NOVARYN
INDUSTRIAL LIMITED

INSTALLATION & MAINTENANCE MANUAL

Process Heat Transfer — installation and maintenance

Handling, installation, commissioning, operation, inspection and maintenance guidance. Read with the project datasheet and approved drawings.

SCOPE
Process Heat Transfer

DOCUMENT
Process Heat Transfer — Installation and Maintenance

REVISION
Rev. 02

ISSUE DATE
2026-06-15

APPLIES TO
Standard product and project variants

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SAFETY

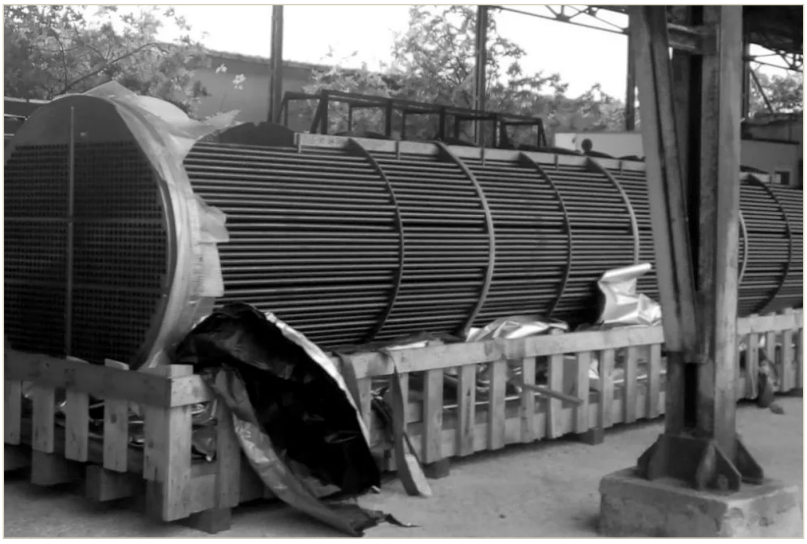
Isolate before you inspect.

Pressure, temperature, stored energy, rotating equipment and lifting are the principal hazards. The project risk assessment takes precedence.

- Isolate and lock out all energy sources before opening the unit.
- Depressurise and drain the unit. Confirm zero pressure at the gauge.
- Allow the unit to cool below the specified touch temperature before work.
- Use the lifting points and certified slings identified on the drawing.
- Isolate electrical supplies to fans, pumps, heaters and instruments.
- Use the PPE and permits required by the site and the project risk assessment.
- Do not weld, grind or hot-work on a unit that has not been cleaned and gas-freed.
- Refrigerant and process media must be recovered and disposed of lawfully.

Competence

Installation, commissioning and maintenance must be carried out by competent personnel who have read this manual and the project documentation. Work on pressure equipment may require a qualified inspector.



SHELL AND TUBE HEAT EXCHANGER BUNDLE

Before work

Confirm isolation, zero pressure, safe temperature and the permit. If the unit has handled a hazardous medium, confirm cleaning and gas-free status before entry.

INSTALLATION

The envelope is part of the duty.

Receiving checks, clearance, level, pipe loads and free movement must match the approved drawing.

On receipt

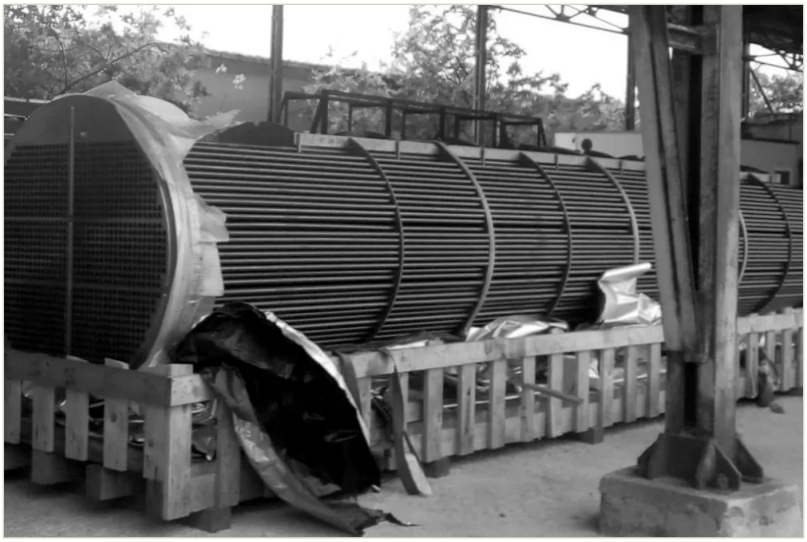
- Record the nameplate serial and compare it with the order.
- Photograph any packaging, coating or connection damage before signing.
- Check that caps, plugs, instruments and loose accessories are present.
- Store under cover, dry, with flange faces protected.

Installation

- Verify the foundation or support steel against the GA drawing.
- Set the unit level and shim as required. Secure fixings without distorting the frame.
- Provide the specified clearance for doors, tube pull, fan removal or plate access.
- Support pipework independently. Do not use the unit as a pipe anchor.
- Fit isolation valves, drains, vents and strainers where specified.
- Check rotation and alignment of pumps and fans before energising.
- Complete insulation, cladding and frost protection after pressure testing.

Interface check

Confirm electrical, control, drainage and access interfaces against the project package before closing the installation.



SHELL AND TUBE HEAT EXCHANGER BUNDLE

Receiving record

Record the serial, packaging condition, loose accessories and any damage before signing. A receiving photo is part of the handover record.

COMMISSIONING

Prove the safe envelope before the duty.

The project commissioning plan controls the sequence. The checks below are the minimum standard.

STEP	CHECK	ACCEPTANCE
1	Pressure / leak test complete	Signed test record
2	Flushing and cleaning complete	Clean strainers, clear flow
3	Instrument calibration	Loop check signed
4	Electrical rotation and interlocks	Correct rotation, alarms proven
5	Control sequence and setpoints	Match project settings
6	Operating data at design point	Within datasheet tolerance
7	Vibration, noise and leakage	No abnormal condition
8	Documentation and training	Handover record complete

REPRESENTATIVE EQUIPMENT / COMMISSIONING

Commissioning record

Retain the signed pressure test, flushing, loop check and operating data. The handover record should identify the revision and the serial number.

OPERATION

Start, stop and abnormal conditions.

Use the project operating instructions where they differ. Record operating data at each shift or as specified.

Normal start

- Confirm the unit is isolated, drained and safe to fill.
- Fill with the specified medium and vent trapped air.
- Start circulation and confirm flow before applying heat or cooling.
- Start fans or pumps in the specified sequence.
- Bring the unit to duty gradually and check for leaks and abnormal noise.

Normal stop

- Remove the heat load before stopping circulation where the process permits.
- Stop fans and pumps in the specified sequence.
- Isolate and drain only if the unit will be out of service or exposed to frost.
- Record the reason for the stop and any abnormal observation.

Operating limits

Do not exceed the design pressure, design temperature, flow or ambient limits shown on the project datasheet. A change in duty requires an engineering review.

REPRESENTATIVE EQUIPMENT / OPERATING CONTEXT

Shift record

READING	RECORD
Flow / pressure drop	Value and time
Inlet / outlet temperature	Value and time
Ambient / fan condition	Value and observation
Abnormal noise, leak or alarm	Action and reference

MAINTENANCE

Inspect on condition, record on schedule.

Intervals are indicative. Severe duty, fouling media and critical service may require shorter intervals.

TASK	INDICATIVE INTERVAL	RECORD
Visual inspection for leaks, corrosion and damage	Monthly / each campaign	Inspection log
Operating data review (flow, ΔT, ΔP)	Monthly	Operating log
Clean strainers and filters	As indicated / quarterly	Maintenance log
Coil or tube cleaning	Condition-based	Cleaning report
Fan / motor inspection and lubrication	Per manufacturer schedule	Service record
Gasket / seal inspection	Annual or at shutdown	Inspection report
Pressure test / NDT	Per inspection plan	Test / NDT report
Performance review	Every 3–5 years or after modification	Performance report

Cleaning

Use cleaning methods compatible with the materials and gaskets. Do not use abrasive or aggressive chemicals without confirmation. Rinse and neutralise after chemical cleaning.

REPRESENTATIVE EQUIPMENT / SERVICE ACCESS

Spare parts

Use the serial number and the recommended spares list. Gaskets, seals and filters must match the material and media scope of the original selection.

TROUBLESHOOTING

Read the symptom against the record.

Use the project datasheet and the operating log. Do not open a pressurised unit.

SYMPTOM	POSSIBLE CAUSE	ACTION
Reduced heat transfer	Fouling, air, low flow, bypass	Check flow, vent, inspect and clean
High pressure drop	Fouling, blockage, valve position	Check strainers, valves and cleaning
Leak at connection	Gasket, torque, thermal cycling	Isolate, depressurise, inspect and reseal
Abnormal noise / vibration	Fan imbalance, bearing, cavitation	Stop, inspect rotating parts and flow
High motor current	Mechanical binding, over-duty, voltage	Check load, alignment and electrical supply
Ice formation	Low refrigerant, defrost fault, airflow	Check charge, defrost and fan control
Corrosion / coating damage	Chemical attack, mechanical damage	Clean, assess wall thickness, repair coating

REPRESENTATIVE SERVICE POINT

Before you open

Stop the unit, isolate, depressurise and drain. Confirm the medium is known and safe to handle. Escalate any pressure-boundary defect to the engineering desk.

SPARES & SERVICE

Use the serial number.

Spares are matched to the order record. Provide the nameplate serial number and the required part.

- Gaskets, plates, coils, fans, motors, pumps and instruments
- Recommended spares list issued with the order
- Emergency kits for critical assets on request
- Inspection, cleaning, retrofit and performance review

SERVICE DESK

Send the duty point.

Media, flow, temperatures, pressure, ambient conditions, plot and access constraints, and the document requirement. If the duty is still forming, send what you have and we will frame the questions.

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Document history

REVISION	DATE	CHANGE
Rev. 02	2026-06-15	Current release
Rev. 01	2026-06-15	Initial issue

Recommended spares

ITEM	TYPICAL SCOPE	NOTE
Gaskets / seals	Plate, frame, connection	Media and temperature matched
Filters / strainers	Service and process	Check mesh and pressure drop
Instruments	Pressure, temperature, flow	Range and signal matched
Rotating parts	Fans, motors, pumps	Serial and frame matched