

Ely Chemical Company Ltd

Lisle Lane, Ely, Cambs CB7 4AS
Tel: 01353 665881 Fax 01353 664623



NON-DESTRUCTIVE TESTING & SPECIALITY CHEMICALS

TECHNICAL INFORMATION

ELYMAG 1 PERMANENT YOKE MAGNET ELY H005



THE ELY H005 ELY MAG 1 PERMANENT YOKE MAGNET is ideal for the effective magnetisation of components for crack detection, particularly where the use of electromagnetic yokes is impracticable or prohibited for safety reasons. The hinged arms and rotating pole pieces facilitate the local inspection of a diverse range of components such as critical welds in structures of fabrications, castings and automotive components. The ELY MAG 1 is also supplied with a "keeper bar" which conveniently stores in the handle when not in use.

The magnets used in the ELY MAG 1 are manufactured from Neodymium Iron Boron, which is a recently developed alloy and has been specially selected for the ELY MAG 1. This material offers the highest magnetic energy per unit volume commercially available today and due to its longer 'magnetic life' it is more convenient for the inspector as well as reducing operational costs.



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TECHNICAL INFORMATION

Specification	:	ASME V, BS6072, EN ISO 9943-3:2002.
Lifting Power	:	Greater than 18 Kg.
Magnetic Material	:	Neodymium Iron Boron.

DIMENSIONS

Handle Length	:	200mm (8 inches).
Height	:	177mm (7 inches) handle to leg tip.
Poles	:	35mm (1.4 inches).
Weight-Yoke	:	3.02 Kg (6.6 pounds).
Weight-With Keeper	:	3.34 Kg (7.1 pounds).
Magnet Complete	:	Part No H005.

OPTIONS

The ELY MAG 1 can also be supplied in kit form, consisting of a carrying case, ELY MAG 1, aerosols of black or fluorescent ink, white contrast paint, wire brush and cloth.

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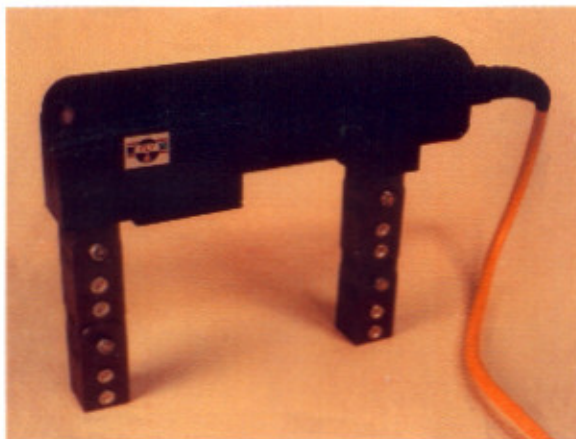
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CEY ADJUSTABLE YOKE ELECTROMAGNET H007/8/9



THE ELY H007/8/9 CEY ADJUSTABLE YOKE ELECTROMAGNET is commonly used for the magnetisation of ferromagnetic materials during magnetic particle inspection. Welds in pipes, pressure vessels, fabrications and individual components such as crankshafts, gears or castings can be easily tested for defects.

Operation of the yoke is carried out by selecting the correct voltage unit, placing of the poles on the test area, pressing the energising switch and applying Ferromor dry powder, Supramor visual or Lumor fluorescent particles to the test area whilst the component is being magnetised. (Note application of magnetic particles should cease before power is switched off).

Visual inspection should then be carried out under diffused light of at least 500 lux (45 ft cdl) with a minimum of 1200 μ watts per sq. cm for fluorescent inspection.

White contrast paint (WCP712/722) may be used on dark substrates to provide better contrast.



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Specification	:	ASME V, BS6072, EN ISO 9943-3:2002.
Lifting Power	:	Greater than 6 Kg when used with alternating current, 50/60 Hz.
Supply Voltage	:	240 volts 50 Hz, 110 volts 50 Hz and 48 volts 50 Hz.
Field Strength	:	Greater than 2400A/mctyre (30 oersteds) between poles 150mm apart on ferromagnetic material of saturation permeability more than 300.

DIMENSIONS

Cable Length	:	10 metres (32 ft).
Weight-Yoke	:	<3.5 Kg (7.7 pounds).
CEY 240V Magnet	:	Part No H007, (220/240 volts AC).
CEY 110V Magnet	:	Part No H008, (110 volts AC).
CEY 48V Magnet	:	Part No H009, (48 volts AC).

OPTIONS

For 24 volts use a CEY 48 electromagnet with a step down transformer.

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CALIBRATED FIELD INDICATOR ELY F003/1/2/3/4



THE ELY F003/1/2/3/4 CALIBRATED MAGNETIC FIELD INDICATOR (MODLE 25) is used to determine the presence of magnetism in ferrous materials when subjected to magnetic particle testing. The indicator can be used to ensure that components are appropriately magnetised and de-magnetised after undergoing magnetic particle inspection, an indication of polarity of the field can also be measured by the direction of the pointer deflection on the centre zero scale.

A useful accessory for Magnetic Particle Inspection, the indicator is available with several different ranges, is serialised and is supplied complete with a calibration certificate.

TECHNICAL INFORMATION

Dimensions	:	Nominal Diameter 64mm (2.5 inches).
Readings	:	In Gauss, correct to within 5% of full scale at 20°C.
Gauss Range (20+0-20)	:	Part No F003/1.
Gauss Range (2-0-2)	:	Part No F003/2.
Gauss Range (5+0-5)	:	Part No F003/3.
Gauss Range (10+1-10)	:	Part No F003/4.



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SURETEST FLUX STRIPS

ELY A001/002

FORGINGS & CASTINGS (TYPE I) BRASS - AEROSPACE (TYPE II) SILVER



THE ELY A001/002 SURETEST MAGNETIC FLUX INDICATOR STRIPS are widely used to indicate the presence of induced magnetic fields during the magnetic particle inspection method of ferromagnetic materials. Flux Indicators give evidence of an external field in the air above the magnetised surface and in some circumstances can be used to obtain a semi-qualitative estimate of the tangential field strength H.

Type I indicators are typically used for general engineering applications and type II are used for aerospace applications. Both types consist of three laminations measuring 50 x 12 mm which are fixed together to form sandwich structure which is nominally 0.15 mm thick. The inner lamination has three interruptions, which are parallel to the long side. The width of these interruptions and the material of the outer laminations means that the type I indicators respond to a weaker field than type II strips. Both types are protected by a polymetric layer and can be differentiated by the Roman numeral next to the ELY logo.

Flux indicators have the advantage of being flexible enough so that they can be bent to fit the contours of a workpiece, but robust enough to enable them to be used many times.

They may also be cut into smaller pieces to allow them to be fixed in recesses and otherwise inaccessible locations on the workpiece.



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PRINCIPLE

All simple flux indicators rely on the fact that when an induced magnetic field B in a ferromagnetic material is interrupted by a non-ferromagnetic material, there is a flux leakage. When magnetic particles are applied to such a device during magnetisation then visible indications will be formed provided that the direction of the interruptions are not parallel to that of the induced magnetic field. In order to make practical use of this simulation of the magnetic particle process; the material containing the interruptions is covered by an entire piece of material. Ely flux strips are ideal for confirming that an induced field exists across the surface of the workpiece as well as indicating the direction of that field. Estimates of the field strength H can only be made when the workpiece is magnetised by electrical contact. When any method of magnetisation which uses a magnetic field induced in the air around the workpiece is used, no estimate of field strength can be made since the flux indicator will respond to airborne flux whether a ferromagnetic body is present or not. This excludes the possibility of estimating field strength when any of the following methods of magnetisation are used:-

Encircling coil, magnetic flow, yoke magnetisation, induced current, central conductor, adjacent cable or permanent magnet.

The design of the Suretest Flux indicators allows estimates of the field strength to be made when workpieces are magnetised by use of alternating current (AC) at 50 or 60 Hz.

METHOD OF USE

Attach one flux indicator to a vertical surface of the workpiece under test so that its length is at right angles to the direction of the applied current and attach a second at right angles to the first. Magnetise the workpiece by the use of the same electric current waveform as will be used for the inspection technique. The magnetisation time will vary according to the self-inductance of the workpiece, but should be less than 3-seconds. While the workpiece is being magnetised apply magnetic particles. It is essential that the application of magnetic particles stops before the end of magnetisation.

INTERPRETATION

The direction of the induced magnetic field is seen readily from the response of the flux indicators. If one indicator shows indications and the other none, the induced magnetic field is in the direction parallel to the indicator showing no indications. If both flux strips show indications this shows that the direction of the induced magnetic field is at an angle of between 30 and 60 degrees to them. The exact direction can be checked by re-orientating the indicators with respect to the direction of the field. If neither flux indicator shows any indications there is insufficient field for the test to take place.

Interpretation of the strength of the magnetic field can only be made when alternating current of 50 or 60 Hz frequency is used by direct contact to magnetise the workpiece. The indicators must also be mounted in a vertical plane. In these conditions the induced magnetic field strength is as follows:-

Greater than 2400 Amp/metre when all three indications can be seen on the type I indicator.

Greater than 6400 Amp/metre when all three indications are seen on the type II indicator.

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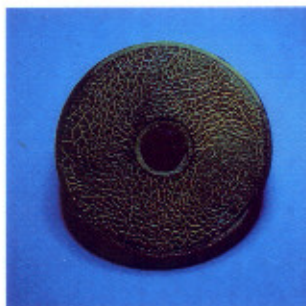


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TECHNICAL INFORMATION

MTU 3 MAGNETIC INK MONITOR

ELY E002



THE ELY E002 MTU 3 MAGNETIC INK MONITOR is a useful accessory for determination of the magnetic powder concentration in the test liquid. The MTU test piece consists of a manganiferous steel, which is alloyed with vanadium. The cracks available in the test piece on both surfaces are manufactured by hardening and are in the size of 0,1 to 1 μ m. Every test piece has a unique crack figure, it distinguishes itself by having net-shaped crack indications which were produced as naturally grown cracks. The assessment as to whether the magnetic powder suspension is still usable for crack indication is carried out by means of the preparation of a reference image for comparison of the monitor when used with the test sample.

TECHNICAL INFORMATION

Dimensions : 50mm diameter x 10mm thick with a 10mm diameter central hole.

Clear-sighted indications are achieved on the test piece when used with a threader bar magnetised at a field strength of 24 Amp/cm.



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TECHNICAL INFORMATION

BERTHOLD PENTRAMETER

ELY A005



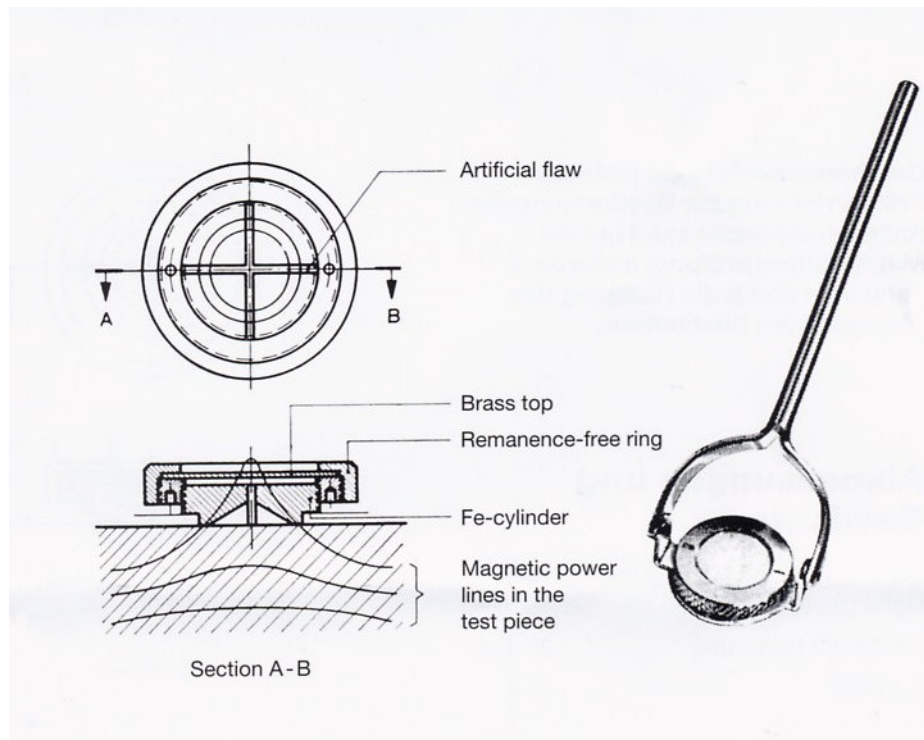
THE ELY A005 BERTHOLD PENTRAMETER consists of a remanence-free shielding ring into which an iron cylinder, sectioned into four quarters is placed. The cuts in the iron cylinder simulate artificial flaws in the form of a cross. The iron cylinder is covered by a thin brass plate, which can be varied in distance to and from the test piece.

When the pentrameter is placed on a magnetised test piece, magnetic lines pass through the sectioned iron cylinder. If magnetic powder or fluorescent magnetic solution is sprayed over the pentrameter, the cuts in the iron cylinder become visible. By turning the pentrameter around its axis, the maximum indication of the cut indicates precisely the magnetic field direction. The magnetic field direction is perpendicular to the artificial flaw at maximum indication.

For determination of magnetising efficiency, penetration and quality of the fluorescent penetrant suspension, the outside ring of the pentrameter is turned slowly, increasing the distance of the thin brass plate from the test piece. The amount of lift-off at the point where the indication just disappears is a measure of magnetic particle test efficiency. The lift-off is read to plus or minus $\frac{1}{4}$ mm on the shielding ring.



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TECHNICAL INFORMATION

Diameter	:	19 mm (0.75 inches).
Height	:	6.4 mm (0.25 inches).
Overall Length	:	102 mm (4 inches).
Weight	:	24 grams.

Meets the requirements of MIL-STD271 & 1949, NAVSHIPS 259-1500-1, ASTM E-1444 & E709, ASME Section V and others.

The indicator is complete with a sturdy brass handle and leather case with belt clip.

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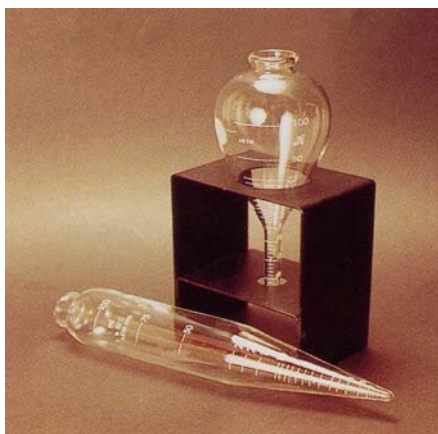
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TECHNICAL INFORMATION

MAGNETIC INK CENTRIFUGE TUBE ELY D001/002/003



THE ELY D001/002/003 MAGNETIC INK CENTRIFUGE (SETTLING) TUBES are used to measure the settlement, volume and bath strength of magnetic inks. Magnetic inks, whether fluorescent or non-fluorescent, ready made or from concentrate shall consist of finely divided ferromagnetic particles and a suitable carrier liquid. These magnetic ink tubes are an easy cost-effective way of ascertaining the working strengths of magnetic inks. The tubes can be used for sampling inks prior to use from the container, as well as in-service inks.

TECHNICAL INFORMATION

ELY D001	Dimensions	:	Length 200 mm, Neck ID 17 mm
	Capacity	:	100 ml.
	Complies With	:	BS4069
ELY D002	Dimensions	:	Length 200 mm, Pear Shaped
	Capacity	:	100 ml.
	Complies With	:	ASTM D96, D-893 and D-1796
ELY D003	Description	:	Stand for Settling Tube



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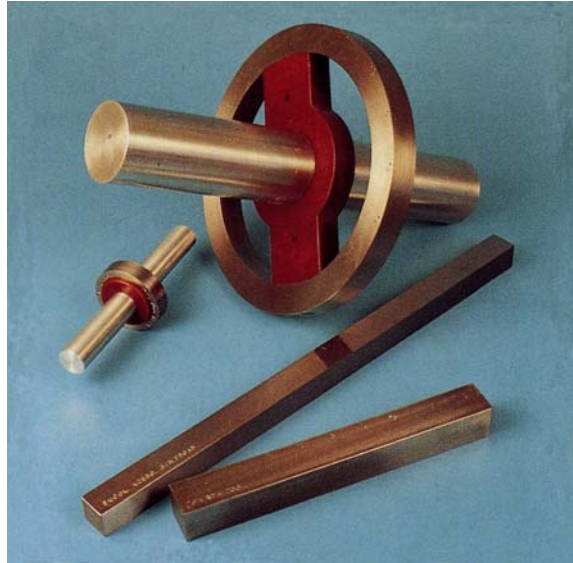


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TECHNICAL INFORMATION

MAGNETIC TEST PIECES

ELY E004/5/6/7/8



THE ELY E004/5/6/7/8 MAGNETIC TEST PIECES provide a quick means by which magnetic inspection processes can be checked for serviceability. They verify the elements of the process to ensure that they are functioning correctly. Regular use of the test pieces at the beginning and the end of the shift will help prove that a particular process is operating correctly and increase overall confidence in the system.

TECHNICAL INFORMATION

E004	Current Flow	1000-3000 amps	:	TP2A (RPS 700).
E005	Current Flow	3000-5000 amps	:	TP3A (RPS 700).
E006	Magnetic Flow	(5-Holes)	:	TP4A (RPS 700).
E007	Current Flow	0-1000 amps	:	TP1A (RPS 700).
E008	Current Flow	(1-Hole)	:	TP5 (BS 6072).



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MF300B MAGNETIC FLUX METER

ELY F005



THE ELY F005 MAGNETIC FLUX STRENGTH METER is battery operated and is used when the magnetic inspection calls for the use of a specific level of magnetic flux within steel components. If the magnetic flux level is too low, then defects may be overlooked; if too high then spurious indications may occur. The meter has been produced to measure the magnetic flux density just below the surface. The magnetic flux is measured simply by placing the probe on the surface of interest. The monitor will measure constant or alternating magnetic flux, which can be produced by permanent or electric currents. The measured value is displayed in units of Tesla. Measurements of magnetic flux are displayed on the unit and can also be sent via an RS232 link to a PC.

Software for use with the meter is provided which enables data to be saved and entered in spreadsheets.

The meter provides quantitative measurement of magnetic flux inside steel and measures flux density in any direction.



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TECHNICAL INFORMATION

Measures Peak Magnetic Flux Density.

Uses unique Magnetic Flux probe.

Auto-zero before every reading.

Use with constant or alternating magnetisation.

Meets BS 5750/ISO 9000 quality assurance requirements.

Fully calibrated with test certificate.

Supplied complete with protective carrying case and full user instructions.

Meter Complete : Part No F005.

SPECIFICATION

Techniques : Can be used with all magnetisation techniques including permanent magnets, AC magnets, current cables and current probes.

Detection : Detects the peak value of the magnetic flux density inside the materials.

Range : 0 to 1.99 Tesla

Accuracy : Plus or minus 3%.

Probe Size : 22mm x 7mm.

Power Supply : 4 standard AA cells.

Monitor Size : 165 x 100 x 50mm.

Weight in Case : 1.1 kg.

Warranty : 12 months.

OPTIONAL FEATURES

Analogue output available to enable connection to chart recorders.

RS232 output for computer connection.

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MF300H MAGNETIC FIELD METER

ELY F006



THE ELY F006 MAGNETIC FIELD STRENGTH METER is battery operated with a rugged Hall effect probe suitable for laboratory and workshop use. The Hall detector is housed in a stainless steel sheath for maximum protection. The meter uses a membrane keypad and a digital display, which makes it easy to operate.

The instrument can be customised by the user to display a wide range of magnetic field measurements in a choice of units. Auto-zero can be requested at any time by the press of a single key. Measurements of magnetic fields together with the selected units are displayed on the unit and can also be sent via an RS232 link to a PC.

Software for use with the meter is provided which enables data to be saved and entered in spreadsheets.

The meter is ideal for the measurements of magnetic fields and also for the recording of magnetic field measurements.



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TECHNICAL INFORMATION

Measures Average, Peak and RMS magnetic fields.

User selects units of measurement.

Rugged probe for extra protection.

Auto-zero facility.

Meets BS 5750/ISO 9000 quality assurance requirements.

Fully calibrated with test certificate.

Supplied complete with protective carrying case and full user instructions.

Meter Complete : Part No F006.

SPECIFICATION

Manual Ranges : 0 to 1999
0 to 199.9
0 to 19.99

Auto Range : 0 to 1999

Selectable Units : Gause, Tesla, mTesla, Oersteds, KA/m.

Functions : Average, Peak, RMS.

Accuracy : 1% at full scale at 20°C.

Probe Size : 2.2mm x 6.5mm x 100mm long.

Handle : 50mm long.

Power Supply : 4 standard AA cells.

Monitor Size : 165 x 100 x 50mm.

Weight in Case : 1.1 kg.

Warranty : 12 months.

OPTIONAL FEATURES

Transverse Probe.

Axial Probe.

Analogue output available for connection to chart recorders.

RS232 output for computer connection.

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STEEL (KETOS) RING TEST PIECE

ELY H010



This disc allows for the checking of the intensity of an induced field by a current flow through a copper pin threader bar. (Use only with three phases rectified current). Successive drilled holes from the surface simulate sub-surface defects that are revealed by surface indications at various magnetising current levels.

METHOD OF USE:

- Place a 30 mm diameter copper pin threader bar inside the bore of the disc.
- Insert the pin between the electrodes of the Magnetic Particle Inspection equipment.
- Adjust the intensity of the transversal magnetisation.
- Spray the disc with the magnetic ink all along the transversal magnetisation during the cycle.
- The number of indications revealed depends on the waveform and the intensity of the current.

Note: The disc has to be carefully cleaned after each use.

COMPLIES WITH:

ASTM E1444-01 and MIL-STD-1949A.



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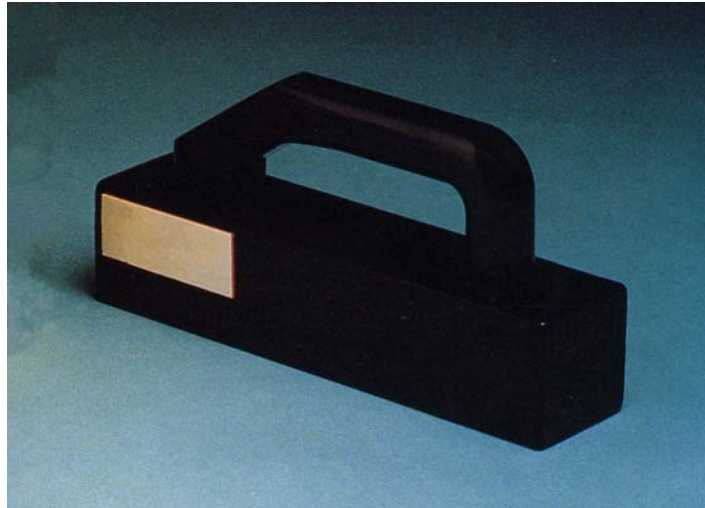


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TEST BLOCK

ELY H013/014



THE ELY H013/014 TEST BLOCKS are used for the checking of the serviceability of both permanent magnet yokes and electromagnetic yokes. Two weights that are complete with carrying handles are available, 4.5 Kg for electromagnetic yokes and 18 Kg for permanent magnet yokes. Both blocks come complete with test certificates traceable to national standards.

TECHNICAL INFORMATION

Block 1 :- Weight 18 Kg.

Part No :- H013.

Block 2 :- Weight 4.5 Kg.

Part No :- H014.

Meets the requirements of BS 6072 and EN ISO 9943-3:2002



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