Annex D
(informative)

Static magnetic characteristics

D.1 Introduction

This annex gives definitions and values for certain static magnetic characteristics of high coercivity magnetic stripes. These parameters are useful in the manufacture of magnetic material and are not directly related to magnetic performance characteristics given in Table 1 for cards. There is no guarantee that magnetic stripes with values given in this informative annex will meet the mandatory requirements given in Table 1. However, magnetic stripes that do not comply with the suggested static magnetic values probably will not conform to Table 1 properties.

D.2 Definitions

D.2.1
maximum field, H_{max}
maximum absolute magnetic field strength applied as described by the test method

D.2.2
static M(H) loop
normal hysteresis loop for which the magnetic field strength is cycled between the extremes - H_{max} to + H_{max} at such a low rate of change that the loop is not influenced by the rate of change (see IEC 50(221))

D.2.3
coercivity, $H'_{cM} = H'_{cJ}$
continuously applied magnetic field which reduces the magnetisation to zero from a previous maximum magnetisation state in the opposite direction, the quantity of interest being that which is measured parallel to the longitudinal axis of the stripe (see IEC 50(221))

D.2.4
remanence, M_r
value of magnetisation (M) in a given direction at zero magnetic field (H=0) after the application and removal of the maximum field (H_{max}) in the same direction

D.2.5
remanence coercivity, H_r
applied magnetic field which when removed returns the material to a zero magnetisation state from a previous maximum magnetisation state in the opposite direction, the quantity of interest being that which is measured parallel to the longitudinal axis of the stripe

D.2.6
oersted, Oe
Gaussian cgs unit of magnetic field strength which is commonly used in the magnetic recording industry equal to approximately 79,578 A/m (relationship is informative, see annex A (informative) of ISO 31-5:1992)

D.2.7
static demagnetisation, S_{160}
reduction in remanent magnetisation under the influence of an opposing magnetic field; characterised by $(M_r - M^+(-160))/ M_r$

D.2.8
longitudinal squareness, $SQ = M_r/M$ at (H_{max})
ratio of the value of remanence (M_r) after the application and removal of the maximum field (H_{max}) to the magnetisation (M) at the maximum field applied (H_{max}) measured along the longitudinal axis of the stripe

D.2.9
remanence ratio, $R_M = (M_{rP} / M_{rL})$
ratio of the perpendicular remanence measured perpendicular to the surface of the magnetic stripe (M_{rP}) to the longitudinal remanence measured along the longitudinal direction of the magnetic stripe (M_{rL})

D.2.10
switching field by slope, SF_S
$(|H_2|-|H_1|)/H'_{cM}$ where $M(-|H_1|) = 0{,}5M_r$ and $M(-|H_2|) = -0{,}5\ M_r$; the difference between the field values at the intercept of the static magnetisation $M(H)$ loop with $M(H) = 0{,}5\ M_r$ and $M(H) = -0{,}5\ M_r$, divided by the coercivity

D.2.11
switching field by derivative, SF_D
the width at half height of the differentiated static magnetisation curve $M(H)$ divided by the coercivity value on the same curve

D.3 Recommended characteristics

The recommended static characteristics of high coercivity magnetic stripe are shown in Table D.1.

Table D.1 — Static characteristics of high coercivity magnetic material

Number	Parameter	Symbol	Value
1	Coercivity	H'_{cM}	335 kA/m (4200 Oe) maximum 200 kA/m (2500 Oe) minimum
2	Static demagnetisation	S_{160}	0,20 maximum
3	Longitudinal squareness	SQ	0,80 minimum
4	Remanence ratio	R_M	0,35 maximum
5	Switching field by slope	SF_S	0,30 maximum
6	Switching field by derivative	SF_D	0,50 maximum