

SILENT CORE INDUSTRIES | MARINE HVAC REPORT

Corrosion and Leak Assessment

Sunseeker 73 ft | Dometic three-chiller chilled-water system

REPORT REFERENCE	SCI-MHVAC-CASE-003	SYSTEM	Marine HVAC / chilled water
REPORT TYPE	Damage assessment and repair scope	PHOTO RECORD	Technical close-ups included

CURRENT STATUS

Critical strip inspection and leak confirmation required

Executive assessment

The condition exceeded routine maintenance scope. Saltwater exposure, advanced corrosion, condenser fouling, suspected refrigerant leakage and possible internal water ingress affected multiple chiller circuits. At least one assembly required removal for controlled inspection, while two circuits required confirmed leak testing before any recharge decision.

Situation

A multi-chiller marine HVAC installation was inspected for non-cooling and poor air delivery. Visible salt deposits, corrosion, fouling and water leakage were present across machinery, pumps, plumbing and several fan-coil units.

Diagnostic scope

- Visual and operational review of three chiller circuits.
- Assessment of refrigerant-pressure indication, leak evidence and saltwater contamination.
- Inspection of seawater and freshwater pumps, hoses, clamps and leakage points.
- Condition review of accessible fan-coil units, filters, coils, blowers and airflow.
- Repairability triage: clean/service in place, remove for bench inspection, or replace subject to confirmation.

Key technical outcome

The correct next step was containment and confirmation, not indiscriminate refrigerant charging. Leak source control, removal of the most damaged chiller and a structured inspection of the remaining circuits were prerequisites to any repair-versus-replacement decision.

Equipment details

Key equipment information recorded during the inspection.

Item	Specification	Field note
Yacht	Sunseeker 73 ft motor yacht	Three-chiller chilled-water installation.
Chiller make and type	Dometic chilled-water system	Manufacturer and system type recorded in the inspection header.
Chiller quantity	3 chiller circuits	All three were separately assessed for corrosion, leakage and refrigerant condition.
Reported capacity	100,000+ BTU	Recorded source capacity; the record does not state whether this is total or per unit.
Refrigerant	R410A recorded for chillers 1, 2 and 3	Supports circuit-specific isolation and leak-test planning.
Fan-coil inventory	Header cites 9 FCUs; room schedule describes 12, including one not inspected	Inventory discrepancy must be reconciled before final repair scope and commissioning.
FCU capacity range	9,000 to 24,000 BTU across the recorded room schedule	Explains varied air-side repair decisions by zone.

Note: The equipment list gives two FCU counts; confirm the final quantity before parts are ordered.

Condition by subsystem

Subsystem	Recorded condition	Required next decision
Chiller circuit 1	Possible internal water ingress, heavy salt deposits, general corrosion, clogged drainage and poor wiring insulation.	Remove for controlled strip inspection; confirm internal leak path and contamination extent.
Chiller circuits 2 and 3	Recorded pressure indication of -30 psi on each circuit; leak suspected; salt exposure, marine growth, corrosion and poor wiring insulation.	Leak-test before charging; assess hoses, clamps, electrical protection and compressor condition.
Seawater circuit	High marine growth, leaking hose area and advanced corrosion on pump and motor.	Stop the water source, clean the circuit and dismantle/assess the pump for repair or replacement.
Freshwater circuit	Pump operating, but installation location was unsuitable; hose/clamp leakage observed.	Repair leaks and review relocation for access and protection.
Air distribution	One heavily corroded evaporator with weak blower and poor cooling; several units dirty or clogged.	Remove the severely affected unit; service and test the remainder.

Evidence classification

Evidence level	Confirmed by inspection record	Still requires confirmation
Observed	Salt deposits, corrosion, marine growth, dirty coils/filters, plumbing leaks, poor wiring insulation and damaged pump condition.	Extent of internal component damage.
Measured	A -30 psi pressure indication was recorded on two refrigerant circuits.	Instrument setup, circuit state and final leak location.
Suspected	Internal leakage or water ingress affecting one chiller circuit.	Pressure test, vacuum/hold test, oil/contamination inspection and controlled teardown as applicable.
Not inspected	One expected fan-coil unit was inaccessible.	Condition, airflow and cooling performance of the inaccessible unit.

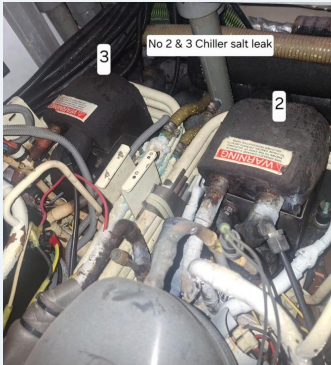
Risk prioritization

Priority	Observed risk	Required control
CRITICAL	Possible water ingress or internal breach in a refrigerant circuit.	Isolate; recover safely as applicable; inspect off-system before further operation.
HIGH	Suspected leaks and very low recorded pressure on two circuits.	Leak-test and repair before any recharge decision.
HIGH	Saltwater leakage and severe pump/electrical corrosion.	Stop the leak source, restore water integrity and assess electrical safety.
MEDIUM	Corroded or clogged fan-coil units.	Service, repair or replace based on coil integrity and measured performance.

Selected field evidence

Close-up evidence documents the extent and distribution of salt exposure without revealing the vessel or customer.

Technical close-ups recorded during the inspection.



MULTI-CIRCUIT SALT EXPOSURE

Deposits around two chiller assemblies indicated a shared environmental or leak mechanism.



ACTIVE CONTAMINATION PATH

Visible saltwater residue and corrosion were present in the machinery base area.



CORROSION PROPAGATION

Salt deposits extended beyond a single component and affected adjacent structure and pipework.



REFRIGERANT-CIRCUIT CONDITION

Close-up evidence supported removal and off-system confirmation before a repair decision.

Field notes

- The damage pattern was distributed across multiple components, not isolated to one failed part.
- Saltwater leakage and restricted heat rejection were physically visible and aligned with the written findings.
- The images justify containment, leak confirmation and reparability triage before recharge or recommissioning.

Supplementary pump and plumbing evidence

Additional close-ups show that the condition extended from chiller equipment into the seawater and freshwater circulation systems.

Technical close-ups recorded during the inspection.



FRESHWATER PUMP AND PIPEWORK

Field evidence documented leakage and an unsuitable pump installation condition.



SEAWATER PUMP CORROSION

Advanced corrosion affected the seawater pump body, motor and mounting area.

Field notes

- The condition was not limited to the refrigerant circuits; both water-circulation systems also required triage.
- The pump and plumbing evidence supports containment and staged repair rather than isolated component replacement.

Assessment

The dominant failure mechanism was systemic saltwater exposure combined with restricted heat rejection and deferred condition control. This likely accelerated corrosion of chiller assemblies, pumps, plumbing and air-side components. Refrigerant loss was indicated on two circuits, while possible internal water ingress on another required teardown-level confirmation before reparability could be judged.

Key observations

- Salt deposits and corrosion appeared across multiple independent components, supporting a common environmental or leakage mechanism.
- Marine growth in the condenser circuit reduced heat-transfer capability and increased operating stress.
- The recorded negative pressure indication on two circuits was consistent with severe loss of charge or measurement under vacuum, but did not locate the leak.
- Air-side fouling and evaporator corrosion independently explained weak airflow and poor zone cooling.

Recommended work

1. Isolate the most damaged chiller and remove it for controlled inspection in accordance with manufacturer and refrigerant-handling procedures.
2. Confirm or reject internal leakage using appropriate pressure, vacuum-hold and contamination checks before selecting repair or replacement.
3. Leak-test the other two circuits, repair verified leak points and replace degraded hoses, clamps, covers and wiring insulation.
4. Eliminate the saltwater leak source; clean/descale the condenser circuit and verify seawater flow.
5. Dismantle and assess the severely corroded seawater pump; replace it if integrity or reliable duty cannot be demonstrated.
6. Repair freshwater leaks and review pump relocation for access, drainage and future serviceability.
7. Remove and inspect the most corroded fan-coil unit; clean and service remaining accessible units.
8. Commission only after water integrity, refrigerant tightness, electrical safety and heat-transfer performance are documented.

After repair

- Record leak-test method, test medium, pressure, duration and acceptance result for each circuit.
- Record vacuum hold, final charge method, stabilized pressures/temperatures and compressor current where repair proceeds.
- Verify seawater and chilled-water flow, air velocity, supply-air temperature and condensate drainage.
- Inspect the previously inaccessible fan-coil unit before final system close-out.

Report notes

The source report documented visual findings and selected pressure/airflow evidence, but not a complete off-system teardown, leak-test certificate or post-repair commissioning dataset. Repair-versus-replacement conclusions therefore remain conditional.