SLOVENSKI STANDARD
SIST EN 60205:2006/A1:2009

01-april-2009

Izraļ un efektivnih parametrov magnetnih sestavnih delov (IEC 60205:2006/A1:2009)

Calculation of the effective parameters of magnetic piece parts (IEC 60205:2006/A1:2009)

Berechnung der effektiven Kernparameter magnetischer Formteile (IEC 60205:2006/A1:2009)

Calcul des paramètres effectifs des pièces ferromagnétiques (CEI 60205:2006/A1:2009)

Ta slovenski standard je istoveten z: EN 60205:2006/A1:2009

ICS:

29.100.10 Magnetne komponente Magnetic components

SIST EN 60205:2006/A1:2009 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60205/A1

February 2009

ICS 29.100.10

English version

Calculation of the effective parameters of magnetic piece parts
(IEC 60205:2006/A1:2009)

Calcul des paramètres effectifs
des pièces ferromagnétiques
(CEI 60205:2006/A1:2009)

Berechnung der effektiven Kernparameter
magnetischer Formteile
(IEC 60205:2006/A1:2009)

This amendment A1 modifies the European Standard EN 60205:2006; it was approved by CENELEC on 2009-02-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60205:2006/A1:2009 E

Foreword

The text of document 51/928A/CDV, future amendment 1 to IEC 60205:2006, prepared by IEC TC 51, Magnetic components and ferrite materials, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60205:2006 on 2009-02-01.

The following dates were fixed:

– latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2009-11-01
– latest date by which the national standards conflicting with the amendment have to be withdrawn	(dow)	2012-02-01

Endorsement notice

The text of amendment 1:2009 to the International Standard IEC 60205:2006 was approved by CENELEC as an amendment to the European Standard without any modification.

IEC 60205

Edition 3.0 2009-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

Calculation of the effective parameters of magnetic piece parts

Calcul des paramètres effectifs des pièces magnétiques

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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ICS 29.100.10

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FOREWORD

This amendment has been prepared by IEC technical committee 51: Magnetic components and ferrite materials.

The text of this standard is based on the following documents:

CDV	Report on voting
51/928A/CDV	51/940/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

The French version of this amendment has not been voted upon.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

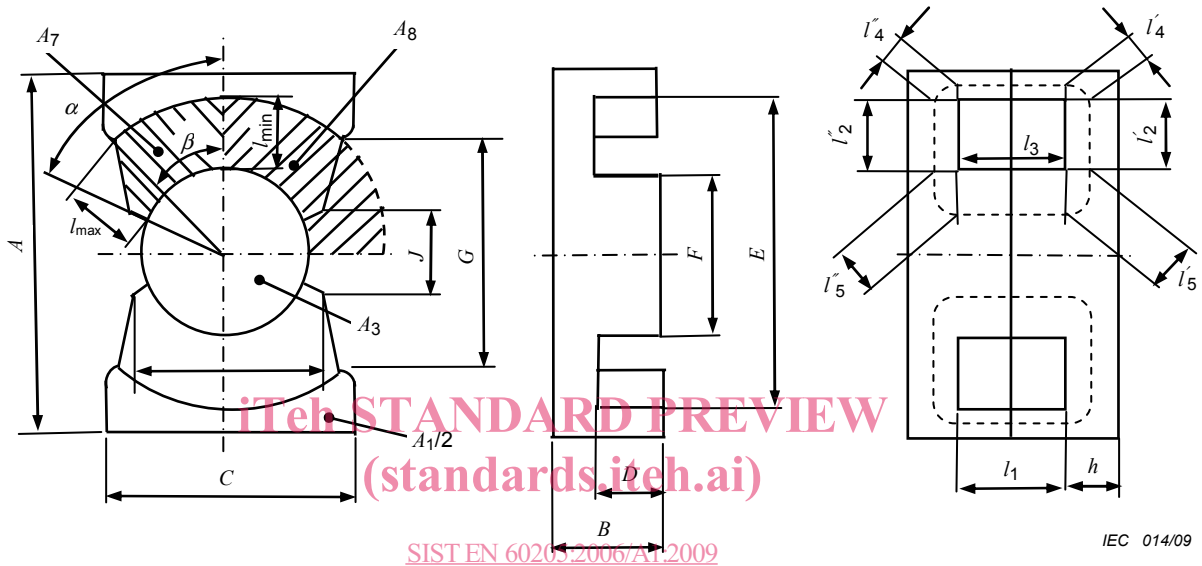
Replace the existing subclause 3.12 with the following new text.

3.12 Pair of PQ-cores

NOTE 1 This calculation ignores the effect of spring recesses.

NOTE 2 PQ+PLT (Plate)-cores use PQ core formulas.

NOTE 3 The equations below are consistent with those given in IEC 62317-13.



Area of outer leg:

$$A_1 = C(A - G) - \frac{\beta E^2}{2} + \frac{1}{2} GI$$

where

$$\beta = \arccos\left(\frac{G}{E}\right)$$

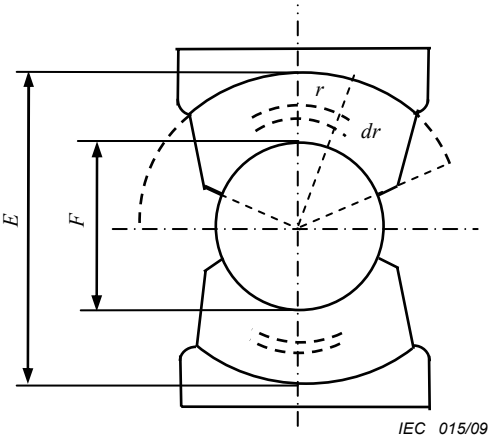
$$I = E \sin \beta$$

Mean length of flux path at outer leg:

$$l_1 = 2D$$

Core factors associated with l_2:

For l_2, A_2 the elemental radius dr shown in the figure is elemental length of the flux path in the integral below. The radius vector extends from F/2 to E/2 for the entire circle. The effective length l_{2i} for the section is multiplied by f. The area is the physical area multiplied by K.



$$\frac{l_{2i}}{A_2} = \int_{\frac{F}{2}}^{\frac{E}{2}} \frac{f}{K 2\pi r (B-D)}\, dr = \frac{f}{2\pi K (B-D)} \ln\left(\frac{E}{F}\right)$$

$$\frac{l_{2i}}{A_2^2} = \int_{\frac{F}{2}}^{\frac{E}{2}} \frac{f}{[2\pi K (B-D) r]^2}\, dr = f \frac{\left(\frac{1}{F} - \frac{1}{E}\right)}{2[\pi K (B-D)]^2}$$

From this A_2 is computed. The total magnetic length of this section is $2l_{2i}$ for the top and bottom halves together.

$$A_2 = \pi K E F \frac{B-D}{E-F} \ln\left(\frac{E}{F}\right)$$

$$l_2 = 2l_{2i} = f \frac{EF}{E-F} \left(\ln\left(\frac{E}{F}\right)\right)^2$$

where

$$K = \frac{A_7}{A_8} = \frac{A_7}{\frac{\pi}{16}\left(E^2 - F^2\right)}$$

$$A_7 = \frac{1}{8}\left(\beta \cdot E^2 - \alpha \cdot F^2 + G \cdot L - J \cdot I\right)$$

$$\alpha = \arctan\left(\frac{L}{J}\right)$$

$$f = \frac{l_{\min} + l_{\max}}{2l_{\min}}$$

$$l_{\max} = \frac{\sqrt{E^2 + F^2 - 2EF\cos(\alpha - \beta)}}{2}$$

Define the other two physical areas in the flux path at back wall.

$$A_9 = 2\alpha \cdot F(B - D)$$

$$A_{10} = 2\beta \cdot E(B - D)$$

The mathematical area A_2 is given as $A_{10} > A_2 > A_9$.

Area of centre limb:

$$A_3 = \frac{1}{4}\pi F^2$$

Mean length of flux path at centre limb:

$$l_3 = 2D$$

Area of outside corner:

$$A_4 = \frac{1}{2}(A_1 + A_{10}) = \frac{1}{2}[A_1 + 2E(B - D)\beta]$$

Mean length of flux path at outside corner:

$$l_4 = l_4' + l_4'' = \frac{\pi}{4}\left((B - D) + \frac{1}{2}A - \frac{1}{2}E\right)$$

Area of inside corner:

$$A_5 = \frac{1}{2}(A_3 + A_9) = \frac{\pi}{2}\left(\frac{F}{2}\right)^2 + F(B - D)\alpha$$

Mean length of flux path at inside corner:

$$l_5 = l_5' + l_5'' = \frac{\pi}{4}\left((B - D) + \left(1 - \frac{1}{\sqrt{2}}\right)F\right)$$

$$C_1 = \sum_{i=1}^{5} \frac{l_i}{A_i} \qquad C_2 = \sum_{i=1}^{5} \frac{l_i}{A_i^2}$$