



Airconditioning capacity — the ‘Ton’

Most of us have heard about the **Ton*** in connection with Heat Load or capacity of airconditioning equipment. The Ton (TR)** in Refrigeration & Airconditioning is a unit indicating a certain *Quantity of Heat*. This “Quantity of Heat” is different from temperature which only says how hot the substance is but not *how much heat* it contains.

The two most common units for stating the heat quantity are the **British thermal unit (Btu)** and the **Calorie (cal)**.

- The Btu is the quantity of heat needed to raise the temperature of 1 lb. of water by 1° Fahrenheit
- The Calorie is the metric unit of heat quantity. It is the heat needed to raise the temperature of 1 gram of water by 1° Celsius. Since a calorie is a very small measurement, it is practical to use thousand calories as the unit for airconditioning and it is expressed as Kilo Calorie (K Cal).

$$1 \text{ Ton Refrigeration} = 12000 \text{ Btu/hr or } 3000 \text{ K Cal/hr}$$

*One Ton Refrigeration was originally conceived to describe the quantity of heat removed to freeze 1 Ton (1 American Short Ton is 2000 pounds) of water at 32°Fahrenheit to ice at the same temperature in 24 hours.

**The airconditioning engineer uses the term ‘Ton Refrigeration’ (TR), popularly referred to as ‘Ton’, when associated with refrigeration and airconditioning. We will use the term ‘Ton’ or its abbreviation ‘TR’ in this book.