

## STEAM SURFACE CONDENSER FREQUENTLY ASKED & TYPICAL QUESTIONS

Q. Why is a Condenser not classed as an ASME Pressure Vessel?

The ASME Committee considers that certain classes of vessels are not included in the scope of the ASME Boiler & Pressure Vessel Code (BPVC) Section VIII, Division I. These include “...vessels having an internal or external operating pressure not exceeding 15psi (103 kPa), ...with no limitation on size.” [1]. The **Shellside** of a Steam Surface Condenser is typically designed for Full Vacuum to 15psiG, and is therefore not included in the scope of ASME BPVC. Further, “...a vessel containing water under pressure..., when none of the following limitations are exceeded: (1) a design pressure of 300 psi (2 MPa), (2) a design temperature of 210°F”. [2]. The  **Tubeside**, including **Waterboxes**, of a Steam Surface Condenser are typically designed for no more than 150psiG and 150°F, and are therefore also not included in the scope of ASME BPVC.

[1] ASME B&PVC, 2015 Section VIII, Division 1, Scope U-1 (c),(2), (h-1)

[2] ASME B&PVC, 2015 Section VIII, Division 1, Scope U-1 (c),(2), (f-1,f-2)

However, should Purchasers so desire, Steam Surface Condensers can be designed and manufactured per ASME B&PVC, though this is not a mandatory requirement per HEI Standards. Specific reference to the requirements for compliance with ASME BPVC should always be mutually agreed between the Purchaser and the Condenser Manufacturer.

**NOTE:** HEI Standards for Steam Surface Condensers do specifically reference ASME BPVC Section II, Part D for the use of material physical properties including Allowable Stress values within stated design formulae and procedures. Furthermore, HEI Standards for Steam Surface Condensers reference Section IX of the ASME Unfired Pressure Vessel Code for the qualification of Welding Procedures and Welders.

Q. I cannot maintain both of HEI’s guidelines for a Maximum Enthalpy of 1,225 BTU/lb Enthalpy and maintain the superheat requirements for Bypass Cases in the 25-75°F range. What do I do?

The requirement to maintain a minimum superheat of 25°F during Bypass operation is the primary concern, to ensure damaging wet steam never enters the condenser. This should always be adhered to, with no exceptions. It is therefore acceptable, in some instances, to have an Enthalpy above 1,225 Btu/lb, but only if this is required to achieve and maintain the minimum superheat guidelines. An absolute maximum Enthalpy of 1,250 BTU/lb should not be exceeded. Bypass Conditions should always be mutually agreed between the Purchaser and the Condenser Manufacturer.

---

This Tech Sheet was developed by the members of the Heat Exchange Institute’s (HEI) Condenser Section. HEI is a trade association comprising the leading manufacturers of heat exchange and vacuum equipment. HEI Tech Sheets are information tools and should not be used as substitutes for instructions from individual manufacturers. Always consult with individual manufacturers for specific instructions regarding their equipment.

Q. *What is the guaranteed noise level of the condenser?*

Noise levels in the condenser cannot be guaranteed because it is hard to differentiate the noise generated by the condenser and those from other valves and rotating equipment. The condensing action in the condenser does not generate any noise. Vents and drains discharging into the condenser or equipment (for example motors and valves) in the vicinity of the condenser generate noise. It is very hard to predict these noise levels and they can be reduced by using noise insulations.