Handout GEMÜ Code 5M

EN

Validation Guide

General Information Document

1 Background

Due to the discontinuation of polymers used in the construction of the two-piece PTFE/EPDM code 5E, M1 and 50 diaphragms, GEMÜ have released a replacement code 5M diaphragm.

2 Details of Code 5M diaphragms

1. PTFE Shield material in contact with process media unchanged (same as Code 5E).
2. Diaphragm designed as a direct replacement for the code 5E, M1 and 50 diaphragms without modification to the valve body or top works.
3. Diaphragm backing (not in product contact) made of the new code 19 elastomer material developed and optimized by GEMÜ.

3 Advantages/Innovation of Code 5M diaphragms

1. PTFE shield designed with additional chambering on the reverse side (non-product contact) for vacuum applications, this prevents the diaphragm face from being pulled into the valve.
2. The PTFE shield has a wider sealing bead to compensate any play in assembly.
3. Improved long-term sealing as result of new weir sealing bead design (Figure 1).
4. Tabs on PTFE shield and EPDM backing diaphragm are aligned on opposite sides, so that all information on diaphragms is visible when assembled.
5. Mechanical Stop designed into Diaphragm Shield mounting pin to ensure correct assembly of diaphragm.
6. Leakage holes in EPDM backing cushion as standard.
7. New diaphragm available in diaphragm size 10, previously this size was only available in laminated form.

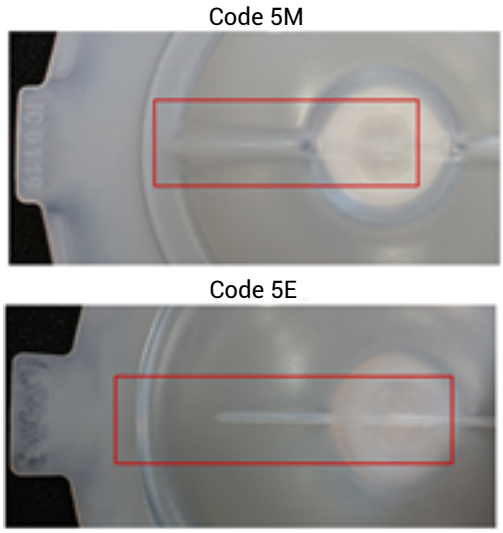

Fig. 1: Full-length weir sealing bead

4 Comparison of material for Code 5M/5E diaphragms

The following Table 1 shows the Values for compression set, hardness, tensile strength and elongation at break for both Code 5M and 5E elastomeric diaphragm raw material. The Code 5M raw material shows a lower compression set which is an indication of a tighter sealing behavior. In addition, the Code 5M material shows a higher tensile strength and higher elongation at break compared to the material of the Code 5E diaphragms. The hardness of both materials is nearly identical.

Test:	Code 5M	Code 5E
Compression set 70 h/150 °C	++	+
Hardness	+	+
Tensile strength	++	+
Elongation at break	++	+
"+" = good		

Table 1 Comparison of material test results Code 5M/5E

5 Endurance testing for Code 5M diaphragms

The service life of Code 5M diaphragms has been validated and compared to that of the Code 5E, M1 and 50 diaphragms using endurance tests. The Code 5M test diaphragms are assembled on valves by trained personnel. Leak testing in accordance with DIN EN 12266 is carried out before, after and during endurance tests. These tests are used to determine whether, and to what extent, the leak-tightness characteristics of the diaphragms are reduced by the stresses of the endurance tests. The endurance tests result in artificial ageing due to the effects of mechanical and thermal stress as well as direct contact with corrosive media. Once the test valve has completed the specified test program, it is removed and a final leak test is carried out. Following this, the test valve is disassembled and the diaphragm is analyzed for faults by diaphragm experts.

The sterility endurance test is run in cycles. During a sterility cycle, the test valve is exposed to steam, vacuum and cold water. From our analysis of the results of our testing, GEMÜ can state the Code 5M diaphragm has equal or better performance than the Code 5E, M1 and 50 diaphragms that it is replacing.

Additional performed tests passed successfully

1. Steam endurance test
2. Vacuum endurance test
3. Determining the pin pull-out forces
4. Determining the pin over torque

6 Batch testing for Code 5M diaphragms

Every new diaphragm batch is tested by GEMÜs quality assurance department. The diaphragm surface, dimensional tolerances, the hardness is audited by quality assurance personal. For every diaphragm batch a sterility endurance test with leak measurements in accordance with DIN EN 12266 is done. Only if the diaphragm batch passes all quality tests within the tolerances it will be released for use.

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Subject to alteration

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