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Brake Booster Safety

BPW TB – 2013/01

Long stroke air brake boosters offer significantly improved braking performance and safety when compared to the short stroke type, as usually fitted to vehicles in South Africa. Long stroke boosters apply effective braking force over a longer travel and a greater time period than the short stroke type. This results in more consistent and efficient brake performance allied with greater safety.



Long stroke

vs

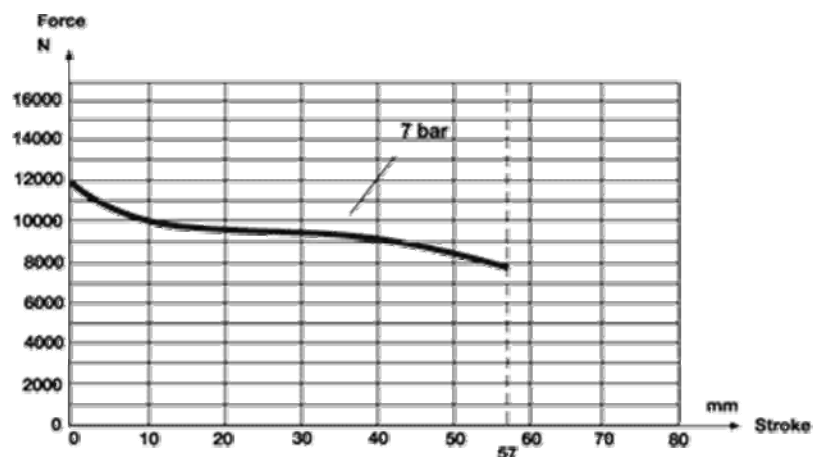


Short stroke

All BPW boosters have a 75mm stroke and are manufactured to European safety and quality standards.

Short stroke brake boosters generally have a stroke of 57mm in total. Current brake systems require approximately 45mm of the stroke of the booster merely to overcome the mechanical slack, wear and tear and flexibility in the braking system. At operating temperature conditions a further 7-10mm of stroke is required to overcome the expansion of the components. The brake boosters are therefore always operating at full stroke, with no reserve available to compensate for inaccuracies or wear and tear in the system. In addition a short stroke booster loses about 20% of the effective brake force at 50mm stroke. This is illustrated in the graph below.

#24 Short stroke Booster





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Comparing the performance characteristics of brake boosters with a 75mm stroke it is clear that the long stroke boosters maintain a force of almost 8 500Nm for the entire stroke between 40mm and 60mm of the travel out of a total travel of 75mm. This will take care of all slack, flexibility, and expansion at operating temperatures, with ample stroke in reserve.

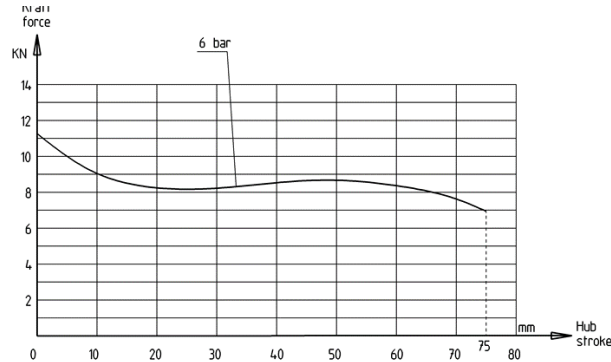


Diagramm der Betriebsbremse Typ 24 (theoretisch)

Diagram of service brake type 24 (theoretic)

#24 Long stroke Booster

With the advent of SANS 20013 regulations dd. 14 Feb. 2004, which requires all new and rebuilt vehicles to be fitted with the automatic slack adjusters, the choice between fitting short or long stroke brake boosters becomes moot, as most automatic slack adjusters require the longer stroke to activate the adjustment mechanism accordingly.

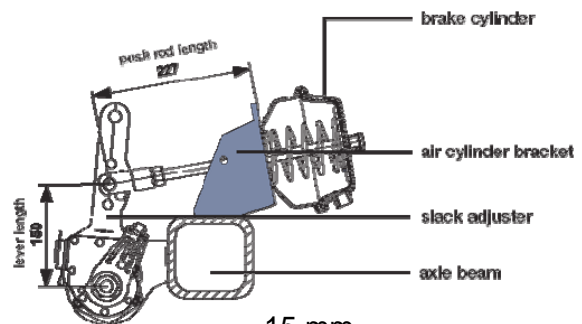
It is also clear to see the brake in-balance (Loss) from left to right on an axle when a long stroke and a short stroke booster are fitted onto the same axle.

Where is all the loss of stroke and brake adjustment being taken up?

1. Mechanical slack between working parts. ("S" Cam, rollers, spline, slack adjuster, etc.)
2. Component wear and tear between these parts (Shoes, carriers, linings, lining clearance)
3. Booster push rod length.
4. Slack Adjuster lever length setting and arc.

Automatic Slack Adjuster setting – *loss of stroke*

- 120 mm hole: - 12 mm to 18 mm
- 135 mm hole: - 14 mm to 20 mm
- 150 mm hole: - 15 mm to 22 mm
- 165 mm hole: - 17 mm to 24 mm



- Effective stroke:** - Lining loss = 15 mm
- Booster to Slack Adjuster to lining against drum @150 setting = 22 mm
- Heat expansion = 10 mm
- Wear & tear = 6 mm
- Lining clearance / gap = 2mm

Average loss of stroke = 55 mm

Effective stroke on a standard Booster = 2 mm (57-55)

Effective stroke on a long stroke Booster = 20 mm (75-55)