

# Test Report

**Test centre:** TÜV Saarland e. V.  
Am TÜV 1  
66280 Sulzbach

**Test object:** Shut-off damper, ID no. 220  
Diameter 200 mm

**Customer:** Aerotechnik Siegwart GmbH  
Untere Hofwiesen  
66299 Friedrichsthal

**Scope of 2nd commission:** Measurement of the leakage air flow in accordance with DIN EN 1751

**Test basis:** DIN EN 1751, issue 01.99

**Test date:** 31-03-2005

**Inspected by:** Mahren (Graduate Engineer – Dipl. Ing. (FH))

**Test report no.:** 60404A0216/B shut-off damper, circular

**No. of pages.:** 5

## **1. General information**

Aerotechnik Siegwart GmbH, Friedrichsthal commissioned us to inspect the sealing characteristics of a circular shut-off damper in accordance with DIN EN 1751, class 4. The purpose of the test was to establish whether DIN EN 1751 (class 4) requirements were met.

## **2. Description of the inspected system**

The description of the inspected damper in accordance with the manufacturer's specifications is included in enclosure 1. The documents presented to us do not contain production tolerances.

## **3. Test structure and realisation of measurements**

The test station structure is illustrated in the enclosure. A diaphragm gas meter was utilised to measure the air volume and a differential pressure measuring instrument (SI) to measure the pressure.

## **4. Measuring results**

Measuring results are listed in table 1 of the report.

The leakage air volumes measured are less than the values specified in DIN EN 1751 (as illustrated in table 1).

The inspection described here was not intended as a type or design acceptance test, endurance test, material test or production inspection, and no requirement for such existed. The measurement results are only valid for the inspected damper.

**Table 1**

Circular shut-off damper in accordance with DIN EN 1751, class 4

Dimensions $\varnothing$ [mm]	$\Delta p$ [Pa]	V [m <sup>3</sup> /h]	Free surface [m <sup>2</sup> ] * 10 <sup>-2</sup>	Permissible leakage air flow [ $\frac{m^3}{h \cdot m^2}$ ]	Measured leakage air flow [ $\frac{m^3}{h \cdot m^2}$ ]
200	250	0.0154	3.14	9.2	0.49
	500	0.0254	3.14	12.8	0.81
	1000	0.0371	3.14	18.0	1.18

**Table 2**

List of measuring instruments employed:

Ser. no.	Measuring instrument designation	Measurement range	Measurement uncertainty	Calibrated yes/no	Comment
1	Diaphragm gas meter	0 ... 10 m <sup>3</sup> /h	± 1.0 % of measurement value	yes	
2	Micromanometer Manufacturer: SI	0 ... 200 Pa 0 ... 2000 Pa	± 0.5 % of measurement value	yes yes	

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Sulzbach, 02-05-05

Building Services and Conveying Engineering  
Assessor:

*Signature*

Mahren (Graduate Engineer – Dipl. Ing. (FH))

**Enclosure**

Manufacturer's description  
Test structure  
Calculation example

**TC**

**Date:**

**Distributor:**

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5 copies: Aerotechnik Siegwart; c/o H. Kuhn, Untere Hofwiesen,  
66299 Friedrichsthal

**Calculation example:**

Circular shut-off damper in accordance with DIN EN 1751, class 4

Diameter	200 mm
Test pressure	1000 Pa
Free surface A	$3.14 \cdot 10^{-2} \text{ m}^2$

Permissible leakage air flow  $Q_{VLBA}$  in  $\text{l} \cdot \text{s}^{-1} \cdot \text{m}^{-2}$  from Fig. C 1 of DIN EN 1751 at a test pressure of 1000 Pa, class 4:

$$Q_{VLBA} = 5 \text{ l} \cdot \text{s}^{-1} \cdot \text{m}^{-2}, \text{ equivalent to } 18 \text{ m}^3 \cdot \text{h}^{-1} \cdot \text{m}^{-2}$$

Measurement value:  $V = 0.0371 \text{ m}^3/\text{h}$

Leakage air flow:

$$Q_{VLBA} = \frac{V[\text{m}^3/\text{s}]}{A[\text{m}^2]} = \frac{0.0371}{3.14 \cdot 10^{-2}} \cdot \frac{\text{m}^3}{\text{h} \cdot \text{m}^2}$$

$$= 1.81 \text{ m}^3 \cdot \text{h}^{-1} \cdot \text{m}^{-2} < 18 \text{ m}^3 \cdot \text{h}^{-1} \cdot \text{m}^{-2}$$

**Description of the circular shut-off damper made from Sendzimir galvanised sheet steel**

Type:	AKH ID no. 220
Construction year:	2005
Diameter:	200 mm
Installation length:	220 mm
Adjustment:	Manual adjustment device by lever with fixing disc
Male couplings:	Rolling rubber ring sealing system "Roll-Gu-Fix" Male couplings press-calibrated according to DIN 24147 T1

The airtight circular shut-off damper type AKH  $\varnothing$  200 mm consists of a laser-welded housing made from Sendzimir galvanised sheet steel manufactured according to EN 1506 with a centrally located sealing disc.

The fitting of the rubber seal against the tube wall is realized by a laser-welded housing with smooth surface, without any intruding fold. The male couplings are press-calibrated according to DIN 24147 part 1 and consequently they are dimensionally stable and fit accurately.

The sealing disc consists of two Sendzimir galvanised sheet steel discs with an intermediate silicone rubber-washer and is manufactured as a combination in a kind of "sandwich structure", including a form-fit hexagonal axle pick-up for the damper axles. This pick-up serves at the same time as centring of the sealing disc against the tube wall.

The actual damper axle consists of two single hexagonal axles (span of the jaw 7), each with an adapter for an o-ring and a retaining ring.

The axle bearing is realized by a special, maintenance-free bearing-bush in which is included a cut-in. During installation, the retaining ring locks into the cut-in of the bearing-bush and thus prevents an axial displacement of the hexagonal axle while the o-ring guarantees an airtight shaft feedthrough towards the exterior.

The locking adjustment of the damper blade is realized by a lever and a fixing disc with grid spacing which is mounted on the housing.

The seal of the a.m. shut-off damper is airtight up to a pressure of 1000 Pa according to Din EN 1751 class 4. It operates within a temperature range from -15°C to 100°C.

Friedrichsthal, 23-03-2005

Helm