



# Thermal Mass Flow Meter for gases



measuring  
•  
monitoring  
•  
analysing

KEC



- Direct mass flow rate measurement of gases
- Measuring accuracy:  
±0.3% of full scale  
±1.5% of reading  
on request:  
±0.3% of full scale  
±1.0% of reading
- $p_{\max}$  100 bar,  $t_{\max}$  180 °C
- Fast response time
- No moving parts
- Analogue output, alarm contact, Modbus RTU and impulse output
- ATEX approval



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AUSTRALIA, AUSTRIA, BELGIUM, BULGARIA, CANADA, CHINA, CZECHIA, FRANCE, GERMANY, GREAT BRITAIN, HUNGARY, INDIA, INDONESIA, ITALY, MALAYSIA, MEXICO, NETHERLANDS, PERU, POLAND, REPUBLIC OF KOREA, SPAIN, SWITZERLAND, THAILAND, TUNISIA, TURKEY, USA, VIETNAM

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## Description

The new flow sensors KEC work according to the calorimetric measuring principle. Therefore an additional temperature and pressure compensation is not necessary.

Due to its robust design, the aluminium die cast housing, the robust sensor tip made from stainless steel 1.4571, new KEC are suitable for demanding industrial applications.

Contrary to the previously used bridge circuit, the newly developed evaluation electronics records all measured values digitally. This allows very precise and fast measurements with a wide temperature range of up to 180 °C. The measuring span is 1... 1000 and therefore enables measurements in very low as well as very high flow speeds of up to 224 m/s.

KEC has an integrated Modbus output as a standard with which all parameters like Nm<sup>3</sup>/h, Nm<sup>3</sup>, Nm/s, NI/min, NI/s, kg/h, kg/min, ft/min, °C etc. can be transferred. All parameters can be adjusted directly at the instrument (via display) or via Service Software. Of course there are also 2x4-20 mA analogue outputs available for flow and temperature and a galvanically isolated pulse output for the total consumption.

A remote diagnosis can be carried out via Modbus and all relevant parameters can be checked and changed if necessary. So it is possible to change e. g. the gas type, the inner diameter, the scaling and so on or the zero point resp. the leak flow volume suppression in case of changed process conditions.

Via remote diagnosis and status update e. g. temperature exceedings, failures of the sensor or the calibration date can be determined.

## Utilising Industries

- Chemistry, petro chemistry
- Natural gas, methane
- Pharmaceutical industry
- Food production
- Breweries
- Diaries
- Power plants
- Semiconductor/electronics
- Automotive industry

## Application Range

- Ideal also for the outdoor area
- Compressed air measurement and distribution
- Leakage measurement of compressed air and gases
- Flow measurement of gases like e. g. nitrogen, argon, carbon dioxide, oxygen etc.
- Flow measurement in vacuum systems
- Flow measurement of corrosive, acid gases like e. g. biogas with different gas mixtures
- Measurement of oxygen and natural gas at gas burners
- Flow measurement of gas mixtures like e. g. forming gas

## Special Features

- No moving parts, no wearout
- Sensor tip very robust, easy to clean
- Easy mounting and dismounting under pressure via ½" ball valve
- Safety ring for mounting and dismounting under pressure
- Depth scale for precise installation
- All measured values, settings like gas type, inner diameter, serial number etc. retrievable via Modbus RTU
- Notification in case of exceeding of the calibration cycle
- Measuring span of 1 : 1000 (0.1 ... 224 m/s)
- Configuration and diagnosis via display, PC service software on-site
- Gas type (air, nitrogen, oxygen, argon etc.) freely adjustable via PC service software
- Reference conditions °C and mbar/hPa freely adjustable
- Zero-point adjustment, leak flow volume suppression
- Pressure loss negligible
- Flow measurement in both directions via flow direction switch

## KEC-Display

- 2" TFT colour display (320 x 420)
- Display and housing rotatable by 180°
- The following values are displayed on Display:  
Flow, total consumption, velocity and temperature
- Units freely adjustable via display

| *** Mittelwert Min Max ***      |  |  |  | *** Mittelwert Min Max *** |    |     |        | *** Mittelwert Min Max *** |    |     |       |
|---------------------------------|--|--|--|----------------------------|----|-----|--------|----------------------------|----|-----|-------|
| 83.25<br>m/s                    |  |  |  | Durchfl. m <sup>3</sup> /h | AV | Min | Max    | Geschw.: m/s               | AV | Min | Max   |
| 24.1<br>°C                      |  |  |  | 395.38                     |    |     | 0      | 83.25                      |    |     | 0     |
| Air                             |  |  |  | 391.23                     |    |     | 410.34 | 82.46                      |    |     | 91.32 |
| HW: 1.02 SW: 1.00 MBID: 127 2/4 |  |  |  | Verbrauch: m <sup>3</sup>  |    |     |        | Temperatur: °C             |    |     |       |
|                                 |  |  |  | 78562                      |    |     |        | 24.1                       |    |     | 21.3  |
|                                 |  |  |  | 391                        |    |     |        | 23.7                       |    |     | 24.6  |
|                                 |  |  |  | MW-Zeit: 1 Minute          |    |     | 3/4    | MW-Zeit: 1 Minute          |    |     | 4/4   |



### Configuration of KEC via PC Service Software

In general all configurations can be done via the integrated display. For sensors without display there is a PC Service Software available.

The following adjustment can be carried out directly at the display resp. by means of the PC Service Software:

- Adjustment of inner diameter of pipe
- Selection of units: e.g. m<sup>3</sup>/h, m<sup>3</sup>/min, l/min, kg/s
- Reset of counter
- Zero point adjustment/leak flow volume suppression
- Scaling of 4 - 20 mA output/setting of pulse weight
- Adjustment of Modbus settings

The following adjustments can only be executed via PC Service Software:

- Gas type selection
- Adjust standard temperature and pressure

### Available Models

KEC-1 ... Immersion version with 1/2" connection

KEC-2 ... In-line version for NW 15 ... NW 80

### KEC-1 Immersion Sensor

Flow sensor for heavy duty industrial applications inclusive temperature measurement.

The immersion sensor KEC-1 is the ideal flow sensor for installation into existing compressed air resp. gas lines from 3/4" ... DN 1000.



### Technical Details KEC-1/KEC-3

|                                                                                       |                                                                                                                                                                                                                                                                      |                                          |                                                                                                                         |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Measuring range:                                                                      | 0.1 ... 50 Nm/s, low speed version<br>0.1 ... 92.7 Nm/s, stand. version*<br>0.1 ... 185 Nm/s, max. version*<br>0.1 ... 224 Nm/s, high speed version<br>* All measured values referred to DIN 1343<br>standard conditions 0° and 1013 mbar ex<br>factory              | Additional average<br>value calculation: | for all parameters freely adjustable<br>from 1 minute up to 1 day, e. g. ½<br>hours average value, average day<br>value |
| Accuracy:                                                                             | ± 1.5% of reading<br>± 0.3 % of full scale<br>on request:<br>± 1.0% of reading<br>± 0.3% of full scale                                                                                                                                                               | Protection:                              | IP 67                                                                                                                   |
| Accuracy indications:                                                                 | referred to ambient temperature<br>22°C ± 2°C, system pressure 6 bar                                                                                                                                                                                                 | Material:                                | housing aluminium die cast, probe<br>tube stainless steel 1.4571, glass                                                 |
| Repeatability:                                                                        | 0.25% of reading in case of correct<br>mounting (mounting support,<br>position, inlet section)                                                                                                                                                                       | Screw-in thread:                         | G ½ ISO 228, ½" NPT                                                                                                     |
| Measuring principle:                                                                  | thermal mass flow sensor, the<br>measuring effect is based on the<br>cooling down of a heated sensor<br>PT 45 by bypassing gas. The ambient<br>temperature is measured with a<br>PT 100. An additional pressure and<br>temperature compensation is not<br>necessary. | Operating pressure<br>KEC-1:             | 50 bar; in special version 100 bar                                                                                      |
| Response time:                                                                        | t <sub>90</sub> < 3 s                                                                                                                                                                                                                                                | Power supply:                            | 18 ... 36 V <sub>DC</sub> , 5 W                                                                                         |
| Operating temperature<br>range:                                                       | -40 ... 180°C standard version, probe<br>tube<br>-20 ... 120°C for media O <sub>2</sub> , natural<br>gas, propane, methane, biogas or in<br>combination with option silicone free<br>or with ATEX version<br>-40 ... 70°C display unit                               | Approvals:                               | II 2G Ex db IIC T4 Gb<br>II 2D Ex tb IIIC T90°C Db                                                                      |
| Adjustment possibilities<br>via display,<br>PC Service Software,<br>remote diagnosis: | Nm³/h, Nm³/min, NI/min, l/s, ft/min,<br>cfm, kg/h, kg/min, inner diameter,<br>reference conditions °C/°F, mbar/<br>hPa, zero-point correction, leak<br>flow volume suppression, scaling of<br>analogue output 4-20 mA, pulse/<br>alarm, error codes etc.             |                                          |                                                                                                                         |
| Outputs:                                                                              | Modbus RTU, 2x4-20 mA<br>galvanically isolated for °C and<br>Nm³/h, pulse (pulse rate freely<br>selectable), alarm max. 48 V <sub>DC</sub> 0.5 A                                                                                                                     |                                          |                                                                                                                         |
| Load:                                                                                 | 500 Ω                                                                                                                                                                                                                                                                |                                          |                                                                                                                         |
| 3 internal counters:                                                                  | 1 x total counter deletable, freely<br>adjustable counter between 1 minute<br>and 1 day deletable, e. g. ½ hours<br>counter, day counter                                                                                                                             |                                          |                                                                                                                         |

## Order Details KEC-1/KEC-3 Immersion Version (Example: KEC-1 S 016 1 L S 00)

| Model                                                          | Measuring range                                                                                                                                | Connection / sensor length                                                                                                                                                                                                                                                                                                                                     | Display                                                          | Gas type                                                                                                                                                                                                                                                                | Max. pressure <sup>5)</sup>                                        | Calibration                                                                                                                                                                             | Options                                                                                                                                     |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <b>KEC-1</b> = Standard version<br><b>KEC-3</b> = ATEX version | <b>L</b> = low-speed-version 50 m/s<br><b>S</b> = standard 92.7 m/s<br><b>M</b> = max-version 185 m/s<br><b>H</b> = high-speed-version 224 m/s | <b>016</b> = G ½, 160 mm<br><b>022</b> = G ½, 220 mm<br><b>030</b> = G ½, 300 mm<br><b>040</b> = G ½, 400 mm<br><b>050</b> = G ½, 500 mm<br><b>060</b> = G ½, 600 mm<br><b>116</b> = ½" NPT, 160 mm<br><b>122</b> = ½" NPT, 220 mm<br><b>130</b> = ½" NPT, 300 mm<br><b>140</b> = ½" NPT, 400 mm<br><b>150</b> = ½" NPT, 500 mm<br><b>160</b> = ½" NPT, 600 mm | <b>1</b> = with integrated display<br><b>0</b> = without display | <b>L</b> = air<br><b>N</b> = nitrogen<br><b>A<sup>2)4)</sup></b> = argon, carbon dioxide, oxygen, nitrous oxide, methane, biogas, natural gas<br><b>E<sup>2)3)</sup></b> = hydrogen <sup>6)</sup> , helium, propane<br><b>S<sup>8)</sup></b> = other gas or gas mixture | <b>S</b> = 50 bar (standard)<br><b>H</b> = 100 bar (high pressure) | <b>0</b> = standard<br><b>E<sup>7)</sup></b> = real gas calibration<br><b>C<sup>1)</sup></b> = 5 point calibration certificate<br><b>J</b> = ±1 % accuracy class of reading (precision) | <b>0</b> = without<br><b>R</b> = cleaning oil and fat free<br><b>S<sup>4)</sup></b> = silicone free version incl. oil and fat free cleaning |

<sup>1)</sup> 3-point calibration certificate is included in standard version. Standard calibration is carried out at 5 bar and 20 °C <sup>2)</sup> Please specify gas in writing <sup>3)</sup> With real gas calibration only <sup>4)</sup> Reduced operating temperature range: -20...120 °C. Operating pressure must be specified when ordering. <sup>5)</sup> Operating pressure and operating temperature must be specified when ordering. <sup>6)</sup> with „hydrogen“ only up to 1" <sup>7)</sup> Required when selecting gas type E <sup>8)</sup> Other gas: Specify gas type; Gas mixture: Specify mixing ratio

A comprehensive list of gas types and related flow measuring ranges per pipe diameter can be found on pages 10 to 13.

## Accessories

| Model               | Description                                                 |                                                                                       |
|---------------------|-------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>KEC-Soft</b>     | Service software incl. PC-connector                         |  |
| <b>KEC-ZANR1500</b> | Welding nipple, L = 35 mm, male thread, R ½" st. st. 1.4571 |  |



### KEC-2 with integrated measuring section

KEC-2 is supplied with an integrated measuring section. The measuring sections are available in flanged version or with R or NPT thread.

A special feature is the removable measuring head. So the measuring unit can be removed easily and quickly for calibration or cleaning purposes without having to dismount the measuring section intricately. During this period, the

measuring section is sealed by a closing cap (accessory).

The screw with centering device ensures that the sensor is positioned accurately in the center when screwing it into the measuring section, furthermore it grants an exact positioning in the flow direction. This avoids unnecessary measuring faults.

### Measuring range flow KEC-2 In-Line version

| Inner diameter of pipe |      |       | Low-Speed Version<br>(50 m/s)            |      |                 |                |                |                  |                  | Standard Version<br>(92.7 m/s)           |      |                 |                |                |                  |                  |
|------------------------|------|-------|------------------------------------------|------|-----------------|----------------|----------------|------------------|------------------|------------------------------------------|------|-----------------|----------------|----------------|------------------|------------------|
|                        |      |       | Full scale values in Nm <sup>3</sup> /h* |      |                 |                |                |                  |                  | Full scale values in Nm <sup>3</sup> /h* |      |                 |                |                |                  |                  |
| Inch                   | [mm] | DN    | Air**                                    | Ar   | CO <sub>2</sub> | N <sub>2</sub> | O <sub>2</sub> | N <sub>2</sub> O | Natural gas (NG) | Air**                                    | Ar   | CO <sub>2</sub> | N <sub>2</sub> | O <sub>2</sub> | N <sub>2</sub> O | Natural gas (NG) |
| ½"                     | 16.1 | DN 15 | 20                                       | 35   | 20              | 20             | 20             | 20               | 15               | 45                                       | 70   | 45              | 40             | 40             | 40               | 25               |
| ¾"                     | 21.7 | DN 20 | 45                                       | 75   | 45              | 40             | 45             | 45               | 25               | 85                                       | 135  | 85              | 80             | 80             | 85               | 50               |
| 1"                     | 27.3 | DN 25 | 75                                       | 120  | 75              | 70             | 75             | 75               | 45               | 145                                      | 230  | 145             | 135            | 140            | 140              | 85               |
| 1¼"                    | 36.0 | DN 32 | 140                                      | 220  | 140             | 130            | 135            | 140              | 85               | 265                                      | 415  | 260             | 240            | 250            | 260              | 155              |
| 1½"                    | 41.9 | DN 40 | 195                                      | 305  | 195             | 180            | 185            | 190              | 115              | 365                                      | 570  | 360             | 335            | 345            | 355              | 215              |
| 2"                     | 53.1 | DN 50 | 320                                      | 505  | 320             | 295            | 305            | 315              | 190              | 600                                      | 935  | 590             | 550            | 570            | 585              | 355              |
| 2½"                    | 71.1 | DN 65 | 550                                      | 865  | 545             | 505            | 525            | 540              | 325              | 1025                                     | 1605 | 1015            | 945            | 980            | 1005             | 605              |
| 3"                     | 84.9 | DN 80 | 765                                      | 1200 | 760             | 705            | 730            | 750              | 450              | 1420                                     | 2225 | 1405            | 1305           | 1355           | 1395             | 840              |

### Measuring range flow KEC-2 In-Line version (continuation)

| Inner diameter of pipe |      |       | Max. Version<br>(185.0 m/s)              |      |                 |                |                |                  |                  | High-Speed Version<br>(224.0 m/s)        |      |                 |                |                |                  |                  |
|------------------------|------|-------|------------------------------------------|------|-----------------|----------------|----------------|------------------|------------------|------------------------------------------|------|-----------------|----------------|----------------|------------------|------------------|
|                        |      |       | Full scale values in Nm <sup>3</sup> /h* |      |                 |                |                |                  |                  | Full scale values in Nm <sup>3</sup> /h* |      |                 |                |                |                  |                  |
| Inch                   | [mm] | DN    | Air**                                    | Ar   | CO <sub>2</sub> | N <sub>2</sub> | O <sub>2</sub> | N <sub>2</sub> O | Natural gas (NG) | Air**                                    | Ar   | CO <sub>2</sub> | N <sub>2</sub> | O <sub>2</sub> | N <sub>2</sub> O | Natural gas (NG) |
| ½"                     | 16.1 | DN 15 | 90                                       | 140  | 90              | 80             | 85             | 85               | 50               | 110                                      | 170  | 105             | 100            | 105            | 105              | 65               |
| ¾"                     | 21.7 | DN 20 | 175                                      | 275  | 175             | 160            | 165            | 170              | 105              | 215                                      | 335  | 210             | 195            | 205            | 210              | 125              |
| 1"                     | 27.3 | DN 25 | 290                                      | 460  | 290             | 270            | 280            | 285              | 170              | 355                                      | 555  | 350             | 325            | 340            | 345              | 210              |
| 1¼"                    | 36.0 | DN 32 | 530                                      | 830  | 525             | 485            | 505            | 520              | 310              | 640                                      | 1005 | 635             | 590            | 610            | 630              | 380              |
| 1½"                    | 41.9 | DN 40 | 730                                      | 1140 | 720             | 670            | 695            | 715              | 430              | 885                                      | 1385 | 875             | 815            | 845            | 865              | 520              |
| 2"                     | 53.1 | DN 50 | 1195                                     | 1870 | 1185            | 1100           | 1140           | 1170             | 705              | 1450                                     | 2265 | 1430            | 1330           | 1380           | 1420             | 855              |
| 2½"                    | 71.1 | DN 65 | 2050                                     | 3205 | 2030            | 1885           | 1955           | 2010             | 1210             | 2480                                     | 3880 | 2455            | 2280           | 2365           | 2435             | 1465             |
| 3"                     | 84.9 | DN 80 | 2840                                     | 4440 | 2810            | 2610           | 2710           | 2785             | 1680             | 3440                                     | 5380 | 3405            | 3165           | 3280           | 3375             | 2035             |

\* Nm<sup>3</sup>/h according to DIN 1343: 0°C, 1013.25 mbar for gases

\*\* DIN 1945/ISO 1217: 20°C, 1000 mbar for air

A comprehensive list of gas types and related flow measuring ranges per pipe diameter can be found on pages 14 to 17.



### Technical Details KEC-2/KEC-4

|                                                       |                                                                                                                                                                                                                                                                                                                                                                    |                                       |                                                                                                                                                        |
|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measuring range:                                      | 0.1 ... 50 Nm/s, low speed version<br>0.1 ... 92.7 Nm/s, stand. version*<br>0.1 ... 185 Nm/s, max. version*<br>0.1 ... 224 Nm/s, high speed version<br>* Measuring ranges Nm <sup>3</sup> /h for different pipe diameters and gases, see table flow measuring ranges<br>* All measured values referred to DIN 1343 standard conditions 0° and 1013 mbar ex factory | Outputs:                              | Modbus RTU, 2x4 - 20 mA galvanically isolated for °C and Nm <sup>3</sup> /h, pulse (pulse rate freely selectable), alarm max. 48 V <sub>DC</sub> 0.5 A |
| Accuracy:                                             | ± 1.5 % of reading<br>± 0.3 % of full scale<br>on request:<br>± 1.0 % of reading<br>± 0.3 % of full scale                                                                                                                                                                                                                                                          | Load:                                 | 500 Ω                                                                                                                                                  |
| Accuracy indications:                                 | referred to ambient temperature 22 °C ± 2 °C, system pressure 6 bar                                                                                                                                                                                                                                                                                                | 3 internal counters:                  | 1 x total counter deletable, freely adjustable counter between 1 minute and 1 day deletable, e.g. ½ hours counter, day counter                         |
| Repeatability:                                        | 0.25 % of reading in case of correct mounting (mounting support, position, inlet section)                                                                                                                                                                                                                                                                          | Additional average value calculation: | for all parameters freely adjustable from 1 minute up to 1 day, e.g. ½ hours average value, average day value                                          |
| Measuring principle:                                  | Thermal mass flow sensor, the measuring effect is based on the cooling down of a heated sensor PT45 by bypassing gas. The ambient temperature is measured with a PT100. An additional pressure and temperature compensation is not necessary.                                                                                                                      | Protection:                           | IP 67                                                                                                                                                  |
| Response time:                                        | t <sub>90</sub> < 3 s                                                                                                                                                                                                                                                                                                                                              | Material:                             | Housing aluminium die cast, probe tube stainless steel 1.4571, glass                                                                                   |
| Operating temperature range probe tube/ display unit: | -40 ... 180 °C standard version, probe tube<br>-20 ... 120 °C for media O <sub>2</sub> , natural gas, propane, methane, biogas or in combination with option silicone free or with ATEX version<br>-40 ... 70 °C display unit                                                                                                                                      | Operating pressure:                   | 16 bar, in special version 40 bar                                                                                                                      |
| Adjustment possibilities via display, PC Service      |                                                                                                                                                                                                                                                                                                                                                                    | Power supply:                         | 18 ... 36 V <sub>DC</sub> , 5 W                                                                                                                        |
| Software, remote diagnosis:                           | Nm <sup>3</sup> /h, Nm <sup>3</sup> /min, Nl/min, l/s, ft/min, cfm, kg/h, kg/min, inner diameter, reference conditions °C/°F, mbar/hPa, zero-point correction, leak flow volume suppression, scaling of analogue output 4 - 20 mA, pulse/alarm, error codes etc.                                                                                                   | Approvals:                            | Ex II 2G Ex db IIC T4 Gb<br>II 2D Ex tb IIIC T90°C Db                                                                                                  |

## Ordering Details KEC-2/KEC-4 In-Line version (Example: KEC-2 S R15 1 L S 0 0)

| Model                                            | Measuring range                                                                                                    | Connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Display                                            | Gas type                                                                                                                                                                                                                                | Max. pressure <sup>5)</sup>                         | Calibration                                                                                                                                                    | Options                                                                                                                 |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| KEC-2 = standard version<br>KEC-4 = ATEX version | L = low-speed-version 50 m/s<br>S = standard 92.7 m/s<br>M = max-version 185 m/s<br>H = high-speed-version 224 m/s | R15 = R ½ male<br>R20 = R ¾ male<br>R25 = R 1 male<br>R32 = R 1 ¼ male<br>R40 = R 1 ½ male<br>R50 = R 2 male<br>Nxx = NPT thread<br>Flange DIN EN 1092-1 PN40<br>F15 = flange DN15<br>F20 = flange DN20<br>F25 = flange DN25<br>F32 = flange DN32<br>F40 = flange DN40<br>F50 = flange DN50<br>F65 = flange DN65<br>F80 = flange DN80<br>Flange ASME Class 150<br>A15 = flange ½" ASME<br>A20 = flange ¾" ASME<br>A25 = flange 1" ASME<br>A32 = flange 1 ¼" ASME<br>A40 = flange 1 ½" ASME<br>A50 = flange 2" ASME<br>A65 = flange 2 ½" ASME<br>A80 = flange 3" ASME<br>Bxx = flange ASME Class 300<br>XXX = special version | 1 = with integrated display<br>0 = without display | L = air<br>N = nitrogen<br>A <sup>2,4)</sup> = argon, carbon dioxide, oxygen, nitrous oxide, methane, biogas, natural gas<br>E <sup>2,3)</sup> = hydrogen <sup>6)</sup> , helium, propane<br>S <sup>8)</sup> = other gas or gas mixture | S = 16 bar (standard)<br>H = 40 bar (high pressure) | 0 = standard<br>E <sup>7)</sup> = real gas calibration<br>C <sup>1)</sup> = 5 point calibration certificate<br>J = ± 1 % accuracy class of reading (precision) | 0 = without<br>R = cleaning oil and fat free<br>S <sup>4)</sup> = silicone free version incl. oil and fat free cleaning |

<sup>1)</sup> 3-point calibration certificate is included in standard version. Standard calibration is carried out at 5 bar and 20 °C. <sup>2)</sup> please specify gas in writing <sup>3)</sup> with real gas calibration only <sup>4)</sup> Reduced operating temperature range: -20...120°C. Operating pressure must be specified when ordering. <sup>5)</sup> Operating pressure and operating temperature must be specified when ordering. <sup>6)</sup> with „hydrogen“ only up to 1" <sup>7)</sup> Required when selecting gas type E <sup>8)</sup> Other gas: Specify gas type; Gas mixture: Specify mixing ratio

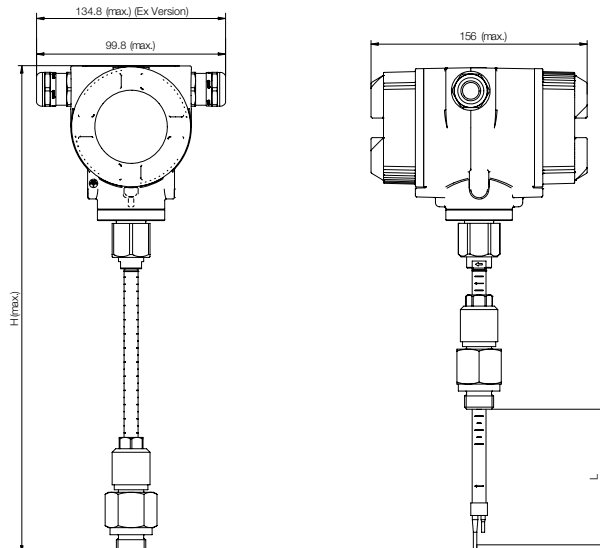
## Accessories

| Model    | Description                         |
|----------|-------------------------------------|
| KEC-Soft | Service software incl. PC-connector |



## Dimensions [mm]

### KEC-1/KEC-3

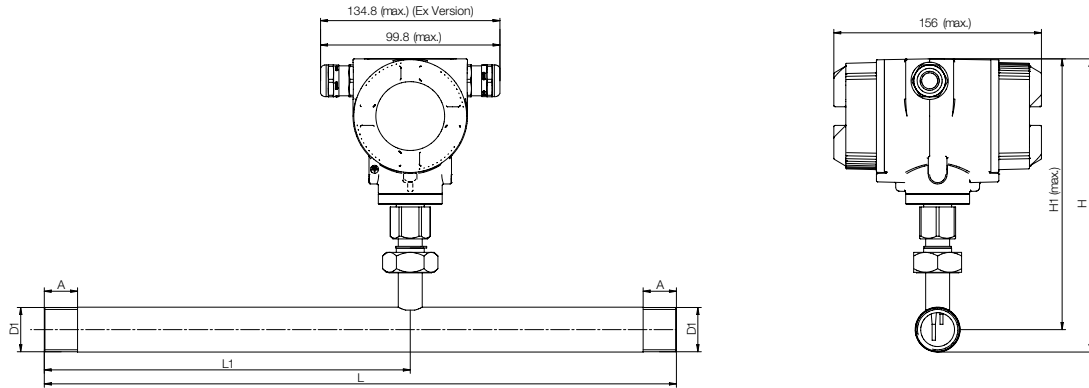


| L [mm] | H [mm] |
|--------|--------|
| 220    | 441    |
| 300    | 521    |
| 400    | 621    |
| 500    | 721    |
| 600    | 821    |
| 160    | 381    |



**Dimensions [mm] (continuation)**

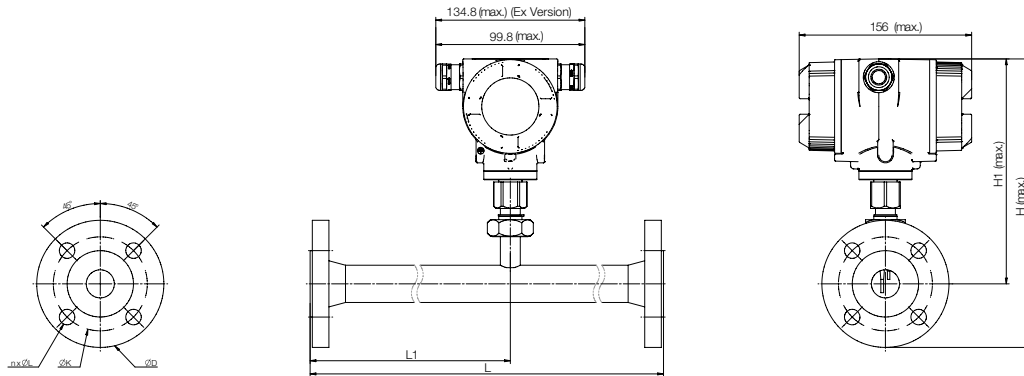
**KEC-2/KEC-4**



**KEC-2/KEC-4 thread**

| Thread connection<br>D1 | Pipe outer Ø [mm] | Pipe inner Ø [mm] | L<br>[mm] | L1<br>[mm] | H<br>[mm] | H1<br>[mm] | A<br>[mm] |
|-------------------------|-------------------|-------------------|-----------|------------|-----------|------------|-----------|
| R ½"                    | 21.3              | 16.1              | 300       | 210        | 176.4     | 165.7      | 20        |
| R ¾"                    | 26.9              | 21.7              | 475       | 275        | 179.2     | 165.7      | 20        |
| R 1"                    | 33.7              | 27.3              | 475       | 275        | 182.6     | 165.7      | 25        |
| R 1¼"                   | 42.4              | 36.0              | 475       | 275        | 186.9     | 165.7      | 25        |
| R 1½"                   | 48.3              | 41.9              | 475*      | 275        | 186.9     | 165.7      | 25        |
| R2"                     | 60.3              | 53.1              | 475*      | 275        | 195.9     | 165.7      | 30        |

\*Attention: Shortened inlet section! Please observe the recommended minimum inlet section (length = 10x inner diameter).



**KEC-2/KEC-4 flange**

| Flange<br>connection | Pipe outer Ø<br>[mm] | Pipe inner Ø<br>[mm] | L<br>[mm] | L1<br>[mm] | H<br>[mm] | H1<br>[mm] | Flange DIN EN 1092-1 |     |        |
|----------------------|----------------------|----------------------|-----------|------------|-----------|------------|----------------------|-----|--------|
|                      |                      |                      |           |            |           |            | ØD                   | ØK  | n x ØL |
| DN 15                | 21.3                 | 16.1                 | 300       | 210        | 213.2     | 165.7      | 95                   | 65  | 4 x 14 |
| DN 20                | 26.9                 | 21.7                 | 475       | 275        | 218.2     | 165.7      | 105                  | 75  | 4 x 14 |
| DN 25                | 33.7                 | 27.3                 | 475       | 275        | 223.2     | 165.7      | 115                  | 85  | 4 x 14 |
| DN 32                | 42.4                 | 36.0                 | 475       | 275        | 235.7     | 165.7      | 140                  | 100 | 4 x 18 |
| DN 40                | 48.3                 | 41.9                 | 475*      | 275        | 240.7     | 165.7      | 150                  | 110 | 4 x 18 |
| DN 50                | 60.3                 | 53.1                 | 475*      | 275        | 248.2     | 165.7      | 165                  | 125 | 4 x 18 |
| DN 65                | 76.1                 | 68.9                 | 475       | 275        | 268.2     | 175.7      | 185                  | 145 | 8 x 18 |
| DN 80                | 88.9                 | 80.9                 | 475       | 275        | 275.7     | 175.7      | 200                  | 160 | 8 x 18 |

\*Attention: Shortened inlet section! Please observe the recommended minimum inlet section (length = 10x inner diameter).



## Flow measuring ranges KEC-1/KEC-3

### Measuring ranges low-speed version

| Inside diameter of pipe |       |        | Low-speed version (50 m/s)                    |               |              |              |                      |                           |             |               |                | Recomm-<br>ended<br>probe length |
|-------------------------|-------|--------|-----------------------------------------------|---------------|--------------|--------------|----------------------|---------------------------|-------------|---------------|----------------|----------------------------------|
|                         |       |        | Measuring range full scales in Nm³/h* / [cfm] |               |              |              |                      |                           |             |               |                |                                  |
| Inch                    | mm    | DN     | Air**                                         | Nitrogen (N₂) | Argon (Ar)   | Oxygen (O₂)  | Carbon dioxide (CO₂) | Methane natural gas (CH₄) | Helium (He) | Hydrogen (H₂) | Propane (C₃H₈) |                                  |
| ½"                      | 16.1  | DN 15  | 24 [14]                                       | 22 [13]       | 38 [22]      | 23 [13]      | 24 [14]              | 14 [8]                    | 10 [6]      | 7 [4]         | 11 [6]         | 160 mm -<br>6.299 inch           |
| ¾"                      | 21.7  | DN 20  | 48 [28]                                       | 44 [26]       | 75 [44]      | 45 [26]      | 47 [27]              | 28 [16]                   | 20 [11]     | 14 [8]        | 22 [13]        |                                  |
| 1"                      | 27.3  | DN 25  | 79 [46]                                       | 73 [43]       | 124 [73]     | 75 [44]      | 78 [46]              | 47 [27]                   | 33 [19]     | 23 [13]       | 36 [21]        |                                  |
| 1 ¼"                    | 36.0  | DN 32  | 143 [84]                                      | 132 [77]      | 224 [132]    | 136 [80]     | 142 [83]             | 85 [50]                   | 60 [35]     | 42 [24]       | 66 [38]        |                                  |
| 1 ½"                    | 41.9  | DN 40  | 197 [116]                                     | 181 [107]     | 309 [182]    | 188 [111]    | 195 [115]            | 117 [68]                  | 82 [48]     | 58 [34]       | 90 [53]        |                                  |
| 2"                      | 53.1  | DN 50  | 323 [190]                                     | 297 [175]     | 506 [297]    | 308 [181]    | 320 [188]            | 191 [112]                 | 135 [79]    | 95 [55]       | 148 [87]       | 220 mm -<br>8.661 inch           |
| 2 ½"                    | 68.9  | DN 65  | 554 [326]                                     | 509 [300]     | 866 [510]    | 528 [311]    | 548 [322]            | 328 [193]                 | 231 [136]   | 162 [95]      | 254 [150]      |                                  |
| 3"                      | 80.9  | DN 80  | 768 [452]                                     | 706 [415]     | 1201 [706]   | 732 [431]    | 760 [447]            | 454 [267]                 | 321 [188]   | 225 [132]     | 353 [207]      |                                  |
| 4"                      | 110.0 | DN 100 | 1426 [839]                                    | 1311 [772]    | 2230 [1312]  | 1360 [800]   | 1411 [830]           | 844 [496]                 | 596 [350]   | 418 [246]     | 655 [386]      |                                  |
| 5"                      | 133.7 | DN 125 | 2110 [1241]                                   | 1940 [1141]   | 3299 [1941]  | 2011 [1183]  | 2088 [1228]          | 1248 [734]                | 881 [519]   | 619 [364]     | 970 [570]      |                                  |
| 6"                      | 159.3 | DN 150 | 2999 [1765]                                   | 2758 [1623]   | 4689 [2759]  | 2859 [1682]  | 2967 [1746]          | 1774 [1044]               | 1253 [737]  | 880 [518]     | 1379 [811]     | 300 mm -<br>11.811 inch          |
| 8"                      | 200.0 | DN 200 | 4738 [2788]                                   | 4357 [2564]   | 7409 [4360]  | 4517 [2658]  | 4689 [2759]          | 2804 [1650]               | 1980 [1165] | 1391 [819]    | 2178 [1282]    |                                  |
| 10"                     | 250.0 | DN 250 | 7413 [4362]                                   | 6817 [4011]   | 11590 [6820] | 7067 [4159]  | 7336 [4317]          | 4386 [2581]               | 3098 [1823] | 2177 [1281]   | 3408 [2005]    |                                  |
| 12"                     | 300.0 | DN 300 | 10687 [6289]                                  | 9828 [5783]   | 16710 [9833] | 10189 [5996] | 10576 [6224]         | 6324 [3721]               | 4466 [2628] | 3138 [1847]   | 4914 [2891]    |                                  |

### Measuring ranges low-speed version (continued)

| Inside diameter of pipe |       |        | Low-speed version (50 m/s)                    |                                      |                        |                                |                                |                                |                                |                           |                                | Recomm-<br>ended<br>probe length |
|-------------------------|-------|--------|-----------------------------------------------|--------------------------------------|------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------|--------------------------------|----------------------------------|
|                         |       |        | Measuring range full scales in Nm³/h* / [cfm] |                                      |                        |                                |                                |                                |                                |                           |                                |                                  |
| Inch                    | mm    | DN     | Corgon<br>®18                                 | Forming<br>gas<br>90% N₂ +<br>10% H₂ | Natural<br>gas<br>(NG) | Biogas<br>50% CH₄ +<br>50% CO₂ | Biogas<br>60% CH₄ +<br>40% CO₂ | LPG<br>60% C₃H₈ +<br>40% C₄H₁₀ | LPG<br>50% C₃H₈ +<br>50% C₄H₁₀ | Nitrous<br>oxide<br>(N₂O) | Ethyne/<br>Acetylene<br>(C₂H₂) |                                  |
| ½"                      | 16.1  | DN 15  | 35 [21]                                       | 20 [12]                              | 15 [9]                 | 17 [10]                        | 17 [10]                        | 13 [7]                         | 12 [7]                         | 24 [14]                   | 13 [8]                         | 160 mm -<br>6.299 inch           |
| ¾"                      | 21.7  | DN 20  | 70 [41]                                       | 40 [23]                              | 30 [17]                | 34 [20]                        | 34 [20]                        | 25 [15]                        | 25 [14]                        | 47 [27]                   | 26 [15]                        |                                  |
| 1"                      | 27.3  | DN 25  | 116 [68]                                      | 67 [39]                              | 50 [29]                | 57 [34]                        | 56 [33]                        | 42 [24]                        | 41 [24]                        | 78 [45]                   | 44 [26]                        |                                  |
| 1 ¼"                    | 36.0  | DN 32  | 209 [123]                                     | 121 [71]                             | 91 [53]                | 104 [61]                       | 101 [59]                       | 76 [45]                        | 74 [44]                        | 140 [89]                  | 80 [47]                        |                                  |
| 1 ½"                    | 41.9  | DN 40  | 288 [170]                                     | 167 [98]                             | 125 [73]               | 143 [84]                       | 140 [82]                       | 105 [62]                       | 103 [60]                       | 194 [114]                 | 110 [65]                       |                                  |
| 2"                      | 53.1  | DN 50  | 472 [278]                                     | 273 [161]                            | 205 [120]              | 235 [138]                      | 229 [135]                      | 172 [101]                      | 168 [99]                       | 317 [186]                 | 181 [106]                      | 220 mm -<br>8.661 inch           |
| 2 ½"                    | 68.9  | DN 65  | 809 [476]                                     | 469 [276]                            | 351 [207]              | 403 [237]                      | 393 [231]                      | 295 [173]                      | 288 [169]                      | 543 [320]                 | 311 [183]                      |                                  |
| 3"                      | 80.9  | DN 80  | 1121 [660]                                    | 649 [382]                            | 487 [286]              | 558 [328]                      | 544 [320]                      | 409 [240]                      | 400 [235]                      | 753 [443]                 | 430 [253]                      |                                  |
| 4"                      | 110.0 | DN 100 | 2082 [1225]                                   | 1206 [710]                           | 905 [532]              | 1037 [610]                     | 1011 [595]                     | 759 [447]                      | 742 [437]                      | 1399 [823]                | 800 [470]                      |                                  |
| 5"                      | 133.7 | DN 125 | 3080 [1813]                                   | 1785 [1050]                          | 1338 [787]             | 1534 [903]                     | 1496 [880]                     | 1123 [661]                     | 1098 [646]                     | 2069 [1217]               | 1183 [696]                     |                                  |
| 6"                      | 159.3 | DN 150 | 4378 [2576]                                   | 2537 [1493]                          | 1903 [1119]            | 2181 [1283]                    | 2126 [1251]                    | 1597 [939]                     | 1561 [919]                     | 2941 [1731]               | 1682 [990]                     | 300 mm -<br>11.811 inch          |
| 8"                      | 200.0 | DN 200 | 6918 [4071]                                   | 4009 [2359]                          | 3006 [1769]            | 3446 [2028]                    | 3359 [1977]                    | 2523 [1485]                    | 2467 [1452]                    | 4647 [2735]               | 2658 [1564]                    |                                  |
| 10"                     | 250.0 | DN 250 | 10823 [6369]                                  | 6271 [3690]                          | 4703 [2768]            | 5392 [3173]                    | 5255 [3093]                    | 3947 [2323]                    | 3860 [2271]                    | 7270 [4278]               | 4158 [2447]                    |                                  |
| 12"                     | 300.0 | DN 300 | 15604 [9183]                                  | 9042 [5321]                          | 6781 [3990]            | 7774 [4575]                    | 7577 [4459]                    | 5691 [3349]                    | 5565 [3275]                    | 10482 [6168]              | 5995 [3528]                    |                                  |

\* Nm<sup>3</sup>/h in acc. with DIN 1343: 0 °C, 1013.25 hPa for gases

\*\* ISO 1217: 20 °C, 1000 hPa for air

## Flow measuring ranges KEC-1/KEC-3

## Measuring ranges standard version

| Inside diameter of pipe |       |        | Standard version (92.7 m/s)                   |               |               |               |                      |                           |             |               |                | Recomm-<br>ended<br>probe length |
|-------------------------|-------|--------|-----------------------------------------------|---------------|---------------|---------------|----------------------|---------------------------|-------------|---------------|----------------|----------------------------------|
|                         |       |        | Measuring range full scales in Nm³/h* / [cfm] |               |               |               |                      |                           |             |               |                |                                  |
| Inch                    | mm    | DN     | Air**                                         | Nitrogen (N₂) | Argon (Ar)    | Oxygen (O₂)   | Carbon dioxide (CO₂) | Methane natural gas (CH₄) | Helium (He) | Hydrogen (H₂) | Propane (C₃H₈) |                                  |
| ½"                      | 16.1  | DN 15  | 45 [26]                                       | 41 [24]       | 71 [41]       | 43 [25]       | 45 [26]              | 26 [15]                   | 19 [11]     | 13 [7]        | 20 [12]        | 160 mm -<br>6.299 inch           |
| ¾"                      | 21.7  | DN 20  | 89 [52]                                       | 81 [48]       | 139 [81]      | 84 [49]       | 88 [51]              | 52 [31]                   | 37 [21]     | 26 [15]       | 40 [24]        |                                  |
| 1"                      | 27.3  | DN 25  | 147 [86]                                      | 135 [79]      | 230 [135]     | 140 [82]      | 146 [86]             | 87 [51]                   | 61 [36]     | 43 [25]       | 67 [39]        |                                  |
| 1 ¼"                    | 36.0  | DN 32  | 266 [156]                                     | 244 [144]     | 416 [245]     | 253 [149]     | 263 [155]            | 157 [92]                  | 111 [65]    | 78 [46]       | 122 [72]       |                                  |
| 1 ½"                    | 41.9  | DN 40  | 366 [215]                                     | 337 [198]     | 573 [337]     | 349 [205]     | 363 [213]            | 217 [127]                 | 153 [90]    | 107 [63]      | 168 [99]       |                                  |
| 2"                      | 53.1  | DN 50  | 600 [353]                                     | 551 [324]     | 938 [552]     | 572 [336]     | 593 [349]            | 355 [208]                 | 250 [147]   | 176 [103]     | 275 [162]      |                                  |
| 2 ½"                    | 68.9  | DN 65  | 1028 [604]                                    | 945 [556]     | 1607 [945]    | 980 [576]     | 1017 [598]           | 608 [358]                 | 429 [252]   | 301 [177]     | 472 [278]      | 220 mm -<br>8.661 inch           |
| 3"                      | 80.9  | DN 80  | 1424 [838]                                    | 1309 [770]    | 2227 [1310]   | 1358 [799]    | 1409 [829]           | 842 [496]                 | 595 [350]   | 418 [246]     | 654 [385]      |                                  |
| 4"                      | 110.0 | DN 100 | 2644 [1556]                                   | 2432 [1431]   | 4135 [2433]   | 2521 [1484]   | 2617 [1540]          | 1565 [921]                | 1105 [650]  | 776 [457]     | 1216 [715]     |                                  |
| 5"                      | 133.7 | DN 125 | 3912 [2302]                                   | 3597 [2117]   | 6116 [3599]   | 3729 [2195]   | 3871 [2278]          | 2315 [1362]               | 1635 [962]  | 1149 [676]    | 1798 [1058]    |                                  |
| 6"                      | 159.3 | DN 150 | 5560 [3272]                                   | 5113 [3009]   | 8693 [5116]   | 5301 [3119]   | 5502 [3238]          | 3290 [1936]               | 2324 [1367] | 1633 [961]    | 2556 [1504]    | 300 mm -<br>11.811 inch          |
| 8"                      | 200.0 | DN 200 | 8785 [5170]                                   | 8079 [4754]   | 13736 [8083]  | 8376 [4929]   | 8694 [5116]          | 5198 [3059]               | 3672 [2160] | 2580 [1518]   | 4039 [2377]    |                                  |
| 10"                     | 250.0 | DN 250 | 13744 [8088]                                  | 12638 [7437]  | 21488 [12646] | 13103 [7711]  | 13601 [8004]         | 8133 [4786]               | 5744 [3380] | 4036 [2375]   | 6319 [3718]    |                                  |
| 12"                     | 300.0 | DN 300 | 19814 [11661]                                 | 18221 [10723] | 30980 [18232] | 18891 [11117] | 19609 [11539]        | 11725 [6900]              | 8281 [4873] | 5819 [3424]   | 9110 [5361]    |                                  |

## Measuring ranges standard version (continued)

| Inside diameter of pipe |       |        | Standard version (92.7 m/s)                   |                                      |                        |                                |                                |                                |                                |                           |                                | Recomm-<br>ended<br>probe length |
|-------------------------|-------|--------|-----------------------------------------------|--------------------------------------|------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------|--------------------------------|----------------------------------|
|                         |       |        | Measuring range full scales in Nm³/h* / [cfm] |                                      |                        |                                |                                |                                |                                |                           |                                |                                  |
| Inch                    | mm    | DN     | Corgon<br>Ø18                                 | Forming<br>gas<br>90% N₂ +<br>10% H₂ | Natural<br>gas<br>(NG) | Biogas<br>50% CH₄ +<br>50% CO₂ | Biogas<br>60% CH₄ +<br>40% CO₂ | LPG<br>60% C₃H₈ +<br>40% C₄H₁₀ | LPG<br>50% C₃H₈ +<br>50% C₄H₁₀ | Nitrous<br>oxide<br>(N₂O) | Ethyne/<br>Acetylene<br>(C₂H₂) |                                  |
| ½"                      | 16.1  | DN 15  | 66 [39]                                       | 38 [22]                              | 28 [17]                | 33 [19]                        | 32 [19]                        | 24 [14]                        | 23 [13]                        | 44 [26]                   | 25 [15]                        | 160 mm -<br>6.299 inch           |
| ¾"                      | 21.7  | DN 20  | 130 [76]                                      | 75 [44]                              | 56 [33]                | 64 [38]                        | 63 [37]                        | 47 [27]                        | 46 [27]                        | 87 [51]                   | 49 [29]                        |                                  |
| 1"                      | 27.3  | DN 25  | 215 [126]                                     | 124 [73]                             | 93 [55]                | 107 [63]                       | 104 [61]                       | 78 [46]                        | 76 [45]                        | 144 [85]                  | 82 [48]                        |                                  |
| 1 ¼"                    | 36.0  | DN 32  | 388 [228]                                     | 225 [132]                            | 168 [99]               | 193 [114]                      | 188 [111]                      | 141 [83]                       | 138 [81]                       | 261 [153]                 | 149 [87]                       |                                  |
| 1 ½"                    | 41.9  | DN 40  | 535 [315]                                     | 310 [182]                            | 232 [136]              | 266 [157]                      | 260 [153]                      | 195 [114]                      | 191 [112]                      | 359 [211]                 | 205 [121]                      |                                  |
| 2"                      | 53.1  | DN 50  | 876 [515]                                     | 507 [298]                            | 380 [224]              | 436 [256]                      | 425 [250]                      | 319 [188]                      | 312 [183]                      | 588 [346]                 | 336 [198]                      |                                  |
| 2 ½"                    | 68.9  | DN 65  | 1500 [883]                                    | 869 [511]                            | 652 [383]              | 747 [440]                      | 728 [428]                      | 547 [322]                      | 535 [315]                      | 1008 [593]                | 576 [339]                      | 220 mm -<br>8.661 inch           |
| 3"                      | 80.9  | DN 80  | 2079 [1223]                                   | 1205 [709]                           | 903 [531]              | 1036 [609]                     | 1009 [594]                     | 758 [446]                      | 741 [436]                      | 1397 [822]                | 799 [470]                      |                                  |
| 4"                      | 110.0 | DN 100 | 3861 [2272]                                   | 2237 [1316]                          | 1678 [987]             | 1923 [1132]                    | 1875 [1103]                    | 1408 [828]                     | 1377 [810]                     | 2594 [1526]               | 1483 [873]                     |                                  |
| 5"                      | 133.7 | DN 125 | 5711 [3361]                                   | 3309 [1947]                          | 2482 [1460]            | 2845 [1674]                    | 2773 [1632]                    | 2083 [1226]                    | 2037 [1198]                    | 3837 [2258]               | 2194 [1291]                    |                                  |
| 6"                      | 159.3 | DN 150 | 8118 [4777]                                   | 4704 [2768]                          | 3528 [2076]            | 4044 [2380]                    | 3942 [2320]                    | 2961 [1742]                    | 2895 [1704]                    | 5453 [3209]               | 3119 [1835]                    | 300 mm -<br>11.811 inch          |
| 8"                      | 200.0 | DN 200 | 12827 [7548]                                  | 7432 [4374]                          | 5574 [3280]            | 6390 [3760]                    | 6229 [3665]                    | 4678 [2753]                    | 4575 [2692]                    | 8616 [5071]               | 4928 [2900]                    |                                  |
| 10"                     | 250.0 | DN 250 | 20066 [11809]                                 | 11627 [6842]                         | 8720 [5132]            | 9997 [5883]                    | 9744 [5734]                    | 7319 [4307]                    | 7157 [4212]                    | 13480 [7932]              | 7709 [4537]                    |                                  |
| 12"                     | 300.0 | DN 300 | 28930 [17025]                                 | 16763 [9865]                         | 12572 [7399]           | 14413 [8482]                   | 14048 [8267]                   | 10552 [6209]                   | 10318 [6072]                   | 19434 [11437]             | 11115 [6541]                   |                                  |

\* Nm<sup>3</sup>/h in acc. with DIN 1343: 0 °C, 1013.25 hPa for gases

\*\* ISO 1217: 20 °C, 1000 hPa for air



## Thermal Mass Flow Meter Model KEC

### Flow measuring ranges KEC-1/KEC-3

#### Measuring ranges max version

| Inside diameter of pipe |       |        | Max version (185.0 m/s)                       |                  |               |                |                            |                                 |                |                  |                   | Recomm-<br>ended<br>probe length |
|-------------------------|-------|--------|-----------------------------------------------|------------------|---------------|----------------|----------------------------|---------------------------------|----------------|------------------|-------------------|----------------------------------|
|                         |       |        | Measuring range full scales in Nm³/h* / [cfm] |                  |               |                |                            |                                 |                |                  |                   |                                  |
| Inch                    | mm    | DN     | Air**                                         | Nitrogen<br>(N₂) | Argon<br>(Ar) | Oxygen<br>(O₂) | Carbon<br>dioxide<br>(CO₂) | Methane<br>natural gas<br>(CH₄) | Helium<br>(He) | Hydrogen<br>(H₂) | Propane<br>(C₃H₈) |                                  |
| ½"                      | 16.1  | DN 15  | 90 [53]                                       | 83 [49]          | 142 [83]      | 86 [51]        | 90 [52]                    | 53 [31]                         | 38 [22]        | 26 [15]          | 41 [24]           | 160 mm -<br>6.299 inch           |
| ¾"                      | 21.7  | DN 20  | 177 [104]                                     | 163 [96]         | 278 [163]     | 169 [99]       | 175 [103]                  | 105 [61]                        | 74 [43]        | 52 [30]          | 81 [48]           |                                  |
| 1"                      | 27.3  | DN 25  | 294 [173]                                     | 271 [159]        | 460 [271]     | 280 [165]      | 291 [171]                  | 174 [102]                       | 123 [72]       | 86 [50]          | 135 [79]          |                                  |
| 1 ¼"                    | 36.0  | DN 32  | 531 [312]                                     | 488 [287]        | 830 [489]     | 506 [298]      | 525 [309]                  | 314 [185]                       | 222 [130]      | 156 [91]         | 244 [143]         |                                  |
| 1 ½"                    | 41.9  | DN 40  | 732 [430]                                     | 673 [396]        | 1144 [673]    | 697 [410]      | 724 [426]                  | 433 [254]                       | 305 [180]      | 215 [126]        | 336 [198]         |                                  |
| 2"                      | 53.1  | DN 50  | 1197 [704]                                    | 1101 [648]       | 1872 [1101]   | 1141 [671]     | 1185 [697]                 | 708 [417]                       | 500 [294]      | 351 [206]        | 550 [324]         | 220 mm -<br>8.661 inch           |
| 2 ½"                    | 68.9  | DN 65  | 2051 [1207]                                   | 1886 [1110]      | 3207 [1887]   | 1955 [1151]    | 2030 [1194]                | 1214 [714]                      | 857 [504]      | 602 [354]        | 943 [555]         |                                  |
| 3"                      | 80.9  | DN 80  | 2842 [1672]                                   | 2614 [1538]      | 4444 [2615]   | 2710 [1594]    | 2813 [1655]                | 1682 [989]                      | 1188 [699]     | 834 [491]        | 1307 [769]        |                                  |
| 4"                      | 110.0 | DN 100 | 5278 [3106]                                   | 4854 [2856]      | 8252 [4856]   | 5032 [2961]    | 5223 [3074]                | 3123 [1838]                     | 2206 [1298]    | 1550 [912]       | 2427 [1428]       |                                  |
| 5"                      | 133.7 | DN 125 | 7807 [4594]                                   | 7179 [4225]      | 12206 [7183]  | 7443 [4380]    | 7726 [4546]                | 4620 [2718]                     | 3263 [1920]    | 2293 [1349]      | 3589 [2112]       |                                  |
| 6"                      | 159.3 | DN 150 | 11096 [6530]                                  | 10204 [6005]     | 17349 [10210] | 10579 [6226]   | 10981 [6462]               | 6566 [3864]                     | 4637 [2729]    | 3259 [1917]      | 5102 [3002]       | 300 mm -<br>11.811 inch          |
| 8"                      | 200.0 | DN 200 | 17533 [10318]                                 | 16123 [9488]     | 27413 [16132] | 16716 [9837]   | 17351 [10211]              | 10375 [6105]                    | 7328 [4312]    | 5149 [3030]      | 8061 [4744]       |                                  |
| 10"                     | 250.0 | DN 250 | 27428 [16141]                                 | 25223 [14843]    | 42884 [25237] | 26150 [15389]  | 27143 [15974]              | 16231 [9552]                    | 11463 [6746]   | 8055 [4740]      | 12611 [7421]      |                                  |
| 12"                     | 300.0 | DN 300 | 39544 [23271]                                 | 36364 [21400]    | 61827 [36385] | 37701 [22187]  | 39133 [23030]              | 23400 [13771]                   | 16527 [9726]   | 11614 [6834]     | 18182 [10700]     |                                  |

#### Measuring ranges max version (continued)

| Inside diameter of pipe |       |        | Max version (185.0 m/s)                       |                                                              |                        |                                                        |                                                        |                                                                                  |                                                                                  |                                        |                                                          | Recomm-<br>ended<br>probe length |
|-------------------------|-------|--------|-----------------------------------------------|--------------------------------------------------------------|------------------------|--------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------|----------------------------------|
|                         |       |        | Measuring range full scales in Nm³/h* / [cfm] |                                                              |                        |                                                        |                                                        |                                                                                  |                                                                                  |                                        |                                                          |                                  |
| Inch                    | mm    | DN     | Corgon<br>®18                                 | Forming<br>gas<br>90% N <sub>2</sub> +<br>10% H <sub>2</sub> | Natural<br>gas<br>(NG) | Biogas<br>50% CH <sub>4</sub> +<br>50% CO <sub>2</sub> | Biogas<br>60% CH <sub>4</sub> +<br>40% CO <sub>2</sub> | LPG<br>60% C <sub>3</sub> H <sub>8</sub> +<br>40% C <sub>4</sub> H <sub>10</sub> | LPG<br>50% C <sub>3</sub> H <sub>8</sub> +<br>50% C <sub>4</sub> H <sub>10</sub> | Nitrous<br>oxide<br>(N <sub>2</sub> O) | Ethyne/<br>Acetylene<br>(C <sub>2</sub> H <sub>2</sub> ) |                                  |
| ½"                      | 16.1  | DN 15  | 132 [78]                                      | 76 [45]                                                      | 57 [33]                | 66 [38]                                                | 64 [37]                                                | 48 [28]                                                                          | 47 [27]                                                                          | 89 [52]                                | 51 [30]                                                  | 160 mm -<br>6.299 inch           |
| ¾"                      | 21.7  | DN 20  | 259 [152]                                     | 150 [88]                                                     | 112 [66]               | 129 [76]                                               | 126 [74]                                               | 94 [55]                                                                          | 92 [54]                                                                          | 174 [102]                              | 99 [58]                                                  |                                  |
| 1"                      | 27.3  | DN 25  | 430 [253]                                     | 249 [146]                                                    | 187 [110]              | 214 [126]                                              | 208 [122]                                              | 156 [92]                                                                         | 153 [90]                                                                         | 289 [170]                              | 165 [97]                                                 |                                  |
| 1 ¼"                    | 36.0  | DN 32  | 775 [456]                                     | 449 [264]                                                    | 337 [198]              | 386 [227]                                              | 376 [221]                                              | 283 [166]                                                                        | 276 [162]                                                                        | 521 [306]                              | 298 [175]                                                |                                  |
| 1 ½"                    | 41.9  | DN 40  | 1068 [629]                                    | 619 [364]                                                    | 464 [273]              | 532 [313]                                              | 519 [305]                                              | 389 [229]                                                                        | 381 [224]                                                                        | 718 [422]                              | 410 [241]                                                |                                  |
| 2"                      | 53.1  | DN 50  | 1748 [1029]                                   | 1013 [596]                                                   | 759 [447]              | 871 [512]                                              | 849 [499]                                              | 637 [375]                                                                        | 623 [367]                                                                        | 1174 [691]                             | 671 [395]                                                | 220 mm -<br>8.661 inch           |
| 2 ½"                    | 68.9  | DN 65  | 2995 [1762]                                   | 1735 [1021]                                                  | 1301 [766]             | 1492 [878]                                             | 1454 [856]                                             | 1092 [642]                                                                       | 1068 [628]                                                                       | 2012 [1184]                            | 1150 [677]                                               |                                  |
| 3"                      | 80.9  | DN 80  | 4150 [2442]                                   | 2404 [1415]                                                  | 1803 [1061]            | 2067 [1216]                                            | 2015 [1186]                                            | 1513 [890]                                                                       | 1480 [871]                                                                       | 2788 [1640]                            | 1594 [938]                                               |                                  |
| 4"                      | 110.0 | DN 100 | 7706 [4535]                                   | 4465 [2628]                                                  | 3349 [1971]            | 3839 [2259]                                            | 3742 [2202]                                            | 2811 [1654]                                                                      | 2748 [1617]                                                                      | 5177 [3046]                            | 2961 [1742]                                              |                                  |
| 5"                      | 133.7 | DN 125 | 11399 [6708]                                  | 6605 [3887]                                                  | 4954 [2915]            | 5679 [3342]                                            | 5535 [3257]                                            | 4157 [2446]                                                                      | 4065 [2392]                                                                      | 7657 [4506]                            | 4379 [2577]                                              |                                  |
| 6"                      | 159.3 | DN 150 | 16201 [9534]                                  | 9388 [5524]                                                  | 7041 [4143]            | 8071 [4750]                                            | 7867 [4630]                                            | 5909 [3477]                                                                      | 5778 [3400]                                                                      | 10883 [6405]                           | 6224 [3663]                                              | 300 mm -<br>11.811 inch          |
| 8"                      | 200.0 | DN 200 | 25599 [15065]                                 | 14833 [8729]                                                 | 11125 [6547]           | 12753 [7505]                                           | 12431 [7315]                                           | 9337 [5494]                                                                      | 9130 [5373]                                                                      | 17196 [10120]                          | 9835 [5788]                                              |                                  |
| 10"                     | 250.0 | DN 250 | 40046 [23567]                                 | 23205 [13656]                                                | 17404 [10242]          | 19951 [11741]                                          | 19447 [11444]                                          | 14606 [8596]                                                                     | 14283 [8406]                                                                     | 26901 [15831]                          | 15386 [9054]                                             |                                  |
| 12"                     | 300.0 | DN 300 | 57736 [33977]                                 | 33455 [19688]                                                | 25091 [14766]          | 28764 [16927]                                          | 28037 [16499]                                          | 21058 [12393]                                                                    | 20593 [12119]                                                                    | 38784 [22824]                          | 22182 [13054]                                            |                                  |

\* Nm<sup>3</sup>/h in acc. with DIN 1343: 0 °C, 1013.25 hPa for gases

\*\* ISO 1217: 20 °C, 1000 hPa for air

## Flow measuring ranges KEC-1/KEC-3

## Measuring ranges high-speed version

| Inside diameter of pipe |       |        | High-speed version (224.0 m/s)                |               |               |               |                      |                           |               |               |                | Recomm-<br>ended<br>probe length |
|-------------------------|-------|--------|-----------------------------------------------|---------------|---------------|---------------|----------------------|---------------------------|---------------|---------------|----------------|----------------------------------|
|                         |       |        | Measuring range full scales in Nm³/h* / [cfm] |               |               |               |                      |                           |               |               |                |                                  |
| Inch                    | mm    | DN     | Air**                                         | Nitrogen (N₂) | Argon (Ar)    | Oxygen (O₂)   | Carbon dioxide (CO₂) | Methane natural gas (CH₄) | Helium (He)   | Hydrogen (H₂) | Propane (C₃H₈) |                                  |
| ½"                      | 16.1  | DN 15  | 110 [64]                                      | 101 [59]      | 172 [101]     | 105 [61]      | 109 [64]             | 65 [38]                   | 46 [27]       | 32 [19]       | 50 [29]        | 160 mm -<br>6.299 inch           |
| ¾"                      | 21.7  | DN 20  | 215 [126]                                     | 198 [116]     | 336 [198]     | 205 [120]     | 213 [125]            | 127 [74]                  | 89 [52]       | 63 [37]       | 99 [58]        |                                  |
| 1"                      | 27.3  | DN 25  | 356 [210]                                     | 328 [193]     | 557 [328]     | 340 [200]     | 353 [207]            | 211 [124]                 | 149 [87]      | 104 [61]      | 164 [96]       |                                  |
| 1 ¼"                    | 36.0  | DN 32  | 643 [378]                                     | 591 [348]     | 1006 [592]    | 613 [361]     | 636 [374]            | 380 [224]                 | 268 [158]     | 188 [111]     | 295 [174]      |                                  |
| 1 ½"                    | 41.9  | DN 40  | 886 [521]                                     | 815 [479]     | 1385 [815]    | 845 [497]     | 877 [516]            | 524 [308]                 | 370 [218]     | 260 [153]     | 407 [239]      |                                  |
| 2"                      | 53.1  | DN 50  | 1450 [853]                                    | 1333 [784]    | 2267 [1334]   | 1382 [813]    | 1434 [844]           | 858 [504]                 | 606 [356]     | 425 [250]     | 666 [392]      |                                  |
| 2 ½"                    | 68.9  | DN 65  | 2484 [1461]                                   | 2284 [1344]   | 3883 [2285]   | 2368 [1393]   | 2458 [1446]          | 1469 [865]                | 1038 [611]    | 729 [429]     | 1142 [672]     | 220 mm -<br>8.661 inch           |
| 3"                      | 80.9  | DN 80  | 3441 [2025]                                   | 3165 [1862]   | 5381 [3166]   | 3281 [1931]   | 3406 [2004]          | 2036 [1198]               | 1438 [846]    | 1010 [594]    | 1582 [931]     |                                  |
| 4"                      | 110.0 | DN 100 | 6391 [3761]                                   | 5877 [3458]   | 9992 [5880]   | 6093 [3586]   | 6324 [3722]          | 3782 [2225]               | 2671 [1572]   | 1877 [1104]   | 2938 [1729]    |                                  |
| 5"                      | 133.7 | DN 125 | 9453 [5563]                                   | 8693 [5116]   | 14780 [8698]  | 9012 [5304]   | 9355 [5505]          | 5594 [3292]               | 3951 [2325]   | 2776 [1633]   | 4346 [2558]    |                                  |
| 6"                      | 159.3 | DN 150 | 13436 [7907]                                  | 12355 [7271]  | 21007 [12362] | 12810 [7538]  | 13296 [7825]         | 7950 [4679]               | 5615 [3304]   | 3946 [2322]   | 6177 [3635]    | 300 mm -<br>11.811 inch          |
| 8"                      | 200.0 | DN 200 | 21229 [12493]                                 | 19522 [11489] | 33192 [19533] | 20240 [11911] | 21009 [12363]        | 12562 [7393]              | 8873 [5221]   | 6235 [3669]   | 9761 [5744]    |                                  |
| 10"                     | 250.0 | DN 250 | 33211 [19544]                                 | 30540 [17973] | 51925 [30557] | 31663 [18633] | 32865 [19341]        | 19652 [11565]             | 13880 [8168]  | 9753 [5740]   | 15270 [8986]   |                                  |
| 12"                     | 300.0 | DN 300 | 47880 [28177]                                 | 44030 [25912] | 74861 [44055] | 45649 [26864] | 47383 [27885]        | 28333 [16674]             | 20012 [11777] | 14062 [8275]  | 22015 [12956]  |                                  |

## Measuring ranges high-speed version (continued)

| Inside diameter of pipe |       |        | High-speed version (224.0 m/s)                |                                      |                        |                                |                                |                                |                                |                           |                                | Recomm-<br>ended<br>probe length |
|-------------------------|-------|--------|-----------------------------------------------|--------------------------------------|------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------|--------------------------------|----------------------------------|
|                         |       |        | Measuring range full scales in Nm³/h* / [cfm] |                                      |                        |                                |                                |                                |                                |                           |                                |                                  |
| Inch                    | mm    | DN     | Corgon<br>®18                                 | Forming<br>gas<br>90% N₂ +<br>10% H₂ | Natural<br>gas<br>(NG) | Biogas<br>50% CH₄ +<br>50% CO₂ | Biogas<br>60% CH₄ +<br>40% CO₂ | LPG<br>60% C₃H₈ +<br>40% C₄H₁₀ | LPG<br>50% C₃H₈ +<br>50% C₄H₁₀ | Nitrous<br>oxide<br>(N₂O) | Ethyne/<br>Acetylene<br>(C₂H₂) |                                  |
| ½"                      | 16.1  | DN 15  | 160 [94]                                      | 93 [54]                              | 69 [41]                | 80 [47]                        | 78 [45]                        | 58 [34]                        | 57 [33]                        | 108 [63]                  | 61 [36]                        | 160 mm -<br>6.299 inch           |
| ¾"                      | 21.7  | DN 20  | 314 [185]                                     | 182 [107]                            | 136 [80]               | 156 [92]                       | 152 [89]                       | 114 [67]                       | 112 [65]                       | 211 [124]                 | 120 [71]                       |                                  |
| 1"                      | 27.3  | DN 25  | 521 [306]                                     | 301 [177]                            | 226 [133]              | 259 [152]                      | 253 [148]                      | 190 [111]                      | 185 [109]                      | 349 [205]                 | 200 [117]                      |                                  |
| 1 ¼"                    | 36.0  | DN 32  | 939 [552]                                     | 544 [320]                            | 408 [240]              | 468 [275]                      | 456 [268]                      | 342 [201]                      | 335 [197]                      | 631 [371]                 | 360 [212]                      |                                  |
| 1 ½"                    | 41.9  | DN 40  | 1294 [761]                                    | 749 [441]                            | 562 [331]              | 644 [379]                      | 628 [369]                      | 472 [277]                      | 461 [271]                      | 869 [511]                 | 497 [292]                      |                                  |
| 2"                      | 53.1  | DN 50  | 2117 [1245]                                   | 1226 [721]                           | 920 [541]              | 1054 [620]                     | 1028 [605]                     | 772 [454]                      | 755 [444]                      | 1422 [836]                | 813 [478]                      |                                  |
| 2 ½"                    | 68.9  | DN 65  | 3626 [2134]                                   | 2101 [1236]                          | 1576 [927]             | 1806 [1063]                    | 1761 [1036]                    | 1322 [778]                     | 1293 [761]                     | 2436 [1433]               | 1393 [820]                     | 220 mm -<br>8.661 inch           |
| 3"                      | 80.9  | DN 80  | 5025 [2957]                                   | 2911 [1713]                          | 2183 [1285]            | 2503 [1473]                    | 2440 [1436]                    | 1832 [1078]                    | 1792 [1054]                    | 3375 [1986]               | 1930 [1136]                    |                                  |
| 4"                      | 110.0 | DN 100 | 9331 [5491]                                   | 5407 [3182]                          | 4055 [2386]            | 4649 [2735]                    | 4531 [2666]                    | 3403 [2003]                    | 3328 [1958]                    | 6268 [3689]               | 3585 [2109]                    |                                  |
| 5"                      | 133.7 | DN 125 | 13802 [8122]                                  | 7997 [4706]                          | 5998 [3530]            | 6876 [4046]                    | 6702 [3944]                    | 5034 [2962]                    | 4923 [2897]                    | 9271 [5456]               | 5302 [3120]                    |                                  |
| 6"                      | 159.3 | DN 150 | 19617 [11544]                                 | 11367 [6689]                         | 8525 [5017]            | 9773 [5751]                    | 9526 [5606]                    | 7155 [4210]                    | 6997 [4117]                    | 13178 [7755]              | 7537 [4435]                    |                                  |
| 8"                      | 200.0 | DN 200 | 30996 [18241]                                 | 17960 [10569]                        | 13470 [7927]           | 15442 [9087]                   | 15051 [8858]                   | 11305 [6653]                   | 11055 [6506]                   | 20821 [12253]             | 11908 [7008]                   | 300 mm -<br>11.811 inch          |
| 10"                     | 250.0 | DN 250 | 48489 [28535]                                 | 28097 [16535]                        | 21072 [12401]          | 24157 [14216]                  | 23546 [13857]                  | 17686 [10408]                  | 17295 [10178]                  | 32573 [19169]             | 18629 [10963]                  |                                  |
| 12"                     | 300.0 | DN 300 | 69907 [41140]                                 | 40508 [23839]                        | 30381 [17879]          | 34828 [20496]                  | 33947 [19978]                  | 25498 [15005]                  | 24934 [14674]                  | 46961 [27636]             | 26858 [15806]                  |                                  |

\* Nm<sup>3</sup>/h in acc. with DIN 1343: 0 °C, 1013.25 hPa for gases

\*\* ISO 1217: 20 °C, 1000 hPa for air



## Flow measuring ranges KEC-2/KEC-4

### Measuring ranges low-speed version

| Inside diameter of pipe |      |       | Low-speed version (50 m/s)                    |               |            |             |                      |                           |                |                  |                  |
|-------------------------|------|-------|-----------------------------------------------|---------------|------------|-------------|----------------------|---------------------------|----------------|------------------|------------------|
|                         |      |       | Measuring range full scales in Nm³/h* / [cfm] |               |            |             |                      |                           |                |                  |                  |
| Inch                    | mm   | DN    | Air**                                         | Nitrogen (N₂) | Argon (Ar) | Oxygen (O₂) | Carbon dioxide (CO₂) | Methane natural gas (CH₄) | Helium (He)    | Hydrogen (H₂)    | Propane (C₃H₈)   |
| ½"                      | 16.1 | DN 15 | 20 [14.4]                                     | 20 [13.2]     | 35 [20]    | 20 [13.5]   | 20 [14.1]            | 240 NI/min [8.4]          | 170 NI/min [6] | 120 NI/min [4.2] | 185 NI/min [6.6] |
| ¾"                      | 21.7 | DN 20 | 45 [25]                                       | 40 [25]       | 75 [40]    | 45 [25]     | 45 [25]              | 25 [15]                   | 20 [11.7]      | 235 NI/min [8.1] | 20 [12.9]        |
| 1"                      | 27.3 | DN 25 | 75 [45]                                       | 70 [40]       | 120 [70]   | 75 [40]     | 75 [45]              | 45 [25]                   | 30 [15]        | 20 [13.5]        | 35 [20]          |
| 1 ¼"                    | 36.0 | DN 32 | 140 [80]                                      | 130 [75]      | 220 [130]  | 135 [80]    | 140 [80]             | 85 [50]                   | 60 [35]        | 40 [20]          | 65 [35]          |
| 1 ½"                    | 41.9 | DN 40 | 195 [115]                                     | 180 [105]     | 305 [180]  | 185 [110]   | 195 [115]            | 115 [65]                  | 80 [45]        | 55 [30]          | 90 [50]          |
| 2"                      | 53.1 | DN 50 | 320 [190]                                     | 295 [175]     | 505 [295]  | 305 [180]   | 320 [185]            | 190 [110]                 | 135 [75]       | 95 [55]          | 145 [85]         |
| 2 ½"                    | 68.9 | DN 65 | 550 [325]                                     | 505 [300]     | 865 [510]  | 525 [310]   | 545 [320]            | 325 [190]                 | 230 [135]      | 160 [95]         | 250 [150]        |
| 3"                      | 80.9 | DN 80 | 765 [450]                                     | 705 [415]     | 1200 [705] | 730 [430]   | 760 [445]            | 450 [265]                 | 320 [185]      | 225 [130]        | 350 [205]        |

### Measuring ranges low-speed version (continued)

| Inside diameter of pipe |      |       | Low-speed version (50 m/s)                    |                             |                  |                          |                          |                          |                          |                     |                          |
|-------------------------|------|-------|-----------------------------------------------|-----------------------------|------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------|--------------------------|
|                         |      |       | Measuring range full scales in Nm³/h* / [cfm] |                             |                  |                          |                          |                          |                          |                     |                          |
| Inch                    | mm   | DN    | Corgon ®18                                    | Forming gas 90% N₂ + 10% H₂ | Natural gas (NG) | Biogas 50% CH₄ + 50% CO₂ | Biogas 60% CH₄ + 40% CO₂ | LPG 60% C₃H₈ + 40% C₄H₁₀ | LPG 50% C₃H₈ + 50% C₄H₁₀ | Nitrous oxide (N₂O) | Ethyne/ Acetylene (C₂H₂) |
| ½"                      | 16.1 | DN 15 | 35 [20]                                       | 20 [12]                     | 15 [9]           | 15 [10.5]                | 15 [10.2]                | 215 NI/min [7.5]         | 210 NI/min [7.5]         | 20 [14.1]           | 225 NI/min [8.1]         |
| ¾"                      | 21.7 | DN 20 | 70 [40]                                       | 40 [20]                     | 30 [15]          | 30 [20]                  | 30 [20]                  | 25 [15]                  | 25 [14.7]                | 45 [25]             | 25 [15]                  |
| 1"                      | 27.3 | DN 25 | 115 [65]                                      | 65 [35]                     | 50 [25]          | 55 [30]                  | 55 [30]                  | 40 [20]                  | 40 [20]                  | 75 [45]             | 40 [25]                  |
| 1 ¼"                    | 36.0 | DN 32 | 205 [120]                                     | 120 [70]                    | 90 [50]          | 100 [60]                 | 100 [55]                 | 75 [45]                  | 70 [40]                  | 140 [80]            | 80 [45]                  |
| 1 ½"                    | 41.9 | DN 40 | 285 [170]                                     | 165 [95]                    | 125 [70]         | 140 [80]                 | 140 [80]                 | 105 [60]                 | 100 [60]                 | 190 [110]           | 110 [65]                 |
| 2"                      | 53.1 | DN 50 | 470 [275]                                     | 270 [160]                   | 205 [120]        | 235 [135]                | 225 [135]                | 170 [100]                | 165 [95]                 | 315 [185]           | 180 [105]                |
| 2 ½"                    | 68.9 | DN 65 | 805 [475]                                     | 465 [275]                   | 350 [205]        | 400 [235]                | 390 [230]                | 295 [170]                | 285 [165]                | 540 [320]           | 310 [180]                |
| 3"                      | 80.9 | DN 80 | 1120 [660]                                    | 645 [380]                   | 485 [285]        | 555 [325]                | 540 [320]                | 405 [240]                | 400 [235]                | 750 [440]           | 430 [250]                |

\* Nm³/h in acc. with DIN 1343: 0 °C, 1013.25 hPa for gases

\*\* ISO 1217: 20 °C, 1000 hPa for air

## Flow measuring ranges KEC-2/KEC-4

## Measuring ranges standard version

| Inside diameter of pipe |      |       | Standard version (92.7 m/s)                                |                            |             |                          |                                   |                                        |             |                            |                                          |
|-------------------------|------|-------|------------------------------------------------------------|----------------------------|-------------|--------------------------|-----------------------------------|----------------------------------------|-------------|----------------------------|------------------------------------------|
|                         |      |       | Measuring range full scales in Nm <sup>3</sup> /h* / [cfm] |                            |             |                          |                                   |                                        |             |                            |                                          |
| Inch                    | mm   | DN    | Air**                                                      | Nitrogen (N <sub>2</sub> ) | Argon (Ar)  | Oxygen (O <sub>2</sub> ) | Carbon dioxide (CO <sub>2</sub> ) | Methane natural gas (CH <sub>4</sub> ) | Helium (He) | Hydrogen (H <sub>2</sub> ) | Propane (C <sub>3</sub> H <sub>8</sub> ) |
| ½"                      | 16.1 | DN 15 | 45 [25]                                                    | 40 [20]                    | 70 [40]     | 40 [25]                  | 45 [25]                           | 25 [15]                                | 15 [11.1]   | 220 NI/min [7.8]           | 20 [12.3]                                |
| ¾"                      | 21.7 | DN 20 | 85 [50]                                                    | 80 [45]                    | 135 [80]    | 80 [45]                  | 85 [50]                           | 50 [30]                                | 35 [20]     | 25 [15]                    | 40 [20]                                  |
| 1"                      | 27.3 | DN 25 | 145 [85]                                                   | 135 [75]                   | 230 [135]   | 140 [80]                 | 145 [85]                          | 85 [50]                                | 60 [35]     | 40 [25]                    | 65 [35]                                  |
| 1 ¼"                    | 36.0 | DN 32 | 265 [155]                                                  | 240 [140]                  | 415 [245]   | 250 [145]                | 260 [155]                         | 155 [90]                               | 110 [65]    | 75 [45]                    | 120 [70]                                 |
| 1 ½"                    | 41.9 | DN 40 | 365 [215]                                                  | 335 [195]                  | 570 [335]   | 345 [205]                | 360 [210]                         | 215 [125]                              | 150 [90]    | 105 [60]                   | 165 [95]                                 |
| 2"                      | 53.1 | DN 50 | 600 [350]                                                  | 550 [320]                  | 935 [550]   | 570 [335]                | 590 [345]                         | 355 [205]                              | 250 [145]   | 175 [100]                  | 275 [160]                                |
| 2 ½"                    | 68.9 | DN 65 | 1025 [600]                                                 | 945 [555]                  | 1605 [945]  | 980 [575]                | 1015 [595]                        | 605 [355]                              | 425 [250]   | 300 [175]                  | 470 [275]                                |
| 3"                      | 80.9 | DN 80 | 1420 [835]                                                 | 1305 [770]                 | 2225 [1310] | 1355 [795]               | 1405 [825]                        | 840 [495]                              | 595 [350]   | 415 [245]                  | 650 [385]                                |

## Measuring ranges standard version (continued)

| Inside diameter of pipe |      |       | Standard version (92.7 m/s)                                |                                                     |                  |                                                  |                                                  |                                                                            |                                                                            |                                  |                                                    |
|-------------------------|------|-------|------------------------------------------------------------|-----------------------------------------------------|------------------|--------------------------------------------------|--------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------|----------------------------------------------------|
|                         |      |       | Measuring range full scales in Nm <sup>3</sup> /h* / [cfm] |                                                     |                  |                                                  |                                                  |                                                                            |                                                                            |                                  |                                                    |
| Inch                    | mm   | DN    | Corgon ®18                                                 | Forming gas 90% N <sub>2</sub> + 10% H <sub>2</sub> | Natural gas (NG) | Biogas 50% CH <sub>4</sub> + 50% CO <sub>2</sub> | Biogas 60% CH <sub>4</sub> + 40% CO <sub>2</sub> | LPG 60% C <sub>3</sub> H <sub>8</sub> + 40% C <sub>4</sub> H <sub>10</sub> | LPG 50% C <sub>3</sub> H <sub>8</sub> + 50% C <sub>4</sub> H <sub>10</sub> | Nitrous oxide (N <sub>2</sub> O) | Ethyne/ Acetylene (C <sub>2</sub> H <sub>2</sub> ) |
| ½"                      | 16.1 | DN 15 | 65 [35]                                                    | 35 [20]                                             | 25 [15]          | 30 [15]                                          | 30 [15]                                          | 20 [14.1]                                                                  | 20 [13.8]                                                                  | 40 [25]                          | 25 [15]                                            |
| ¾"                      | 21.7 | DN 20 | 130 [75]                                                   | 75 [40]                                             | 55 [30]          | 60 [35]                                          | 60 [35]                                          | 45 [25]                                                                    | 45 [25]                                                                    | 85 [50]                          | 45 [25]                                            |
| 1"                      | 27.3 | DN 25 | 215 [125]                                                  | 120 [70]                                            | 90 [55]          | 105 [60]                                         | 100 [60]                                         | 75 [45]                                                                    | 75 [45]                                                                    | 140 [85]                         | 80 [45]                                            |
| 1 ¼"                    | 36.0 | DN 32 | 385 [225]                                                  | 225 [130]                                           | 165 [95]         | 190 [110]                                        | 185 [110]                                        | 140 [80]                                                                   | 135 [80]                                                                   | 260 [150]                        | 145 [85]                                           |
| 1 ½"                    | 41.9 | DN 40 | 535 [315]                                                  | 310 [180]                                           | 230 [135]        | 265 [155]                                        | 260 [150]                                        | 195 [110]                                                                  | 190 [110]                                                                  | 355 [210]                        | 205 [120]                                          |
| 2"                      | 53.1 | DN 50 | 875 [515]                                                  | 505 [295]                                           | 380 [220]        | 435 [255]                                        | 425 [250]                                        | 315 [185]                                                                  | 310 [180]                                                                  | 585 [345]                        | 335 [195]                                          |
| 2 ½"                    | 68.9 | DN 65 | 1500 [880]                                                 | 865 [510]                                           | 650 [380]        | 745 [440]                                        | 725 [425]                                        | 545 [320]                                                                  | 535 [315]                                                                  | 1005 [590]                       | 575 [335]                                          |
| 3"                      | 80.9 | DN 80 | 2075 [1220]                                                | 1205 [705]                                          | 900 [530]        | 1035 [605]                                       | 1005 [590]                                       | 755 [445]                                                                  | 740 [435]                                                                  | 1395 [820]                       | 795 [470]                                          |

\* Nm<sup>3</sup>/h in acc. with DIN 1343: 0 °C, 1013.25 hPa for gases

\*\* ISO 1217: 20 °C, 1000 hPa for air



## Flow measuring ranges KEC-2/KEC-4

### Measuring ranges max version

| Inside diameter of pipe |      |       | Max version (185.0 m/s)                                    |                            |             |                          |                                   |                                        |             |                            |                                          |
|-------------------------|------|-------|------------------------------------------------------------|----------------------------|-------------|--------------------------|-----------------------------------|----------------------------------------|-------------|----------------------------|------------------------------------------|
|                         |      |       | Measuring range full scales in Nm <sup>3</sup> /h* / [cfm] |                            |             |                          |                                   |                                        |             |                            |                                          |
| Inch                    | mm   | DN    | Air**                                                      | Nitrogen (N <sub>2</sub> ) | Argon (Ar)  | Oxygen (O <sub>2</sub> ) | Carbon dioxide (CO <sub>2</sub> ) | Methane natural gas (CH <sub>4</sub> ) | Helium (He) | Hydrogen (H <sub>2</sub> ) | Propane (C <sub>3</sub> H <sub>8</sub> ) |
| ½"                      | 16.1 | DN 15 | 90 [50]                                                    | 80 [45]                    | 140 [80]    | 85 [50]                  | 90 [50]                           | 50 [30]                                | 35 [20]     | 25 [15]                    | 40 [20]                                  |
| ¾"                      | 21.7 | DN 20 | 175 [100]                                                  | 160 [95]                   | 275 [160]   | 165 [95]                 | 175 [100]                         | 105 [60]                               | 70 [40]     | 50 [30]                    | 80 [45]                                  |
| 1"                      | 27.3 | DN 25 | 290 [170]                                                  | 270 [155]                  | 460 [270]   | 280 [165]                | 290 [170]                         | 170 [100]                              | 120 [70]    | 85 [50]                    | 135 [75]                                 |
| 1 ¼"                    | 36.0 | DN 32 | 530 [310]                                                  | 485 [285]                  | 830 [485]   | 505 [295]                | 525 [305]                         | 310 [185]                              | 220 [130]   | 155 [90]                   | 240 [140]                                |
| 1 ½"                    | 41.9 | DN 40 | 730 [430]                                                  | 670 [395]                  | 1140 [670]  | 695 [410]                | 720 [425]                         | 430 [250]                              | 305 [180]   | 215 [125]                  | 335 [195]                                |
| 2"                      | 53.1 | DN 50 | 1195 [700]                                                 | 1100 [645]                 | 1870 [1100] | 1140 [670]               | 1185 [695]                        | 705 [415]                              | 500 [290]   | 350 [205]                  | 550 [320]                                |
| 2 ½"                    | 68.9 | DN 65 | 2050 [1205]                                                | 1885 [1110]                | 3205 [1885] | 1955 [1150]              | 2030 [1190]                       | 1210 [710]                             | 855 [500]   | 600 [350]                  | 940 [555]                                |
| 3"                      | 80.9 | DN 80 | 2840 [1670]                                                | 2610 [1535]                | 4440 [2615] | 2710 [1590]              | 2810 [1655]                       | 1680 [985]                             | 1185 [695]  | 830 [490]                  | 1305 [765]                               |

### Measuring ranges max version (continued)

| Inside diameter of pipe |      |       | Max version (185.0 m/s)                                    |                                                     |                  |                                                  |                                                  |                                                                            |                                                                            |                                  |                                                    |
|-------------------------|------|-------|------------------------------------------------------------|-----------------------------------------------------|------------------|--------------------------------------------------|--------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------|----------------------------------------------------|
|                         |      |       | Measuring range full scales in Nm <sup>3</sup> /h* / [cfm] |                                                     |                  |                                                  |                                                  |                                                                            |                                                                            |                                  |                                                    |
| Inch                    | mm   | DN    | Corgon ®18                                                 | Forming gas 90% N <sub>2</sub> + 10% H <sub>2</sub> | Natural gas (NG) | Biogas 50% CH <sub>4</sub> + 50% CO <sub>2</sub> | Biogas 60% CH <sub>4</sub> + 40% CO <sub>2</sub> | LPG 60% C <sub>3</sub> H <sub>8</sub> + 40% C <sub>4</sub> H <sub>10</sub> | LPG 50% C <sub>3</sub> H <sub>8</sub> + 50% C <sub>4</sub> H <sub>10</sub> | Nitrous oxide (N <sub>2</sub> O) | Ethyne/ Acetylene (C <sub>2</sub> H <sub>2</sub> ) |
| ½"                      | 16.1 | DN 15 | 130 [75]                                                   | 75 [45]                                             | 55 [30]          | 65 [35]                                          | 60 [35]                                          | 45 [25]                                                                    | 45 [25]                                                                    | 85 [50]                          | 50 [30]                                            |
| ¾"                      | 21.7 | DN 20 | 255 [150]                                                  | 150 [85]                                            | 110 [65]         | 125 [75]                                         | 125 [70]                                         | 90 [55]                                                                    | 90 [50]                                                                    | 170 [100]                        | 95 [55]                                            |
| 1"                      | 27.3 | DN 25 | 430 [250]                                                  | 245 [145]                                           | 185 [110]        | 210 [125]                                        | 205 [120]                                        | 155 [90]                                                                   | 150 [90]                                                                   | 285 [170]                        | 165 [95]                                           |
| 1 ¼"                    | 36.0 | DN 32 | 775 [455]                                                  | 445 [260]                                           | 335 [195]        | 385 [225]                                        | 375 [220]                                        | 280 [165]                                                                  | 275 [160]                                                                  | 520 [305]                        | 295 [175]                                          |
| 1 ½"                    | 41.9 | DN 40 | 1065 [625]                                                 | 615 [360]                                           | 460 [270]        | 530 [310]                                        | 515 [305]                                        | 385 [225]                                                                  | 380 [220]                                                                  | 715 [420]                        | 410 [240]                                          |
| 2"                      | 53.1 | DN 50 | 1745 [1025]                                                | 1010 [595]                                          | 755 [445]        | 870 [510]                                        | 845 [495]                                        | 635 [375]                                                                  | 620 [365]                                                                  | 1170 [690]                       | 670 [395]                                          |
| 2 ½"                    | 68.9 | DN 65 | 2995 [1760]                                                | 1735 [1020]                                         | 1300 [765]       | 1490 [875]                                       | 1450 [855]                                       | 1090 [640]                                                                 | 1065 [625]                                                                 | 2010 [1180]                      | 1150 [675]                                         |
| 3"                      | 80.9 | DN 80 | 4150 [2440]                                                | 2400 [1415]                                         | 1800 [1060]      | 2065 [1215]                                      | 2015 [1185]                                      | 1510 [890]                                                                 | 1480 [870]                                                                 | 2785 [1640]                      | 1590 [935]                                         |

\* Nm<sup>3</sup>/h in acc. with DIN 1343: 0 °C, 1013.25 hPa for gases

\*\* ISO 1217: 20 °C, 1000 hPa for air



## Flow measuring ranges KEC-2/KEC-4

## Measuring ranges high-speed version

| Inside diameter of pipe |      |       | High-speed version (224.0 m/s)                             |                            |             |                          |                                   |                                        |             |                            |                                          |
|-------------------------|------|-------|------------------------------------------------------------|----------------------------|-------------|--------------------------|-----------------------------------|----------------------------------------|-------------|----------------------------|------------------------------------------|
|                         |      |       | Measuring range full scales in Nm <sup>3</sup> /h* / [cfm] |                            |             |                          |                                   |                                        |             |                            |                                          |
| Inch                    | mm   | DN    | Air**                                                      | Nitrogen (N <sub>2</sub> ) | Argon (Ar)  | Oxygen (O <sub>2</sub> ) | Carbon dioxide (CO <sub>2</sub> ) | Methane natural gas (CH <sub>4</sub> ) | Helium (He) | Hydrogen (H <sub>2</sub> ) | Propane (C <sub>3</sub> H <sub>8</sub> ) |
| ½"                      | 16.1 | DN 15 | 110 [60]                                                   | 100 [55]                   | 170 [100]   | 105 [60]                 | 105 [60]                          | 65 [35]                                | 45 [25]     | 30 [15]                    | 50 [25]                                  |
| ¾"                      | 21.7 | DN 20 | 215 [125]                                                  | 195 [115]                  | 335 [195]   | 205 [120]                | 210 [125]                         | 125 [70]                               | 85 [50]     | 60 [35]                    | 95 [55]                                  |
| 1"                      | 27.3 | DN 25 | 355 [210]                                                  | 325 [190]                  | 555 [325]   | 340 [200]                | 350 [205]                         | 210 [120]                              | 145 [85]    | 100 [60]                   | 160 [95]                                 |
| 1 ¼"                    | 36.0 | DN 32 | 640 [375]                                                  | 590 [345]                  | 1005 [590]  | 610 [360]                | 635 [370]                         | 380 [220]                              | 265 [155]   | 185 [110]                  | 295 [170]                                |
| 1 ½"                    | 41.9 | DN 40 | 885 [520]                                                  | 815 [475]                  | 1385 [815]  | 845 [495]                | 875 [515]                         | 520 [305]                              | 370 [215]   | 260 [150]                  | 405 [235]                                |
| 2"                      | 53.1 | DN 50 | 1450 [850]                                                 | 1330 [780]                 | 2265 [1330] | 1380 [810]               | 1430 [840]                        | 855 [500]                              | 605 [355]   | 425 [250]                  | 665 [390]                                |
| 2 ½"                    | 68.9 | DN 65 | 2480 [1460]                                                | 2280 [1340]                | 3880 [2285] | 2365 [1390]              | 2455 [1445]                       | 1465 [865]                             | 1035 [610]  | 725 [425]                  | 1140 [670]                               |
| 3"                      | 80.9 | DN 80 | 3440 [2025]                                                | 3165 [1860]                | 5380 [3165] | 3280 [1930]              | 3405 [2000]                       | 2035 [1195]                            | 1435 [845]  | 1010 [590]                 | 1580 [930]                               |

## Measuring ranges high-speed version (continued)

| Inside diameter of pipe |      |       | High-speed version (224.0 m/s)                             |                                                     |                  |                                                  |                                                  |                                                                            |                                                                            |                                  |                                                    |
|-------------------------|------|-------|------------------------------------------------------------|-----------------------------------------------------|------------------|--------------------------------------------------|--------------------------------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------|----------------------------------|----------------------------------------------------|
|                         |      |       | Measuring range full scales in Nm <sup>3</sup> /h* / [cfm] |                                                     |                  |                                                  |                                                  |                                                                            |                                                                            |                                  |                                                    |
| Inch                    | mm   | DN    | Corgon ®18                                                 | Forming gas 90% N <sub>2</sub> + 10% H <sub>2</sub> | Natural gas (NG) | Biogas 50% CH <sub>4</sub> + 50% CO <sub>2</sub> | Biogas 60% CH <sub>4</sub> + 40% CO <sub>2</sub> | LPG 60% C <sub>3</sub> H <sub>8</sub> + 40% C <sub>4</sub> H <sub>10</sub> | LPG 50% C <sub>3</sub> H <sub>8</sub> + 50% C <sub>4</sub> H <sub>10</sub> | Nitrous oxide (N <sub>2</sub> O) | Ethyne/ Acetylene (C <sub>2</sub> H <sub>2</sub> ) |
| ½"                      | 16.1 | DN 15 | 160 [90]                                                   | 90 [50]                                             | 65 [40]          | 80 [45]                                          | 75 [45]                                          | 55 [30]                                                                    | 55 [30]                                                                    | 105 [60]                         | 60 [35]                                            |
| ¾"                      | 21.7 | DN 20 | 310 [185]                                                  | 180 [105]                                           | 135 [80]         | 155 [90]                                         | 150 [85]                                         | 110 [65]                                                                   | 110 [65]                                                                   | 210 [120]                        | 120 [70]                                           |
| 1"                      | 27.3 | DN 25 | 520 [305]                                                  | 300 [175]                                           | 225 [130]        | 255 [150]                                        | 250 [145]                                        | 190 [110]                                                                  | 185 [105]                                                                  | 345 [205]                        | 200 [115]                                          |
| 1 ¼"                    | 36.0 | DN 32 | 935 [550]                                                  | 540 [320]                                           | 405 [240]        | 465 [275]                                        | 455 [265]                                        | 340 [200]                                                                  | 335 [195]                                                                  | 630 [370]                        | 360 [210]                                          |
| 1 ½"                    | 41.9 | DN 40 | 1290 [760]                                                 | 745 [440]                                           | 560 [330]        | 640 [375]                                        | 625 [365]                                        | 470 [275]                                                                  | 460 [270]                                                                  | 865 [510]                        | 495 [290]                                          |
| 2"                      | 53.1 | DN 50 | 2115 [1245]                                                | 1225 [720]                                          | 920 [540]        | 1050 [620]                                       | 1025 [605]                                       | 770 [450]                                                                  | 755 [440]                                                                  | 1420 [835]                       | 810 [475]                                          |
| 2 ½"                    | 68.9 | DN 65 | 3625 [2130]                                                | 2100 [1235]                                         | 1575 [925]       | 1805 [1060]                                      | 1760 [1035]                                      | 1320 [775]                                                                 | 1290 [760]                                                                 | 2435 [1430]                      | 1390 [820]                                         |
| 3"                      | 80.9 | DN 80 | 5025 [2955]                                                | 2910 [1710]                                         | 2180 [1285]      | 2500 [1470]                                      | 2440 [1435]                                      | 1830 [1075]                                                                | 1790 [1050]                                                                | 3375 [1985]                      | 1930 [1135]                                        |

\* Nm<sup>3</sup>/h in acc. with DIN 1343: 0 °C, 1013.25 hPa for gases

\*\* ISO 1217: 20 °C, 1000 hPa for air