



## HIGH PERMEABILITY LOW LOSS SPIRAL CORES

SUPERSEDES  
BP 76117  
Rev. 01

## 1. GENERAL:

This specification governs the quality of single, unit rolled strip spiral wound cores manufactured from high permeability low loss nickel iron alloy to grade E-1 of IS: 9344 - 1979 or IEC 635 - 1978.

**Note:** Any other composition which improves the magnetic characteristics can also be considered provided the supplier furnishes a certificate of the composition and improvement in magnetic characteristics achieved.

## 2. APPLICATION:

For cores of Instrument Transformer.

## 3. COMPLIANCE WITH NATIONAL STANDARD:

This specification is generally based on:-

IS: 9344 - 1979/IEC 635 - 1978.

## 4. DIMENSIONS AND TOLERANCES:

4.1 Dimensions

4.1.1 The following dimensions shall be specified on the order.

Nominal height 'h' mm

Nominal Outside Diameter 'd<sub>1</sub>' mm

Nominal Inside Diameter 'd<sub>2</sub>' mm

4.1.2 Thickness

Thickness of strip shall be 0.27 to 0.35 mm.

4.1.3 Width

The width of the strip shall be 10, 20, 25, 40 mm, or any other as specified on the order.

4.2 Tolerance on dimensions

All cores shall pass over a cylindrical plug of diameter 'd<sub>2</sub>' within a cylindrical bore (concentric with plug) of diameter 'd<sub>1</sub>' and between parallel faces (at right angles to these diameters) and a distance of 'h' + 0.80 mm apart.

The maximum internal diameter shall be 'd' mm where  $d = d_2 + 1.60 \text{ mm}$  or  $d_2 + 1$  percent, whichever is greater.

The minimum external diameter shall be 'D' mm where  $D = d_1 - 1.60 \text{ mm}$  or  $d_1 - 1$  percent whichever is less.

4.3 Minimum weight

No core shall have a weight less than that calculated from the formula below:

$$\text{Minimum weight} = 6.566 h (D^2 - d^2) \times 10^{-6} \text{ Kgs}$$

(Assuming a metal density of 8.8 gm/cm<sup>3</sup> and a space factor of 0.95).

Revision:- Brought upto date.

02

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Technical Services Division

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**5. MAGNETIC CHARACTERISTICS:****5.1 Type tests**

The core manufactured from a strip shall have the r.m.s. values of the reactive and loss components of the magnetising force, as functions of the peak value of the flux density and measured for sinusoidal fluxes of 50 c/s conforming to the typical values laid down in the curves given in Annexure 1.

The absolute saturation induction shall not exceed 0.6 Tesla.

**5.2 Routine Test**

The guaranteed minimum permeability at 0.4 A/m shall be 50,000 and the maximum flux density at 2 A/m shall be 0.25 tesla.

**6. MANUFACTURE:****6.1 Annealing**

The wound cores shall be annealed. A suitable medium should be chosen in annealing to avoid adverse effects of atmosphere at high temperature on cores.

**6.2 Impregnation and varnish**

Unless otherwise specified on the order cores having  $d_1 < 1.25 d_2$  and those having  $d_1 > 254$  mm shall be bonded with varnish.

The varnish shall be fully cured so as to meet the requirements given in Cl. 6.4.

**6.3 Freedom from defects**

No taping shall be applied, projecting edges and sharp corners should be avoided and particular attention be given to securing the end of the strip to prevent un-ravelling.

**6.4 Quality of varnish**

When tested in accordance with IS: 335/IEC 296 - Class 1 with the exception of a piece of steel, varnished or lacquered as appropriate and cured in the same manner as the core substituted for the copper catalyst and the oil maintained at a temperature of  $100 \pm 5^\circ\text{C}$ , the properties of the oil shall not exceed the following values:-

Increase in Sludge  $\pm 0.05\%$

Increase in Acidity 1 mg KOH/g

Varnish shall not be softened by this test.

**7. TEST CERTIFICATE:**

Five copies of the test certificate shall be supplied with each consignment. The test certificate shall bear the following information:

BP 76117 - Rev. 02 : High-Permeability Low-loss Spiral Cores.

BHEL Order No.

Supplier's Name

Magnetic characteristics (1) Type Test - per consignment:  
(Cl. 5.1)

- 0.25 Tesla

- 0.50 Tesla

(2) Routine test - per core supplied  
(Cl. 5.2)

Composition

Quality of varnish

Consignment No.



**8. PACKING  
AND  
MARKING:**

Each core shall be marked with blue lacquer of a quality specified in clause 6.4, or a suitable label. Each core shall be suitably packed to prevent damage during transit.

Each package shall enclose or have a securely attached label bearing the following information:

BP 76117 : High-Permeability Low-loss Spiral Cores.

BHEL Order No.

Consignment No.

Size & No. of cores

Supplier's Name

**9. REJECTION:**

BHEL reserves the right to reject any material not complying to this specification.

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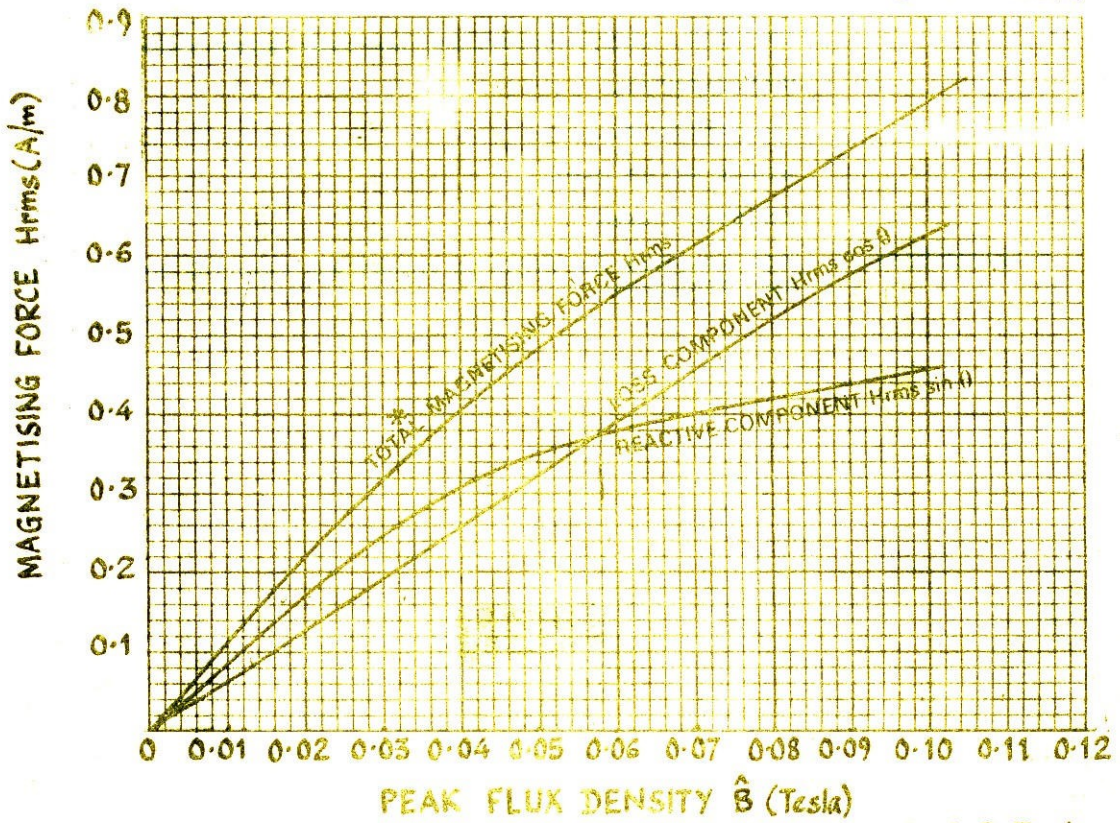
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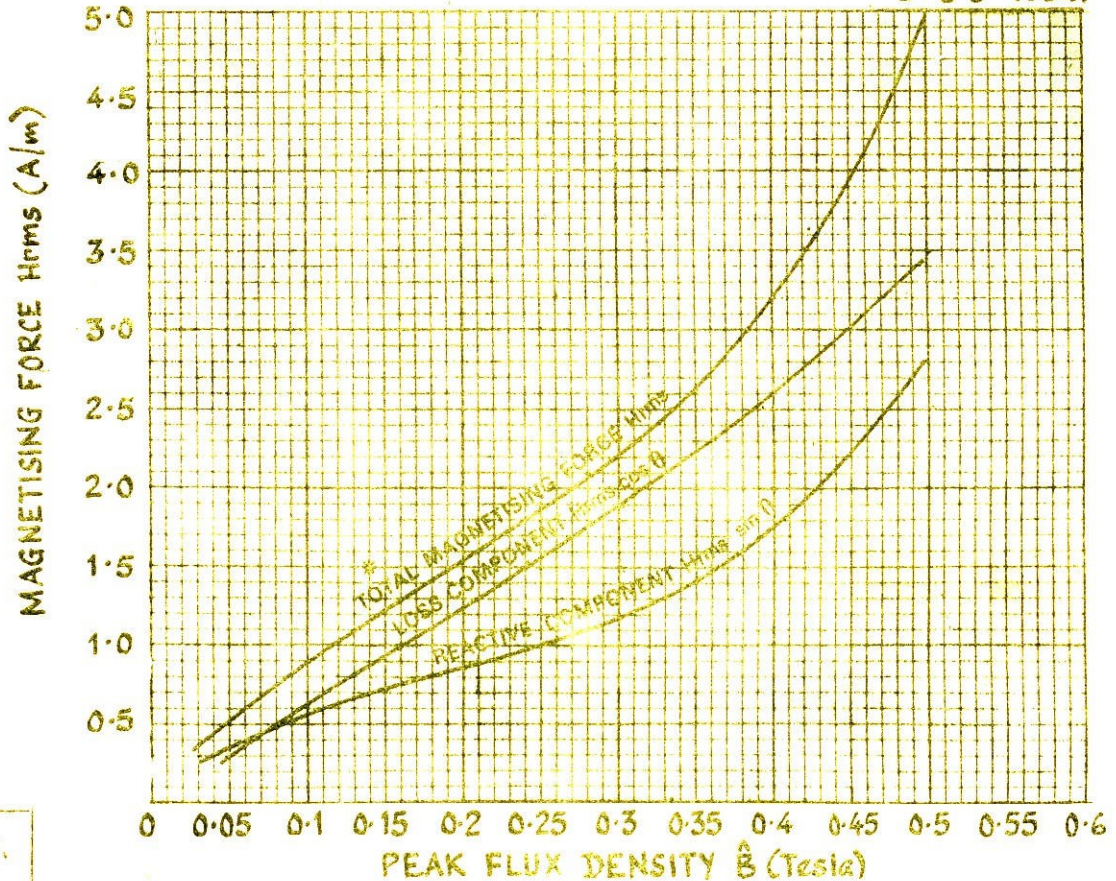
ANNEXURE-1

Resolved magnetisation curves 50Hz,

0-0.1 Tesla



0-0.5 Tesla



\* Normal Guarantee Levels.

REV. 02

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