Marconi Broadcasting Transmitter Systems

Liquid-cooled Loads

B8052
B8053

U.H.F Liquid Load B8052

The B8052 series of liquid test loads includes two versions. The standard load BT.02.8052, uses water having a conductivity within a certain range (see Data Summary) or an anti-freeze mixture, as the dissipative element and coolant. An alternative design, BT.01.8052, which is suitable for use with anti-freeze mixture only, is shorter in length.

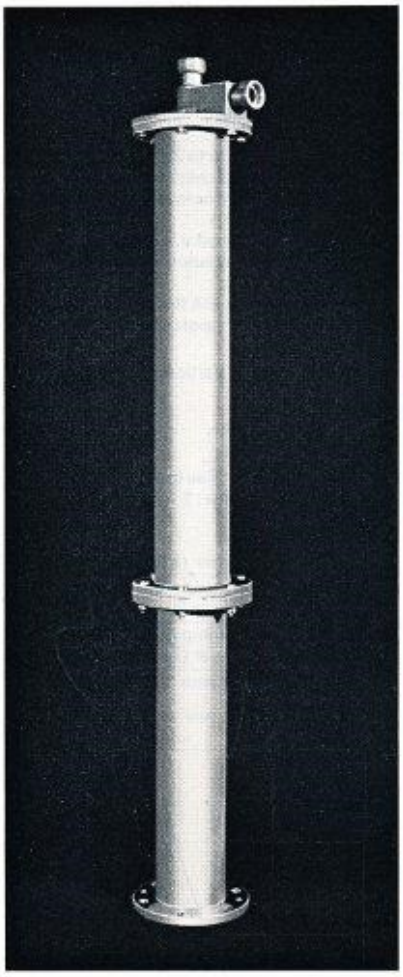
Both versions are of coaxial construction, and in each case the coolant enters the load via a pipe union connected to the inner conductor. It then flows towards the r.f input end of the load where the inner conductor is perforated, allowing the coolant to flow in the reverse direction to the outlet pipe union at the end of the assembly. The coolant, together with a tapered polythene assembly, therefore forms the dielectric between inner and outer.

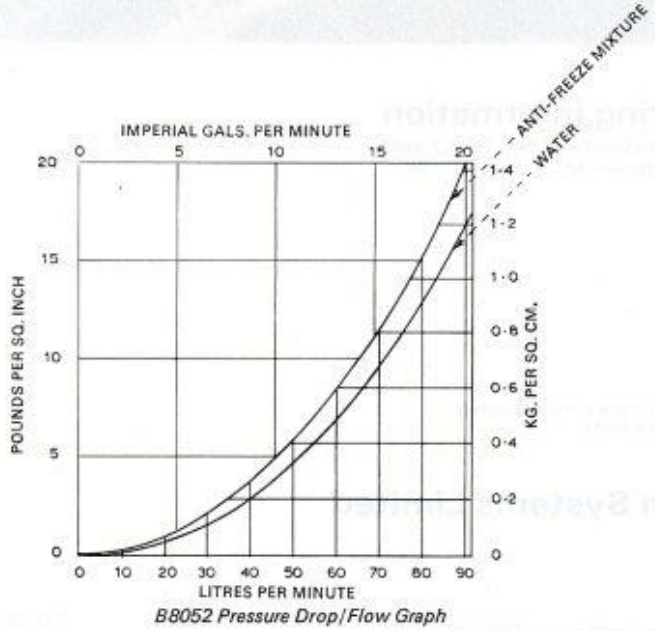
The test load comprises two tubular items, the liquid-cooled assembly of 3⅛in diameter tube and a matching adaptor of 3⅛in diameter line, connected in series.

The liquid-cooled assembly can be considered as having two functions; an impedance changing section followed by a low impedance, high-loss section which is short-circuited at the end remote from the input. The conductor sizes are chosen such that, with solid polythene dielectric at the input end, the input impedance is 50 Ω, whilst, using the coolant as the dielectric, the impedance falls to approximately 9 Ω. Hence an impedance changing section is required with a tapered polythene dielectric which merges with the power dissipating section, in direct contact with the coolant. Power is dissipated directly into the coolant, giving a v.s.w.r of between 1·08 and 1·15. The matching adaptor, which connects the cooling assembly to the transmission line, is factory adjusted to reduce the v.s.w.r to less than 1·04 on any specified channel by the choice of size and position of a ferrule-type patch on the inner conductor.

Data Summary

Coolant: Water having a conductivity between 100–500 μmhos/cm³ can be used in the BT.02.8052 load. An antifreeze mixture (33% Ethaneidiol antifreeze type B to BS.3151 1959, and 67% demineralized water by volume) can be used in either load.
Power dissipation: Up to 45kW c.w subject to coolant not exceeding maximum outlet temperature. (See below).
Input impedance: 50 Ω.
Working frequency and v.s.w.r: < 1·04 over a specified 8MHz channel in the range 470MHz to 860MHz.
R.F connector: 3⅛in EIA flange.
Temperature of coolant at outlet (max): +70°C.
Operating position: Vertical.
Water pressure loss: See graph.
Maximum working pressure: 1·4kg/cm² (20lb/in²)
Dimensions:
Length
965mm (38 in) for BT.01.8052
1·6m (5ft 3in) for BT.02.8052
Diameter
137mm (5⅝in) for both versions.





B8052 Pressure Drop/Flow Graph

Water flow required:

$$\text{litres/minute} = \frac{\text{Power (kW)}}{0{\cdot}069 \times \text{temp rise (°C)}}$$

$$\text{Imp. gal/min} = \frac{\text{Power (kW)}}{0{\cdot}314 \times \text{temp rise (°C)}}$$

$$\text{U.S gal/min} = \frac{\text{Power (kW)}}{0{\cdot}262 \times \text{temp rise (°C)}}$$

Ordering Information

U.H.F Liquid Load
BT.02.8052 using either water or antifreeze mixture.
OR (to special order only),
BT.01.8052 using antifreeze mixture only.
Please state channel over which load should be matched.

Thermometers, flowmeters, flow alarms, pipework etc can also be supplied to order.

V.H.F Water Cooled Load B8053

The type B8053 water cooled test load is a fully screened coaxial device capable of dissipating up to 20kW c.w power in the v.h.f range. The dissipative element is a tubular cracked carbon resistor of 50·0 Ω resistance, which forms the inner of the coaxial construction. The cooling water enters the load at the end opposite the coaxial r.f connector. It then passes through the centre of the tubular resistor and returns along the outer surface of the resistor, being confined by a polythene insulator forming the dielectric between outer and inner. This insulator is tapered towards the end in order to preserve an accurate match.

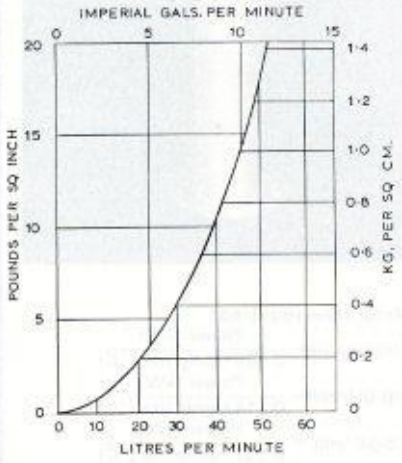
Data Summary

Coolant: Water (conductivity not significant).
Power dissipation: Up to 20kW c.w subject to coolant not exceeding maximum outlet temperature. (See below.)
Input Impedance: 50 Ω.
Working frequency and v.s.w.r: < 1·04 over a specified 8MHz channel in the range 50–254MHz.
R.F connector: 3⅛ in EIA flange.
Max temperature of coolant at outlet: 70°C.
Operating position: Vertical, with water connections down.
Dimensions:
Length, 516mm (20$\frac{5}{16}$in).
Diameter, 137mm (5⅜in).
Water pressure loss: See graph.
Max working pressure: 1·4kg/cm² (20lb/in²).
Water flow required:

$$\text{litres/min.} = \frac{\text{Power (kW)}}{0{\cdot}069 \times \text{temp rise (°C)}}$$

$$\text{Imp.gal/min} = \frac{\text{Power (kW)}}{0{\cdot}314 \times \text{temp rise (°C)}}$$

$$\text{U.S gal/min} = \frac{\text{Power (kW)}}{0{\cdot}262 \times \text{temp rise (°C)}}$$



B8053 Pressure Drop/Flow Graph

Ordering Information

V.H.F water cooled load B.00.8053. Please state channel over which load should be matched.

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