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Options are described in separate documents. Image sizes are described in the quote.

Some of the advantages by using the KSM-System:

1. High accuracy gives reliable and extremely repeatable results very useful for material savings
Material are the biggest cost in a cable.
Used by 19 Test Institutes in the world, among others all three in Germany.
2. Very rapid automatic measurements of the cable cross-section, measuring time 1-2 seconds.
3. Applicable in both Laboratory and Production.
Most of our units are used within the production area.
4. All applications are working with User-friendly and Self-explanatory Windows menus
5. Storage of measured data for later evaluation in PC and, or, by a Server through the network.
6. Easy adaptation to future needs. We have already programs making it possibly to run KSM under or together for example with BAAN or SAP system. And programs like CableBuilder.
7. Remote function making it possible to run dynamically linked to your database.
ACMMT can also make Excel links for the specifications as used in the KSMLDB mode.
8. Measure in mm , inch or mils, selectable in setup
9. Possibility to use optic/focus system to measure extruder tooling by using model DSM

The KSM-System has since its introduction nearly thirty years ago provided cable manufacturers with excellent, precise knowledge of material consumption that has enabled the higher production quality. We also offer our customer's continuous update of delivered systems to keep all KSM-Systems in most modern mode. All our delivered KSM systems are still in operation including the very first one updated from the old DOS version to today's Windows platform also updated with new modern optic.

Our offer is based on a certain cable diameter range but we can easily adapt it for your particular needs. Different dimensions only marginally influence the prize. Since it is easy to alter later the diameters should an optimal dimension be selected without adding for to much possible future needs.

Over 250 systems delivered. Most of them are repeat orders.

We can mention deliveries to ABB, Aberdare Cables, African Cables, Brugg Kabel, Centelsa, Coficab, Conductores Monterrey, Draka, Dubai Cables, Ericsson, Eupen, General Cables, Huber+Suhner, Kromberg & Schubert, Nexans, NKT, OLEX Cables, Prysmian, REKA and Telefonika. The test institutes, **B.S.I.** and **BASEC** in England, **Dekra** in Holland, **SEV** in Switzerland, **EZU** in Czech Republic, **DELPHI**, **LABCo** and **VDE Labs** in Germany, **TSE** in Turkey as well as **DEMKO (UL)**, **FIMKO**, **NEMKO**, **Intertek SEMKO** in Scandinavia and the ones in China are also using KSM. Information for down load at www.acmab.com/Info/ and www.acmab.com/Info/Video

KSM Basic contains everything to measure quick and accurate



The KSM-System consists of a specially developed measurement box combined with a PC where ready to use imaging gauging software is installed. The programs are easy selectable with the icon. The measuring time is only 1-2 seconds and the accuracy for normal cameras 0.05%. (1/2000 part of the image field). For higher accuracy HR (high resolution) and HER cameras are available. The measurement box contains illumination as back light and possibly also the optional automatic over light. The over light is needed for non translucent multi layer products and also for stripe percentage measuring (like in green/yellow conductors). Optional automatic over light is then highly recommended. The box is at the same time a protection from outside light. Camera with fixed Optic is located a long distance from the samples giving more accurate results on cable measuring. The cable samples to be measured are easy handled on measuring glass plates sliding on glass. The KSM-System has since its introduction thirty years ago provided cable manufacturers in the complete world with excellent, precise knowledge of material consumption that has enabled the higher production quality. ACMMT also offer our customer's continuous update of delivered systems to keep all KSM-Systems in most modern mode. All our delivered KSM systems are still in operation including the very first one updated from the old DOS version to today's Windows platform also updated with new modern optic.

Measurement box contain camera/optic (s) to cover needed diameter range
 Normally 1, 2 or 3 cameras/optics is used to cover the needed diameter range.
 The camera(s) are combined with fixed optic thus no adjustment needed. The fixed optic has a very low distortion giving optimal repeat accuracy. Digital firewire cameras are used with different number of pixels based upon needs for the customer application.
 The offer is based on a certain cable diameter range but we can easily adapt it for your particular needs. To optimise the use of image fields your information on how many samples you have per the cable diameter are very useful. Different dimensions only marginally influence the prize. It is easy later to alter the diameters thus the optimal dimension can be selected without adding for possible future needs.

1 KSM Cameras/Optics and ranges

The KSM-System can be equipped with 1 – 3 cameras/optics depending on range to be measured. For special cases can a 4th camera/optic be added, for example to measure holes like in extruder tooling's.

KSM Basic contains everything to measure quick and accurate and many data handling options



The KSM-System consists of a specially developed measurement box combined with a PC, special developed ready to use application PC imaging gauging software and an imaging card. The measuring time is only 1-2 seconds and the accuracy 0.005%. (1/2000 of the image field) The measurement box is at the same time protection from outside light and contains illumination as back light and possibly also over light (option). Camera/Optic is located a long distance from the samples avoiding wrong measuring. The cables samples to be measured are easy handled on measuring glass plates sliding on glass.

Measurement box including

- 1.1 1 CCD-camera with Fix-optics type **KSMXXF** (as defined in the quote)
- 1.2 2 CCD-cameras with Fix-optics type **KSMXX/XXF** (as defined in the quote)
- 1.3 3 CCD-cameras with Fix-optics type **KSMXX/XX/XXF** (as defined in the quote)

HR cameras

Any camera can be equipped with a HR (High Resolution) CCD-camera. Model HR in the type A HR camera has approx. 2 times as many pixels as the normal camera thus giving higher accuracy making it possible to locate smaller walls like in HV Cable's conductor and insulation screens.

EHR cameras

Any camera can be equipped with the new EHR (Extra High Resolution) CCD-camera. Model EHR in the type. This rather expensive camera has even more pixels for even higher accuracy and can also locate even smaller walls.

2 Computer WIN10 with KSM Software

ACM supply a Dell PC-computer with 8 GB RAM memory, 8 MB Graphic, 120 GB Flash and CD, where the frame grabber card is assembled and the ready to use application programs are installed. Alternatively we can install at a customer new PC sent to ACMMT.

The customer provides Colour monitor min 1024 x 768 in true colour and if needed Printer.

Easy usable Image measuring - program are installed in the KSM PC

Many optional programs are available adapted to different markets. Refer to a separate description. Below the standard programs always delivered. Other programs enclosed are defined in the quote.

- RG**  Round cable General min 1 layer as per IEC 60811-201/202/
Or RGA for US market as per
- RL**  Round cable Local min with grows 1 layer as per IEC 60811-201/202/
- CW**  Cable Wall
- M**  Manual measuring of complete samples
- CAL1**  Password protected Calibration program including calibration units
In a factory already having KSM existing calibration units will be used.

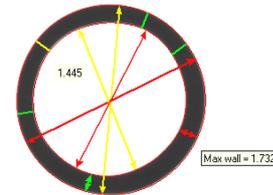
Directly after measuring an image where the system did locate the boarder lines is automatically displayed.

Also the measuring lines and the min spot value are displayed.

When pointing with the mouse on any measurement line its value is displayed, in this case “Max wall = 1.732”

The image with measuring lines is saved.

For other item descriptions, refer to enclosed documents



Measurement protocol in KSM Basic mode

2012-04-09 10:14:34	Batch	
Cable name Name	Tooling	
Sample type Insulation	Process step	Insulation
Works Order No	Insulation material	
Machine	Batch Ins	
Operator	Position	Start
Article #	Subtype	Blue
	Length	6000
	Reel nbr	B21

RG Roundcable global	
	Measured
Wall min	1.53 mm
Wall ave.	1.65 mm
Wall max	1.83 mm
Concentricity	0.31
Inn.D.ave.	14.45 mm
Out.D.min	17.81 mm
Out.D.ave.	17.84 mm
Out.D.max	17.89 mm
Ovality	0.08
Colour	0 %
Resistance	20.45
Mass.wt	31.11
Strip force	21.67
Area Hole	163.84 mm ²
Area Wall	86.14 mm ²



All walls can if needed be displayed

The PC Screen protocol including customer logo and heading is automatically displayed directly after measuring.

The header can be adapted to customer needs via KSM Setup. Also the values displayed can be selected via editable ASCII fr2 files.

Except for standard Min/Max-values and average the system measures also the area of insulation and the centre hole. This is very usable for new cable designs.

Additional data from any measured or recorded data can be calculated such as “Mass of lost area” and/or “Area EN”.

Fonts and formats for the protocols (also summary if DB is used) are adaptable by the customer in editable ASCII and html files serving as filter between the data file and the protocol. Data file only occur if DB mode is used.

In the basic data file all data are stored as well as check values per measuring occasion when using KSMLDB.

In KSM Basic printing of the protocol by a local or a network printer alternatively Adobe Acrobat to create pdf files can be used (if a pdf program is installed)

Software

Measurements made by **KSM** are stored on the server as Standard ASCII-files using Article number or/and Order number as reference. Thereafter they are available for the summary printout and statistical evaluations or exported to “Excel-files”.

For your ISO-certification is tractability substantially simplified.

- KSMDB:** Database to store measured values including summery protocols.
- KSMLDB:** Database for reference and measured values linked to the production line.
- KSMTrend:** Giving the operator trend curves and over dimensional cost after measuring.
- KSMData:** Handle specifications and measuring data at the office.
Many export functions to excel
- KSMAnalyze:** Analyze over dimensional cost. Display trends with many filter functions.
Many optional reports giving information how cost can be reduced.
- KSMRemote:** Allow **KSM** to operate directly under your own Database program.

Application language can be easily selected with set up in the start file.

The KSM System can for the time being operate in English, French, Chinese, Czech, German, Polish, Portuguese, Russian, Spanish, Turkish, Danish, Finnish, Norwegian or Swedish as standard, other languages can if requested be introduced.

Customers own wordings can be stored not affected by program updates.

KSMData Basic now delivered with **KSM** if **DB** and **KSMLDB** is used

Many functions are equal in **KSM** and **KSMData** e.g. summery protocols and editing articles.

Refer to separate description

KSMAnalyze to analyze **EXTRA** not paid for

Refer to separate description

