

# PRODUCT DATA

## Wideband Ear Simulator — Type 4195 Q for Production-line Testing of Telephones

*Wideband Ear Simulator Type 4195 Q is a Quality Control (QC) coupler designed for realistic and comparable telephone-receiver response measurements both on the production line and in the laboratory. With this feature, this acoustic coupler finally fills the gap between Quality Control and Research and Development measurements. The performance is based on the standardised Ear Simulator Type 4195 (ITU–T Rec. P.57 Artificial Ear Type 3.2 low-leak).*

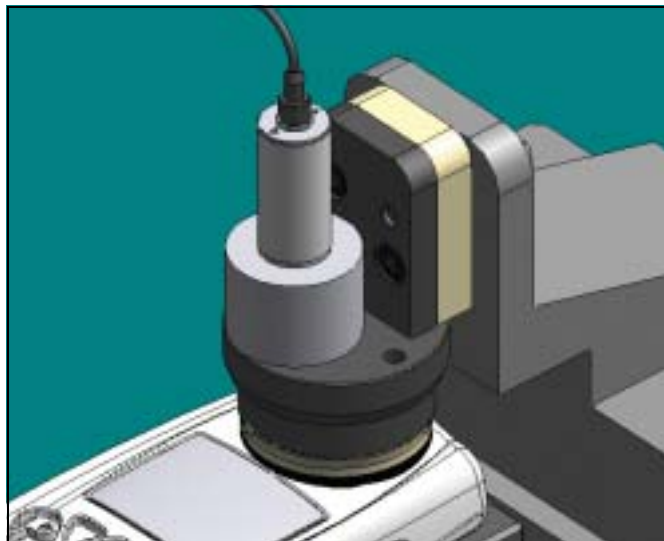


### FEATURES

- Perfect, customised sealing on any type of telephone handset
- Design based on ITU–T Rec. P.57, Type 3.2 low-leak simplified pinna simulator
- Includes IEC 60711 coupler with prepolarised ½-inch microphone and DeltaTron® preamplifier for easy connection to CCLD inputs
- Easy calibration/verification
- Fast and easy swap between different telephone designs on the production line
- Factory Calibration according to ITU–T Rec. P.57
- Similar performance to the standardised Brüel & Kjær Wideband Ear Simulator Type 4195

### BENEFITS

- Identical measurement results in production and the laboratory reduce the need for prototypes and accelerate the transition from development phase to volume production, saving time and costs
- The combination of reusable standard parts and few customised parts ensures fast payback and high return on investment
- Fast and easy handling in swapping telephone models on the production line gives high up-time and minimal production disturbance
- Increased yield due to controlled leakage and high repeatability giving more handsets within specifications and fewer rejections from the production line
- Faster production-line trouble-shooting due to increased coupler quality and stability

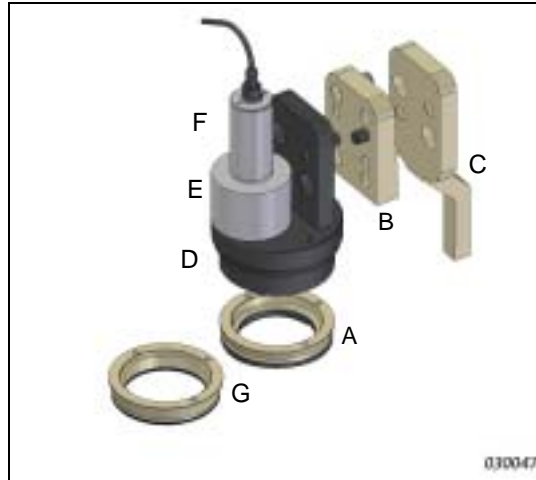


### Description

The new Wideband Ear Simulator Type 4195 Q has been developed especially for the quality control of telephonic handsets on the production line. It is an innovative concept that allows full measurement compatibility between the production line and the laboratory/verification department using a coupler design based on the ITU–T Rec. P.57, Type 3.2 low-leak, simplified pinna simulator.

The coupler is built up of standard components and customised parts. The standard parts are reusable and can be employed on all telephone types, models and shapes, while the customised parts are specially designed to fit your specific telephone model/shape. The front of a customised adaptor ring is made of moulded rubber to protect the handset surface and ensure perfect sealing conditions.

**Fig. 1**  
The complete coupler comprises customised and standard parts



The customised parts are ordered for each new telephone model as a start-up kit (UA 1575-ENG) that initialises the design and verification phases (see Fig. 3). The standardised parts are off-the-shelf items that can be ordered as normal – please see ‘Project Information’ for further details.

For laboratory and off-line verification use, the coupler can also be mounted in Brüel & Kjær Test Head Type 4602 B for direct comparison of QC and laboratory measurements. Order Adaptor for Test Head UA 1573 for this purpose.

Customised Parts UA 1575-xxx (designed to fit individual handsets)

- A: Customised Adaptor Ring (with moulded rubber front)
- B: Angle Adaptor
- C: End Stop (only delivered in cases where the end-stop is necessary to position the coupler correctly relatively to the handset)

Standard Parts Type 4195 Q (reusable)

- D: Simplified Pinna Simulator
- E: IEC60711 Coupler with prepolarised microphone
- F: ½-inch DeltaTron Microphone Preamplifier Type 2695 (CCLD, micro-DOT connection)
- G: Standard Adaptor Ring (for sensitivity verification)

## Calibration and Verification

**Fig. 2**  
The coupler mounted with the Standard Adaptor Ring for on-the-line sensitivity verification with Sound Level Calibrator Type 4231 and Calibration Adaptor DP 0939



During manufacture, the coupler is calibrated according to ITU – T P.57, Type 3.2 low-leak, Simplified Pinna Simulator like the standard coupler Wideband Ear Simulator Type 4195.

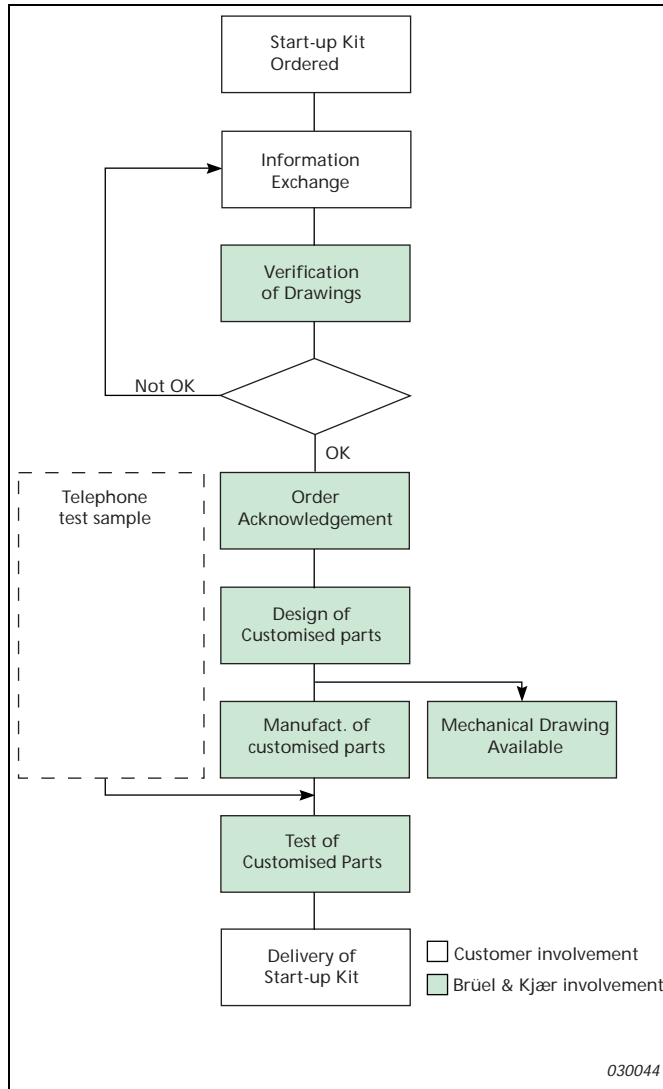
For further calibration information, refer to the Product Data for Wideband Ear Simulator Type 4195 (available at [www.bksv.com](http://www.bksv.com)).

All relevant calibration data are stated on the supplied calibration chart and are also available on the calibration data disk. The data are stored in ASCII format and are suitable for import by Brüel & Kjær's SoundCheck™ Electroacoustic Test Software, PULSE™ System and Audio Analyzer Type 2012.

Production-line verification of the QC-coupler sensitivity is performed by swapping the Customised Adaptor Ring with the Standard Adaptor Ring for calibration and mounting it as shown in Fig. 2. Since the QC-coupler is designed for production-line testing and consists of very stable components, this verification is only necessary when there is a direct need for verifying or trouble-shooting the production-line system.

The absolute sensitivity at 1 kHz in V/Pa, as specified on the calibration chart, is verified by means of Sound Level Calibrator Type 4231, mounted with Calibration Adaptor DP0939.

**Fig. 3**  
Project phases when first ordering customised parts



Wideband Ear Simulator Type 4195 Q uses customised parts which are specific to your handset design. Therefore, detailed information is required before your order is accepted and the coupler-design process initiated. If requested, Brüel & Kjær signs a confidentiality agreement before such information is exchanged; see Fig. 3 for the project phases.

**Start-up Kit**

This is the first step in initialising the customisation of parts for a new telephone model. It is possible to order Start-up Kit UA 1575 - ENG, along with the additional Type 4195 Q as described in ‘Ordering Information’.

**Information Exchange**

Before the design of the customised parts can start, the following information must be available to and verified by Brüel & Kjær:

- 3D drawings of the telephone in Parasolid® data format. The drawings should preferably show the entire front (cover) of the telephone as well as the receiver area and all relevant measurements with respect to important boundaries
- The Ear Reference Point (ERP) of the earpiece must be defined (see Fig. 4)
- A reference plane (e.g., battery plane) of the handset and the fixture in which the handset is tested

- A contact person for technical details
- A telephone hardware sample for verification tests – the test sample need not necessarily be functional

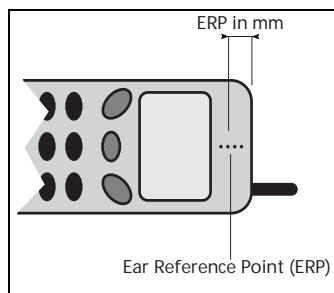
**Verification of Drawings**

The 3D drawings that are handed over to Brüel & Kjaer need to be verified with respect to data-format compatibility and accessibility for further use in the QC-coupler design process.

**Order Acknowledgement**

The order is considered accepted when the drawings are verified and all required information is available. The delivery time is then confirmed by Brüel & Kjær.

**Fig. 4**  
The preferred ERP should be defined for design guidelines



**Design of Customised Parts**

The design of the customised parts starts.

**Manufacturing of Customised parts**

A mould for the rubber gasket of the Customised Adaptor Ring is made as well as for the Angle Adaptor (and possibly the End Stop, depending on production-line (test-box) design).

**Mechanical Drawing Available**

A drawing showing how the QC-coupler is aligned on the telephone handset is available from Brüel & Kjaer for test-box design purposes.

### Telephone Test Sample

A test sample of the handset must be available now for testing the customised parts with respect to positioning and sealing. The telephone test sample does not have to be electronically functional since all tests are performed mechanically.

### Test of Customised Parts

The customised parts and the telephone test sample are tested together to verify a perfect seal between coupler and telephone.

### Delivery of Start-up Kit

The start-up kit is now verified and ready for delivery.

---

## Order Options

---

Refer to 'Ordering Information' in the specifications section.

Wideband Ear Simulator Type 4195 Q can be used both in test boxes used on the production line and in the standardised test head used in the laboratory. It consists of standard and customised parts. When you first buy Type 4195 Q, you invest in both standard and customised parts. With the introduction of new models, only investment in customised parts is necessary.

### Standard Parts Configuration (see Fig. 1)

The standard parts are reused when a new telephone model is to be tested.

- 4195 Q: contains the standard parts including ½-inch DeltaTron Microphone Preamplifier Type 2695 (short) and Factory Calibration of the coupler
- 4195 Q-001: as for 4195 Q but supplied with ½-inch DeltaTron Microphone Preamplifier Type 2671 (long)
- 4195 Q-002: as for 4195 Q-001 but without preamplifier

### Customised Parts Configuration (see Fig. 1)

Customised parts are unique and developed solely for specific telephone models. When the order for customised parts is first placed for a specific telephone model, a start-up kit is supplied which includes the necessary uniquely developed and manufactured parts.

UA 1575-ENG Start-up Kit: includes the design and development of the customised parts for a new telephone model. It is supplied with 3 customised adaptor rings and 3 angular adaptors as well as a verification chart showing how the QC-coupler is aligned for the specific handset.

To order the start-up kit for a new telephone model, please order 1 × UA 1575-ENG and the desired number of Type 4195 Q (see above for versions). When the order is acknowledged, the start-up kit is given a new, unique reference number for future classification and re-ordering.

---

## Delivery

---

### First-time ordering

Delivery of Start-up Kit UA 1575-ENG is dependent on the different project phases shown in Fig. 3. Under normal conditions, delivery is 8 weeks from the date of order acceptance assuming the final test of the customised parts is successful.

### Re-ordering

Normally, the delivery time when re-ordering parts is at most 6 weeks. This also applies to standard parts. If faster delivery is requested, special agreements can be negotiated.


---

## Warranty

---

All parts are designed for long-term production-line use. There is a one-year warranty on all parts, except for the Customised Adaptor Ring, as this is considered a consumable part whose lifetime is dependent on its use, its integration into the production line, and the number of test operations.

## Compliance with Standards

	CE-mark indicates compliance with: EMC Directive and Low Voltage Directive. C-Tick mark indicates compliance with the EMC requirements of Australia and New Zealand.
<b>Safety</b>	EN 61010-1 and IEC 61010-1: Safety requirements for electrical equipment for measurement, control and laboratory use. UL 3111-1: Standard for Safety – Electrical measuring and test equipment.
<b>EMC Emission</b>	EN/IEC 61000-6-3: Generic emission standard for residential, commercial and light industrial environments. EN/IEC 61000-6-4: Generic emission standard for industrial environments. CISPR 22: Radio disturbance characteristics of IT equipment. Class B limits. FCC Rules, Part 15: Complies with the limits for a Class B digital device.
<b>EMC Immunity</b>	EN/IEC 61000-6-1: Generic standards – immunity for residential, commercial and light industrial environments. EN/IEC 61000-6-2: Generic standards – immunity for industrial environments. EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMA requirements. Note 1: The above is only guaranteed using accessories included in this Product Data sheet.
<b>Temperature</b>	IEC 60068-2-1 & IEC 60068-2-2: Environmental Testing. Cold and Dry Heat. Operating Temperature: 5 to 40°C (41 to 104°F) Storage Temperature: -25 to +70°C (-13 to 158°F)
<b>Humidity</b>	IEC 60068-2-78: Damp Heat: 90% RH (non-condensing at 40°C (104°F))
<b>Mechanical</b>	Non-operating: IEC 60068-2-6: Vibration: 0.3 mm, 20 m/s <sup>2</sup> , 10-500 Hz IEC 60068-2-27: Shock: 1000 m/s <sup>2</sup> IEC 60068-2-29: Bump: 1000 bumps at 250 m/s <sup>2</sup>

Conformance with ITU-T Rec. P.57 (when mounted with Standard Adaptor Ring UC 5366)

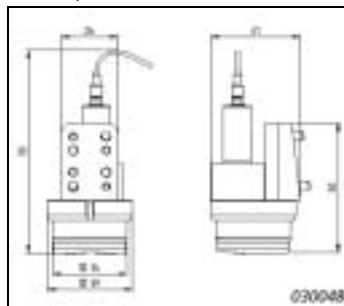
## Specifications – Wideband Ear Simulator Type 4195 Q

### System Compatibility

BZ 5320 SoundCheck™ Electroacoustic Test Software  
 Type 3560 C PULSE Multi-analyzer System  
 Type 2012 Audio Analyzer

### Coupler Dimensions

Positioning tolerance onto handset: ±0.2 mm  
 Vertical pressure force: 10 – 15 N



## Ordering Information

### Available Configurations – Standard Parts

Name	Type/Part No.	4195 Q	4195 Q–001	4195 Q–002
Simplified Pinna Simulator	DB 3800	✓	✓	✓
IEC 711 Coupler with Prepolarized Microphone	UA 1567	✓	✓	✓
Standard Adaptor Ring for Calibration	UC 5366	✓	✓	✓
½" DeltaTron Microphone Preamplifier	2695	✓		
½" DeltaTron Microphone Preamplifier	2671		✓	

### Available Configurations – Customised Parts

Name	Type/Part No.	Start-up Kit UA 1575 – ENG	UA 1575 – xxx <sup>a</sup>
Design and Development		✓	
Customised Adaptor Ring	DK 1324 – xxx <sup>a</sup>	✓	✓
Angle Adaptor	UC 5365 – xxx <sup>a</sup>	✓	✓
End Stop	DK 1325 – xxx <sup>a</sup>	✓ <sup>b</sup>	

a. When the order is accepted in the project phase, xxx is changed to specific numbers for future reference and re-ordering

b. Only included in cases where the end-stop is necessary to position the coupler correctly relatively to the handset

### Spare Parts Policy

The customised parts have a minimum quantity of 3 per order. Type 4195 Q–002 is the minimum configuration that can be ordered separately. Please refer to the part numbers in the table above.

### Accessories Available

DP 0939 Calibration Adaptor for Type 4231  
UA 1573 Adaptor for Test Head Type 4602 B

### Additional Instrumentation

#### CONDITIONING

Type 2690 AOS2/OS4 4-channel Microphone Conditioning Amplifier (NEXUS™)  
Type 5996 3-channel DeltaTron Amplifier (3-channel with gain)  
Type 4416 B Battery-powered ISOTRON® Conditioner (1-channel CCLD input)

#### OTHER

Type 4231 Sound Level Calibrator

#### CABLES

AO 0531 5 m Microdot-to-BNC Cable for ½-inch DeltaTron Microphone Preamplifier Type 2695 (included with Type 2695)  
AO 0087 3 m BNC-to-BNC Cable for ½-inch DeltaTron Microphone Preamplifier Type 2671

#### SERVICES

4195 Q-CFF Factory Calibration of 4195 Q

For further product data and specifications, see [www.bksv.com](http://www.bksv.com).

#### TRADEMARKS

Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and/or other countries. DeltaTron is a registered trademark and NEXUS and PULSE are trademarks of Brüel & Kjær Sound and Vibration Measurement A/S. SoundCheck is a trademark of Listen, Inc. Parasolid is a registered trademark of EDS in the United States and/or other countries. ISOTRON is a registered trademark of ENDEVCO Corporation

Brüel & Kjær reserves the right to change specifications and accessories without notice.

HEADQUARTERS: DK-2850 Nærum · Denmark · Telephone: +45 4580 0500  
Fax: +45 4580 1405 · [bksv.com](http://bksv.com) · e-mail: [info@bksv.com](mailto:info@bksv.com)

Australia (+61) 2 9889-8888 · Austria (+43) 1 865 74 00 · Brazil (+55) 11 5188-8166  
Canada (+1) 514 695-8225 · China (+86) 10 680 29906 · Czech Republic (+420) 2 6702 1100  
Finland (+358) 9-755 950 · France (+33) 1 69 90 71 00 · Germany (+49) 421 17 870  
Hong Kong (+852) 2548 7486 · Hungary (+36) 1 215 83 05 · Ireland (+353) 1 803 7600  
Italy (+39) 0257 68061 · Japan (+81) 3 3779 8671 · Republic of Korea (+82) 2 3473 0605  
Netherlands (+31) 318 55 9290 · Norway (+47) 66 77 11 55 · Poland (+48) 22 816 75 56  
Portugal (+351) 21 47 11 4 53 · Singapore (+65) 377 4512 · Slovak Republic (+421) 25 443 0701  
Spain (+34) 91 659 0820 · Sweden (+46) 8 449 8600 · Switzerland (+41) 1 880 7035  
Taiwan (+886) 22 713 9303 · United Kingdom (+44) 14 38 739 000 · USA (+1) 800 332 2040

Local representatives and service organisations worldwide

**Brüel & Kjær** 