



P7683

DOUBLE EFFECT EVAPORATOR STEAM BENCH

FEATURES

- ◆ Compact modular design
- ◆ Low capital cost
- ◆ Easy installation
- ◆ Comprehensive instrumentation
- ◆ Pressure test certificates supplied for major components

PRINCIPLE EXPERIMENTS

- ◆ Determination of the performance of a double effect evaporator
- ◆ Comparison of the relative efficiencies of a single effect and double effect evaporator

INTRODUCTION

The Multiple Effect Principle consists of the reuse of latent heat for successive evaporations and is one of the greatest single aids to steam economy. Its application is limited, but it deserves close study because, even if it is impossible to use it, the analysis of its working gives such perfect examples of correct and incorrect steam technique. Once the fundamentals of the technique are mastered there are dozens of ways in which they can be applied in all kinds of directions and which give simple, large and lasting economies. When steam is used for evaporating water from a product, the original heat in the steam is split in two:

- 1) Latent Heat of vaporisation (or condensation) which is by evaporating water from the product, while condensing the original steam;
- 2) Sensible or water heat which is retained in the condensate which forms when the original steam condenses. The proportions of these divisions depend on the pressure at which the original steam gives up its latent heat.

The heat in the condensate at any particular pressure is greater than the heat in condensate at lower pressure. If, therefore, the pressure on the condensate is reduced, the excess heat causes some steam to be generated as "Flash" or "Self evaporation". Such flash steam is just as useful as any other steam at the same pressure.

DESCRIPTION

Cussons P7683 Double Effect Evaporator consists of a sturdy framework and panels of all steel construction, fitted with a student work surface, interconnecting back panel and adjustable feet.

The steam bench includes two evaporator vessels with interconnecting pipework and valves to allow single or double effect evaporation. The steam feed line includes a pressure reducing valve and safety relief valve. The steam used is measured by sub cooling the condensate and using collecting beakers. Bourdon type pressure gauges are provided for pressure indications and thermocouples are used to measure temperature, which may be individually selected for display on an analogue temperature meter.

STEAM HEADER ASSEMBLY

Mild steel steam header welded in accordance with BS2633 (1973) to supply steam to a feed line, and fitted with a pressure measuring point connect to a 0-16 bar Bourdon type pressure gauge and a temperature measuring point equipped with a type K thermocouple. The steam header is enclosed within a header box and fully insulated with mineral wool.

EVAPORATORS

Shell with steam coil of copper tube and steam trap on each evaporator vessel. Steam and vapour lines fitted with Bourdon type pressure gauges and temperature measuring points with type K thermocouples.

ADDITIONAL INSTRUMENTATION

A 0-250°C analogue temperature display meter connected to each of the type K thermocouples through a seven position switch for selection of required temperature for display.

CERTIFICATION

The steam header is pressure tested at 21 bar and supplied with test certificate.

SERVICE SYSTEMS

The bench is equipped with independent service lines relating to water supply (untreated), blowdown and drainage. These lines interconnect with similar facilities on other steam benches to provide a common service facility.

INTERCONNECTION OF STEAM BENCHES

To enable steam benches to be linked to form a system, utilising common steam supply and service systems, the steam bench is supplied complete with:

- an interconnecting back panel and student work surface,
- a set of 4 stainless steel flexible hoses for the steam and service connections,
- section of aluminium-clad lagging for the flexible steam hose.

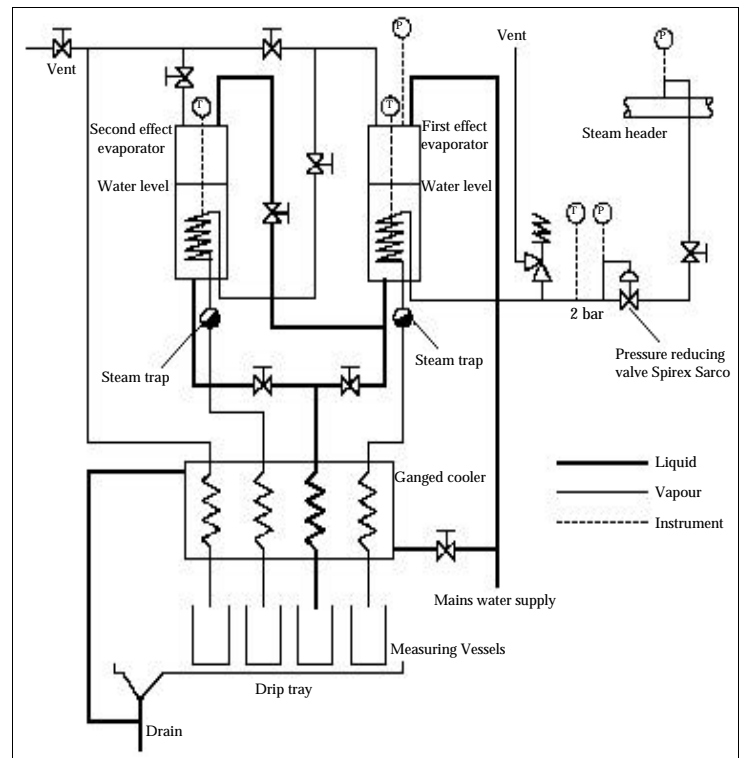
PIPE CLOSURE KIT

If this steam bench is to be installed on a stand alone basis or is the last unit in a run of steam benches a P7682 Pipe Closure Kit will be required.

TENDER SPECIFICATION

Steam Bench designed for investigating the performances of a double effect evaporator. The bench comprises two evaporator vessels with copper tubed steam coils, together with interconnecting pipework and isolating valves, shelled tube heat exchanger to sub cool the condensate discharge from the steam trap on each evaporator vessel.

A fully insulated steam header line, fitted with a 0-16 bar Bourdon type pressure gauge and temperature measuring point supplies steam to the feed line. A type K thermocouple is fitted at each temperature measuring point and connected to a 0-250°C analogue temperature meter via a 7-position selector switch. Steam inlet and vapour pressures are indicated on separate Bourdon type pressure gauges. The foregoing are installed on sturdy frame complete with panels of all-steel construction and service facilities relating to water supply, blowdown and drainage. To enable the unit to be integrated into a steam bench system, it is supplied with an interconnecting back panel, student work surface, a set of 4 stainless steel flexible interconnecting hoses and a section of aluminium-clad lagging for the flexible steam header.



Double Effect Evaporator Steam Bench - Schematic Diagram

SERVICES

Steam supply:-

Maximum working pressure of 10.34 bar and maximum temperature of 235°C, which can be supplied by Cussons P7670 Steam Boiler Bench, a Cussons Steam Plant, or clients own steam line.

Water supply:-

From bench water service line. Mains pressurised water supply.

SHIPPING DETAILS

Case size:	2.32 m ³
Gross weight:	260 Kg
Nett weight:	160 Kg