and pressure switch.
- » **CHETRA heat exchanger,** water-cooled or air-cooled
- » **CHETRA cyclone separator.**
- » **CHETRA pressure transmitter.**
- » **CHETRA loop systems.**
- » **CHETRA central refill systems.**

## CHETRA International Services

- » **CHETRA Service Centers** in Europe, in the Middle East and in Asia, as well as on-call service supervisors from the parent company ensure swift implementation of CHETRA mechanical seals, whether new or second-hand.
- » **CHETRA repair and maintenance service:** Analysis of damage, advice for improvement potential, expert and quick overhauling and optimizing of CHETRA seals and competitors' seals, worldwide logistics.
- » **CHETRA maintenance contracts:** Optimized fixed costs contracts and maintenance contracts.
- » **CHETRA spare parts service:** Large volume of spare parts on stock and perfected logistics for the worldwide supply of mechanical seals spare parts. Spare parts kits available for all cartridge mechanical seals (all dynamically used parts) as well as individual spare parts acc. to parts' unit.
- » **CHETRA CAS Computer Aided Seal Selection:** A CHETRA-developed design recommendation for 1000 media acc. to temperature, pressure and speed, for material, operation, style and assessment of friction power of mechanical seals.



# Solutions

## Technology

### **Specially Designed Mechanical Seal for Application in Bead Mills**

An internationally operating bead mill manufacturer required CHETRA to design a suitable mechanical seal for his aggregates for the production of chocolate. This specialized mechanical seal had to meet the usual requirements (acc. to CIP, SIP, GMP and FDA) and, in addition, to take into account the very abrasive medium. Furthermore, the installation conditions for the mechanical seal were confined and not to be changed.

The CHETRA solution: To create a short design double mechanical seal with solid hard metal seal faces. Further factors to fully meet the customer's requirements were its self-aligning arrangement and the protection of sensitive components by upstream elements.

Today bead mills equipped with CHETRA mechanical seal style 577 are successfully in use by nearly all chocolate manufacturers in Europe – and, to a certain extent, also overseas. They achieve advantageous 3 – 4 years of service life on average.

### **Improvements on Service Life – Mechanical Seals for Homogenizers**

Homogenizers are used for the production of butter and margarine, in the pressure range of > 50 bar. Due to insufficient service life of the mechanical seals being used, the service organisation of a large Dutch food processing group contacted CHETRA in order to achieve an improvement in this area.

The conception of a “heavy-duty” single mechanical seal in stationary design – using solely solid seal rings/stationary seats and adjustment to the existing aggregates – led to the target results of a maintenance-free, operationally reliable mechanical seal for a long period of application.

### **Wort Pump – Simplified Maintenance**

Maintenance of the beer wort pumps had to be simplified and improved in the world's biggest wheat beer brewery. Confined space and rather large pumps (dia: 100 mm) impeded the disassembly/assembly of the mechanical seals used up to this point, also the service life was not optimum. The mechanical seal also had to be stable for the sealing of wort and in the cooker pumps within the resp. cleaning cycle.

The CHETRA solution: a split mechanical seal in stationary design. The first measure taken allowed a simplified assembly of the seal on site; the stationary arrangement combined with abrasion-proof seal faces resulted in a service life of > 3 years.

## Food

The mechanical seals listed here comprise single seals ("non-cartridge"), mostly single and double cartridge mechanical seals in **SIP-/CIP**-design, allowing for **customer-specific requirements** and adjustment to the respective aggregate. Further mechanical seal designs, cartridge as well as "non-cartridge", are available.

Mechanical seal, style / Series:	Typical applications:	Technical Data (physical parameters):
<b>Single mechanical seals "non-cartridge"</b>		
900 S 900 S-aseptic	Single-acting mech. seal for sterile applications in centrifugal pumps and eccentric screw pumps (EHEDG): in special design for mills and e.g. for sealing of mustard, juices, dressings a.o.	p <sub>max</sub> : 28 bar t <sub>max</sub> : 200° C v <sub>max</sub> : 15 m/s
700	Single-acting mech. seal with metal bellows (acc. to DIN EN 12756) for juice preproducts, condensation; e.g. tomato juice.	p <sub>max</sub> : 28 bar t <sub>max</sub> : 250° C v <sub>max</sub> : 25 m/s
<b>Single and double mechanical seals cartridge</b>		
201 201 S	Single-acting mech. seal with fluid quench, sterile design for: agitator applications and homogenizers (production of butter and margarine).	p: vacuum up to 20 bar p <sub>max</sub> : 70 bar (homogenizer) t <sub>max</sub> : 200° C v <sub>max</sub> : 25 m/s
299	<b>Split</b> single-acting mech. seal in stationary design for pumps with inaccessible location. Simplified assembly/disassembly, e.g. in wort pumps, cooker pumps and brewery applications.	p: vacuum 0.5 abs. up to max. 25 bar t <sub>max</sub> : 120° C v <sub>max</sub> : 10 m/s
521	Double-acting sterile design, adapted to the aggregate, for agitators, dryers, mixers – with integrated bearing; special design for low-speed equipment and poor lubricating barrier fluid media (DGM 202.11805.3). Special applications e.g. cocoa and chocolate powder a.o.	p: vacuum up to 12 bar t <sub>max</sub> : 200° C v <sub>max</sub> : 15 m/s Low-speed equipment: n: 5 - 30 min <sup>-1</sup>
541 S	Stationary double mech. seal (CIP-/SIP) for agitators, mixers and other process installations; sealing of liquid/semisolid media such as ketchup, mayonnaise, pastes, etc.	p: vacuum up to 35 bar t <sub>max</sub> : 200° C v <sub>max</sub> : > 25 m/s
541 S/L	Double-acting mech. seal for agitators in aseptic processes (designed for CIP-/SIP); surface finish Ra = 0.4 µm. Mech. seal with integrated bearing; seal verified acc. to EHEDG (Cert. no. 89/240804).	p: vacuum up to 20 bar t <sub>max</sub> : 220° C v <sub>max</sub> : 15 m/s
561 / 562	Double mech. seal for agitators (bottom drive) – special design for decaffeinating installations in coffee production.	p: vacuum up to 16 bar t <sub>max</sub> : 200° C v <sub>max</sub> : 10 m/s
577	Double-acting, short design mech. seal for mills; ball bead mills – a.o. specially for applications in the chocolate production.	p: vacuum up to 20 bar t <sub>max</sub> : 250° C v <sub>max</sub> : 15 m/s
877 877 X-aseptic	Double-acting mech. seal in sterile design for applications in the food processing industry, for aseptic modular installations (agitators, dispersers, mills).	p: vacuum up to 20 bar t <sub>max</sub> : 220° C v <sub>max</sub> : 20 m/s

All mechanical seals are available in compliance with **ATEX**. Dimensions: Dia: 15 mm to 450 mm, sizes in inches possible.

### Safety instructions for application areas and technical data:

The statements in this leaflet are based on the current state-of-the-art technology, including extensive testing and practical experience. Please note: The physical parameters (technical data) given here will interact with each other and cannot be fully utilized all at the same time. The listed temperature ranges are, among others, dependent on the type of secondary seal used, the accessories for the seal and the other technical parameters. Due to the variety of uses and the individual technical arrangements only general pointers, which may not be applicable in every case, can be given for a successful application. No responsibilities can be accepted for statements made in this leaflet and therefore it is recommended to always undertake tests prior to application.