AESSEAL®
ENVIRONMENTAL TECHNOLOGY

STS™

Mechanical seals for general purpose steam turbine

Typical benefits of steam turbine mechanical seal technology

- Improved plant and personnel safety
- Reduced plant operation costs
- Reduction in GHG Scope 1 or 2 emissions
- Extended steam turbine life
- Field proven technology
- No maintenance

www.aesseal.com

>$1.2 million saved with steam savings of 170 metric tonnes per seal per year?

Impressive!

An oil and gas refinery in the UK was experiencing poor reliability of its steam turbines resulting from the failure of its existing seal system. AESSEAL® recommended the use of its STS™ mechanical seal and LabTecta® IP66 Steam Turbine bearing protector. The annual steam savings resulting from the use of one STS™ seal are estimated to exceed 170 metric tonnes . The result for the client company has been to eliminate the leakage of steam into the turbine bearing housing, extending the life of the turbines from five to eight years, and greatly reducing the time and cost of maintenance. The company has estimated its cost savings associated with the avoidance of steam losses across the fleet of upgraded turbines to be over £1 million per year.

To read the full case study, scan the QR code.

Reduce process steam loss, improve turbine efficiency

The STS™ mechanical seal has been developed in conjunction with a major oil refinery to replace existing carbon ring seals normally fitted to steam turbines.

STS™ adopts AESSEAL® non-contacting seal face technology to provide a solution that virtually eliminates steam losses.

Carbon ring seals traditionally used in steam turbines wear with use, meaning that steam leaks over 45 kg (100 lbs) per hour are common. This makes for reduced performance and higher maintenance. The energy required to replace lost steam is also significant, delivering additional business costs and a higher carbon footprint (Scope 1 or Scope 2 GHG emissions*).

These losses are completely avoidable using proven sealing technology that has been available for decades. It is no different from having your heating or air conditioning on at the maximum setting and leaving the door open.

View case history 'Improving reliability, increasing efficiency'

- Modular cartridge design — simple to install and suitable for a wide range of steam turbines
- Improved machine life
  - Extended interval between major overhauls
- Improved bearing life
  - Reduced bearing temperature
  - Reduced bearing contamination (steam ingress)
- Elimination of shaft wear
- No-wear parts
- Reduced corrosion in steam turbine speed control equipment and adjacent machinery

Watch video showing the STS seal in action

Scope 1 emissions — Scope 1 covers emissions from sources that an organization owns or controls directly – for example from burning fuel in our fleet of vehicles (if they're not electrically-powered).

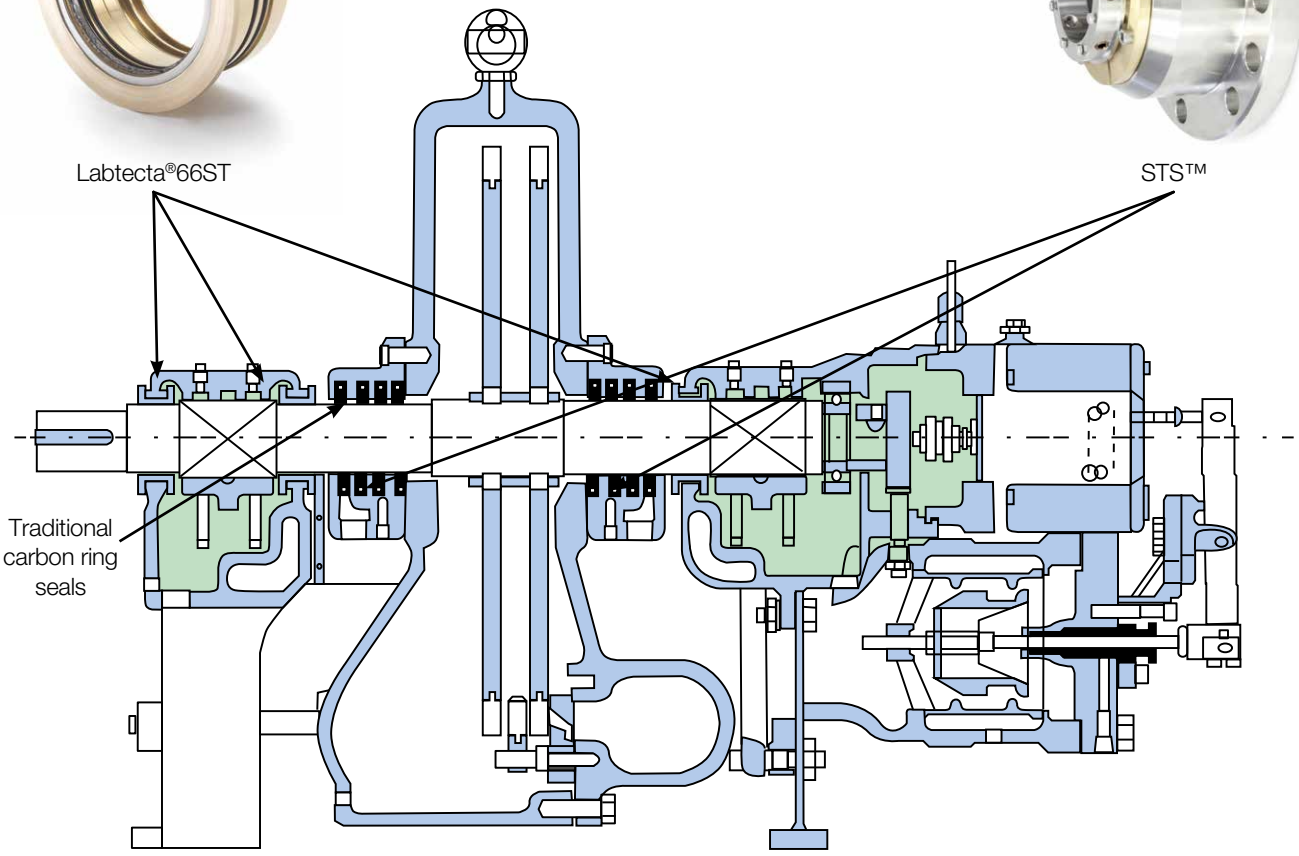
Scope 2 emissions —Scope 2 are emissions that a company causes indirectly when the energy it purchases and uses is produced. For example, for our electric fleet vehicles the emissions from the generation of the electricity they're powered by would fall into this category.

NET ZERO

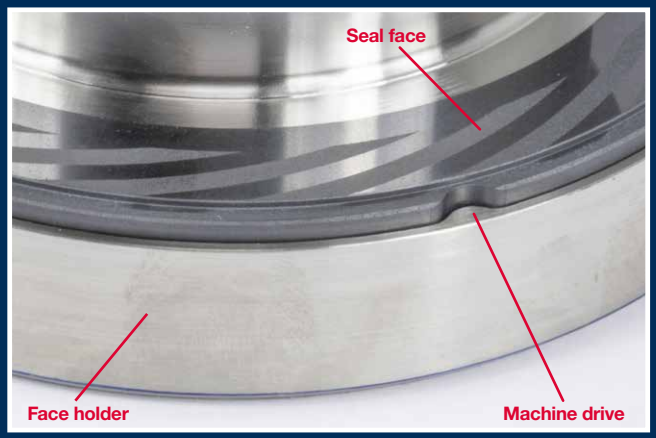
STS™ — General specification

Size range:	38mm to 115mm / 1.5” to 4.5”
Face options:	Antimony Carbon / Silicon Carbide
Secondary seal options:	High temperature polymer
Sleeve seal and gasket:	Flexible graphite

Common equipment specific standard designs are readily available. View full product details at **aesseal.com/en/product/gas-seals/steam-turbine/sts**



Typical steam turbine cross section

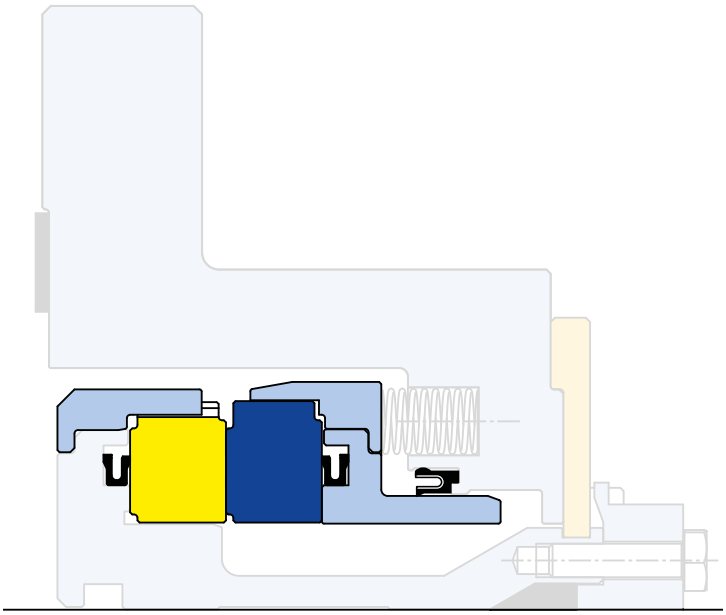


The seal face holder incorporates CNC machine drive lugs that are a precision fit to the corresponding seal face. Drive slots are curved and optimized to eliminate seal face stress.

Without steam turbine seal

With steam turbine seal

Standard core modular components	
Core parts balance Ø	Max nominal shaft size
2.375”	1.750”
2.875”	2.250”
3.125”	2.500”
4.000”	3.375”



Market-leading delivery performance from inventoried standard core modular components. The adaptive hardware (sleeve and gland plates) can be rapidly CNC manufactured to suit specific machines.

Bearing protector for steam turbines

LabTecta®66ST

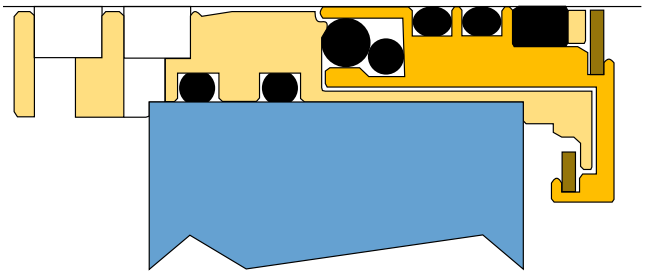
Process steam turbines present a unique challenge for bearing protection. As the carbon rings containing the steam wear, high temperature / high velocity steam travels down the shaft directly at the bearing seal. Standard OEM labyrinth seals have proven to be ineffective in preventing steam ingress.

AESSEAL® has developed LabTecta®66ST designs specifically for steam turbine applications.

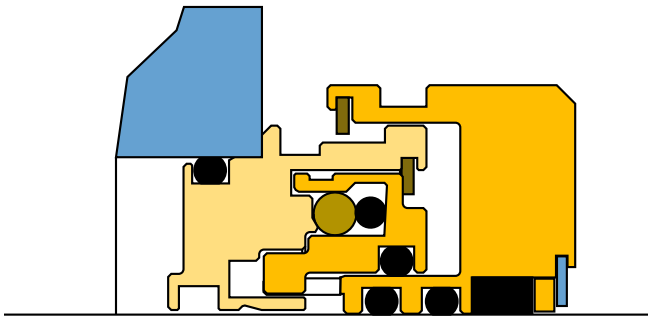
This design features:

- Extra clearances for thermal expansion
- Steam deflector / flinger
- TFE/P 'O' rings as standard
- Internal shut-off valve
- Field proven technology

View case history 'Preventing steam ingress into the bearing housing'



LabTecta-ST™



LabTecta-STAX™

For smaller steam turbines, the LabTecta®66ST design provides excellent protection in a compact package. For larger steam turbines, the LabTecta®66STAX provides easy installation with the capability to accommodate large axial shaft movement.

Standard designs are available for common steam turbine models. Specific designs can be manufactured at no additional charge.

For further information visit:
aesseal.com/en/product/bearing-protection/steam-turbine

> These steam turbine seals are so good you should be looking at rolling them out to refineries worldwide

Refinery workshop manager

aesseal.com/en/product/gas-seals/steam-turbine/sts

AESSEAL®

ENVIRONMENTAL TECHNOLOGY

To experience the exceptional, please contact your local representative. Discover full details on our website:

www.aesseal.com

This brochure is fully recyclable. When laminated, a sustainable, biodegradable and recyclable lamination is used.

For further information and safe operating limits contact our technical specialists at the locations below.

THE QUEEN'S AWARDS FOR ENTERPRISE: INNOVATION 2021

THE QUEEN'S AWARDS FOR ENTERPRISE: SUSTAINABLE DEVELOPMENT 2022

AESSEAL plc is certified to:

ISO 9001, ISO 14001, ISO/IEC 20000, ISO/IEC 27001, ISO/TS 29001, ISO 37001, ISO 45001 & ISO 50001

Use double mechanical seals with hazardous products.

Always take safety precautions:

WARNING

- **Guard your equipment**
- **Wear protective clothing**

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