

**THE M1 AMMONIA CRACKER AND  
M15 CATALYST CONTAINER**

# CODE M1 AMMONIA CRACKER

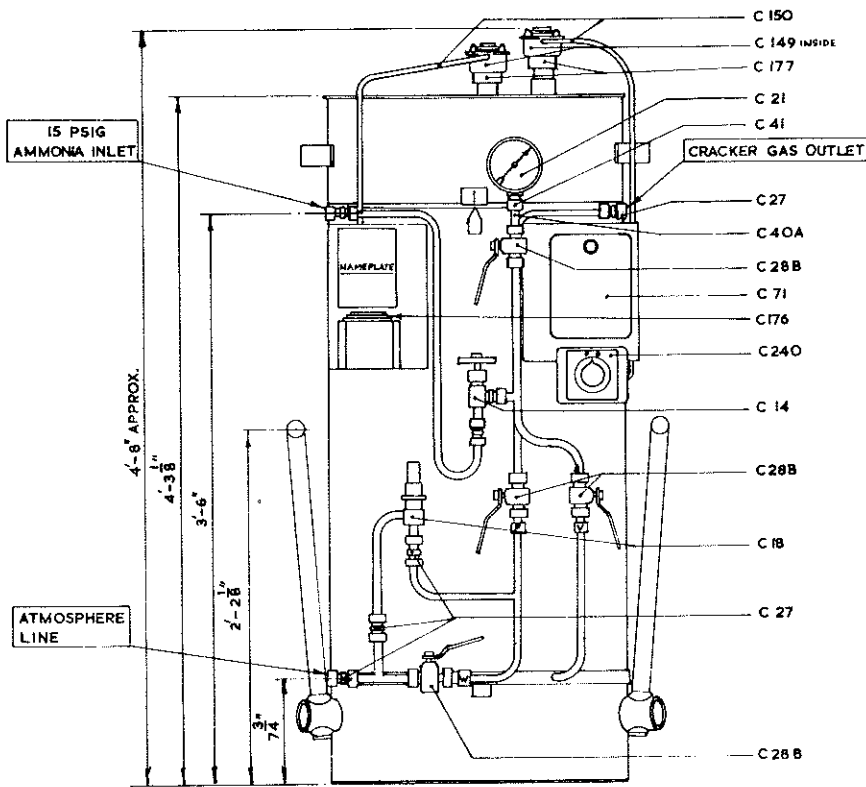


Fig. 1 ELEVATION OF CRACKER (CODE M1)

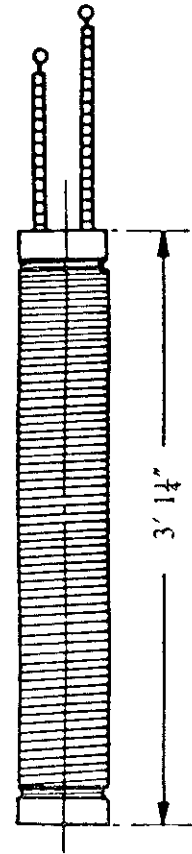


Fig. 2 CRACKER HEATER PACKED IN CRACKER

## INTRODUCTION

The M1 Ammonia Cracker is used to produce "cracker gas"—a hydrogen rich gas—from ICI anhydrous ammonia. In the Cracker, ammonia is dissociated over a heated catalyst into a mixture of 3 parts hydrogen and 1 part nitrogen by volume.

## SPECIFICATION

The Cracker is an electrically-heated, temperature-controlled, refractory-lined chamber, around which are placed an ammonia preheating coil made from material resistant to oxidation and to attack by ammonia, and a cracker gas cooling-coil made from mild steel. The whole is thermally insulated with slag wool and enclosed in a mild steel casing.

## EXTERNAL FITTINGS

External fittings supported on the casing are:

One mercury relay switch, fitted with a current transformer and signal lamp;

One millivoltmeter, calibrated in °C;

One ammonia flow control valve;

One ammonia pressure gauge, calibrated from 0–100 lb/in<sup>2</sup>;

One relief valve;

Four sleeve-packed isolation cocks for the ammonia inlet, the pressure-gauge, the cracker gas outlet, and the atmospheric outlet pipes;

Interconnecting pipework;

Eight feet of electric power cable.

## OTHER ITEMS SUPPLIED AS PART OF THE CRACKER

Thermocouples complete with compensating leads, porcelain connectors, mild steel sheaths, and light alloy dust-covers.

One temperature controller.

### Spare parts supplied are:

Two nose pads for the relief valve;

Two copper ferrules for the catalyst container joints.

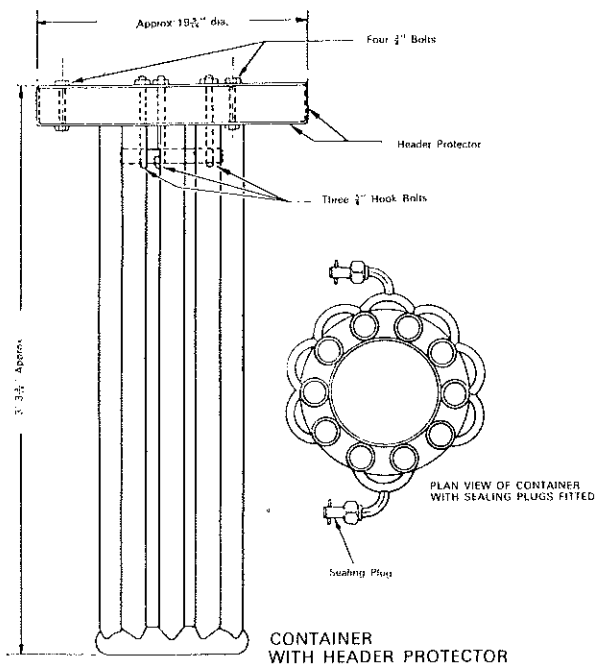
### Finish:

Casing: Light battleship grey, or similar;

Pipework, valves, etc.: Gloss black.

# CODE M15 CATALYST CONTAINER WITH CATALYST

CODE M15 CATALYST CONTAINER WITH CATALYST



## OPERATION

In the Ammonia Cracker (Code M1), gaseous ammonia at a pressure of not more than 25lb/in<sup>2</sup>. gauge is passed over a heated catalyst and is dissociated into cracker gas. The catalyst in the tubular catalyst container is heated by an external electric heater, and the temperature is maintained automatically in the range of 610–670°C. The catalyst is expendable and its life is dependent on particular operating conditions.

At the maximum gas generating rate, the residual ammonia content is a maximum of 0.1 per cent by volume; with most operating conditions, the residual ammonia content is much less.

When the residual ammonia content of the cracker gas is detrimental to a process, it can be removed by de-ammoniating equipment, details of which will be provided on request.

The pressure of the ammonia gas supplied to the cracker is controlled by the 1/4 in. Ammonia Pressure-reducer Unit (Code A5.)

## DIMENSIONS AND WEIGHT

The ammonia cracker, assembled with the catalyst container, is approximately 2ft in diameter and 4ft 6in. high, and weighs approximately 10 cwt (500kg). It needs no special foundations.

## RATING

The maximum cracker gas flow rating is 150ft<sup>3</sup>/hr. (4.25m<sup>3</sup>/hr.) measured at a temperature of 20°C and a pressure of 1 atmosphere absolute.

## POWER REQUIREMENTS

Single phase, AC, 50 cycles per second, 220–250 volts. Maximum power input: 4.5 kW.

## CATALYST CONTAINER AND CATALYST (CODE M15)

The catalyst container, which fits into the refractory-lined chamber of the ammonia cracker (Code M1), is made from material resistant to oxidation and to attack by ammonia. All containers are interchangeable and can be hired or purchased outright.

The catalyst container is recharged by James Hogg (Chemical Engineering) when the catalyst in use is expended; the minimum expected life of the catalyst is six months.

## TESTING

The pipework is tested hydraulically at a pressure of 250lb/in<sup>2</sup>. gauge. After assembly but before despatch, the ammonia cracker is tested hydraulically at a pressure of 90lb/in<sup>2</sup>. gauge.

The catalyst container is first tested hydraulically at a pressure of 250lb/in<sup>2</sup>. gauge, then tested with air at a pressure of 100lb/in<sup>2</sup>. gauge, and finally, after filling and sealing, it is tested with ammonia gas at approximately 50lb/in<sup>2</sup>. gauge.

The heater and electrical circuit of the ammonia cracker are tested by applying a voltage of 230V.

## PACKING

The ammonia cracker is delivered in three packages. It is normally delivered by road. The packed weights are respectively 10 cwt, 160lbs and 28lbs.

The catalyst container, with catalyst, is packed as one item in one returnable pack. Its packed weight is 160lbs, and it is normally delivered by road or passenger train.

The returnable pack is: a header protector (two pieces); four 3/8 in. Whitworth bolts and nuts; three 5/8 in. hook bolts and nuts; two sealing plugs.

The parts are invoiced on delivery and full credit is given on their return.

The items comprising the Mk. 2 Ammonia Cracker (Code M1) and the Catalyst Container (Code M15) are illustrated in this leaflet.

## 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.