TÜVRheinland®

Test Report
944-7119076-2/DG

Test Report

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Testing brake bleeder valves made of steel

Place:	Date:	Consultant:	Checked by:	Test Institute:
Köln	14/03/2007	Dipl.-Ing. Dieter Grunow	Dipl.-Ing. Thomas Kampmann	TÜV Rheinland Kraftfahrt GmbH Fahrzeugtechnik (TVS) Am Grauen Stein D-51105 Köln Germany
		(signature)	*(signature)*	

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Test Report
944-7119076-2/DG

Test sample Client: **fastplan GmbH**
Werksstraße 15
D-45527 Hattingen

Test date: 12/02 / 02/03/2007

Order number: 944-7119076

Manufacturer: **fastplan GmbH**
Werksstraße 15
D-45527 Hattingen

Set-up: Haas
Execution: Haas/Grunow
Measuring technology: Inv. no.: 1729, 7808,128940, 9312

Description:		**Sizes:**	**Material:**
Bleeder valve with		M7, M8, M10, 2 each	Steel
adapter and		M7, M8, M10, 2 each	Steel
banjo bolt		M10x1.25, 3 each	Aluminium
Material of steel components:	C45 k		
Material of aluminium components:	Al Zn MG CU 1.5 EN AW 7075		
O-Ring:	EPDM, resistant against glycol ether-based brake fluid		
Spring:	Steel 1.4310 X10 CrNi 18-8		
Ball:	Steel 1.3541 X45 Cr13		

Tests
Test No. 1: Salt spray test
Test No.2: Continuous pulsating load using 0-150 bar across 150,000 load changes
Test No. 3: Tightening torque test with specified torque values

Test parameter **Test No. 1:** **Salt spray test**
Test specification: EN 60068-2-52 Severity 3
Corrosion test with one test sample of the bleeder valve made of steel as well as one banjo bolt made of aluminium anodized in a natural hue. The top parts of the valve were protected with the aluminium dust cover provided.
For the purpose of testing, the test samples were screwed into an aluminium cylinder.
Salt spray cycles of 4 x 2 hours respectively with 22 hour long storage in damp conditions.
Subsequently, storage in damp conditions for a further 3 days with concluding reporting.

Test result Test No. 1: **O.k.**
Comments on test result: After completing the salt spray test, the surfaces of the test sample (dust cover, steel adapter, aluminium banjo bolt) showed crystalline salt residues. On one side of the adapter, the test sample made of steel showed signs of corrosion (see photo). After removing the dust cover, no corrosion was detectable on the steel bleeder valves. After removing the salt residues, there was only the small area of corrosion on the hexagon head of the steel adapter noticeable. It was possible to remove this small area of corrosion by scratching it off with a finger nail and subsequently cleaning it with a cloth.

Error descriptions: None

Result Test No. 1:
O.k.

Photographic documentation: Salt spray test

Test cylinder with test sample steel (top)

Beginnings of corrosion on steel version

Test sample steel/steel

Test sample steel after removing salt residues

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			Order number:	944-7119076	
	Manufacturer:	**fastplan GmbH** **Werksstraße 15** **D-45527 Hattingen**	Set-up: Execution: Measuring technology:	Haas Haas/Grunow Inv.-Nr.: 1729, 7808,128940, 9312	
	Description:	Bleeder valve with adapter and banjo bolt	Test object No.:	M7, M8, M10 M7, M8, M10 M10x1.25	Steel Steel Aluminium

Test parameter Test No. 2: **Continuous pulsating load**

Test machine:	Pneumatic cylinder Festo above hydraulic cylinder on test block with valves
Control:	PC using DasyLab, Festo valves
Type of signal:	0-150 bar, half sine
Frequency:	approx. 0.6 Hz
Load changes:	125.000
Opening of bleeder valves:	15 times per system across 125.000 load changes

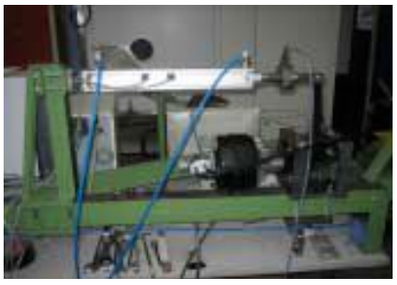
Test result Test No. 2: **O.k.**

Comments on test result: All test samples survived the continuous run of 125.000 load changes at a pulsating load of 150 bar brake pressure without suffering any damage/leakages.

Error descriptions: None

Result Test No. 2:
O.k.

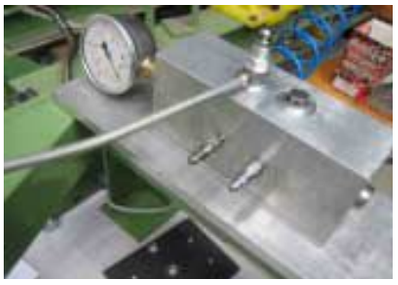
Photographic documentation for continuous pulsating load



Test set-up with pneumatic and master cylinder

Control and monitoring unit

Test carrier with test samples



Test carrier with test samples

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			Order number:	944-7119076	
	Manufacturer:	**fastplan GmbH** **Werksstraße 15** **D-45527 Hattingen**	Set-up: Execution: Measuring technology:	Haas Haas/Grunow Inv.-Nr.: 1729, 7808,128940, 9312	
	Description:	Bleeder valve with adapter and banjo bolt	Test object No.:	M7, M8, M10 M7, M8, M10 M10x1.25	Steel Steel Aluminium

Test parameter Test No 3:	**Tightening torque**	
Overload value:	Adapter, steel M7, M8, M10	14 Nm
Overload value:	Top part, brake bleeder valve, steel/steel	12 Nm
Overload value:	Banjo bolt, aluminium	18 Nm

Test result

Test No. 3: **O.k.**

Comments on test result: All test samples withstood the specified torque values without any damage.

Error description: None

Result Test No. 3:
O.k.

Photographic documentation for tightening torque