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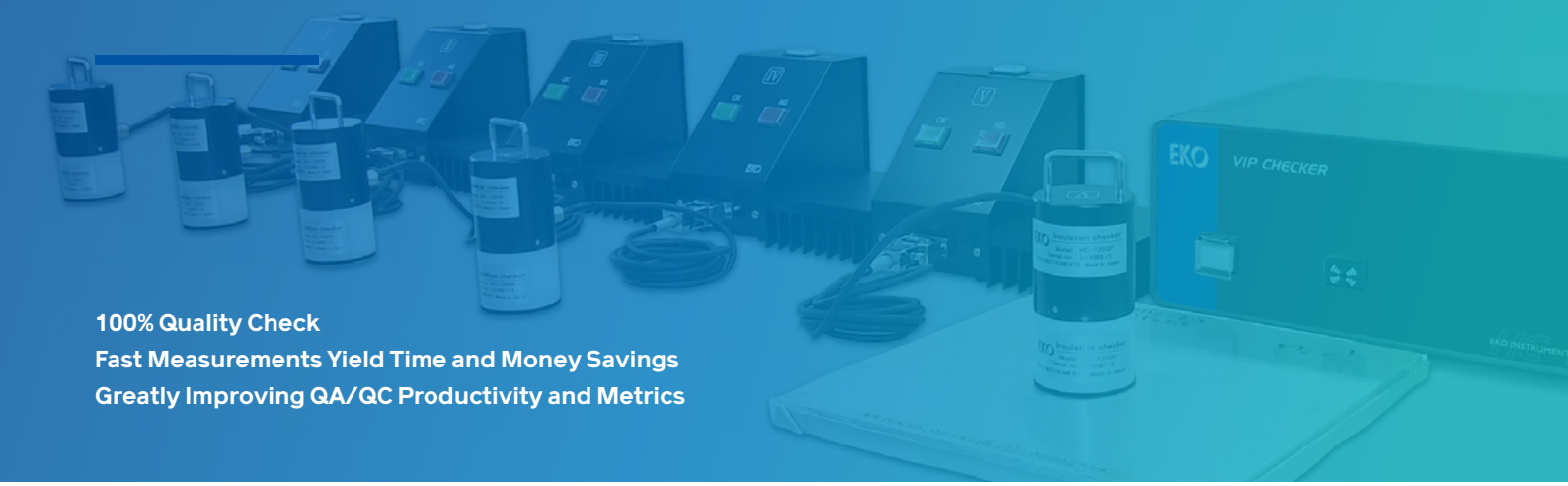
HC-121 VIP Checker

The preferred tool to check the performance of your VIP - Vacuum Insulation Panel



100% Quality Check
Fast Measurements Yield Time and Money Savings
Greatly Improving QA/QC Productivity and Metrics

Vacuum Insulation Panel (VIP) is a very good thermal insulation material. Typically, commercially available VIPs can achieve a thermal conductivity of 0.002 W/(m•K) across the center of the panel, or an overall value of 0.006-0.008 W/(m•K) after allowing for thermal bridging (heat conduction across the panel edges) and the inevitable gradual loss of vacuum over time. VIPs are used in building construction, refrigeration units, and insulated shipping containers to provide better insulation performance than conventional insulation materials.

However, VIPs are subject to vacuum leakage due to manufacturing, transportation, and installation quality issues. Any puncture of the VIP material will cause a vacuum leakage and greatly affect the insulation properties of the total product. Because of these quality and handling issues, users need to check the performance of VIPs in several different stages. From the start of the VIP supply chain, many people and machines encounter the materials causing situations in which a small puncture could occur.

Material:	Thermal Conductivity (W/mK)
Vacuum Insulation Panel	0.002 - 0.008
Silica aerogel	0.014
Foil-faced polyisocyanurate rigid panel (pentane expanded) initial	0.018
Foil-faced polyisocyanurate rigid panel (pentane expanded) aged 5-10 years	0.026
Polyurethane rigid pane (CFC/HCFC expanded) initial	0.018 - 0.021
Polyurethane rigid panel (CFC/HCFC expanded) aged 5-10 years	0.023
Polyurethane rigid panel (pentane expanded) initial	0.021
Polyurethane rigid panel (pentane expanded) aged 5-10 years	0.026
Foil-faced Polyurethane rigid panel (pentane expanded)	0.021 - 0.022
Closed-cell polyurethane spray foam	0.022 - 0.026

ABOVE. Commonly used insulating materials (typical values)

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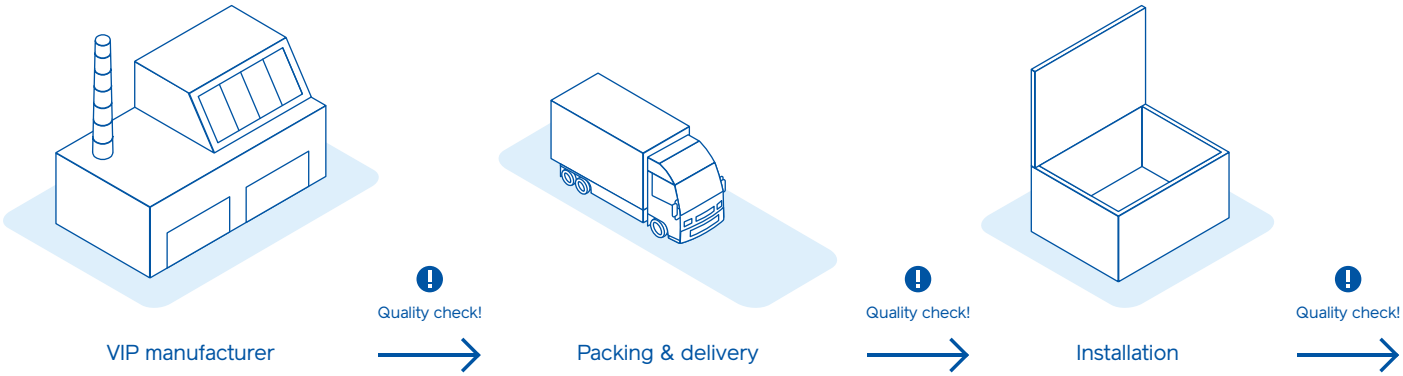
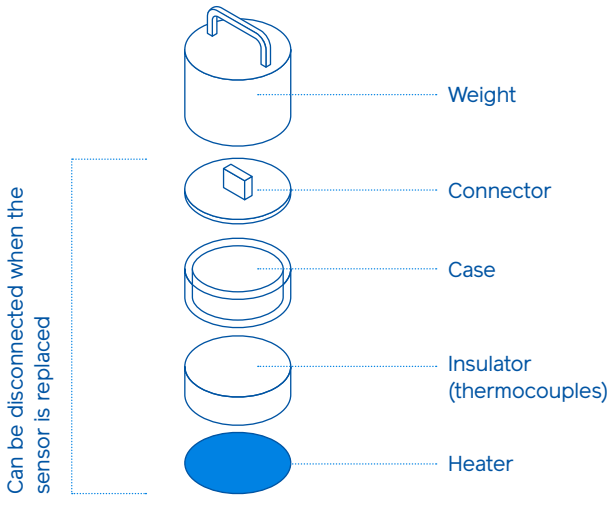
BELOW. Simple diagram of the VIP supply chain.



To measure the performance of VIPs using traditional static methods would be very time consuming (more than 1-hour measurement time per sample). This absolute method is referenced in the following industry standard:

ASTM C1667-15: Standard Test Method for Using Heat Flow Meter Apparatus to Measure the Center-of-Panel Thermal Transmission Properties of Vacuum Insulation Panels

Using the EKO HC-121 VIP Checker, the measurement time can be greatly reduced to 1 minute per sample based on a reliable non-static method.
HC-121 is used to check the performance (Good / No Good) of VIP samples. HC-121 measures the thermal conductivity by means of heat loss. This measurement method takes a very short time compared to traditional methods and has a big advantage since the materials can be evaluated simply from the top side. The HC-121 has a combined heat source and detector sensor head which proportionally measures the heat loss through the detector and insulating material.



ABOVE. Sensor components

Sensor and weight

HC-121 can connect up to 5 sensor units. Each sensor can operate independently allowing for even faster throughput during the production process. Proper operation can yield a maximum measurement throughput of 100 VIP samples in 20 minutes.
As the HC-121 can only perform a relative measurement, the measurement heads need to be individually calibrated at the customer side. HC-121 users should have well characterized samples based on the static method mentioned earlier. These samples should also be representative/equivalent to the VIP material used in the production process. The EKO software provided with each system is used to find the calibration regression function defined by the coefficients a, b and c. In addition to calibrations, the EKO software is used to control the thermal conductivity tester and manage the measurement data acquisition and storage. Another feature of the HC-121 is the possible addition of a bar code reader in order to identify and register all VIP samples.
For many years, EKO has been a leader in supplying VIP-checking equipment to VIP manufacturers, VIP users, and thermal insulation researchers around the world. Currently there are several hundred VIP checkers deployed in Asia, North America, and other locations worldwide. As the competition in the refrigeration industry increases, it is important to produce repeatable measurements throughout the VIP supply chain. For researching new VIP materials or for handheld spot checking, EKO has recently released the HC-10 Quick Lambda Thermal Conductivity Tester. The HC-10 will aid in fast and reliable measurements in many demanding production environments. Whether you are researching a new VIP material or supplying the highest quality refrigeration units to your customers, consider using the proven and industry-leading HC-10 and HC-121 systems.

For more information please visit:
HC-10 product page
HC-121 product page

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