A Guide to
API MECHANICAL SEAL AND SYSTEM DESIGN

- AESSEAL® DESIGNS FOR THE REFINERY AND PETROCHEMICAL INDUSTRIES
- EXAMPLES OF API SEALS
- GUIDELINES FOR USING API SYSTEMS
- AESSEAL® SYSTEM SELECTION SOFTWARE
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## CONTENTS

**Description**  
Objective of the Report .................................................. 4  
Introduction ................................................................. 4  

**Section 1**  
Double Mechanical Seals .................................................. 5  
API Style Double Seals ...................................................... 7  
Axial Movement from Thermal Growth .................................. 7  
Examples of API Style Seal Designs ..................................... 8  
Metal Bellows Cartridge Mechanical Seals .............................. 9  
API 610 VERSION 8/API 682 (Type A) Seal Design ....................... 11  
API Plan 23 and Plan 52/53 Double Tandem Seals ...................... 12  
Section Summary ............................................................. 14  

**Section 2**  
API Seal Support Vessels .................................................. 15  
ASME Seal Support Vessels .................................................. 15  
API 610 Seal Support Vessel Design ..................................... 17  
API 682 Seal Support Vessel Design ..................................... 18  
API Style (Forced Circulation) Seal Support Vessel .................... 20  
Instrumentation & Accessories .......................................... 22  

**Section 3**  
Changing the Seal Environment .......................................... 23  
Efficiency of Pump Cooling Jackets ..................................... 25  
API Plan 23 and Cooling Jacket .......................................... 26  
Guidelines for Using an API Plan 23 System ............................ 27  
Guidelines for Using Equipment Cooling Jackets ...................... 28  
Section Summary ............................................................. 28  

**Section 4**  
API Test Facilities ........................................................... 29  
AESSEAL® System Selection Software .................................... 30
Objective of the Report

The objective of the following report is to provide an insight into some of the mechanical seal and support system products that AESSEAL® offer for the Refinery and Petrochemical industries.

Introduction

With the exception of the Defence industry, the Refinery industry is probably the most established, controlled and developed industry in the entire world.

As a result, rotating equipment specifications within the refinery industry have, in many cases, paved the way forward for other industries.

Mechanical seals and support systems are no exception. Both seals and support systems must conform to a combination of industry specific and site specific technical requirements. Exacting standards in terms of workmanship, materials and product design suggest that only the most technically competent and "rounded" organization may conduct business in such an industry.

As such the mechanical seal industry in this section is controlled by a few global mechanical seal suppliers. In some cases they have become complacent, offering high cost products with long lead times.

Within the next 5 years, AESSEAL® intend to shatter this grasp by offering unsurpassed service levels complemented by a range of technically proficient products.

The following report provides an insight into some of the current products offered to the Petro-chemical and Refinery industries.

The focus of the report is on double pusher and bellows mechanical seals, seal support systems and also "changing the seal environment". In many instances in the Refinery and Petro-chemical industries, the cost of the seal is insignificant to the overall project costs or the consequential loss of production.

Periphery pieces of equipment around the typical plant are sealed with a variety of commonly encountered seal designs. In addition to standard designs, AESSEAL® supply special (non-inventoried) seal designs as detailed in this report.

Please contact the AESSEAL® technical department to process any API related technical enquiry.
SECTION 1

DOUBLE MECHANICAL SEALS

The DMSF™ is used to seal rotating equipment around the central API (non-core) functions.

The DMSF™ is a world class product inventoried from 1.000" to 6.000", (25 - 150mm) and offered in a variety of seal face materials including Antimony Carbon and Reaction Bonded Silicon Carbide.

The seal design features of the patent pending DMSF™ include:

- Four monolithic seal faces for improved temperature performance.
- Bi-directional pumping ring, which circulates high volumes of barrier fluid irrespective of shaft rotation.
- Directional barrier fluid flow path ensuring that barrier fluid is circulated to the seal faces.
- Double hydraulically balanced inboard seal faces.
- Pressure balanced seal faces.

Figure 1

Bi-directional Pumping Scroll (Patent Pending)
The DMSF™ is also supplied with exotic alloy wetted components for improved chemical resistance. Exotic alloy wetted materials include Alloy 276, Alloy 400 and Titanium. When a flush is required, the seal gland is supplied in the solid exotic alloy material.

The generic seal design may also be adapted to suit the requirements of API 610 or 682.

Figure 3 illustrates a DMSF™ with a thick sleeve, register (spigot or pilot) location and fully machined gland to suit the requirements of API 610.

The DMSF™ product has undergone the most extensive test program that the company has ever seen.
**API STYLE DOUBLE SEALS**

Special DMSF™’s have been supplied to the Petrochemical industry for installation on various duties. Figure 4 illustrates a DMSF™ seal design installed on double ended Weir pumps feeding a degasification column.

Typical application duties included 19 bar (275 psi) process pressure, 232°C (450°F) process temperature rotating at 980 rpm.

As the pump was double-ended, two seals were required per pump, with 3 pumps per train (a process block of equipment). AESSEAL® was awarded the seal and system supply contract including full installation and commissioning of 6 trains (12 seals in phase 1 with 12 to be installed in phase 2 with an additional order for a further 12 seals possible).

The seal design underwent extensive pre-delivery (customer-witnessed) tests on hot oil duties that simulated the duties expected on site.

The seal was supplied with 3 AMSE welded and certified flanges for the multi-port flush, quench and drain connections.

**Axial Shaft Movement from Thermal Growth**

Axial movement from thermal growth can severely effect the performance of a mechanical seal. It is worth noting the 4 sets of springs in the design shown in Figure 4.

As the shaft grows axially, each set of springs move 1/2 of the total axial movement of the shaft. This ensures that the seal face pressure remains as near as possible to the idealized "design" conditions, helping to prevent overloading/high heat generation problems.

The API special DMSF™ seal design shown in Figure 4 was a modular design for both the drive end and non-drive end of the double-ended pump. This reduced customer inventory levels and unit price due to the economies of scale.
**METAL BELLOWS CARTRIDGE MECHANICAL SEALS**

AESSEAL® manufacture metal bellows seals and, therefore, have FULL control over ALL supply and inventory issues.

Metal bellow heads are extensively inventoried in ALL ranges of materials and seal face combinations.

This patent pending product range includes component seals with elastomers and graphite wedge options, single cartridge seals with a variety of environmental porting options and double cartridge seals.

Outside of the standard product range AESSEAL® offer a variety of designs to meet application requirements. Figure 6 shows a modular adaptation of a bellows seal mounted in a DMSF™ gland. The BDFI™ seal boasts a full bi-directional pumping scroll, with a deflector to ensure the barrier fluid is circulated to BOTH sets of seal faces.

**Why Outboard Monolithic Faces and not Metal Bellows?**

Often seals with outboard metal bellows units will not physically fit in most types of process equipment without equipment modifications. Designs which may fit often compromise the number of outboard bellows convolutions thereby increasing the bellows spring rate and material stresses.

Furthermore, as the outboard elastomers sited in the barrier fluid are not generally subject to chemical attack, nor does the seal have a barrier temperature necessitating a metal bellows, external metal bellows designs are not applicable for the majority of applications.

**Changing the Environment**

Often the most applicable solution to sealing difficult applications is to change the seal environment.

AESSEAL® widely promote the use of Plan 23 systems, using seals and systems like the SMSS23™ and AESSEAL® Cooler range.

The BDFI23™ or BDFC23™ are simple and cost-effective solutions which also effectively change the seal environment when used in conjunction with an appropriate adaptor plate. The BDFI™ / BDFC™ is also available with a graphite stationary ring. These variants are suffixed with a ‘G’ (eg. BDFI-G™).

This BDFI-G™ / BDFC-G™ design is only to be used in conjunction with a Plan 52, unpressurized barrier fluid system.

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**Figure 6**

BDFI™ – Special Bellows Double Cartridge with Flow Inducer

BDFI23™ plan 23 adaption

BDFI-G™ stationary graphite option
The seal design shown in Figure 6 is modular to the design shown in Figure 7. The difference between the designs is the replacement of the metal bellows rotary head for a conventional "pusher design" shrink-fitted seal face design. This offers certain advantages in viscous applications where a robust inboard drive mechanism is required.

Like ALL standard AESSEAL® designs, the BDFI™ can be supplied with a "thick" sleeve and register / spigot fitted gland in accordance with API.

Furthermore, the modular design allows the fundamental components from the BDFI™ to be used in the BSFR™ design shown in Figure 6.1.

The BSFR™ is a Single bellows seal design with a deflector and a non-sparking restriction bush. The stationary and rotary seal faces are sealed using graphite technology.

An optional sleeve to shaft graphite ring can be supplied to suit customer / application requirements. This is shown in Figure 6.2.

The BSFR™ is an ideal design for some API single cartridge seal applications requiring a bellows with steam quench to drain.
The seal design shown in Figure 8 satisfies the dimensional aspects of the API specification. The rotary mechanical seal design includes a non-sparking floating throttle bush, restrained stationary seal face, and multi-port flush option.

AESSEAL® can currently supply an engineered non-standard single mechanical seal to the dimensional requirements and in "the spirit of" the API 610 Version 8 and API 682 specifications.

The seal shown in Figure 8 is rated to *25 bar (*360 psi) maximum process pressure. This is size dependent. This product is not available as an inventoried design. At the date of publication, this product is not offered with API qualification test documentation.

For further information see AESSEAL® Gold training course.

*For the safe operating parameters of this seal design contact the AESSEAL® Technical Department. Warning - Always use double mechanical seals on hazardous applications.
API PLAN 23 & PLAN 52
DOUBLE TANDEM SEALS

The DMSF™ seal design is an exceptional high performance seal. However, where the application dictates the DMSF™ double seal principle can also be adapted to include a Plan 23 arrangement. This principle is shown in Figure 9. The seal is a tandem mounted double using Plan 52 (un-pressurized buffer fluid) and Plan 23 re-circulation.

Figure 9

CDMSF™ Seal Design Incorporating a Plan 23 Arrangement

The CDMSF™ seal design incorporates the advantages of the SMSS23™ design in a double seal format. A special deflector ensures that the barrier fluid is fully circulated underneath the seal faces further aiding seal face cooling.

In addition, the end cap and gland insert can be offered in a low co-efficient expansion material to reduce thermal growth.

Calculations of the Plan 23 heat and seal Plan 52 must be undertaken during seal selection. Use the AESSEAL® software to assist or contact the Technical Department.

Figure 10 shows a typical Plan 52 specifically engineered double tandem metal bellows seal (not designed by AESSEAL®).
A 2.125” seal (Figure 10) was employed on an IDP pump operating on a hot dowtherm oil duty (320ºC/610ºF) rotating at 2,970 rpm. API Plans 52 and 11 were used.

On repair and seal strip down the following point was noted:

• The inboard seal faces had coked oil in the buffer fluid region.

Figure 11 is an enlarged area of the inboard seal faces. It is clear from Figure 11 that there is only a small volume of buffer fluid.

Furthermore the position of the pumping ring suggests that fluid is not effectively replaced underneath the inboard faces. It was concluded that the combination of a small volume of fluid and ineffective heat removal circulation attributed to the oil coking.

Prolonged exposure to this environment may create problems with the materials used clogging or hanging-up from the coked oil.

Figure 12 illustrates the AESSEAL® (design) equivalent to Figure 10. The seal employs metal bellows seal faces inboard and outboard with pumping rings in both the product and buffer fluid areas. The Plan 11 (flush) is changed to a Plan 23 (flush re-circulation through a heat exchanger).
SECTION SUMMARY

This section has provided an insight into the double seal designs which AESSEAL® have and can supply to the Refinery and Petro-chemical industries.

Each design configuration can be adapted to meet the dimensional requirements of API 610 and 682.

AESSEAL® also offer a full range of “sister” products for single seal applications. Once again these are often fully configured to meet specific international, national or on-site specifications.

AESSEAL® recognize that the best seal design is only as good as the environment into which it is placed. Changing the seal environment is the key to increased seal life.

Section 3 identifies some of the methods through which AESSEAL® configure their standard modular seal range to suit the requirements of the Refinery and Petro-chemical industry.

*Only to be used with an unpressured plan 52 Barrier Fluid.

BDTP™ - Special Double Bellows Tandem Seal with API Plan 23 and Plan 52 (AESSEAL® Designed)

When an API Plan 23 system is employed a further reduction in temperature may be expected. Calculations indicate that the temperature at the inboard seal face will be approximately 120°C (250°F). This 40% reduction in heat (Plan 11 to Plan 23) will help to improve the seal life.

The volume underneath the inboard faces has been increased by the use of larger seal parts. More importantly is the directed barrier fluid circulation.
API SEAL SUPPORT SYSTEMS

The ultimate performance of any mechanical seal is largely dependant upon the environment into which it is placed.

Controlling the seal environment may be achieved through the use of cooling jackets or API system plans. Often API system plans define the use of a seal support system or pressure vessels.

AESSEAL® provide a wide range of seal support systems to various specifications and for all types of industries.

Similar to API mechanical seal design, API specifications regulate the design of the pressure vessels used in the Refinery and Petro-chemical industries.

ASME SEAL SUPPORT VESSEL

AESSEAL® offer a wide range of inventoried ASME™ coded vessels designated AS15™ and AS20™. This modular seal support vessel range is available with either a 15 litre (3.96 US Galls) or 20 litre (5.28 US Galls) tank capacity.

Both ranges of vessels are coded to ASME VIII Div.1 (not u-stamped). The AS20™ range has a design rating of 45 barg at 38°C (652.5 psig at 100°F) and meets the requirements of API 610 7th Edition Section 3.5.2.3.

U-stamped vessels are available on request.

Various instrumentation kits can be added to the modular vessel to meet application and site specific requirements. Such kits include intrinsically safe (IS) and flameproof (Ex) equipment.

Figure 14 illustrates the typical AS15™ system.
Figure 15 below illustrates the modular nature of the AS15™ (ASME) vessels. These AESSEAL® vessels are often supplied to support mechanical seals on periphery equipment around the central API functions.

Figure 15
Like all our mechanical seal designs and seal support systems, the AESSEAL® API 610 pressure vessel is based on a modular principle - the AS20™ vessel.

The AESSEAL®, Lloyds approved, API 610 vessel system can be adapted to suit on-site specifications using a range of add-on instrumentation packages.

Figures 16 and 17 illustrate the typical system.

The 316 Stainless Steel API 610 vessel is designated AS20™-SWF.

It is offered with a 20 litre (5.28 US Galls) tank capacity with a weld pad level gauge, integral cooling coil and socket welded flanges as standard.

Threaded ports can be supplied upon request.

The AS20™-SWF range has a design rating of 45 barg at 38°C (652.5 psig at 100°F) and meets the requirements of API 610 7th Edition Section 3.5.2.3. The design and vessel calculations are approved by Lloyds and conform to ASME™ VIII Divison1 1995 addenda 1997.

The standard product is not u-stamped, however this option is available on request.
The AESSEAL® API 682 vessel design is shown below in Figure 18.

The vessel is designed to meet the requirements of the API 682 specification.

The 316 Stainless Steel API 682 vessel is designated AS28-NPT.

It is offered with a 28 litre (7.39 US Galls) tank capacity with a weld pad level gauge, integral cooling coil and 1/2" NPT threaded ports as standard.

Socket and butt welded flanges can be supplied upon request.
The AS28-NPT range has a design rating of 45 barg at 38ºC (652.5 psig at 100ºF) and meets the requirements of API 682.

Like the API 610 vessel, the design and vessel calculations are approved by Lloyds and conform to ASME™ VIII Division 1 1995 addenda 1997.

The standard product is not u-stamped, however this option is available on request.
API STYLE FORCED CIRCULATION SEAL SUPPORT SYSTEMS

In addition to the wide range of seal support pressure vessels, AESSEAL® offer un-pressurized seal support systems. Such a unit can deliver large volumes of pressurized barrier fluid through forced circulation by pressurizing the pipe work rather than the vessel body.

Figure 21 illustrates the AESSEAL® Pumppac™ system adapted with a special flame-proof motor and immersion heater. This unit strictly controls an elevated barrier fluid temperature for use in applications where the product / barrier fluid must be kept hot.

The Pumppac™ system range is available with 14 pre-assembled options covering oil and water barrier fluid requirements.

With a 45 litre (11.9 US Galls) tank capacity and heat exchanger option the Pumppac™ is ideal for removing the mechanical seal heat from some of the most arduous temperature applications.

The reservoir tank is un-pressurised. Barrier fluid is pressurized by an integral positive displacement pump with EExd motor (if required) for electrically classified areas.

This allows the Pumppac™ to be applied to the most demanding pressure applications.

Figure 22 shows an extended 90 litre (23.8 US Galls) Pumppac™, frame-mounted system with flame-proof motor and level switch.

A total of 6 systems were supplied and commissioned in conjunction with the API style seals outlined in Section 1.4.
Figure 23 illustrates the system schematic for the double Pumppac™ system shown in Figure 22.

AESSEAL® are a modular company. They apply standard or standard "customized" products wherever possible to applications to ensure the best possible customer service.

Where a standard product is unable to meet the demands of an application, AESSEAL® apply engineering and hydraulic experience to create new standards.

It is evident from Figure 23 that AESSEAL® are able to offer the "full package" including special system design to suit the application.

Once a non-standard application is commissioned, customer approved and working, AESSEAL® provide follow-up service by placing long lead-time items in inventory. This maximizes customer service.

The 90 litre (23.8 US Galls) Pumppacs described above and supplied to the Petro-chemical industry are now part of the AESSEAL® standard system range.

For further details contact the AESSEAL® MCK Systems Division.
Figure 24 illustrates the standard AESSEAL® externally mounted heat exchanger.

The standard inventoried unit is offered with a cast iron casing and 316 Stainless Steel tubes and compression fittings.

The "cooler kit" is available in several sizes depending on the heat removal required.

The unit is extensively used in conjunction with the SMSS23™ seal design as defined in Section 3.0, Figure 28.

The design of the cooler is considerably more compact than the equivalent heat removal system of a conventional rectangular plate heat exchanger.

AESSEAL® can adapt instrumentation kits to fit onto purpose made back-plates or industrial cabinets in accordance with on-site requirements. An example of this is shown in Figure 25.

The AESSEAL® approach to system supply is simple:

"Provide everything that is required to connect and commission the arrangement".

This includes components from fittings to ball valves, stainless flexible hoses to stainless "hard" tubing.
SECTION 3
CHANGING THE SEAL ENVIRONMENT

Mechanical seals are often installed in physical areas which do not provide the best opportunity for seal life. Such areas include previously packed stuffing boxes, where the radial clearance between the mechanical seal rotary and pump stuffing box bore can be as little as 0.040" (1mm).

Sealing hot products can cause problems. The effects of sealing hot products include:

1. The breakdown of the fluid film.
2. Premature elastomer failure.
3. The breakdown of the sealed media (changing its state).

It is important that care should be taken when "opening up" the environment around the mechanical seal faces.

Particular care should be given to pumps with cooling jackets.

Figure 26 shows a pump with an integral cooling jacket. The end of the stuffing box has been removed with the intention of improving the circulation of the process fluid around the mechanical seal.

Unfortunately, the removal of the end of the pump stuffing box hinders the effectiveness of the pump cooling jacket. As a result a higher proportion of the heat generated by the mechanical seal faces is taken into the barrier fluid chamber rather than being taken by the cooling jacket.

This can increase the work load on the barrier fluid system, ultimately adding cost to the arrangement. In addition the seal faces will inevitably run hotter.
This allows the cooling jacket to remove more heat from the seal area.

This principle also applies to Plan 23 seal arrangements with integral cooling jackets. The SMSS23™ seal is shown in Figure 28 below. This design is covered in-depth in the DMSF™ / SMSS™ training course.

The Benefits of the SMSS23™ seal include:

- FULL cartridge Plan 23 seal with integral bi-directional pumping ring. There is no separate pumping ring involving operator alignment and setting.
- Monolithic seal faces for improved temperature performance.
- Optional integral restriction bush.
EFFICIENCY OF PUMP COOLING JACKETS

The efficiency of the pump cooling jacket is dependent on a number of factors such as the cooling jacket design and its connecting system. Probably the most important aspect is to have a "clean" water jacket.

Cast Iron pumps corrode and the heat transfer across the surface is dramatically reduced.

One approach used to increase the cooling effect of the equipment is to increase the flow rate through the cooling jacket. The misconception is that higher flow rates will dramatically increase cooling efficiency.

Figure 29 provides an indication of the typical relationship of flow rate and seal chamber temperature using water as the cooling medium circulated inside the cooling jacket. It suggests that increasing the flow rate (500%) from 1.0 US Galls/min to 5.0 US Galls/min (4.0 L/min to 20.0 L/min) only changes the seal chamber temperature by around 15%.

This slight decrease in seal chamber temperature must be evaluated against the increase in water used through the cooling jacket system.

**TIP:** DO NOT ASSUME THAT INCREASING THE FLOW RATE IN A COOLING JACKET WILL DRAMATICALLY CHANGE THE TEMPERATURE IN THE SEAL CHAMBER. YOU COULD SAVE YOUR CUSTOMER MONEY BY REVIEWING THIS!
API PLAN 23 & COOLING JACKET CIRCUIT

Cooling jackets can help reduce the application temperature, effectively changing the environment at the seal faces.

A Plan 23 system can further help reduce the heat at the seal faces.

Let’s face it: why allow the mechanical seal to see process temperatures of 260°C+ (500°F+) when the temperature can be significantly reduced to a point where seal life is increased. Further benefits may also follow. The cost of the consumable package including the seal elastomers might significantly reduce so a standard, more readily available mechanical seal might be utilized.

Figure 30 illustrates a typical schematic arrangement employed with a mechanical seal with a Plan 23 system with a cooling jacket.

The correct use of instrumentation also plays an important part in the system. Vents and shut-off valves are often encountered in typical installations. However, temperature gauges and flow indicators enable precise control of the sealing environment.

The flow indicator in the cooling jacket circuit will detect whether the inlet shut off valve has been closed. Temperature gauges will ensure that the seal and jacket is functioning correctly.

Figure 30

API Plan 23 and Jacket Cooling Diagram
GUIDELINES FOR USING AN API PLAN 23 SYSTEM

The following information provides a series of guidelines for using API Plan 23 systems in process equipment. For further details refer to the AESSEAL® DMS™ / SMSS™ training course.

- The circulation outlet port should be "top-dead centre". This refers to the position of the port internal hole not necessarily the tangential tapping (if applicable). This facilitates seal venting in the process fluid chamber.

- The heat exchanger should be elevated to between 18" (457mm) and 24" (610mm) above the centre line of the seal chamber.

- The recommended tubing outside diameter is 0.750" (19mm).

- Use, where possible, 1/2" NPT connections for the inlet and outlet circulation ports.

- Long radius bends in the pipe work are recommended.

- The horizontal distance from the seal chamber to the heat exchanger should be less than 4 feet (1.2m).

- Position the vent valves at the highest points of the piping system.

- The preferred orientation of the heat exchanger is VERTICAL..

- Close clearances between the circulation/pumping device and the stuffing box (stationary element) are not permitted.

- The stuffing box should be fully vented during first filling of the system with the product fluid.

- In operation the differential temperature of the circulating fluid should be approximately 6°C (10°F) above the cooling media outlet temperature.

- Always ensure that the circulation inlet port is not directly over the circulation-pumping device. This will tend to throw the fluid back up the inlet port, rather than axially towards the outlet port.

The guidelines above should help when using API Plan 23 systems.

TIP: API PLAN 23 IS A VERY EFFECTIVE SYSTEM WHEN USED CORRECTLY.
GUIDELINES FOR USING A STUFFING BOX COOLING JACKET

The following information provides a series of guidelines when using cooling jackets in process equipment:

- Use the cooling jacket, where possible, in conjunction with an API Plan 23 arrangement.
- Use sufficient cooling flow through the cooling jacket. Remember the law of diminishing returns - more flow does not necessarily mean effective cooling.
- Always vent the stuffing box.
- Ensure that the cooling jacket is piped independently.
- Use a relief valve in the cooling line of the cooling jacket. If the shut off valve is closed, the pump is started and fluid is present in the pipe work (with nowhere to go) it will expand. This may cause serious damage if not relieved.
- Use a visual flow indicator in the cooling line. This indicates whether flow is present. Flow is more critical than pressure.
- Do not use a cooling jacket in conjunction with API Plan 11 or 13.
- ‘Softened water’ is preferred as the cooling liquid. Avoid using high mineral content water. Over time the dissolved solids (e.g. lime) will throttle down the pipe bores and reduce the efficiency of the system.
- Do not remove the packing stop or throat bush at the bottom of the stuffing box bore. This would hinder the effectiveness of the cooling jacket.
- Do not connect the cooling lines to the Plan 11 and 13 flush ports in the equipment. Take extra care to identify the correct ports. If the seal is connected in "series" with the jacket cooling water then always supply the coldest fluid to the seal first.

The guidelines above should help when using cooling jackets with mechanical seals.

TIP: COOLING JACKETS ARE VERY EFFECTIVE WHEN USED CORRECTLY.

SECTION SUMMARY

The previous examples illustrate methods for changing the seal environment.

This section reiterates designs which adapt "metal work" to allow standard seal face technology to be offered for applications which on first inspection appear extremely difficult. The SMSS23™ is an excellent example of a Plan 23 single seal.

This section outlines good working practices for applications containing cooling jackets. It suggests that Plan 23 arrangements will complement installations with cooling jackets, however, attention to the connecting support system and pipe work is required.

Often the small price of additional instrumentation within the cooling circuit, such as flow and temperature gauges, can pay for themselves many times over.
API TEST FACILITIES

The API 682 specification defines qualification testing of mechanical seals supplied in accordance with the specification unless otherwise agreed with site.

AESSEAL® have designed, built and qualified in-house test facilities which exceed the requirements of API 682.

Figure 31 shows the API2 test house sited at the AESSEAL® headquarters in Rotherham, England.

The water and mineral oil test facilities allow testing at temperatures up to 260ºC (500ºF).

The facility is also designed to test Propane and Caustic 20% NaOH medias, in constant and cyclic duties in accordance with API 682 Section 6.3.

The equipment is computer controlled 24 hours per day, 7 days per week.

Product and barrier pressures, temperatures, flow rates, shaft speed and power usage are constantly monitored.

Video seal surveillance provides visual evidence of the seal test. This is recorded and stored electronically with the computer test record.

This equipment allows AESSEAL® to conduct pre-delivery tests, in the presence of the customer, prior to on-site installation.
API SYSTEM SELECTION SOFTWARE

Selecting the appropriate seal support system for an application is extremely important.

Incorrectly specified systems may lead to premature seal failure due to the inability of the system to remove the heat generated from the seal and product media.

On-site seal support system selection is often seen as a "black-art".

Systems are often over-specified or over complicated due to the inability of the engineer to define exactly the "heat-dump" of the respective arrangements or configurations in the system.

AESSEAL® have simplified and standardized the selection of seal support systems.

The AESSEAL® system selection software illustrates the "heat-dump" of a range of standard and customized product offerings. The software has been written in conjunction with practical tests.

It allows the user to select the appropriate system for the application, therefore maximizing seal life and minimizing the cost of the system.

For further information see the AESSEAL® Seal & System technical CD-ROM, or contact your nearest technical representative.