

Steam Quality Test Kits

Product Code: SQTK A to L



Description:

The range of Steam Quality Test Kits from Thermal Detection consists of seven kits which cover all of the measurement and reporting requirements in accordance with ISO EN 285, HTM 2010 and HTM 2031.

The test kits includes equipment to enable:

1. The measurement of Non Condensable Gases
2. The measurement of Superheat
3. The measurement of Dryness Value
4. The sampling of steam for Clean Steam Analysis

The table below compares the functions of each kit.

SQ Kit Option	Kit L	Kit A	Kit B	Kit C	Kit D	Kit E	Kit F
Non-Condensable Gas Apparatus	✓	✓	✓	✓	✓	✗	✓
Dryness Value Apparatus	✓	✓	✓	✓	✓	✗	✓
Superheat Apparatus	✓	✓	✓	✓	✓	✗	✓
Steam Sampling Apparatus	✗	✗	✗	✓	✓	✓	✗
Duel Input Thermometer	✗	✗	✓	✗	✓	✗	✗
Electronic Balance	✗	✗	✓	✗	✓	✗	✓
Electronic Calculator	✗	✗	✓	✓	✓	✗	✓
Steam Thermocouple Entry Gland	✗	✓	✓	✓	✓	✗	✓
Protective Gloves	✗	✓	✓	✓	✓	✓	✓
Set of Thermocouple Probes (Type T)	✗	✓	✓	✓	✓	✗	✓
Syringe Cooling Siphon Pump	✗	✓	✓	✓	✓	✓	✓

In addition to Steam Quality Test Kits Thermal Detection also supplies:

Steam Test Elbows

Steam Test Packs and Accessories

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Introduction to Steam Quality Testing:

The testing of the quality of steam for use in pharmaceutical autoclaves has been a statutory requirement within the European Union for many years with the test being required to conform to the European Standard of ISO EN 285.

The Steam Quality Test Kit range was designed and developed by engineers who were responsible for maintaining the efficiency and safe use of pharmaceutical autoclaves. The range of steam test kits offer a reliable and efficient method of performing the required tests in accordance with the above standard, in a convenient and compact form. The kits are designed to enable the engineer to carry out his duties without the need for any additional tools or items of equipment.

Prior to this the equipment needed to complete these tests was both bulky, difficult to set up and to operate.

The Steam Quality Test Kit range consists of seven kits to meet a wide range of requirements, culminating in option 'D' which provides all the components required to perform both steam quality testing and clean steam sampling.

The Steam Quality Test kit allows for :-

1. The measurement of Non-condensable Gases.
2. The measurement of Steam Dryness Value.
3. The measurement of Steam Superheat.

The cleanliness of steam (clean steam) was recommended to be adopted in the United Kingdom National Health Service (NHS) by the Health Technical Memorandum 2031 (HTM2031) and in the European Union by ISO EN 285. Both these documents provide limits for chemical impurities. HTM2031 also provides a limit for the level of bacterial endotoxins (pyrogens).

In order to collect steam condensate for the analysis of bacterial endotoxins, all the components that come into contact with the sampled steam need to be first depyrogenated in an oven. The Clean Steam condenser was designed specifically for this purpose.

To facilitate the measurement of Non-condensable Gas and the collection of Clean Steam an adjustable tripod is supplied for mounting the 'U' tube and its associated components and all water pipe connections are made by 6mm diameter plastic push-fit fittings.

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Non Condensable Gas Test

The non-condensable gas test is designed to demonstrate that the attainment of sterilisation conditions in all parts of a steriliser load (particularly for porous load items) is not impaired by the presence of non-condensable gases.

The measurement of non-condensable gases is made by cooling a steam sample, using water through an efficient condenser. Water can be supplied either directly from a pressurised supply or simply by siphoning from a tank at a flow rate of 200ml/minute, provided that a minimum head of 1.0 metre is maintained and at a temperature not exceeding 25°C.

When the sampled steam is condensed, any non-condensable gases that may be present are liberated and separated from the produced condensate into two sight glass columns. The gas and steam condensate volumes are measured by the 'zero adjustable' scale mounted behind the two sight glasses.



The temperature of the condensate is maintained above 80°C by controlling the steam flow through the inlet needle valve whilst measuring the temperature of the condensate via a thermocouple fitted to the outlet of the condenser.

To carry out repeated tests, a return to the 'zero scales' position is made by opening the condensate drain and gas bleed valves. The valves are then closed when a new sample is required to be taken. Volumes up to 14ml of gas and 140ml of condensate are possible for each sample.

The results of the non-condensable gas test are considered to be acceptable for sterilisation purposes on clinical sterilisers if the percentage of gas to condensate is less than 3.5%.

In addition to calculations on the memory stick, an electronic calculator and table are provided to conveniently calculate the percentage of non-condensable gases.

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Steam Superheat Value

The purpose of the test is to demonstrate that the amount of moisture in the steam supply is sufficient to prevent the steam from being superheated as it enters the expanded space of a sterilizer chamber.

For this test the temperature of steam passing through an orifice in a pitot tube to atmosphere is measured.

The temperature is measured by using a thermocouple which is located at the centre of the expansion tube placed over the pitot tube. The temperature of the steam is considered to be acceptable if it is less than 25°C above that of the local temperature of boiling water, which is altitude dependant.



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Steam Dryness Value Test

The purpose of the steam dryness value test is to ensure that an acceptable amount of moisture is present in the steam supply.

Too little moisture:

- Possibility of superheating
- Prevents optimum sterilisation conditions in the load as moisture is a critical factor for breaking down cell structures of sporing organisms.

Too much moisture:

- Steriliser load may not be acceptably dry at the end of the cycle. Damp wrapping material can cause a break in the microbiological barrier providing a path for re-contamination.

The test is performed by a heat balance using a stainless steel vacuum flask. The flask is primed with a known mass of water at a known temperature. Steam is then condensed in the flask thus raising the temperature of the water. The final mass and temperature of the water are measured and placed into a formula. If the water temperature is lower or the final mass greater, this would indicate that the steam had a higher moisture content, i.e. having a lower value.

Whilst this method is not regarded as a truly accurate measurement of moisture in the steam, it can be used to demonstrate acceptable or otherwise dryness for sterilisation purposes. A dryness value of 1.0 is equivalent to 'dry saturated steam'. For sterilisation purposes a factor of 0.9 is acceptable for non-metal steriliser loads and for loads containing metal, a factor of 0.95.

As the flask has to be connected within 500mm of the sampling point, the test kit incorporates a flask holder so that the flask can be mounted in a convenient position. This holder also serves as a measuring container to prime the flask.

For the engineers convenience, the calculation can be performed manually or by the use of an Excel spread sheet. An electronic scientific calculator and flash drive containing all forms and calculations formulae are supplied.



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Steam Sampling Test

As the steam supply is in direct contact with items that may, in healthcare applications, be in direct contact with patients, any contaminants present in the steam supply could cause adverse effects. Surgical instruments and items used for intravenous injection could effectively be introducing these contaminants into the patients body cavities. Thus resulting in the body's normal immune system being bypassed.

For the clean steam test, a sample of condensed steam is collected with depyrogenated equipment into a sterile pyrogens free container. The sample is then analysed by a laboratory to determine the level of chemical impurities and bacterial endotoxins.



The 316 stainless steel, clean steam condenser is very efficient and compact and the condensate sample is collected cleanly due to the design shape of the condenser outlet. The condenser, pitot tube, isolating valve and steam supply tubing is required to be depyrogenated before use and this can be carried out in a suitably dry heat steriliser/oven at 180°C for three hours prior to their use.

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Steam Quality Test Kit L

**Product Code:
SQTK L**

Description:

The contents of this test kit contains the minimum kit required for the following parameters to be measured :-

1. The non-condensable gas value.
2. The steam superheat value.
3. The steam dryness value.



Qty	Item
1	Carry case
1	Tripod assembly
1	Non-Condensable Gas Apparatus
1	Superheat expansion tube
1	Dewar flask
1	Flask stopper, dip tubes & connecting tube
1	Measuring cup and flask holder
1	Toolwrap
1	Pitot tubes 0.4mm, 0.6mm, 0.8mm and 1.0mm (BSP, NPT or triclamp)
1	Reel of PTFE tape
1	6mm push fit tube weights
1	Water connection elbow 1/2" BSP x 6mm push fit
1	Steam connection elbow 1/4" BSP x 6mm
1	2m x 6mm green tube
1	5m x 6mm red tube
1	5m x 6mm blue tube
1	Flexible steam hose
1	Memory Stick with Instruction Manual and Calculations on spreadsheet

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Steam Quality Test Kit A

**Product Code:
SQTK A**

Description:

The contents of this test kit contains kit required for the following parameters to be measured :-

1. The non-condensable gas value.
2. The steam superheat value.
3. The steam dryness value.



Qty	Item
1	Medium carry case (63 x 54 x 19cm, gross weight 12 Kg)
1	Tripod assembly
1	Syringe pump
1	Non-Condensable Gas Separation Apparatus
1	Superheat expansion tube
1	Dewar flask
1	Flask stopper, dip tubes & connecting tube
1	Measuring cup and flask holder
1	Toolwrap
1	Pitot tubes 0.4mm, 0.6mm, 0.8mm and 1.0mm (BSP, NPT or triclamp)
1	Reel of PTFE tape
1	6mm push fit tube weights
1	Water connection elbow ½" BSP x 6mm push fit
1	Steam connection elbow ¼" BSP x 6mm
1	Thermocouple probe gland
1	Thermocouple connecting cables
1	Thermocouple probes (welded tip)
1	Thermocouple probe 3mm x 150mm
1	Pair of protective gloves
1	2m x 6mm green tube
1	5m x 6mm red tube
1	5m x 6mm blue tube
1	Flexible steam hose
2	Pens
1	Memory Stick with Instruction Manual and Calculations on spreadsheet
5	Re-usable cable ties

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Steam Quality Test Kit B

**Product Code:
SQTK B**

Description:

Kit B allows for the following tests to be determined, and includes a digital thermometer and an electronic balance :-

1. The non-condensable gas value.
2. The steam superheat value.
3. The steam dryness value.



Qty	Item (additional items over kit A in red)
1	Flight case with wheels and folding handle (62 x 65 x 29cm, gross weight 20 kilos).
1	Tripod assembly
1	Syringe pump
1	Non-Condensable Gas Separation Apparatus
1	Electronic balance
1	Superheat expansion tube
1	Dewar flask
1	Flask stopper, dip tubes & connecting tube
1	Measuring cup and flask holder
1	Toolwrap
1	Pitot tubes 0.4mm, 0.6mm, 0.8mm and 1.0mm (BSP, NPT or triclmp)
2	Adjustable spanners
1	Multifunction screwdriver
1	Reel of PTFE tape
1	6mm push fit tube weights
1	Water connection elbow ½" BSP x 6mm push fit
1	Steam connection elbow ¼" BSP x 6mm
1	Thermocouple probe gland
1	Thermocouple connecting cables
1	Thermocouple probes (welded tip)
1	Thermocouple probe 3mm x 150mm
1	Dual input thermometer and mounting bracket
1	Thermometer splash cover
1	Pair of protective gloves
1	2m x 6mm green tube
1	5m x 6mm red tube
1	5m x 6mm blue tube
1	Flexible steam hose
2	Pens
1	Electronic calculator
1	Memory Stick with Instruction Manual and Calculations on spreadsheet
5	Re-usable cable ties

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Steam Quality Test Kit C

**Product Code:
SQTk C**

Description:

The contents of this test kit are the same as for option 'A', but it also includes clean steam components allowing the following four parameters to be determined:

1. The non-condensable gas value.
2. The steam superheat value.
3. The steam dryness value.
4. Clean steam analysis.



Qty	Item (additional items over kit A in red)
1	Small carrying case (54 x 48 x 19cm, gross weight 6 kilos).
1	Tripod assembly
1	Syringe pump
1	Steam sample cooler, fittings, mounting tube and bracket
1	Non-Condensable Gas Separation Apparatus
1	Superheat expansion tube
1	Dewar flask
1	Flask stopper, dip tubes & connecting tube
1	Measuring cup and flask holder
1	Toolwrap
1	Pitot tubes 0.4mm, 0.6mm, 0.8mm and 1.0mm (BSP, NPT or triclamp)
2	Adjustable spanners
1	Multifunction screwdriver
1	Reel of PTFE tape
1	6mm push fit tube weights
1	Water connection elbow ½" BSP x 6mm push fit
1	Steam connection elbow ¼" BSP x 6mm
1	Thermocouple probe gland
1	Thermocouple connecting cables
1	Thermocouple probes (welded tip)
1	Thermocouple probe 3mm x 150mm
1	Pair of protective gloves
1	2m x 6mm green tube
1	5m x 6mm red tube
1	5m x 6mm blue tube
1	Flexible steam hose
2	Pens
1	Electronic calculator
1	Memory Stick with Instruction Manual and Calculations on spreadsheet
5	Re-usable cable ties

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Steam Quality Test Kit D

**Product Code:
SQTK D**

Description:

The contents of kit D are the same as for option 'A', but it also includes clean steam components, a digital thermometer and an electronic balance, allowing the following four parameters to be determined :-

1. The non-condensable gas value.
2. The steam superheat value.
3. The steam dryness value.
4. Clean steam analysis.



Qty	Item (additional items over kit A in red)
1	Flight case with wheels and folding handle (65 x 65 x 29cm, gross weight 20 kilos).
1	Tripod assembly
1	Syringe pump
1	Steam sample cooler, fittings, mounting tube and bracket
1	Non-Condensable Gas Separation Apparatus
1	Electronic balance
1	Superheat expansion tube
1	Dewar flask
1	Flask stopper, dip tubes & connecting tube
1	Measuring cup and flask holder
1	Toolwrap
1	Pitot tubes 0.4mm, 0.6mm, 0.8mm and 1.0mm (BSP, NPT or triclamp)
2	Adjustable spanners
1	Multifunction screwdriver
1	Reel of PTFE tape
1	6mm push fit tube weights
1	Water connection elbow 1/2" BSP x 6mm push fit
1	Steam connection elbow 1/4" BSP x 6mm
1	Thermocouple probe gland
1	Thermocouple connecting cables
1	Thermocouple probes (welded tip)
1	Thermocouple probe 3mm x 150mm
1	Dual input thermometer and mounting bracket
1	Thermometer splash cover
1	Pair of protective gloves
1	2m x 6mm green tube
1	5m x 6mm red tube
1	5m x 6mm blue tube
1	Flexible steam hose
2	Pens
1	Electronic calculator
1	Memory Stick with Instruction Manual and Calculations on spreadsheet
5	Re-usable cable ties

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Steam Quality Test Kit E

**Product Code:
SQTk E**

Description:

The contents of this test kit (in a smaller case) provides the components to enable the carrying out of a clean steam test only :-

1. Clean steam analysis.



Qty	Item
1	Small carrying case 54 x 48 x 19cm weight 6 kilos.
1	Carry case
1	Tripod assembly
1	Syringe pump
1	Steam sample cooler, fittings, mounting tube and bracket
1	Toolwrap
1	Pitot tubes 0.4mm, 0.6mm, 0.8mm (BSP, NPT or triclamp)
2	Adjustable spanners
1	Multifunction screwdriver
1	Reel of PTFE tape
1	6mm push fit tube weights
1	Water connection elbow 1/2" BSP x 6mm push fit
1	Pair of protective gloves
1	5m x 6mm red tube
1	5m x 6mm blue tube
1	Flexible steam hose
2	Pens
1	Memory Stick with Instruction Manual and Calculations on spreadsheet
5	Re-usable cable ties

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Steam Quality Test Kit F

**Product Code:
SQTK F**

Description:

The contents of this test kit allow the following three parameters to be determined :

1. The non-condensable gas value.
2. The steam superheat value.
3. The steam dryness value.



Qty	Item (additional items over kit A in red)
1	Flight case with wheels and folding handle (62 x 65 x 29cm, gross weight 20 kilos).
1	Tripod assembly
1	Syringe pump
1	Non-Condensable Gas Apparatus
1	Electronic balance
1	Superheat expansion tube
1	Dewar flask
1	Flask stopper, dip tubes & connecting tube
1	Measuring cup and flask holder
1	Toolwrap
1	Pitot tubes 0.4mm, 0.6mm, 0.8mm and 1.0mm (BSP, NPT or triclamp)
2	Adjustable spanners
1	Multifunction screwdriver
1	Reel of PTFE tape
1	6mm push fit tube weights
1	Water connection elbow ½" BSP x 6mm push fit
1	Steam connection elbow ¼" BSP x 6mm
1	Thermocouple probe gland
1	Thermocouple connecting cables
1	Thermocouple probes (welded tip)
1	Thermocouple probe 3mm x 150mm
1	Pair of protective gloves
1	2m x 6mm green tube
1	5m x 6mm red tube
1	5m x 6mm blue tube
1	Flexible steam hose
2	Pens
1	Electronic calculator
1	Memory Stick with Instruction Manual and Calculations on spreadsheet
5	Re-usable cable ties

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