

DEPTH MEASUREMENT OF SURFACE BREAKING CRACKS IN STEEL & IRON



Fatigue and other cracks, found either visually or with the aid of such techniques as magnetic particle inspection, in machinery and plant invariably pose the problem that whilst the position and length are easily ascertained, the depth to which the crack penetrates, is not immediately obvious. However, it is usually the depth of the crack, which determines the fate of the defective component; whether or not the item can continue in service under observation with planned remedial action by repair or replacement or whether the item has to be immediately scrapped.

As an aid to gaining full information about the crack we have developed the **QUADENT** crack depth meter. With this portable instrument the depth of a surface-breaking crack can be quickly and easily measured. Little skill is necessary and the information is presented in absolute terms of depth. The propagation rate can be determined and in longer cracks the profile can be plotted.

The **QUADENT** can be used on steel, iron, stainless steel or any metals of relatively low conductivity.

Uses the principle of AC potential drop.

Measuring range 0 to 100mm.

Accuracy $\pm 10\%$ of reading or 1mm whichever is the greater.

Single switch, with Off/Charge, Metric & Inches settings.

Display resolution Metric to 0.1mm or Inches to 0.01 Inch.

Battery powered with an internal charger.

Up to 1000 measurements from a fully charged battery.

Probes have four hardened steel, spring loaded, electrodes in a housing incorporating an automatic zero button.



Telephone

+44 (0)1981 541122

Fax

+44 (0)1981 541133

Email

Sales@InsightNDT.com

Web Site

www.InsightNDT.com

**Insight NDT
Equipment Ltd**

The Old Cider Mill
Kings Thorn
Herefordshire
HR2 8AW

Directors

Mark Willcox BSc (Hons)
Jiang Li BSc (Hons)

VAT Registration No.

771 3060 50

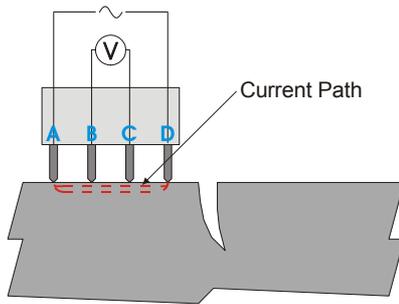
Registration No.

4198815 England

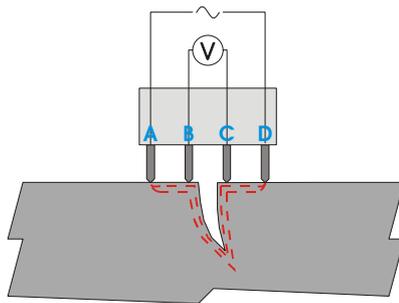
Registered Office

21 St Owen Street, Hereford,
Herefordshire HR1 2JB

The measurement of crack depth uses the principle of electrical AC potential drop. In this method the increase in potential drop in a current passing between two electrodes in contact with a sound surface adjacent to the crack, is compared to the voltage drop when the crack is situated between the two electrodes. Since the current traveling around the crack effectively increases the distance between the measuring electrodes the voltage drop will be greater. The increase is proportional to the crack depth.



A. Zeroing position



B. Measuring position

Current passed between two outer electrodes A&D. Voltage measured between electrodes B&C.

The AC current between electrodes A&D is approximately 0.5 amp at a frequency of 1500Hz. At this frequency the current flows preferentially close to the surface (skin effect) and therefore closely follows the contours of the crack. Even in a very tight crack with fracture faces in contact, the path of least resistance is still around the bottom of the crack.

The application of the electrodes to the material surface is by means of a hand held probe. This houses four spring-loaded electrodes so that they will conform to curved surfaces.

The mode of application is to apply the probe to the surface of the material adjacent to, but not affected by, the crack and press the **zero** button integral in the probe. This action compensates for different conductivity characteristics of the material so that in effect the increase in voltage

drop is related directly to the unaffected surface. The display will indicate **0.0**. Following this procedure the electrode probe is moved so two middle electrodes straddle the crack - one on each side. The path length being effectively extended by the presence of the crack the display will indicate the measured depth.

The **QUADENT** will not only measure crack depth but has the ability to discriminate between surface marks, scores etc., which have the appearance of cracks, and genuine cracks. If during the measurement process the LED displays **0.0** then there is not a crack.

SPECIFICATION

Measuring Range	0-100mm (0-4")
Accuracy	±10% of indicated depth or 1mm (0.040") whichever is the greater value
Resolution	0.1mm (0.01")
Display	3 ¹ / ₂ digit red LED
Indicating Modes	Metric or Inches, switch selectable
Power	Battery powered with integral charger. Battery Low indicator Charger to operate from 110V or 230V
Operating Time	Up to 1000 measurements from fully charged battery
Controls	Single three-position switch. Off/Charge, Metric & Inches
Case	Strong ABS plastic with handle 275mm (10.75") by 250mm (9.75") by 75mm (3.0")
Probe	Four hardened steel, spring-loaded, electrodes in SRBP housing incorporating automatic zero button. Including connecting cable 1200mm (47") long
Optional Test Block	Mild steel relative permeability 240 with graduated slot 0-10mm depth

The equipment is supplied, with comprehensive instructions, in a rigid carrying case with plastic foam cut outs to accommodate various items.