Test Report
No. BZ 117.0

about the determination of characteristics of combined spring brake actuators

1 Technical characteristics of combined spring brake actuators

Manufacturer: Haldex Brake Products GmbH
D-69015 Heidelberg

Trade mark: Haldex

Nature of components: Assembly group, consisting of spring brake actuator (chamber type) and pneumatic actuator (brake chamber)

Working pressure: Max 10 bar
Type (order number): 18/24 (346 186 ...)
20/24 (346 187 ...)

Main dimensions: See appendix

2 Tests carried out

Six combined spring brake actuators of each type have been tested; working pressure range from 0 ... 10 bar. Measuring procedure of the power output via the stroke according DIN 74060 part 10.

2.1 Determination of the characteristics $T_H = f(p)$, $s_p = f(p)$ and of $s_{max}$, each for the pneumatic actuators.


2.2 Determination of the characteristics $T_F = f(s)$ and of $p_{ls}$, each for the spring brake actuators.

Definition of terms: $T_F$ = piston force, $s$ = piston stroke, $p_{ls}$ = release pressure at $s = 10$ mm.
3 Test results

The statistic analysis (besides others linear regression) resulted in the following formulae and values - with p in bar and s in mm:

<table>
<thead>
<tr>
<th>Combined spring brake actuators (type)</th>
<th>piston stroke $s_{\text{max}}$ (mm)</th>
<th>pneumatic actuator piston force $F_{\text{HA}}$ (N)</th>
<th>$s_{\text{p}}$ (mm) $\leq s_{\text{max}}$</th>
<th>spring brake actuator piston force $F_{\text{Tz}}$ (N)</th>
<th>release pressure p.s (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18/24</td>
<td>64</td>
<td>1080p - 300</td>
<td>0.60p + 58</td>
<td>7525 - 75s</td>
<td>4.7</td>
</tr>
<tr>
<td>20/24</td>
<td>64</td>
<td>1190p - 235</td>
<td>0.57p + 58</td>
<td>7525 - 75s</td>
<td>4.7</td>
</tr>
</tbody>
</table>

Essen, 29.02.2000

Dipl.-Ing. Kaesler
Officially authorized Inspector for Motor Vehicles

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The Testing Laboratory is accredited by the Accreditation Body of the German Federal Motor Transport Authority (KBA) to conduct inspections according to ECE, EG-TypV (EEC), StVZO and FzTV (KBA-P 00009-95).