

# Transformer rating

## The transformers rating plate

The following data must be on the rating plate:

- **Maker:** The manufacturer's name or initials.
- **Serial number:** Number for identification.
- **Current type:** To be specified if DC.
- **Rated current:** The rated value for the current flowing through a winding's line terminals at rated load. The maximum current for which the winding is designed.
- **Rated frequency:** The frequency at which the transformer is intended to work (AC).
- **Rated power:** The apparent power in VA, kVA or MVA for AC, W or kW for DC.
- **Rated voltage, primary:** The value of the main voltage which is intended to be applied to or induced in the primary winding. The maximum voltage for which the transformer is designed in normal operation.
- **Rated voltage, secondary:** The voltage which is generated for the transformer's secondary line terminals with or without load (depending on the standard).
- **Cooling type:** A code which indicates the cooling type.
- **Ambient temperature ( $t_o$ ):** See separate section.
- **Short-circuit impedance  $e_z$ :** To be specified if the transformer is greater than or equal to 1 kVA.
- **Short-circuit resistance  $e_r$ :** To be specified if the transformer is greater than or equal to 1 kVA.
- **Transformer weight:** Must be specified if the transformer weighs more than 18 kg.
- **Transformer's degree of protection:** IP rating, see separate section.
- **Insulation class:** See separate section.
- **Coupling group and vector number:** Must be specified if it is a three-phase transformer.
- **Type of operation:** Continuous or intermittent operation.

Depending on whether it is a small transformer or power transformer:

- Year/date of build.
- Build standard.
- Cos phi: power factor.
- Class I, II or III.



The rating plate is the transformer's identity card.

## Cooling type

(IEC60726) On the transformer's rating plate there should be a code indicating the cooling type. The code is made up of four letters which specify the following in the given order:

1. Coolant in contact with the windings - (primary coolant).
2. Circulation method for the primary coolant.
3. Coolant in contact with the cooling system - (secondary coolant).
4. Circulation method for the secondary coolant.

The following letters are used for both enclosed and unenclosed dry-type transformers:

Coolant	Letter
Air	A
Gas	G
Circulation method	Letter
Natural	N
Fan or pump	F

## Insulation class

The energy conversion in the transformer is not ideal. Some of the energy supplied is converted to heat loss. Among other things, IEC60726 specifies the maximum operating temperature of transformers in relation to the insulating material used. If the continuous operating temperature is too high, the service life of the transformer will be reduced considerably. That is to say it is completely normal for transformers to heat up. A transformer, which does not heat up, is not working normally. At rated load and an ambient temperature of 40°C it is not unusual for the surface of the enclosure on a plastic enclosed safety transformer, for example, to reach 70-80°C. At this sort of temperature it is difficult to keep your hand on the transformer without burning it.

Insulation class (°C)	Max permitted temperature increase in windings (K)	
	(IEC60726)	(IEC61558)
105 (A)	60	60
120 (E)	75	75
130 (B)	80	80
155 (F)	100	100
180 (H)	125	125
220	150	-