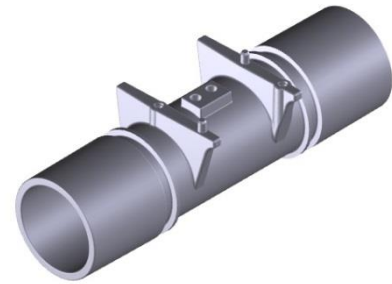


# Flow Element - EK-P4 Evaluation Kit

For SDP3x Differential Pressure Sensors



## Preface

Sensirion's differential pressure sensors are commonly used for measuring the air flow in a bypass configuration. Especially for high volume and cost sensitive applications the differential pressure sensor in bypass is the ideal solution. If the flow element (also known as: flow body, main pass, orifice or pressure drop element), is produced with small dimensional tolerances, no recalibration of every single device is required. This reduces costs even more.

For more information about using Sensirion's differential pressure sensor in a bypass configuration, read the technical white paper: "Efficient Flow measurement in bypass", which can be found on our website.

## 1 Introduction

The EK-P4 is the evaluation kit for Sensirion's ultra-small differential pressure sensor SDP3x. The small size and low weight of the SDP3x make new applications possible. Its small size also comes with its challenges for integration and evaluation. The EK-P4 evaluation kit includes a flow element to make easy flow measurement evaluation in bypass of the SDP3x possible, and is an example on how to design the SDP3x into a target application.

The flow elements are produced for evaluation purposes only.

## 2 Differential Pressure to Flow Conversion

The SDP3x is calibrated for differential pressure. For flow measurements with the flow element the differential pressure (DP) needs to be converted to Standard Liters per Minute (slm). The values in the table below can be used for this conversion.

**Disclaimer: These values are for information purpose only. The flow-elements are not tested and calibrated on a single device basis, and therefore no guarantee on accuracy can be given.**

| DP (Pa) | Flow (slm) | DP (Pa) | Flow (slm) | DP (Pa) | Flow (slm) | DP (Pa) | Flow (slm) | DP (Pa) | Flow (slm) |
|---------|------------|---------|------------|---------|------------|---------|------------|---------|------------|
| 0.00    | 0.0        | 6.65    | 17.2       | 35.70   | 45.1       | 82.38   | 73.0       | 258.42  | 141.3      |
| 0.15    | 1.1        | 8.09    | 19.3       | 38.76   | 47.2       | 86.52   | 75.1       | 274.74  | 146.5      |
| 0.32    | 2.1        | 9.65    | 21.5       | 41.94   | 49.4       | 97.57   | 80.5       | 304.68  | 155.6      |
| 0.54    | 3.2        | 11.35   | 23.6       | 45.21   | 51.5       | 109.38  | 85.9       | 322.50  | 161.0      |
| 0.79    | 4.3        | 13.18   | 25.8       | 48.59   | 53.7       | 121.82  | 91.2       | 340.83  | 166.3      |
| 1.07    | 5.4        | 15.15   | 27.9       | 52.06   | 55.8       | 134.98  | 96.6       | 359.43  | 171.7      |
| 1.39    | 6.4        | 17.26   | 30.1       | 55.62   | 58.0       | 148.59  | 102.0      | 378.05  | 177.1      |
| 1.75    | 7.5        | 19.51   | 32.2       | 59.24   | 60.1       | 162.57  | 107.3      | 397.91  | 182.4      |
| 2.13    | 8.6        | 21.92   | 34.3       | 62.92   | 62.2       | 183.30  | 115.1      | 419.05  | 187.8      |
| 2.52    | 9.7        | 24.43   | 36.5       | 66.67   | 64.4       | 197.59  | 120.3      | 439.32  | 193.2      |
| 2.93    | 10.7       | 27.07   | 38.6       | 70.48   | 66.5       | 212.03  | 125.6      | 461.50  | 198.5      |
| 4.08    | 12.9       | 29.84   | 40.8       | 74.38   | 68.7       | 226.90  | 130.8      | 484.33  | 203.9      |
| 5.32    | 15.0       | 32.71   | 42.9       | 78.35   | 70.8       | 242.51  | 136.0      | 507.99  | 209.3      |

Typical device to device variation is estimated to be around 10% m.v (3sigma).

### 3 Form Factor

The flow element is designed to fit on the SDP3x evaluation kit: EK-P4. The EK-P4 includes two screws to fix the flow element to the PCB.

The 22mm medical cones provide the pneumatic connections to the flow element. The medical cones might not be within specifications and can have leaks because of small molding imperfections.

### 4 Flow Element Availability

The flow element has been included in the EK-P4 evaluation kit for demonstration and quick evaluation purposes, and is not for sale separately.

In case the target application needs a flow element it is important to consider the following points:

- Making a custom and reliable flow element is doable, but not necessarily cheap and easy, because of injection molding tooling.
- It is estimated that for volumes below 2000 pieces per year it is probably not economical to develop a flow element. In this case Sensirion's complete flow sensor solutions are advised, for example the SFM3000 or SFM4100.
- For yearly volumes above 2000 pieces a custom flow element could be the most cost effective solution, but the development, which is often iterative and trial and error, should not be underestimated.
- The STEP file of the flow element is available on request.

For more information on how to integrate the SDP3x in your system, consult the SDP3x Engineering Guidelines in the download center on [www.sensirion.com](http://www.sensirion.com) or contact Sensirion.

## Revision History

| Date     | Version | Author | Changes       |
|----------|---------|--------|---------------|
| Oct 2016 | V0.1    | ANB    | Initial Draft |
|          |         |        |               |

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