DSE
TEST SOLUTIONS

DSE Wire Testers

Catalogue

DSE Test Solutions A/S

Supplier of laboratory equipment and inline test solutions

DSE Test Solutions A/S offer a wide range of wire testers for both laboratory quality control and for inline production control. In our portfolio, you will find testers covering the complete wire journey from incoming inspection performed by the quality laboratory to the inline quality control in the running production.

DSE wire testers — overview

Control and optimize the quality of enameled wire

Optimizing the processes by knowing and controlling the parameters within the production of enamelled wire is essential for the economy when manufacturing this product.

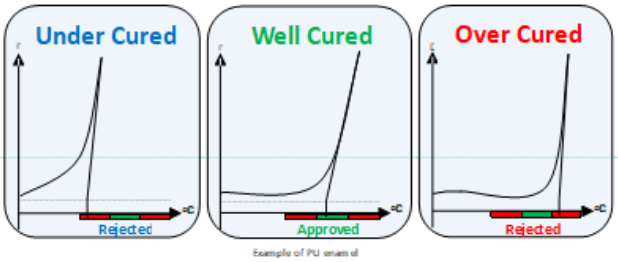
DSE Test Solutions A/S offers:

Laboratory solutions: Thermal testers

Tangent Delta testers

The Tangent Delta testers are applicable for curing control of enamelled wire. During heat-up of the wire, the tester automatically calculates the Tangent Delta temperature (TgD).

With a full TgD curve, it is possible to determine and display valuable information about the quality of the wire enamel.



Main features for our TgD testers

- High consistency of the measurements
- High accuracy
- Low maintenance needs
- Round and Flat wire can be tested in one system
- Quick measurement
- Approve/reject function
- Compare results with multiple curves
- Reference wire in display
- DIN or Logarithmic scales
- Up to 99 pre-settings
- Multi language user interface
- Standard: IEC 60851-5 compliant

Model specific features

DSE TEST SOLUTIONS		
FEATURES	**TD5**	**TD3**
Dimension range round wire (No off-sample holders needed)	0.008...8mm	0.05...6mm
Dimension range flat wire max. (No off-sample holders needed)	8 x 22mm	6 x 12mm
Maximum measuring temperature	400°C (Optional C: 500°C)	350°C
Samples per test	1	1
Test duration time (1mm wire)	~3min	~3min
Semi automation handling of sample holder	Included	No
Built in LCR measuring bridge and controller	Yes	Yes
Test frequency	Multiple	1 kHz
Reference wire for comparison on display	Included	Optional (A)
Presets including reference wire	Included	Optional (A)
Multiple view of measuring's	Included	Optional (A)
Approve / reject function	Included	Included
Dual tangent evaluation (Approve/reject function)	Included (SW>2.07)	Optional (A)
Evaluation of bonding wire (option B)	Optional (B)	Optional (B)
Logarithmic or Linear scale on display	Yes	Yes
Password protection 2 level	Included	Included
Multiple operational language	English- German- Chinese- Russian	English- German- Chinese- Russian
Database local or on central server	Included	Included
Microsoft SQL database search functions	Included	Included
Windows PC system	Windows 11	Windows 11
Compliant IEC 60851-5	Yes	Yes

Laboratory solutions: Thermal testers

Thermal cut-through tester

TP-F

Two straight pieces of wire shall be inserted into the metal block, crossing each other at right angles, and the metal block will be pre-heated.

- **TP-F** Wire diameter range from 0.10 to 1.60 mm (38–14 AWG)
  Maximum test block temperature 520°C

Standard: IEC 60851-6.4 compliant
(wire crossing method)

Solderability tester

ST

Automatic or manual test with the possibility of disconnecting sideways movement of the sample.

- **ST:** Digital temperature controller up to 530°C, accuracy > 0.3%

Standards: IEC 60851-4.5 or NEMA MW 1000

Laboratory solutions: Electrical testers

Breakdown Voltage tester

RDT

Wire diameter from 0.018 to 8 mm (50–0 AWG) and strip up to 50x8 mm
Test voltages standard RDT, RDT1, RDT2 (0-2kV, 0-10kV) RDT 3 (0-4kV, 0-20kV)
Available options:

	RDT	RDT2	RDT3
V15 (0-3kV, 0-15kV)	☑	☑	
V20 (0-4kV, 0-20kV)	☑	☑	
V30 (0-6kV, 0-30kV)	☑	☑	☑
V50 (0-10kV, 0-50kV)			☑
PC control	☑		☑
C2 : Test chamber 250°C	☑		☑

*

Standards (depending on models): IEC 60851-5.4, IEC172, NEMA MW 1000,
JIS C 3216-5, IEC 60243.1, DIN 46453.

According to models different electrodes are available.

*: The shown model is displayed with the PC control option.

Laboratory solutions: Electrical testers

Twist specimen fabricators

Twisting wire for sample preparation for breakdown voltage test and others.
Wire diameter from 0.051 to 2.6 mm (44-10 AWG)

- **TWM:** Turning crank with ball bearing
- **TWM1:** Adjustable rotation speed electronically controlled

Standards depending on models: IEC 60851-5.5, NEMA MW 1000, JIS C 3216-5, ASTM D 1676

Pinhole testers

Based on sodium chloride aqueous solution added with the proper quantity of alcohol solution of 3% phenolphthalein

- **PH:** Small size (245 x 145 x 150 mm, 8L)
- **PH1:** Medium size (490 x 290 x 195 mm, 20L)
- **PH2:** Large size (940 x 640 x 500 mm, 270L)

Standards depending on models: IEC 60851-5, JIS C 3216-5

Electrical resistance testers

The wire's resistance shall be expressed as the directional current resistance at 20°C. Suitable for wire diameters up to 3.15 mm (8 AWG)

- **OHM2:** Range 20 mΩ - 200 kΩ. Res. 1 mΩ - 10 Ω
- **OHM3:** Range 2 mΩ - 20 kΩ. Res. 0.1 mΩ - 0.1 Ω
- **OHM3A:** Range 200 mΩ - 20 kΩ. Res. 0.01 mΩ - 0.1 Ω
- **OHM4:** Range 200 mΩ - 20 kΩ. Res. 1 nΩ - 0.1 Ω

Standards depending on models: IEC 60851-5.3, NEMA MW 1000, DIN 46453

High voltage continuity testers

A voltage generator must provide the electrode with a continuous filtered voltage without transients. The test voltages using an open circuit adjustable in 8 steps: 350V, 500V, 750V, 1kV, 1.5kV, 2kV, 2.5kV, 3kV

- **HVT:** Wire diameters range 0.05 to 1.6 mm (44-14 AWG)
  Nema standard
- **HVT-GS:** Wire diameters range 0.05 to 1.6 mm (44-14 AWG)
  Stretching unit: 2 - 4 - 6 - 8 - 10 - 12 - 14 - 16 - 18 - 20%
  IEC standard

Standards depending on models: IEC 60851-5.5.2, NEMA MW 1000-2015

Transposed cable fault finders

During the strip wire transposed cables, short circuits are formed between adjacent strips, generally caused by the action of the strip former hammer or by metal particles pressed by the stranding machine or caterpillar, punching the strip insulated layer

- **PF:** Test voltage 300 Vac line frequency, threshold fault current 3 to 10 mA
- **PF1:** Pulse with adjustable test voltage, frequency, and duty cycle from 0 to 500Vdc, 1kHz to 20kHz 10 – 90%, and single shot

Standard: ABB 1ZBA166001-1

Laboratory solutions: Electrical testers

Pulse Dielectic Testers

PDT

The enameled wire used in asynchronous motors driven by inverters suffers from relevant electrical and thermal stress due to the resulting sine waveform applied, derived from a modulated square waveform having steep rise and fall edges tenths of nanoseconds

- **PDT:** Suitable for the wire diameter range from 0.05 mm to 2 mm (44AWG–12AWG), independently adjustable from 100Vpp up to 3000Vpp, pulse frequency from 200Hz up to 20kHz. up to 30kHz with de-rate voltage to 1750V.
  Optional: bidirectional test voltage +/- 2000V
- **PDT1:** Suitable for the wire diameter range from 0.05 mm to 2.5 mm (44AWG–10AWG), unidirectional square wave high voltage independently adjustable from 100Vp to 3800Vp, pulse frequency from 1kHz up to 20kHz, 30kHz with de-rate voltage to 1750V

Standards depending on models: IEC 62068-1

Laboratory solutions: Mechanical testers

Spring back testers

SB0

SB4

A wire sample is wound on a diameter mandrel according to the standards to generate a spring back value.

Wire diameter from 0.07 mm to 1.60 mm (41–14 AWG)

- **SB0:** Manual driven
- **SB1:** Electric-driven brushless gear motor for winding /unwinding at a constant speed

Wire diameters range from 1.60 to 7.50 mm and strip wire

- **SB3:** Manually activated
- **SB4:** Fully automatic, with a motorized lever arm with constant speed

Wire diameter from 0.07 mm to 1.60 mm, wire diameter from 1.60 to 7.50 mm and strip wire

SB6

- **SB5:** Manual activated
- **SB6:** Fully automatic, with motorized lever arm with constant speed and electric-driven brushless gear motor for winding /unwinding at a constant speed

Standards depending on models: IEC 60851-3.4, NEMA MW 1000, JIS C 3216-3

Peel testers

PT

A sample of round wire shall be inserted between two mandrels. One can rotate and the other can be displaced axially. The latter is used to apply tension to the rotating mandrel.

- **PT:** Diameters from 0.9 mm to 5.0 mm (19-4 AWG)
- **PT0:** Diameters from 0.9 mm to 2.0 mm (19-12 AWG)

Standard: IEC 60851-3.5.4

Laboratory solutions: Mechanical testers

Elongation testers

The wire shall be stretched at a 5 mm/1" +/—20% rate. The elongation shall be expressed as a percentage of the free measuring length. Maximum elongation percentage 51%.

- **ETM:** Wire diameter from 0.05 to 1.15 mm (42-17 AWG), Test length 250 mm, res. 1%
- **ETM1:** Wire diameter from 0.05 to 1.15 mm (42-17 AWG), Test length 200 mm, res 0.1%
- **ETM2:** Wire diameter from 0.10 to 2.0 mm (38-13 AWG), Test length 200 mm, res 0.1%

ETM

ETM2

Automatic elongation tester

The wire shall be stretched at a rate of 5 mm/1" +/- 20%. The elongation shall be expressed as a percentage of the free measuring length.

- **ET:** Wire diameter from 0.064 to 2.75 mm (42–9 AWG)
- **ET3:** Wire diameter from 0.60 to 5.00 mm (24–3 AWG) and strip to 60 mm^2
- **ET4:** Wire diameter from 0.70 up to 6.00 mm and strip up to 100 mm^2

Standards depending on models: IEC 60851 - 3.3, NEMA MW 1000, JIS C 3216-3, ASTM D 1676.

SBDX

Strip bending device

Bent through 180° round a polished mandrel of the diameter in two directions to form an elongated S-shape.

- **SBDX:** Suitable for strips up to 180 mm^2 flat-wise and edgewise ben

Standard: IEC 60851-3.5.1.2

MW

Winding mandrels

A specimen shall be wound around a mandrel of the diameter given in the relevant specification sheet. After winding, the specimen shall be examined Wire diameter from 0.04 to 1.60 mm (46–14 AWG).

- **MW:** DC motor with gearbox adjustable rotation speed 10 - 100 rpm
- **MW1:** 10 - 2000 rpm with digital tachometer
- **MW2:** Flat wire, dimensions in different ranges

Standards depending on models: IEC 60851-3.5, JIS C 3216-3, NEMA MW 1000

SST5

Coefficient of friction testers

The coefficient of friction (μs) is determined by measuring the inclining angle α of a plane when a block begins to slip on the track made from the wire specimen.

- **SST4:** Wire diameter from 0.05 - 1.60 mm (44–14 AWG) Static
- **SST4-F:** Flat wire dimensions from 0.5 x 1.0 - 3 x 5 mm
  Other dimensions on request
- **SST5:** Wire diameter range 0.05 - 2.00 mm, static/dynamic

Standards depending on models: IEC 60851-3.B5, IEC 60851-3.B2, IEC 60851-3 Annex B2, NEMA

Laboratory solutions: Mechanical testers

Jerk testers

A sudden stretch of a sample of wire of 250 mm in length to its breaking point or an elongation given in the relevant specification sheet

- **JTM:** 0.09 to 1 mm (39-18 AWG), clamping length 200 mm
- **JT:** 0.09 to 1.6 mm (39–14 AWG), clamping length 250 mm

Standards depending on models: IEC 60851-3.5.3, NEMA MW 1000, JIS C 3216-3

Unidirectional scrape tester

A specimen of film-coated wire shall be wiped with a clean cloth or tissue, placed in the machine, and straightened by elongating it not more than 1%. The specimen shall then be secured in the clamping jaws, and the supporting anvil shall be adjusted to contact the underside of the specimen.

- **UST1:** Wire diameter from 0.2 to 2.5 mm (32–9 ½ AWG)

Standards: IEC 60851-3.6, NEMA MW 1000 3.59

Bidirectional scrape tester

Insert it on a device that scrapes the surface of the film coating at a right angle to the wire's length.

- **BST:** Suitable for wire diameter from 0.2 to 2.5 mm (32–10 AWG)

Standard: NEMA MW 1000- 3.51

Low stress elongation tester

place the sample between two jaws at a distance of 26 cm, a pre-load of 51.75 N/ mm2. The comparator used to measure the softness must be zeroed

- **LSE:** Wire diameter from 0.10 to 2.50 mm (38–10 AWG)
- **LSE-PC:** LSE with a PC-control added

Standard: ASTM D1676-99

Flat wire torsion tester

Flat wire should be inserted between one rotating mandrel and another that could be displaced axially with a specified tensioning weight

- **TOR:** Flat wire having dimensions from 3.0 x 5.0 mm to 20 x 6.0 mm, the sample length is adjustable from 400 to 500 mm

Windability tester

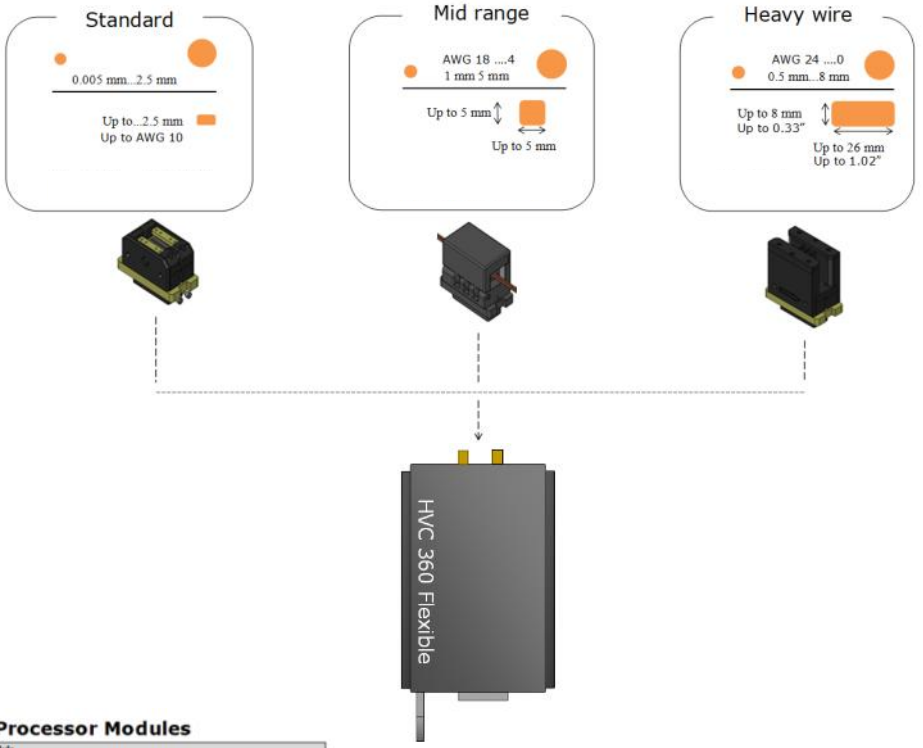
This test is designed to show the windability of film-coated magnet wire in round sizes.

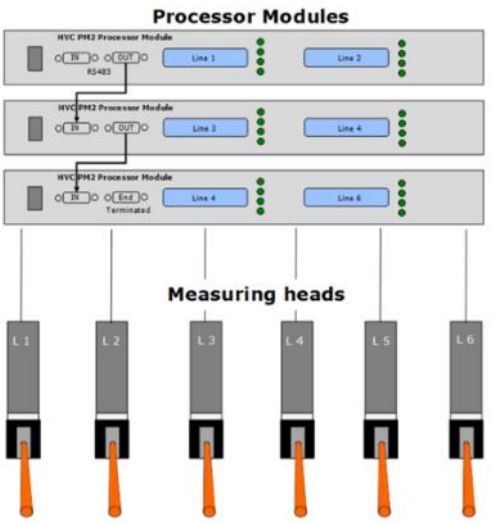
- **WT:** Wire diameter from 0.078 to 2 mm (40–12 AWG)
  Test voltage in 8 steps: 350V, 500V, 750V, 1000V, 1500V, 2000V, 2500V, 3000V

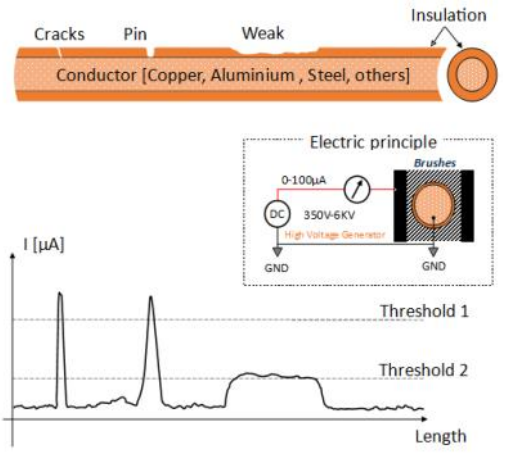
HVC 360 Flex

HVC 360 Flexible is a High-Voltage Continuity tester that detects pinholes and weak spots in wire insulation. It is designed for in-line application at wire manufacturing plants and winding machines.

- Most reliable and flexible quality control tool
- Valuable documentation for each meter of a spool
- Test voltage from 350 VDC to 6.000 VDC
- Reduction of scrap
- Improved efficiency
- Measurement with two level detection
- Solution handles up to 99 lines
- Storing of data on local PC or central server
- Multi language user interface
- Standard: IEC 60851-5 compliant





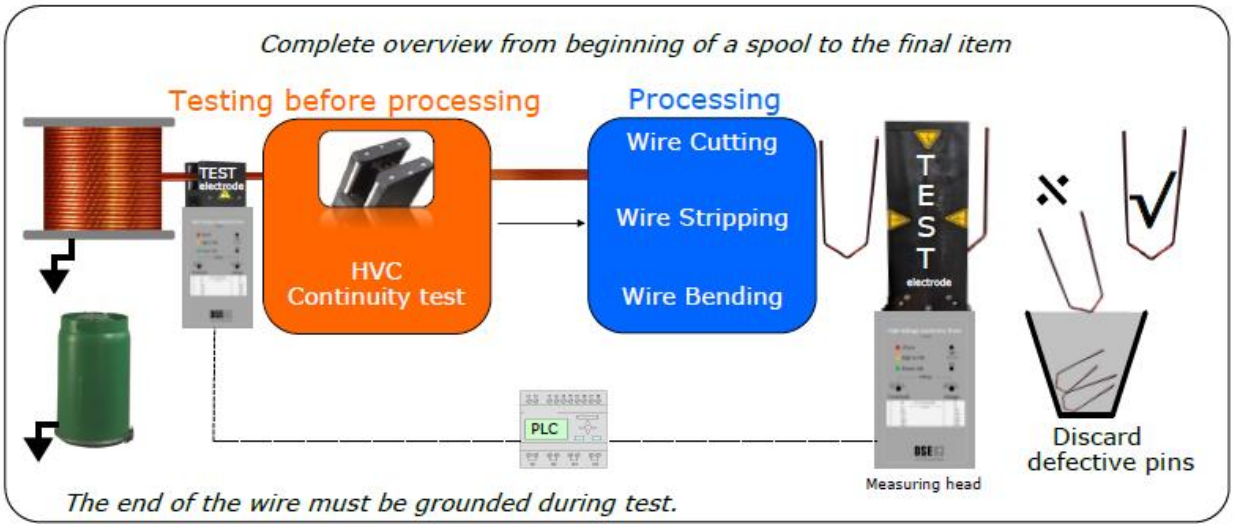


Inline solutions: Electrical testers

HVC 360 SA (Stand Alone]

Testing each single Hairpin or I-pin and each meter of the coated wire before processing is the most effective way for securing the raw material has no faults that later on will discard final product.
Production of E-Motors, transformers or rotors is costly so knowing the raw material has been tested is essential.

- Full 360 degree surface coverage of the wire coating and the bended Hairpin or I-pin
- Build in controller with 5 individual pre-set for both the High Voltage tension and Threshold
- Interface for PLC, direct setting of HV and Fault current/Threshold from [0.. 10 VDC]
- Output for measured fault current
- Wide range of electrodes available from wire size 8 µm to a completed bended Hairpin/I-Pin
- Optical isolated alarm output when fault is detected
- Output for switching on a light tower showing
  Power ON & High Voltage ON
- No damage from sparks (low power design) max 100µA
- Wide output Test Voltage range 350 VDC to 6000 VDC
- Low tension means no damage of the enamel because of very soft conductive brushes



Inline solutions: Electrical testers

Blister detection solutions

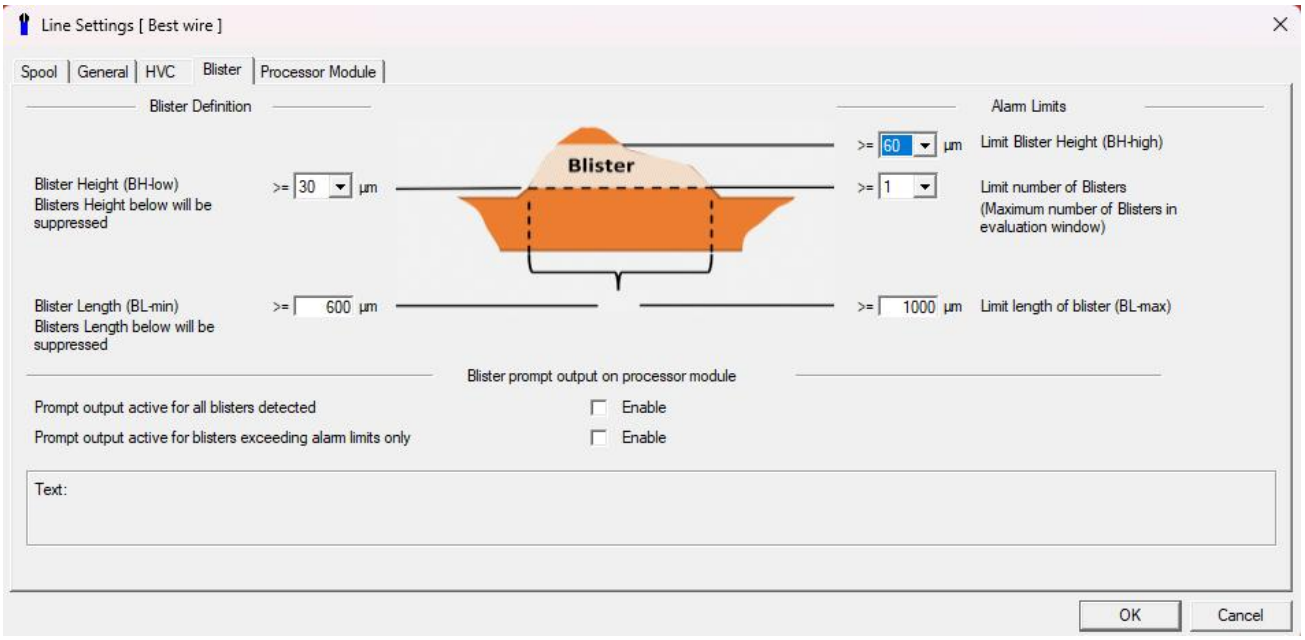
A blister detection solution from DSE is a high-precision, non-destructive device used to detect blisters in the flat enameled wire during manufacturing. If a blister is detected, the data is stored either locally or on a server.
The blister detection solution comes in 2 variants.

Blister Detection Unit (BDU)

- Four side Blister Detection in one measuring unit down to 50µm
- Monitoring HVC and Blister in the same displayed window (Dual View)
- Available as a inline stand alone measuring unit or combine with the High Voltage Continuity (HVC) tester
- Documentation for both continuity and blister detected in one file
- Solution handles up to 99 lines
- Storing of data on local PC or central server
- Multi language user interface
- Reduction of scrap
- Improved efficiency

Blister Measurement System (BMS)

- In-line system for measuring blisters on flat wire down to 30µm
- Measuring the actual height & length of a blister
- Two individual thresholds available for blister height
- Available as a inline stand alone measuring solution or combine with the High Voltage Continuity (HVC) tester
- Output for a marking device when a threshold is exceeded window
- Detection of minimum distance between errors using evaluation window
- Separated graphs for error numbers, blister height and blister length
- Displaying on PC screen the full historic in real-time view and database storage
- Solution handles up to 99 lines
- Multi language user interface



DSE wire testers

Supplier of laboratory– and inline test equipment and solutions

Our products are being used as reference instruments by manufacturers of enamel and enameled wire and the users of enameled wire. We offer a wide range of training, maintenance, and support activities to supplement our product range and support our customers.

Test and measurement is embedded in our DNA

DSE Test Solutions A/S is a company that has "TEST" embedded in its DNA. We really enjoy developing test equipment for different applications in close collaboration with our customers and overcoming challenges together in the process.

+30 years of experience

We delivered the first turnkey test solution more than 30 years ago and have since delivered more than 1,500 turnkey solutions to satisfied customers in different industries.

Accurate instruments for quality and process control

Today, we manufacture the most accurate instruments for quality and process control in various industries and serve customers worldwide.

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