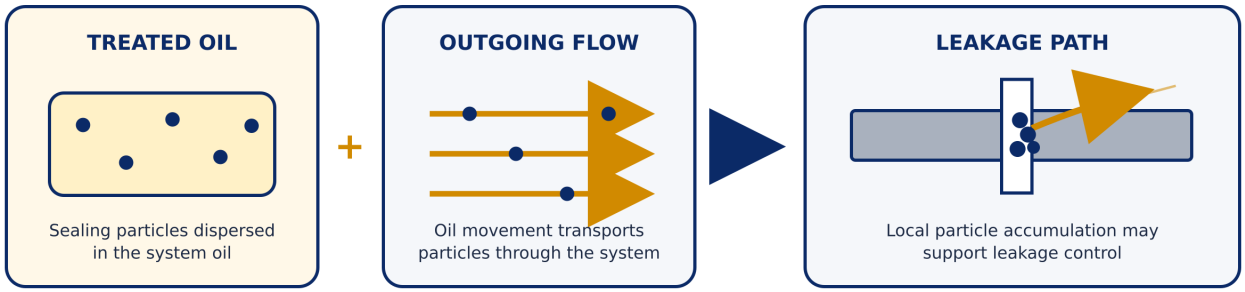
APPLICATION GUIDE

Oil Leakage Treatment



Treated oil + outgoing flow → transport to the leakage path → local accumulation

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CUSTOMER APPLICATION GUIDE
Technical background, limitations and troubleshooting for mineral oil-based stern tube systems. Follow the vessel-specific Vessel Treatment Plan for application and reporting.

SECTION 1 - Document roles

DOCUMENT	PRIMARY ROLE	USED BY
Customer System Assessment (CSA)	Collects the system information required to assess technical suitability.	Customer and AddVation before treatment
Customer Product Sheet (CPS)	Provides the concise commercial and application overview of ST Seal Core Plus.	Customer decision-makers and technical contacts
Technical Data Sheet (TDS)	Provides controlled product properties, compatibility and technical reference information.	Technical personnel and reviewers
Safety Data Sheet (SDS)	Controls safe handling, storage, exposure response and disposal information.	All personnel handling the product
Vessel Treatment Plan	Defines vessel-specific quantities, filter configuration, application, Top-Up Blend and the Treatment Result.	Responsible technical personnel and vessel crew
Quick Guide	Provides a visual reference to the application sequence. Use with the Vessel Treatment Plan.	Vessel crew during application
Application Guide	Explains treatment principles, limitations, exceptions and troubleshooting when technical background is needed.	Crew and technical personnel

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DOCUMENT PRIORITY
The Vessel Treatment Plan is the authoritative treatment instruction. Respect vessel procedures and applicable OEM or seal-maker limits. If instructions conflict or required information is unclear, contact AddVation before addition.

Guide contents

2 Suitability and compatibility	**6 Application sequence and reasoning**
3 Product function and limitations	**7 Controlled operating conditions**
4 Filter assessment	**8 Treatment result and decisions**
5 Treatment liquids and preparation	**9 Troubleshooting, completion and handback**

SECTION 2

System suitability and lubricant compatibility

System suitability should be confirmed and recorded in the Treatment Plan before application.

Quick suitability check

Outgoing lip-seal oil leakage where system oil can carry treatment towards the leaking interface.

Relevant treatment volume and system boundary have been identified.

Before-treatment leakage is known or can be estimated where practical; record the basis if available.

The vessel can perform the stated shaft rotation within applicable vessel, OEM and seal-maker limits.

Filter location, specification, function and the permitted configuration have been confirmed.

CHECK	WHAT TO CONFIRM
System oil	Mineral oil system. Record the lubricant grade in the Treatment Plan.
Previous leak treatment	If another leak-stop, seal-treatment or particle-based product may remain in the system, record the product name and approximate quantity.
Mechanical condition	Severe damage, abnormal vibration/noise or uncontrolled oil loss should be mechanically assessed before treatment.

Assessment information

Application and seal arrangement; seal maker and known seal type.

Relevant system oil volume; header tank arrangement and receiving capacity.

Before-treatment leakage rate and basis, where available; current vessel and shaft condition.

Filtration arrangement; oil appearance and service history; relevant vessel operating restrictions.

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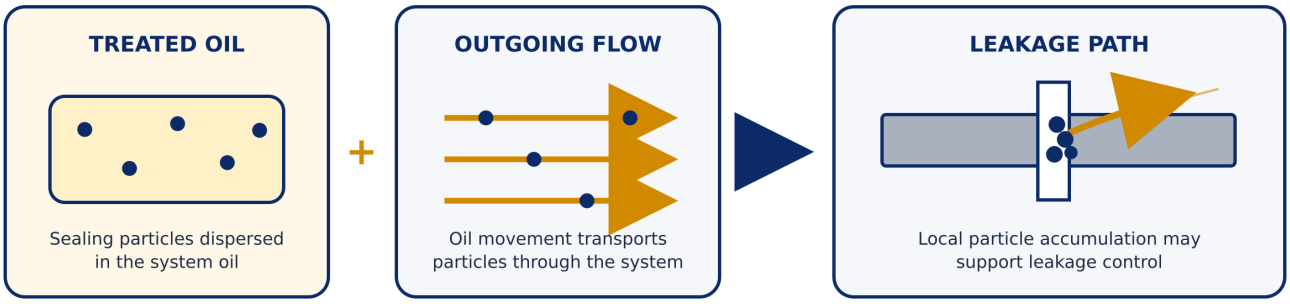
MECHANICAL LIMITATION

ST Seal Core Plus is an operational treatment for suitable leakage cases. It does not remove the need for physical inspection or repair where system or seal condition requires mechanical intervention.

SECTION 3

Product function and technical limitations

The treatment relies on system oil carrying particles through the relevant oil path to the leaking seal.



Treated oil + outgoing flow → transport to the leakage path → local accumulation

Treatment mechanism

ST Seal Core Plus is dispersed into the system oil by preparing the Initial Blend at the stated 1:1 ratio by volume.

Controlled oil circulation carries the dispersed particles through the relevant treatment circuit.

At an outgoing leakage path, oil flow transports particles towards the damaged seal interface.

Under suitable conditions, particles may accumulate at the leakage area and support formation of a sealing barrier.

What influences the response

SYSTEM	CONDITION	OPERATION
Seal arrangement, treatment boundary, circulation path and header-tank configuration.	Damage severity, leakage direction, leakage rate, oil condition and filtration.	Shaft state, operating profile, mixing quality, circulation and correct application.

i **TRANSPORT TO THE SEAL**
The Initial Blend must enter the relevant oil path and reach the leaking seal. If filtration or circulation prevents this, contact AddVation before addition. Do not compensate for an unclear oil path with additional product.

i **PERFORMANCE**
A response cannot be guaranteed. Results depend on the actual system, seal condition, oil, filtration, operation and correct execution.

SECTION 4

Filter assessment and approved configuration

Before addition, confirm with the Chief Engineer or other authorised onboard technical person that the permitted filter configuration allows treatment particles to reach the leaking seal. The configuration must meet vessel procedures and applicable OEM requirements.

Filters in the relevant oil path may retain treatment particles and reduce effectiveness. A filter may also provide essential contamination control or protection. Plus filter guidance is 100 µm. Assess both functions for the actual system; a filter rating alone does not establish particle passage.

CHECK	WHAT TO CONFIRM	ASSESSMENT RECORD
Oil path	Identify every filter between the addition point and the leaking seal, including parallel or separate circuits.	Filter location and the oil path to the leaking seal.
Specification and function	Identify filter type, element and rating, including nominal or absolute where known, and its protection function.	Available filter specification and any required operating function.
Permitted configuration	Confirm the approved arrangement and the onboard person authorised to accept it.	Configuration, approving person and any temporary-change conditions.

Before treatment

Identify filter location, type, element, rating and function in the relevant oil path.

Confirm whether filtration could prevent treatment particles from reaching the leaking seal.

Confirm the permitted configuration with the Chief Engineer or other authorised onboard technical person under vessel procedures and applicable OEM requirements.

If a temporary change is permitted, document the responsible person, allowed duration, operating restrictions and reinstatement trigger before addition.

If a temporary change is authorised

Follow the monitoring and operating restrictions required by the approved temporary configuration and vessel procedures.

Restore the normal filter configuration at the agreed trigger; do not assume a standard removal or bypass period.

Inspect as required by vessel procedures and report abnormal restriction or retained material for technical review.

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CLARIFY BEFORE ADDITION

Do not remove or bypass a filter unless permitted by vessel procedures and applicable OEM requirements. If the oil path, particle passage or permitted configuration is unclear, keep the normal configuration and contact AddVation before adding product.

SECTION 5

Treatment liquids and preparation

Initial Blend provides the initial treatment. Top-Up Blend is used only for the actual level restoration required.

MIXTURE	COMPOSITION	PURPOSE	CONTROL RULE
A. Initial Blend	Up to 500 L system volume: 8% product + 8% system oil (16% total). Over 500 L: 4% product + 4% oil (8% total). Each percentage uses the stated pre-treatment system volume. Mix 1:1 by volume.	The full initial treatment added to the designated tank as stated in the Vessel Treatment Plan.	Use the quantities stated in the Vessel Treatment Plan. Confirm receiving capacity before addition.
B. Top-Up Blend	4% ST Seal Core Plus + 96% system oil by volume of the final refill blend.	Restores toward Normal Level when leakage stops or Low-Level Alarm is reached, as stated in the Vessel Treatment Plan.	Prepare only the actual refill volume required. Keep unused product separate; it is not an additional dose.

Prepare the Initial Blend

Use a clean, suitable mixing container and clean mixing equipment.

Add the ST Seal Core Plus quantity stated for the batch.

Add the volume of system oil stated in the Treatment Plan and mix until homogeneous.

If mixing requires smaller batches, maintain the 1:1 ratio by volume in every batch. This does not authorise a different addition sequence.

Label the Initial Blend clearly. Keep unused ST Seal Core Plus separate for preparing Top-Up Blend as required.

Container labels

A INITIAL BLEND **ST Seal Core Plus: ____ L** **System oil: ____ L | Ratio 1:1 by volume**	**B TOP-UP BLEND** **Final refill blend: ____ L** **4% ST Seal Core Plus / 96% system oil by volume**

SECTION 6

Application sequence and technical reasoning

Follow the Vessel Treatment Plan on board. The Quick Guide is a visual reference; this section explains the same seven steps.

STEP	CONTROLLED ACTION	WHY IT MATTERS
1	**VERIFY SETUP** Confirm sufficient system oil for the Initial Blend and that the permitted filter configuration allows particles to reach the leaking seal. Clarify uncertainties with AddVation before addition.	Checks that the blend can be prepared and that treatment particles can reach the intended seal.
2	**PREPARE INITIAL BLEND** Mix the stated ST Seal Core Plus and system oil quantities 1:1 by volume until homogeneous.	Keeps the product quantity and Initial Blend volume distinct and provides a uniform blend.
3	**LOWER TANK LEVEL** Lower only to the permitted level in the plan. Confirm that the full Initial Blend can be received within permitted levels. Do not empty the tank or system.	Provides receiving capacity without emptying the system or exceeding vessel limits.
4	**ADD INITIAL BLEND** Add the full Initial Blend to the designated tank. Complete the initial application details on page 2, including the addition completion date/time.	Documents the actual application and the starting point for estimating time to leakage stop.
5	**START CONTROLLED OPERATION** Run the system with the shaft rotating for at least 30 minutes, within vessel procedures and applicable OEM limits.	Establishes the initial circulation through the relevant oil path.
6	**MONITOR & MAINTAIN** Follow normal vessel monitoring. When leakage stops or Low-Level Alarm is reached, restore toward Normal Level with Top-Up Blend as required.	Maintains the oil level using the specified refill blend. No separate checkpoint log is required.
7	**REPORT & EVALUATE** Complete and return the Treatment Result on page 2 when leakage is confirmed stopped, or after 14 days if it continues.	Provides one outcome report, including approximate hours or days to leakage stop and a remaining leakage rate if known.

i **TANK LEVEL AND CAPACITY**

Do not empty the tank or system. Follow the level stated in the Vessel Treatment Plan. If the full Initial Blend cannot be received within permitted levels, contact AddVation before addition; use only an updated, agreed plan.

SECTION 7

Controlled operating conditions

The initial circulation requires shaft rotation for at least 30 minutes. The vessel's responsible personnel determine the permitted operating condition under vessel procedures and applicable OEM requirements.

CONTROLLED VARIABLE	RESPONSIBILITY AND GUIDANCE
Vessel condition	Alongside, anchored or underway as permitted by the vessel's responsible personnel. Record the actual condition in the initial application record.
Sailing authority	The vessel's responsible personnel determine whether sailing is permitted. AddVation documents do not grant permission to sail.
Shaft condition	Shaft rotating for the initial circulation period, within vessel procedures and applicable OEM limits.
Initial circulation period	At least 30 minutes as stated in the Vessel Treatment Plan. This is not a requirement for continuous shaft rotation throughout the reporting period.
Normal operating limits	Use the vessel's existing approved limits. This guide specifies no additional treatment pressure setting or pressure increase.
Temperature	Remain within the vessel's normal approved temperature limits. Record the initial reading where requested on page 2.
Responsibility and reporting	Responsible onboard personnel confirm the setup. Complete the initial application details and return one Treatment Result as described in section 8.

Circulation - not simply 'normal operation'

The Initial Blend must be carried through the relevant oil path towards the outgoing leakage path. The permitted vessel and shaft conditions depend on the actual arrangement and remain subject to vessel procedures.

! **VESSEL OPERATION**
The Treatment Plan does not determine whether the vessel may sail. Sailing and changes to shaft condition remain the responsibility of the vessel's responsible personnel under vessel procedures.

i **VESSEL OPERATING LIMITS**
This guide does not introduce a treatment-specific pressure setting. Keep the system within the vessel's existing approved operating limits. Refer any proposed setting change to the responsible onboard personnel.

Stop and clarify before operation when

- the permitted vessel or shaft condition is unclear;
- the intended operating condition conflicts with vessel procedures or OEM guidance;
- the system cannot establish the specified circulation path; or
- abnormal system behaviour is present before the treatment begins.

SECTION 8

Treatment result and decision logic

Complete the initial application details on page 2 at treatment start. Return the same page once: when leakage is confirmed stopped, or after 14 days if it continues.

Leakage estimate when available

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OPTIONAL LEAKAGE-RATE BASIS
If a remaining leakage rate can be estimated, state the value and unit (L/day or L/h). If measured oil loss and a time period are known: L/day = loss (L) / period (h) x 24. If the rate cannot be estimated, leave it blank and explain any uncertainty in Comments.

Complete the Treatment Result

Outcome	Select Leakage stopped, Leakage reduced or No improvement, as shown in the Vessel Treatment Plan.
Time to leakage stop	If stopped, estimate the hours or days after adding the Initial Blend. An exact stop time is not required.
Remaining leakage	If reduced and known, enter the estimated remaining rate and unit in the result field.
Comments and return	Use Comments for relevant uncertainty, deviations or operating changes. Name / role remains optional. Return page 2 only.

Level restoration and reporting

DECISION	TRIGGER	ACTION
Restore normal tank level	Leakage stops or Low-Level Alarm is reached, as stated in the Vessel Treatment Plan.	Use only the actual refill volume required, as Top-Up Blend containing 4% ST Seal Core Plus and 96% system oil by volume.
Return the treatment result	When leakage is confirmed stopped, or after 14 days if it continues.	Send page 2 once. If leakage continues or further treatment is being considered, contact AddVation before any additional dose outside the plan.

Act earlier when

leakage rises rapidly or the header-tank level cannot be maintained;

pressure, temperature, vibration, noise, oil appearance or alarms become abnormal;

the filter configuration or oil path becomes uncertain; or

a required action would fall outside the conditions stated in the Treatment Plan.

SECTION 9

Troubleshooting, completion and handback

Do not correct uncertainty with repeated dosing. Reassess the system and update the Treatment Plan when required.

OBSERVATION	CONTROLLED CHECK	NEXT ACTION
Initial Blend is not homogeneous	Confirm workable temperature, clean equipment, the stated batch ratio and adequate agitation.	Mix smaller batches at the same ratio. Do not add visibly non-homogeneous Initial Blend.
Receiving capacity is insufficient	Recheck normal level, Low-Level Alarm, actual receiving capacity and the full Initial Blend volume.	Stop before addition and contact AddVation. Use only a specifically updated, agreed application plan.
Leakage appears higher	Compare pressure, shaft condition and measurement period with the before-treatment reference.	If the increase is confirmed or abnormal, stop and escalate.
Filter restriction increases	Follow vessel procedures and check the filter configuration, restriction and any retained material.	Maintain required system protection under vessel procedures and obtain technical review before continuing treatment.
No clear response	Verify system volume, the initial 8% or 4% product quantity for the system volume, 1:1 blending by volume, filtration, the oil path and initial circulation.	Complete the Treatment Result and contact AddVation. Do not use unused product as an uncontrolled second dose.

Treatment completion

Initial Blend added and the initial shaft-rotation period of at least 30 minutes completed.

Tank level managed with Top-Up Blend as required; any authorised temporary filter arrangement handled under its agreed conditions.

Initial application details completed in section 4 of the Vessel Treatment Plan.

Outcome, approximate hours or days to leakage stop, and any known remaining leakage rate entered in the Treatment Result.

Page 2 returned when leakage is confirmed stopped, or after 14 days if it continues. Relevant deviations may be noted in Comments.

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RETURN PAGE 2 ONLY

Send a clear scan or mobile photo of page 2 to info@addvation.com or +45 50 181 182. Return it when leakage is confirmed stopped, or after 14 days if it continues. No separate performance log is required.

Important limitations

For mineral oil-based lubricants only. Do not exceed vessel, OEM or seal-maker limits. Filter changes, vessel operation and pressure changes remain subject to vessel procedures and responsible technical personnel. Do not add uncontrolled product or repeat treatment outside the conditions stated in the Treatment Plan. Severe or uncontrolled leakage may require physical intervention.

This guide is provided in good faith as general technical guidance. The Vessel Treatment Plan is based on customer-supplied information and does not constitute certification of system compatibility. The vessel owner/operator remains responsible for confirming system, seal, lubricant and OEM compatibility and suitability before application, and for safe vessel operation and compliance with applicable requirements.

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