

HT.1 AMMONIA CRACKER (Code M7)

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INTRODUCTION

The HT.1 ammonia cracker produces cracker gas, a 75% hydrogen 25% nitrogen gas mixture, by the thermal dissociation of ammonia over a heated catalyst. The residual ammonia content of the cracker gas is less than 0.05% by volume and this can be reduced to less than 5 ppm by the use of dry de-ammoniation equipment.

SPECIFICATION

An outline drawing of the HT.1 ammonia cracker is shown in Figures 1 and 2. The cracker body is a mild steel cylindrical case, lined with a suitable heat insulation material, down the centre axis of which is an electric heater surrounded by a catalyst container. This is a helical coil of heat resistant tubing filled with ICI 27-1 catalyst. An ammonia vaporiser heated by the outgoing cracker gas is fitted to the catalyst container.

An instrument panel is provided on which are mounted temperature and pressure indicating instruments, flow control and relief valves, and an ammonia flowmeter.

RATING

The HT.1 ammonia cracker operates at a temperature of 850°C and gives an infinitely variable cracker gas output in the range 0-300 s.c.f.h. (8.5 m³/hr.) at a pressure in the range 0.5 to 5 lb/in² gauge (0.035 to 0.35 kg/cm²).

SERVICE REQUIREMENTS

1. an electric power supply of 220-250V 50hz 1 ϕ a.c. of 8 $\frac{1}{4}$ kW maximum power input.
2. a liquid ammonia supply at a minimum pressure of 35 lb/in² gauge (2.46 kg/cm²).

WEIGHT

The total weight of the cracker is approximately 14 $\frac{1}{2}$ cwt. (736kg).

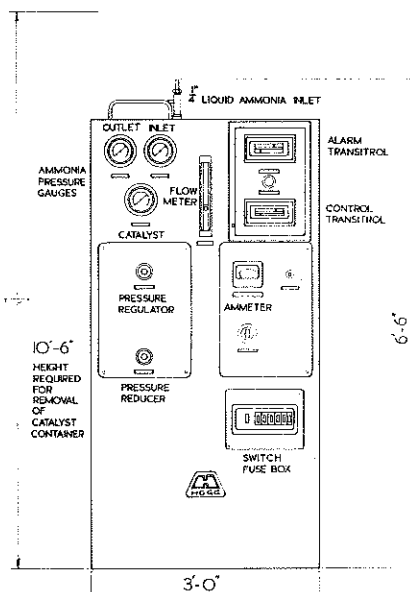


Fig 1 Front Elevation Cracker Panel

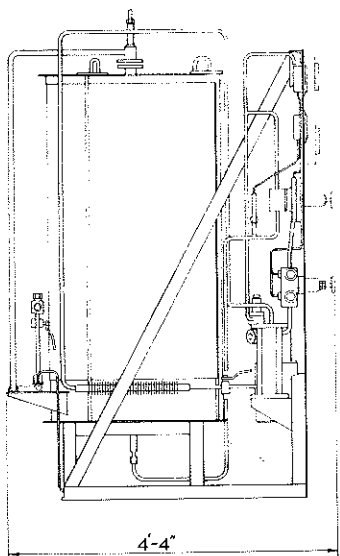


Fig 2 Side Elevation

OPERATION

A line diagram of the HT.1 ammonia cracker is shown in Figure 3.

Liquid ammonia is supplied to a vaporiser. Gaseous ammonia from the vaporiser passes through an oil filter and pressure reducer unit which controls the ammonia pressure at 25 lb/in² gauge. The gas then passes through a flowmeter, pressure regulator and over the hot catalyst, where it dissociates into cracker gas. The hot cracker gas after passing over the ammonia vaporiser and being partially cooled then passes through a gilled pipe cooler to the consuming plant. An instrument with a thermocouple provides temperature indication and control and a second similar instrument with a separate thermocouple provides an audible and visible alarm should the control system fail. Since the heater is designed to operate at 250V, an auto-transformer is incorporated to allow adjustment to the customer's electrical supply.

Reduced voltage tapings are provided on the transformer so that, by means of a manually operated rotary switch on the panel, a lower stand-by temperature can be maintained. This is useful during periods when cracker gas is not required and when gas may subsequently be needed with a minimum of delay. All control and alarm circuits are isolated under these conditions.

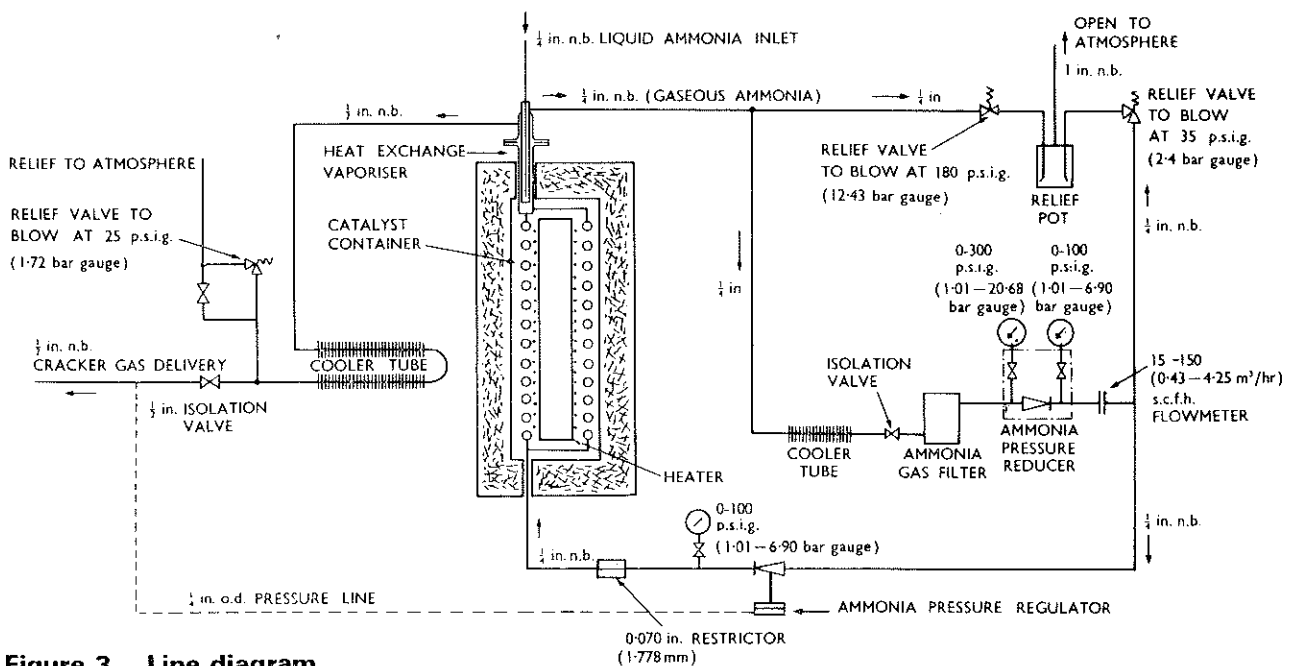


Figure 3 Line diagram

PRESSURE CONTROL

If the cracker gas delivery line pressure is required to be controlled within fine limits ($\pm \frac{1}{2}$ lb/in²) a pressure governor for fitting in the cracker gas delivery line can be supplied.

PACKING

The Cracker is delivered to customers in 2 main packages. (1) cracker body, (2) cracker instrument panel. From these 2 packages the unit can be quickly assembled, requiring only a level surface of 3 ft. 6 in. x 4 ft. 6 in. at the installation site. Connection to the liquid ammonia inlet, ammonia gas vents and cracker gas vent and outlet are made on site.

GUARANTEE

The cracker and catalyst container are guaranteed against faulty material and workmanship for six months, subject to the plant being operated under the recommended conditions. Proprietary fittings are covered by the guarantee of the manufacturer.

No guarantee is given for the catalyst, but in the event of a failure within six months, consideration will be given to the issue of a credit inversely proportionate to the time the catalyst has been in use.