VOLKSWAGEN

AKTIENGESELLSCHAFT

Group Standard

TL 82448 Issue 2010-11

Class. No.: 8JF10 Descriptors: brake pipe, brake line, flare load capacity, reverse bending test

Brake Pipe

Flare Load Capacity, Reverse Bending Test

Preface

The brake pipe is a double-walled pipe rolled from copper-plated strip steel. The two layers of the pipe are joined by melting the copper layers contacting each other.

The position of the brazed seam is not taken into consideration when installing the DUT. The brake pipes are delivered as bars (with a length of 150 mm \pm 2 mm each). Both ends are flared and provided with a pipe bolt.

The test requirement is based on known production parts.

1 Scope

The test described in the following serves to examine the flare and thus the material and the manufacturing process.

This Technical Supply Specification (TL) applies to the following brake pipes (see Table 1):

No.	Diameter in mm	Pipe bolt	Flare
1	4,75	M10 × 1	F
2	4,75	M12 × 1	F
3	6,00	M12 × 1	F
4	4,75	Ripro M10 × 1	F

Table 1	 Brake 	pipes
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Each change in the manufacturing process, manufacturing location, sub-contractor, material, and in the pipe bolt must be succeeded by a test according to this standard.

Verify that you have the latest issue of the Standard before relying on it.

This electronically generated Standard is authentic and valid without signature. The English translation is believed to be accurate. In case of discrepancies, the German version is alone authoritative and controlling. Numerical notation acc. to ISO convention.

Technical r	esponsibility		Standards Department	
			EKDV/4 Wolfgang Tiefenbach	EKDV
EGDB/1	Michael Winter	Tel.: +49 5361 9-26567	Tel.: +49 5361 9-75357	Manfred Terlinden

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2 Symbols and abbreviations

f	Frequency in Hz
N ₅₀	Mean value requirement for cycles
N _{max}	Maximum number of cycles
р	Brake pressure in bar
P _Ü	Probability of survival in %
S _a	Travel amplitude in mm
S _{log}	Logarithmic standard deviation

3 General requirements

This TL is based on test results obtained on servo-hydraulic test equipment at Volkswagen. If other test systems are used, comparability of the test results must be ensured. This must be approved by the EGDB Department.

3.1 Brake pipe

According to DIN 74234

3.2 Material

According to Volkswagen standard VW 22015

3.3 Surface

According to TL 222

4 Test

4.1 Test setup

The tests are performed on a servo-hydraulic test system.



Figure 1 – Test setup

Legend

- A Valve: 357 615 273
- B Connecting piece: 411 611 789
- C Connection to cylinder acc. to Figure A.1
- D Distributor: 1J0 611 755
- E Base plate mount

Original components acc. to Figure 1 must be used for the test setup. The connection to the cylinder must conform to the sketch (see Figure A.1).

4.2 Procedure

Mount the valve (Figure 1 pos. A) and the connecting piece (pos. B) on the brake pipe. Then insert the brake pipe into the connection to the cylinder (pos. C). Fit the DUT onto a new, dry distributor (pos. D) and tighten it with a

tightening torque of

14 Nm, AD18

Clamp the brake pipe in the center of the front shaft. The distance between the shaft's center axis and the beginning of the distributor's sealing surface must be (100 ± 1) mm. Now tighten the mount (pos. E) to the base plate such that the DUT can be installed free of stress. Fill the DUT with brake fluid (acc. to TL 766; type Z).

Pressure (p)	(100 ± 5) bar
Test frequency (f):	(30 ± 2) Hz
Travel (s)	0 mm \pm s _a (purely alternating)
Travel control	
Deactivation	Pressure drop to (10 ± 2) bar
Number of cycles for termination	$N_{max} = 10^7$

5 Random sample

20 parts are tested on 2 load levels. The evaluation is based on a log-normal distribution. To this end, the values are entered into a log-log diagram which is then used to determine an average Wöhler curve.

The logarithmic standard deviation is determined from the dispersion of both load levels (by transferring all values of both load levels to one load level along the determined average Wöhler line for calculatory purposes).

6 Evaluation

At least 10 parts per load level are to be tested.

Logarithmic standard deviation: $s_{log} < 0,4$

The requirements listed in Table 2 must be met.

	Average value requirement N ₅₀	
Travel amplitude in mm	4,75 mm diameter for M10 and M12	6 mm diameter for M12
3,0	40 000	7 000
1,6	500 000	70 000

Table 2

7 Other applicable documents

The following documents cited in this Standard are necessary to its application.

Some of the cited documents are translations from the German original. The translations of German terms in such documents may differ from those used in this Standard, resulting in terminological inconsistency.

Standards whose titles are given in German may be available only in German. Editions in other languages may be available from the institution issuing the standard.

TL 222	Corrosion Protection Coatings for Brake Lines; Surface Protection Requirements
TL 766	Brake Fluid; Material Requirements
VW 22015	Precision Steel Pipes; Dimensions, Supply Specifications

DIN 74234 Hydraulic braking systems; brake pipes, flares

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Appendix A (normative)





Legend

- B Brake pipe
- T 1 Part 1; material = aluminum
- T 2 to T 4 Part 1 to part 4, material = C15