INNOVATIVE TEST & MEASUREMENT SYSTEMS

TECHNICAL DESCRIPTION

DUST CHAMBER SK

SK 2000 Q / L / D / QD

SK 2000 QD in extra-high design

FULFILLED STANDARDS AND REGULATIONS –SK SERIES

The iTS dust chambers from the SK series enable standard-compliant testing of electrical equipment *inside an enclosure* against the ingress of dust. The following standards and specifications for dust testing are met. Depending on the test component or standard, options may be required.

Standards and regulations	Included	Optional	Option
IEC 60529:1989 + A1:1999 + A2:2013	x		
ISO 20653	x		
EN 60068-2-68 – test La2	x		
IEC 60598-1	x		
LV 124	x		
BMW GS 95003-4	x		
SAE 575 (with option)		x	SK.OP-140 (12333)
JIS D203 (with option)		x	SK.OP-140 (12333)

STANDARD SCOPE OF DELIVERY – SK SERIES

The SK dust chamber is a self-contained system and can be easily positioned in the test room via castors. After connecting the system, reproducible tests are carried out repeatedly in the SK dust chambers using standardised test dusts.

SK2000 - series	Q	L	D	QD
Internal test chamber width [mm]	2000	1000	2 x 1000	2000
Internal test chamber depth [mm]	1000	2000	1000	1000
Internal test chamber height [mm]	1000	1000	1000	1000
Door cut-out W x H [mm]	1920 x 920	920 x 920	920 x 920	920 x 920
Number of doors with window wiper	2 Side by side without centre bar (hinged doors)	2 Opposite each other	2 Side by side with centre bar	2 Side by side with centre bar
Size viewing window W x H [mm]	580 x 780	580 x 780	580 x 780	580 x 780

STANDARD SCOPE OF DELIVERY – SK SERIES

SK2000 -series	Q	L	D	QD
External test chamber width [mm]	2240	1670	2240	2240
External test chamber depth [mm]	1850	2400	1850	1850
External test chamber height [mm]	1980	1980	1980	1980
Number of dust blowers	2	2	2	2
Number of vacuum devices	1	1	1	1
Test chamber lighting	Yes / LED	Yes / LED	Yes / LED	Yes / LED
Weight [kg]	850	1050	850	900
Cable entry port [number/ø mm]	2 / 100	2 / 100	2 / 100	2 / 100
Load capacity test grid [kg]	100	100	100	100
Position of control panel	left	left	left	left

Dust circulation

- **The fan achieves the necessary dust circulation even at low speed. The dust blower is controlled by a frequency converter. The speed of the dust blower can be set via the control unit.**
- **The test dust is blown by a fan through an externally heated pipe (via PTC heating). This ensures that the test dust is free-flowing. The PTC heater regulates the temperature itself. The PTC heater also works in standby mode when the chamber is not in operation.**
- **A collection cone made of coated glass fibre fabric is located underneath the test chamber. This is used to return the test dust to the fan. Pneumatic knockers ensure that the test dust is returned to the fan (by knocking it off).**

Blowing dust into the chamber

STANDARD SCOPE OF DELIVERY – SK SERIES

Vacuum device

SK 2000 series	Q / L / D / QD
Measuring range of flow meter [l/h]	30 - 2760
Measuring range of vacuum device [mbar]	0 - 25
Switching point of vacuum limiter [mbar]	-25

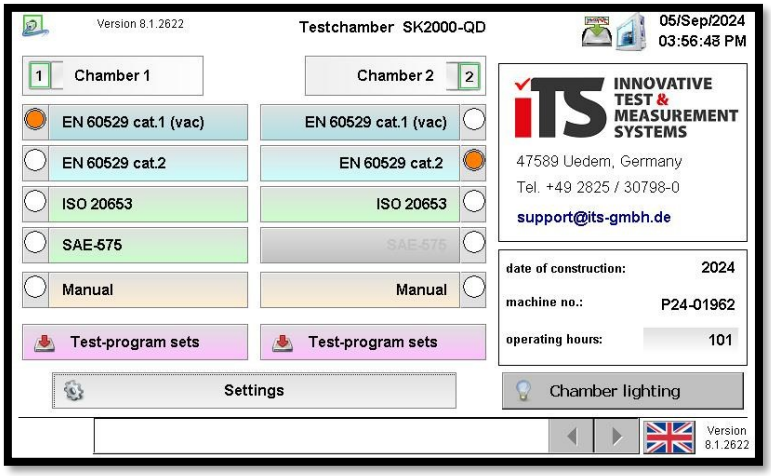
- **All SK series dust chambers have a fully automatic vacuum system for testing in accordance with DIN EN 60529. The vacuum blower is controlled by an inverter.**
- **The SK series is also equipped with electronic vacuum and flow measurement as standard.**
- **The parameters for operating the vacuum device are entered via the touch panel. The negative pressure set via the touch panel is automatically regulated and maintained during the test.**
- **The air extracted by the vacuum unit is channelled through a filter. As a result, the measuring devices are not exposed to dusty air.**
- **Due to the fully automatic control, the system can also be operated overnight (without supervision).**
- **In the SK-D and SK-QD (operation with partition wall), the vacuum device can be switched to both test chambers. Depending on the setting, this can also be done automatically via the control unit.**

SK 2000 QD extra high with 4 vacuum devices (connection via internal hoses)

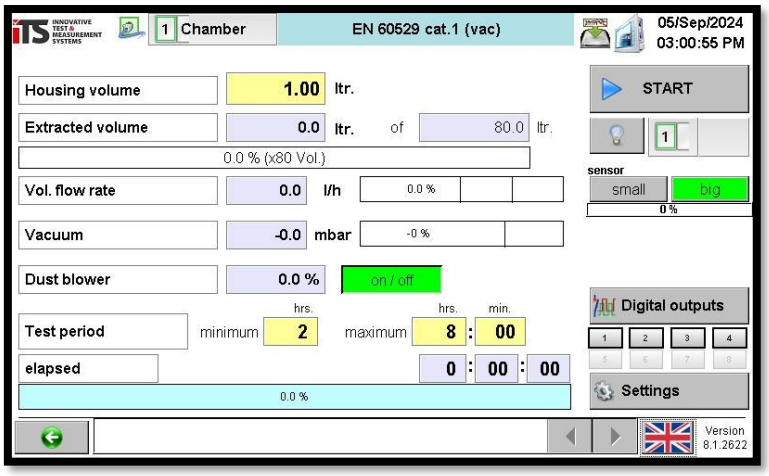
STANDARD SCOPE OF DELIVERY – SK SERIES USER INTERFACE

Control system

- **The SK series dust chambers are equipped with a PLC control system. All required test parameters are entered via a 7' touch panel. The most common tests are stored and can be selected directly on the start screen.**
- **The language can be switched via touch function. The following languages are stored in the SK control unit: German, English, French, Polish.**
- **For the IP6X test (DIN 60529 category 1), the specific test duration is determined automatically. For this test, the operator can simply enter the volume of the test specimen into the control unit. The control unit automatically determines the test duration based on the volume.**
- **Prepared tests can also be started overnight using the automatic system.**
- **If any error messages occur, they are shown in plain text on the display.**
- **Optionally, the data can be recorded and analysed with the iTS COMPANION APP.**
- **With the SK-D and SK-QD (operation with partition wall), the control unit can be used to select which cabin is active.**



Start screen of the SK series



IPX6 test screen according to DIN EN 60529

STANDARD SCOPE OF DELIVERY – SK SERIES USER INTERFACE

IPX6 test screen according to DIN EN 60529

SK 2000 QD extra-high after end of test

GENERAL REQUIREMENTS ON SITE – SK SERIES

Climatic conditions	SK 2000 Q / L / D / QD
Ambient temperature [°C]	10 - 30
Relative humidity max. [%] - non condensing	70

Electrical power supply	SK 2000 Q / L / D / QD
Power supply	3 x 400 Volt /50Hz N/PE
Power consumption up to [kW]	up to 2,5
Installed load max. [A]	16
Electrical connection via	CEE 16A plug
Ethernet (Optional)	RJ 45 socket

- **Note: If connected via a CEE socket outlet, this must be protected by a separate residual current device (RCD) of TYPE B (AC/DC sensitive).**

Compressed air supply	SK 2000 Q / L / D / QD
Compressed air [bar]	3-6, max. 40 l/min
Compressed air quality	ISO 8573-1:2010 [3:3:4]
Compressed air connection	Via quick-release coupling NW 7,2

- **Note: The adapter for the connection is included in the scope of delivery.**

Dust chamber with connections in the lower area (here: compressed air / power / network)

COMPARISON OF THE SK 2000 SERIES

Selection criteria	Q	L	D	QD
Test chamber size and configuration	1 large test chamber 1x 2m³	1 large test chamber 1x 2m³	2 separate test chambers next to each other 2x 1m³	2 separate test chambers next to each other with removable partition wall 2x 1m³ oder 1x 2m³
DUT size and loading	For long DUT: Loading crosswise without centre bar 1x test chamber 2x1x1m	For long DUT: Loading lengthwise without centre bar 1x test chamber 1x2x1m	For compact DUT 2x test chamber 1x1x1m	For compact DUT with partition wall: 2x test room size 1x1x1m For long DUT without partition wall: Loading crosswise with centre bar at the test chamber door 1x test chamber 2x1x1m
Dust types per test chamber	1 dust	1 dust	Use of 2 different dusts in the separate test chambers possible	Use of 2 different dusts in the separate test chambers possible: with partition wall 1 dust: without partition wall
Preparation and testing time	Preparation and test run one after the other	Preparation and test run one after the other	The 2 test chambers can be used separately: 1. test chamber for testing 2. test chamber for preparation	Divided test chamber can be used separately (with partition wall): 1. chamber for testing 2. chamber for preparation Without partition wall: Preparation and test run one after the other
Continuous testing without stops (preparation and follow-up)	-	-	2nd (prepared) test starts automatically after preselection in the control unit after the 1st test	With partition wall: Test run possible as with D Without partition wall: -
Vacuum device (max. 3 more optional)	1 integrated vacuum unit	1 integrated vacuum unit	1 integrated vacuum unit switchable to both test chambers	1 integrated vacuum unit (switchable to both test chambers for operation with partition wall)

OVERVIEW: OPTIONS - SK SERIES

Option number	Option	Checkbox
SK.OP-030 (11834)	DAkkS calibration of the vacuum sensor and flow meter	☐
SK.OP-131 (11848)	Factory calibration of the vacuum and volumetric flow sensors	☐
SK.OP-040 (11835)	Additional Flow Meter (0- 60l/h)	☐
SK.OP-041 (11836)	DAkkS calibration of the secondary flow meter (0-60 l/h)	☐
SK.OP-141 (11849)	Factory calibration of the second flow meter (0-60 l/h)	☐
SK.OP-042 (12322)	Additional low pressure unit (max.3 per dust chamber)	☐ ☐ ☐
SK.OP-132 (14541)	DAkkS calibration of the vacuum sensor and flow meter (SK.OP-042)	☐ ☐ ☐
SK.OP-133 (14542)	Factory calibration of the vacuum sensor and flow meter (SK.OP-042)	☐ ☐ ☐
SK.OP-045 (12279)	Discount for chamber without low pressure unit	☐
SK.OP-046 (12319)	Gloves installed in the window of the front door	☐
SK.OP-070 (11839)	Side wall as a bulkhead	☐
SK.OP-081 (12325)	1-phase test room socket	☐
SK.OP-090 (11841)	Additional entry port 100 mm	☐
SK.OP-091 (11842)	Additional entry port 150 mm	☐
SK.OP-092 (11843)	Additional entry port 200 mm	☐
SK.OP-093 (11844)	Additional entry port 250 mm	☐
SK.OP-100 (11845)	Heavy load grid with increased surface load	☐
SK.OP-140 (12333)	SAE nozzles for SAE and JIS Test	☐
SK.OP-200 (12289)	Data recording incl. ITS companion App - Basic	☐
SK.OP-210 (12290)	Ethernet interface for data recording incl. iTS Companion App - Pro	☐
SK.OP-212 (14583)	iTS Companion App – Pro Plus	☐
SK.OP-220 (12291)	Programmable digital channel (1st channel)	☐
SK.OP-224 (14545)	Additional programmable digital channel (2/3/4. channel)	☐ ☐ ☐
SK.OP-225 (14543)	Emergency stop switch-off of the dust chamber from external	☐
SK.OP-226 (14544)	Dust chamber safety signal for on-site control centre	☐

The individual options are described below.

OVERVIEW: ACCESSORIES - SK SERIES

Accessory number	Accessory	Amount [kg]	Checkbox
SK.ZB-020 (11853)	Talcum powder according to DIN EN 60529		☐
SK.ZB-030 (11854)	Arizona dust A2 according to ISO 12103-1		☐
SK.ZB-035 (14538)	Arizona dust A2 quartz-free according to ISO 12103-1		☐
SK.ZB-040 (11855)	China dust according to FLTM BZ106-01		☐
SK.ZB-080 (11859)	Arizona dust according to SAE J 726		☐
SK.ZB-090 (11860)	Test dust according to ECE R 16		☐
SK.ZB-095 (12318)	Test dust according to DIN EN 40050-9		☐
SK.ZB-070 (11858)	Starter kit for dust chamber		☐
SK.ZB-060 (11857)	Test leak for controlling low pressure equipment		☐

The accessories are described below.

OPTIONS - SK SERIES

SK.OP-030 (11834) - DAkkS calibration of the vacuum sensor and flow meter

- **After DAkkS calibration by a certified company, corresponding DAkkS calibration certificates are provided for the negative pressure sensor of the negative pressure device and for the standard flow meter (measuring range 30 - 2760 l/h).**

SK.OP-131 (11848) - Factory calibration of the vacuum and volumetric flow sensors

- **Calibration of the negative pressure sensor and the standard flow meter (measuring range 30 - 2760 l/h) is carried out by iTS GmbH. A corresponding factory calibration certificate is issued.**

SK.OP-040 (11835) - Additional Flow Meter (0- 60l/h)

- **Additional flow meter with a measuring range of 0-60 l/h, incl. integration into the control unit and user interface. Depending on the size of the flow rate, the respective sensor can be selected on the control unit.**

Note: This option can be used to test small and particularly tight enclosures.

SK.OP-041 (11836) - DAkkS calibration of the secondary flow meter (0-60 l/h)

- **After DAkkS calibration by a certified company, a corresponding DAkkS calibration certificate for the flow meter (SK-OP.40) with a measuring range of 0 - 60 l/h is provided.**

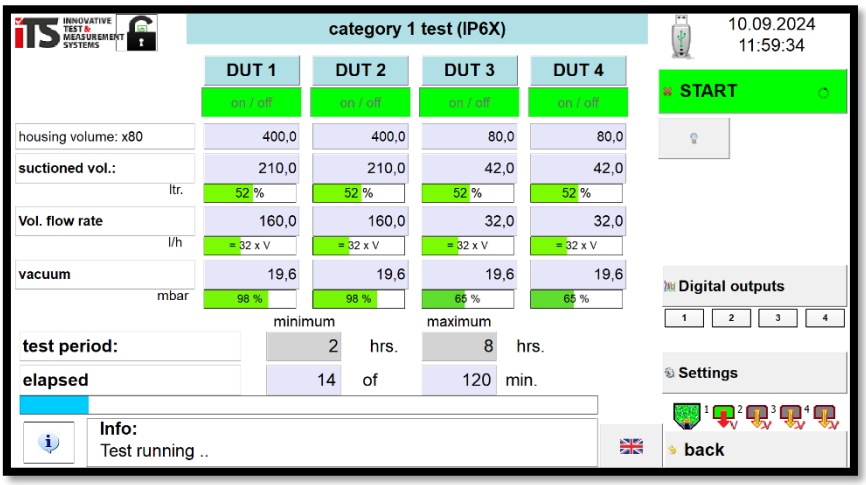
SK.OP-141 (11849) - Factory calibration of the second flow meter (0-60 l/h)

- **The flow meter (SK-OP.40) with a measuring range of 0 - 60 l/h is calibrated by iTS GmbH. A corresponding factory calibration certificate is issued.**

SK.OP-042 (12322) - Additional low pressure unit (max.3 per dust chamber)

- **Integration of an additional vacuum unit including sensors and integration into the control system. Up to 3 additional vacuum devices can be integrated into an SK1000 (a total of 4 including those included in the standard scope of delivery).)**
- **The measuring range of the flow meter can be selected between 0 - 60 l/h and 30 - 2760 l/h. The measuring range of the pressure sensor is 0 to -25 mbar.**

When ordering, please specify the quantity of additional vacuum devices as well as the desired measuring range of the flow meter.



IPX6 test screen in accordance with DIN EN 60529 with 4 vacuum devices

SK.OP-132 (14541) - DAkkS calibration of the vacuum sensor and flow meter (SK.OP-042)

- **After DAkkS calibration by a certified company, corresponding DAkkS calibration certificates are provided for the negative pressure sensor of the negative pressure device and for the flow meter from the additional negative pressure device.**

Note: Please order the number of calibrations corresponding to the additional negative pressure devices.

OPTIONS - SK SERIES

SK.OP-133 (14542) - Factory calibration of the vacuum sensor and flow meter (SK.OP-042)

- **Calibration of the negative pressure sensor and the standard flow meter from the additional negative pressure device is carried out by iTS GmbH. A corresponding factory calibration certificate is issued.**

Note: Please order the number of calibrations corresponding to the additional negative pressure devices.

SK.OP-045 (12279) - Discount for chamber without low pressure unit

- **The chamber is supplied without a vacuum device (from the standard scope of delivery).**

SK.OP-046 (12319) - Gloves installed in the window of the front door

- **A pair of gloves is integrated into the window of the dust chamber door. These make it easy to clean and operate the test specimen.**

Pair of gloves installed in the door

OPTIONS - SK SERIES

SK.OP-070 (11839) - Side wall as a bulkhead

- **One side wall of the dust chamber is designed as a bulkhead. The side panel can therefore be completely removed and replaced with a panel with corresponding fittings.**

Note: The panel with fittings is not included in the scope of delivery and must be provided by the customer.

SK.OP-081 (12325) – 1-phase test room socket

- **A single-phase socket is installed in the test room to supply the DUT. The switch-on time of the socket outlet can be programmed via the system's control unit.**
- **Socket type: Industrial plug HC-B06 with adapter CEE 16A - 230V - 2-pole - PE (blue) - IP67 / Adapter and plug are included in the scope of delivery (see picture).**
- **The power supply and fuse protection of the socket is provided externally via an industrial plug HC-B06 in the front of the dust chamber (plug included).**
- **Without this power supply, the socket is potential-free.**
- **For safety reasons, the socket must be supplied via an on-site isolating transformer.**

Note: On request, the power supply for the socket outlet can be supplied with an isolating transformer. However, the solutions for this must always be agreed separately.

OPTIONS - SK SERIES

SK.OP-090 (11841) - Additional entry port 100 mm

- **A 100 mm entry port is installed in the right-hand side wall of the test chamber.**
- **The entry port is supplied with a suitable rubber plug.**

SK.OP-091 (11842) - Additional entry port 150 mm

- **A 150 mm entry port is installed in the right-hand side wall of the test chamber.**
- **The entry port is supplied with a suitable rubber plug.**

SK.OP-092 (11843) Additional entry port 200 mm

- **A 200 mm entry port is installed in the right-hand side wall of the test chamber.**
- **The entry port is supplied with a suitable rubber plug.**

SK.OP-093 (11844) - Additional entry port 250 mm

- **A 250 mm entry port is installed in the right-hand side wall of the test chamber.**
- **The entry port is supplied with a suitable rubber plug.**

SK.OP-100 (11845) - Heavy load grid with increased surface load

- **The surface load of the grid is increased – heavy-duty design: For SK500 to a max. load of 100kg, for SK 1000-08/-10 to a max. load of 250kg.**

SK.OP-140 (12333) - SAE nozzles for SAE and JIS Test

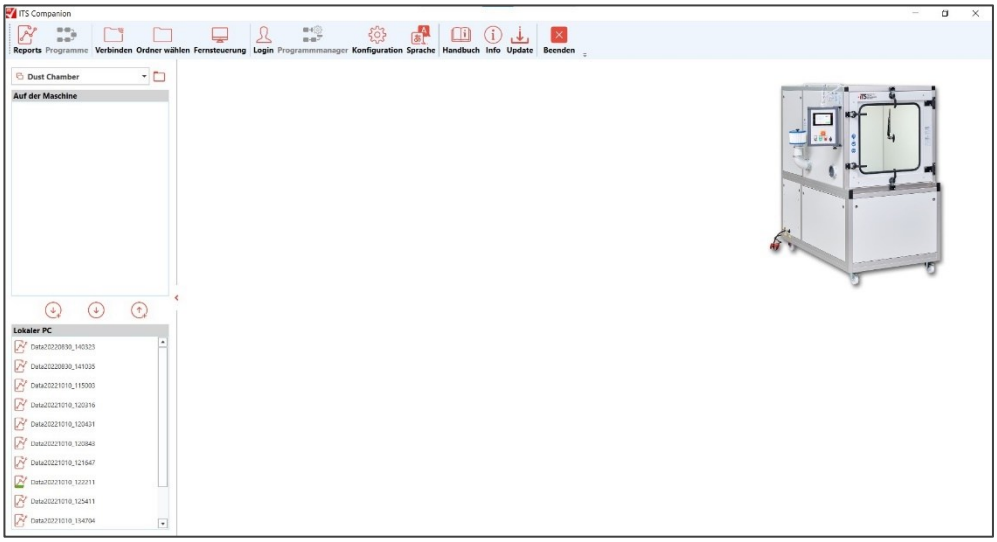
- **Nozzles are installed in the hopper of the dust chamber. These are used to swirl up the dust. The dust thus comes from below and not from above (as required by SAE (according to the old standard using nozzles) and JIS).**

SK.OP-200 (12289) - Data recording incl. ITS companion App - Basic

- **All relevant measured values and parameters are recorded in a CSV file.**
- **The data is downloaded from the control panel via a USB interface.**
- **The iTS Companion App Basic is included in the scope of delivery.**
- **With the iTS Companion App Basic, the CSV data can be analysed and automatically displayed in a test report.**
- **The user interface and the reports are available in German/English and are switchable between these languages.**

Note: A demo version can be downloaded from the following link:

https://its-gmbh.de/wp-content/companion-app/ITS-Companion-v3-Install.zip

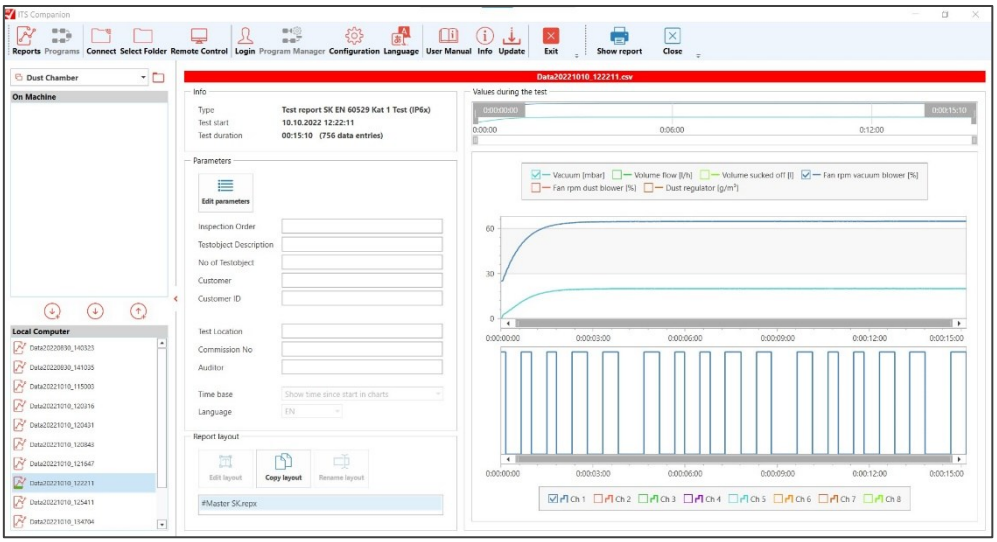


Start screen - iTS Companion App

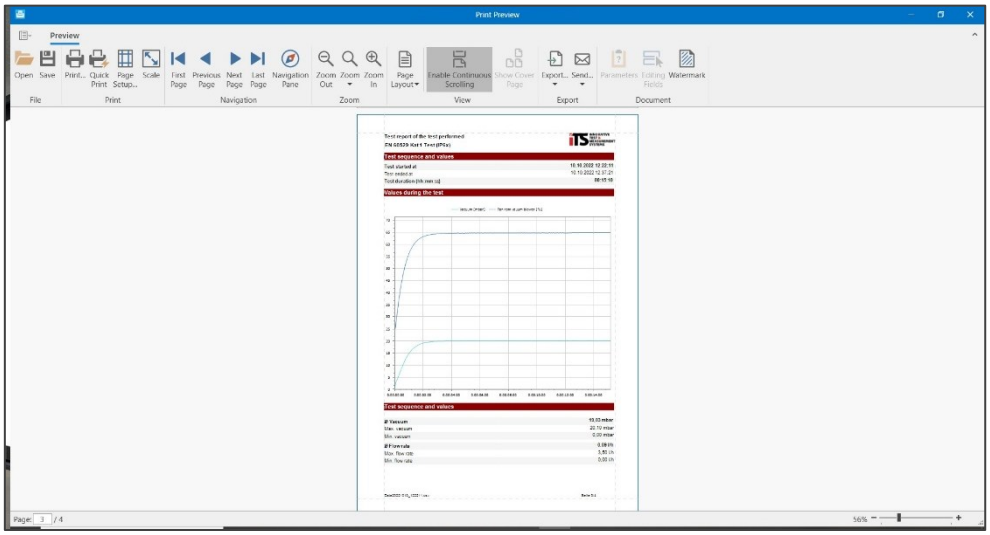
SK.OP-210 (12290) - Ethernet interface for data recording incl. iTS Companion App - Pro

- **The iTS Companion App-Pro includes all the functions of the iTS Companion App-Basic.**
- **An Ethernet interface enables the chamber to be integrated into a customer network.**
- **The Ethernet interface is designed as an RJ45 socket on the back of the chamber.**
- **The interface can be used with a fixed IP address or DHCP.**
- **iTS Companion App Pro with the following additional functions compared to Basic:**
  - **Transmission of the recorded data via Ethernet interface**
  - **Creation, organisation and transfer of test programs**
  - **Remote connection via VNC for monitoring the test chamber**
  - **Remote connection via VNC to control the test chamber**

OPTIONS - SK SERIES



Test sequence - iTS Companion App



Standard-report - iTS Companion App

SK.OP-212 (14583) – iTS Companion App- Pro Plus

- **All functions of the Basic/Pro version are retained, and an editor is also activated with which all reports can be customised by the customer.**
- **This is a onetime, unlimited activation for all iTS Companion App workstations in the company.**

Note: Only in conjunction with an iTS Companion Pro licence.

SK.OP-220 (12291) - Programmable digital channel (1st channel)

- **1. digital channel in a DO box, e.g. for the control/supply of a DUT, is designed as a potential-free NO contact.**
- **The channel can be switched synchronised with the test cycles.**
- **Each system can be equipped with a maximum of 4 channels (see SK.OP-224)**
- **The max. load capacity of the channel is 230V / 5A (AC1).**
- **Interface: Standard 4mm laboratory/banana socket**

SK.OP-224 (14545) – Additional programmable digital channel (2/3/4. channel)

- **1 additional control contact with a maximum load capacity of 230V / 5A (AC1) is designed as a potential-free NO contact.**

Note: Max. 3 additional channels are possible (4 in total with SPK.OP-220)

SK.OP-225 (14543) – Emergency stop switch-off of the dust chamber from external

- **For switching off the test chamber/system by a safety device provided by the customer using two potential-free contacts (2-channel switch-off).**
- **Interface: Standard 4mm laboratory/banana socket.**

SK.OP-226 (14544) – Dust chamber safety signal for on-site control centre

- **Integration of 2 potential-free contacts for signalling emergency stop or door open to the on-site control system, e.g. to switch off an on-site DUT supply when the chamber door is opened.**
- **Interface: Standard 4mm laboratory/banana socket.**

ACCESSORIES - SK SERIES

SK.ZB-020 (11853) - Talcum powder according to DIN EN 60529

- **Talcum test dust for protection class tests (IP code) / Price per kg**

SK.ZB-030 (11854) - Arizona dust A2 according to ISO 12103-1

- **Arizona dust with grain size A2 fine, consisting of mineral silica/quartz (>97%) with other oxides / Price per kg**

SK.ZB-035 (14538) - Arizona dust A2 quartz-free according to ISO 12103-1

- **Arizona dust with grain size A2 fine, consisting of mineral silica/quartz (>97%) with other oxides / Price per kg**

SK.ZB-040 (11855) - China dust according to FLTM BZ106-01

- **Synthetic test dust China Dust according to FLTM BZ106-01 / Price per kg**

SK.ZB-080 (11859) - Arizona dust according to SAE J 726

- **Synthetic Arizona dust according to SAE J726 / price per kg**

SK.ZB-090 (11860) - Test dust according to ECE R 16

- **Test dust, consisting of quartz sand, according to ECE R 16 / Price per kg**

SK.ZB-095 (12318) - Test dust according to DIN EN 40050-9

- **Test dust according to DIN EN 40050-9 from mineral components and fly ash / Price per kg**

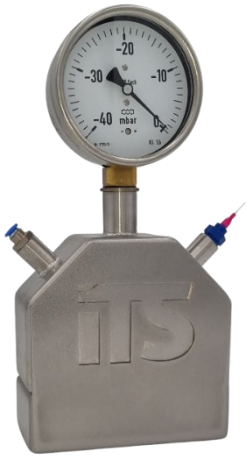
SK.ZB-070 (11858) - Starter kit for dust chamber

The starter kit contains the following items:

- **The hand brush with soft bristles made from FDA-compliant raw materials is ideal for removing fine particles from the DUT or for cleaning the interior of the test chamber.**
- **The dustpan made of FDA-compliant raw materials for any dust sweepings.**
- **The small, soft detail brush made of FDA-compliant raw materials enables gentle cleaning of the DUT.**
- **5 single-use FFP3 masks with exhalation valve for the most comfortable use as possible.**
- **Adjustable safety goggles with flexible frame - compatible with the masks.**
- **Storage box for the starter kit - the box is also suitable for dry storage of test dusts.**

SK.ZB-060 (11857) - Test leak for controlling low pressure equipment

- **The test leak can be used to check the vacuum system cyclically.**
- **The hose of the vacuum device is connected to the test leak.**
- **4 dosing needles of different sizes form a defined hole in the test leak.**
- **At a vacuum of 20 mbar, defined volume flows are created, which can be used to check the flow meter installed in the dust chamber.**



NOTE

We reserve the right to make design and technical changes in the interests of further technical development. This applies to the entire technical description.

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VERSION

Version	Change reason	Released on	Released by
2025	New creation	29.12.2024	CM
2025-1	Flow sensor - measuring range adjusted Link: Demo iTS Companion App	11.03.2025	CM