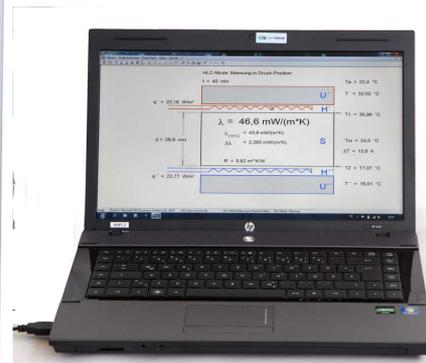


The thermal conductivity analyzer **HLC X520** for the production-area and stock-receipt measures thermal conductivity and thermal resistance of 500*500mm platform insulation materials.



Like all **HESTO-Lambda-CONTROL** analyzers his stand-alone unit has to be connected on a standard 230V-socket only and needs no additional aggregates or water-connection and stands out for easy handling also.



According standards

EN12667:2001
EN1946-3:1999
ISO8301

the instrument measures the thermal transfer properties under steady-state conditions of

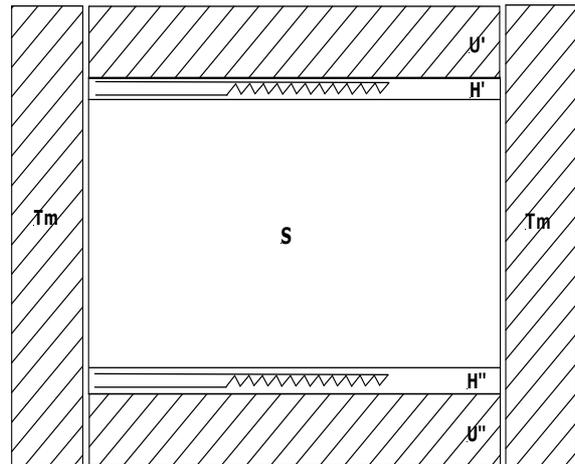
- | 500*500mm platform insulation materials
- | with a thickness of 19,5...200mm
- in meas-ranges of ...
- | thermal resistance **R** up to 40m²*K/W
- | transfer factor **τ** resp. thermal conductivity **λ** 5...200mW/(m*K)

By electromotoric positioning

- not only soft insulation materials with automatic distance-positioning
- but also compact foam materials by using the pressure-position-mode on 625 N

can be analyzed under exact repeatability conditions.

The relative meas methode was realized with two sensitive heat flow sensors (symmetrical configuration) for selectable mean temperature between 10°C...50°C. With a non metering edge-area of each 150mm heat losses to the outer edges are minimized. To be independent of ambient temperature, the measurement chamber is installed into an own temperature system which is separate regulated on the selected mean temperature. Experimental investigations confirm that with a temperature relationship of $e=(T_m-U')/(U'-U'')=0,5$ up to 200mm thickness a thermal loss to the outer edges was not measureable.



**Symmetrical configuration
with one specimen**

U' heat plate U'' cool plate

H', H''' heat flow meter

S' specimen

Tm controlled mean temperature

Construction

The 510mm x 510mm hot copper-plate is exactly temperatured with four PI-regulated Peltier-elements and is spring-mounted with the upper chamber-unit to get in optimal contact with sample surface.

The CU-cool plate down sample is exactly set also with four PI-regulated Peltier-elements. The Peltier-units of both plates are cooled with a powerful liquid-circulation.

On both plate surfaces are sensitive heat flow sensors adapted.

Through a spindle-guard this unit is vertically positioned with a servo-electronic. Fixed in the center of the hot plate is a high-solution linear-measurement-system (solution 0,01mm) for automatic thickness registration, a pressure switch under cool plate limits the servo-controlled pressure at 625N.

An independent **HLC X520**-electronic with power supplies for the temperatures control systems and sensor signal read-out is integrated. On a connected PC or Laptop **WINDOWS**-software **WinHLT#** calculates in Online-mode all meas values, which will be displayed in tables and graphic diagrams on desktop.

Features

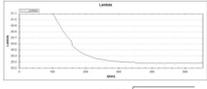
With the Lambda-range until 200 mW/(m*K) all conventional insulation materials are measurable, also plates with metallic cover. In consequence of the thermal hemispherical emittance > 0,8 this analyser is for low density materials especially qualified.

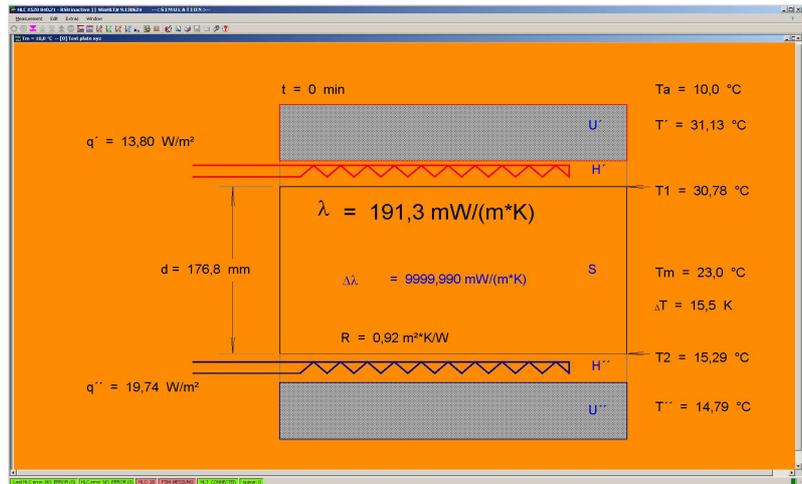
Calibration of the relative measurement is factory-set with several calibration-samples determined per **ISO8302**. With own calibration material, the user can always rapidly and simply test the adjustment.

The instrument needs no special requirements and can be used continuously. When a several day stop occurs, a standby-mode with switched-off power-consumption can be selected.

WINDOWS-Software WinHLT#

With **HLC X520** supplied WINDOWS-software **WinHLT#** runs under **MS-WINDOWS XP / WINDOWS7**. It records, calculates and archives meas data.

Testreport according EN12667:2001 section 9	
a) Test determination:	Determination with heat flow meter methods
b) Kind of apparatus:	Single-specimen symmetrical configuration
c) Identification of apparatus:	HESTO-Lambda Control A206 - SN: 619
d) Specimen standard:	HESTO
e) Specimen no.:	0
f) Name and part/series identification of specimen:	XP82030.8
g) Description of specimen:	Conformity of specimen:
h) Preparation according standard:	0,0505 m - automatic measured
i) Specimen thickness:	
j) Preparation according standard:	
k) Density of prepared specimen:	
l) Flat change of mass during pre-treatment:	
m) Flat change of mass during measurement:	
n) Middle temperature difference between specimen surface:	16,16 K
o) Middle-Temp.:	23,00 °C
p) Density:	(15,84 + 15,88) / 2 = 15,86 W/m ²
q) Thermal Resistance:	1,92 m ² /W
r) Thermal Conductivity:	0,0466 W/(m*K) [λ] = 9999,990 mW/(m*K)]
s) Date of test end:	12.16 / 02.09.2013
t) Duration of test:	230 min
u) Date of last sensor calibration:	-no calibration data-
v) Calibration-Spec.:	Thermal Resistance
w) Date of certificate:	Certificate Inset. cert. number
x) Orientation of the apparatus:	horizontal, warmside up
y) Watertight/resistant cover:	
z) Meas graphic:	
aa) Meas deviation:	2,8 % = $\sqrt{2,5^2 + 2,5^2}$
ab) Conformity:	This test conforms to EN12667:2001 "Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance"
ac) Name of operator:	HESTO



With end of measurement the program automatically prints the test report, which is an important request of **EN12667:2001**; additional test declarations for this report will be insert in remanent text-fields. **WinHLT#** stores all these data as a data-set in a table-file on the hard-disc also.

The automatic run will be moderate with meas-menus and grafic diagrams, variable keys leading errorfree to several menus for different modes and parameters. All modes keep stored after meantime analyser or PC power-off also (means an interrupted measurement in this case will continue automatically).

So with unchanged meas-mode normal operation is restricted with inserting sample material into the measurement chamber and pushing the start-key.

WinHLT# includes several language-variants: actual german, english, french, spanish, italian and polish.

Prinzip and method of operation

After the specimen was insert and "start"-button pushed the measurement chamber will be closed by electromotoric positioning while a linear-measurement-system (solution 0,05mm) automatically registrade the thickness.

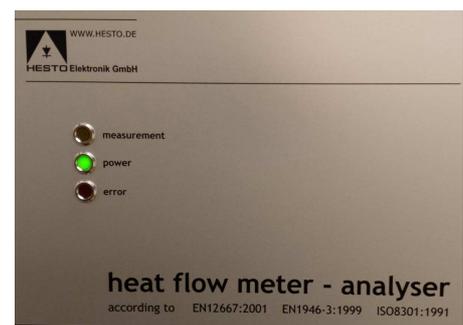
HLC X520 transfers the meas-values to the PC. With the adjust-parameters (stored on hard-disc) **WinHLT#** calculates as follows:

Sign	Size	Unit
R	thermal resistance	m ² *K/W
λ	thermal conductivity	W/(m*K)
A	sensitive area	m ²
d	average thickness	m
T₁	temperature hot side	K
T₂	temperature cold side	K
φ	heat flow rate	W

$$R = \frac{A * (T_1 - T_2)}{\phi}$$

$$\lambda = \frac{\phi * d}{A * (T_1 - T_2)}$$

The necessary physical thermal balance (means steady-state condition) is ready, if both heat flux sensors deliver stable and similar signals. This status is indicated on the desktop and with a blinking LED "measurement" on **HLC X520** front. If operator finish measurement via select in menu now, chamber opens electromotorically and moves out specimen. **WinHLT#** print out the test report (as pdf and/or on a connected printer) and stores final meas data as a data-set on hard-disc.



3 year guarantee and manufatorer direct-service

The instrument needs no special requirements and is designed for continuous operation time. Produced in Germany near Frankfurt/Main, the reliability and durability is protected with a **3-year guarantee**. In service-case the manufatorer helps fast and direct.

Inspection and Cleaning Service

Quality assurance according to **EN ISO9000 ff.** is standard in the insulation industry. The accordance standard prescribes as an elemental condition a cyclic check with certification of the test equipments. Accomplish to this demand we offer for **HLC X520** a low-price and fast inspection/cleaning service inclusive acceptance-protocol with meas date, results and links to used reference materials.

General Specifications HLC X520

Construction accord. ISO8301	Single-specimen symmetrical configuration, heat flow meter on heat- and cold-plate each
Specimen thickness automat. Meassystem	19,5...200mm (according to EN1946-3:1999) incremental Linear-Measurement; Display Solution 0,1mm
Specimen size, weight	500*500mm, max. 3,5kg
Case sensitive area	each 200mm
Width of non metering area	each 150mm
Measurement range	λ (τ) 5...200mW/(m·K) R up to 40 m ² *K/W
Accuracy	< ± 3%
Repeatability	< ± 1%
Mean temperature	selectable between 10°C...50°C , ±0,5°C
Temperature-difference	selectable; default-set as per standard 16 K
Temperature hot plate	Mean temperature + half temperature difference < ± 0,01°C
Temperature cool plate	Mean temperature - half temperature difference < ± 0,01°C
Temperature meas chamber	equal to selected mean temperature < ± <±0,2°C automatically with independent, internal cooling-system
Ambient temperature	15°C...32°C
Positioning	electromotoric, distance selectable from 19,5 to 200,0mm; selectable pressure positioning with 625N
Meas time	about 20 minutes for 20mm thickness;for thicker material up to several hours until steady-state condition
Warmup time	about 120 minutes
PC-Interface	RS232 or USB2.0
Power Requirements	230V/50Hz 3000W; about 100W in Standby-Mode
Noise	about 60 dB with fan cooling in Meas-Mode
Instrument Size	795*1880*872mm (W*H*D)
Instrument Weight	about 400 kg
Delivery scope	analyser HLC X520 with power- and pc-interface-cable, a XPS/EPS test sample for cyclic check of analyser ("Internal control"), pc-software WinHLT# (pc is not part of standard delivery)