Product NEWS

KNORR-BREMSE

Y064230 (EN - Rev. 001)
August 2015

# Diaphragms - BEWARE!

*The humble diaphragm fitted in the service portion of brake actuators may look like a simple component, but don't be fooled. A lot of experience and technology has gone into ensuring the diaphragm provides the actuator with the desired output characteristic.*

**Background**

Actuators for wedge brakes have a maximum stroke of 45, 50 or 53mm and generally come in sizes of T9, T10.5, T12 and T14 (the number denoting the effective area of the diaphragm in square inches). Actuators for S-cam brakes originally had a maximum stroke of 57mm, however, with the advent of automatic slack adjusters the maximum stroke increased to 64mm and many trailers need 75mm of stroke to cope with additional legal requirements and the wind-up of long camshafts. These S-cam actuators normally had sizes of T16, T24, T30 and T36.

With the introduction of air disc brakes as standard on most trucks and buses and the need to fine tune the vehicle's braking system to achieve optimum performance, brake system designers required actuators with interim sizes, such as T18, T22 and T27.

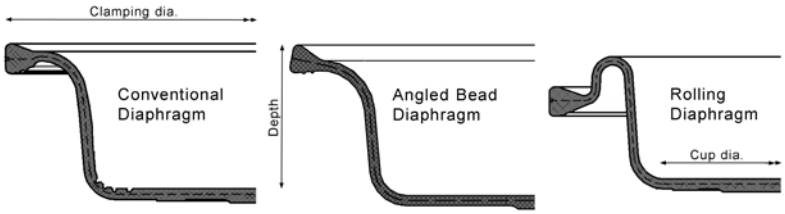
So you can see that the need has arisen for diaphragms to be used in actuators providing varying combinations of size and stroke capability. Fortunately many of the requirements have been rationalised resulting in fewer diaphragm variants. However, the rationalisation is not always obvious and this is where **users must beware!**

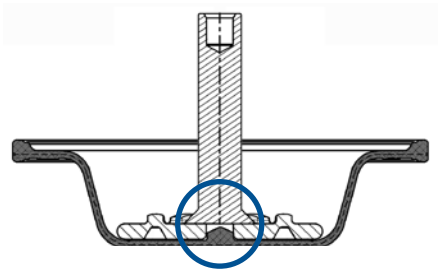
**Design Variants**

The main technical features of a diaphragm (in addition to the effective area) can be summarised as:

- General configuration – divided into three groups, namely: 'Conventional', 'Angled Bead' and 'Rolling' (see diagram).
- Clamping diameter – the diameter of the bead which is gripped by the actuator to form a seal.
- Cup diameter – the diameter of the base of the diaphragm in which the actuator's push plate sits.
- Depth – as it implies – this is the factor that mainly determines the maximum stroke capability of the diaphragm.

For most applications 'Conventional' and 'Angled Bead' diaphragms are interchangeable although installation of a diaphragm in an actuator left in situ on the vehicle may prove difficult. 'Rolling' diaphragms are obviously a breed apart.



The interchangeability of diaphragms with respect to other features relies on matching the dimensions as closely as possible, but this may not be the whole story. An example of this is the provision of a central 'pip' on some diaphragms which locates in a hole in the push plate (avoids the need for gluing the diaphragm to the push plate) to ensure that the push plate stays centrally located in actuators where it does not fill the 'cup diameter' of the diaphragm.

**In summary, the wisest policy is to replace diaphragms on a "like for like" basis unless there is a manufacturer's stated alternative.**
**(see overleaf for more details on common Knorr-Bremse diaphragms)**


Knorr-Bremse Systeme für Nutzfahrzeuge GmbH · Moosacher Straße 80 · 80809 Munich · Germany · Tel: +49 89 3547-0 · Fax: +49 89 3547-2767 · www.knorr-bremse.com · www.knorr-bremseCVS.com

Y064230 (EN - Rev. 001)
August 2015

## Diaphragms for use in the Aftermarket

Knorr-Bremse's product range has benefited from the product portfolios of the many companies that have been integrated into today's organisation. Consequently the company has applied its expertise to offer a rationalised range of diaphragms for use in the Aftermarket effectively reducing the number of diaphragms that need to be stocked. Below is a table setting out the commonly found actuator diaphragms and their Aftermarket replacement numbers:

### TABLE OF COMMON KNORR-BREMSE ACTUATOR DIAPHRAGMS

| Diaphragm Part No. | Application | Diaphragm Type | Aftermarket use |
|---|---|---|---|
| 1185301 | T36 | Angled Bead | 234362DK |
| 1188093 | T18 | Conventional | 20LS |
| 1188094 | T22 | Conventional | 24LS |
| 1188206 | T25 & 27 | Conventional | 30LS |
| 1189902 | T20 | Conventional | 234099K |
| 1190023 | T27 | Angled Bead | 234101K |
| 1480503006 | T12 | Conventional | 234226K |
| 1480503010 | T16 | Conventional | 234189K |
| 1480503018 | T22 | Conventional | 234099K |
| 1480503024 | T16 | Conventional | 234189K |
| 1480503028 | T14 | Conventional | 234189K |
| 16LS | T16 | Angled Bead | 16LS |
| 20LS | T20 | Angled Bead | 20LS |
| 234099K | T20 & 22 | Angled Bead | 234099K |
| 234100K | T24 | Angled Bead | 234100K |
| 234101K | T30 | Angled Bead | 234101K |
| 234189K | T14, 16 & 18 | Angled Bead | 234189K |
| 234226K | T10.5 & 12 | Angled Bead | 234226K |
| 234362DK | T36 | Conventional | 234362DK |
| 234433K | T9 | Angled Bead | 234433K |
| 236664 | T12 | Conventional | KY1505/2 |
| 24LS | T24 | Angled Bead | 24LS |
| 272489 | T9 | Angled Bead | 234433K |
| 272647L | T15 & 16 | Angled Bead | 234189K |
| 272648L | T20 | Angled Bead | 234099K |
| 272649L | T24 | Angled Bead | 234100K |
| 272650L | T30 | Angled Bead | 234101K |
| 30LS | T30 | Angled Bead | 30LS |
| 75681210 | T14 & 16 | Conventional | 234189K |
| 75681211 | T20 | Conventional | 234099K |
| 75681212 | T24 | Conventional | 234100K |
| B49363/2 | T16 | Conventional | 234189K |
| B61184 | T20 | Conventional | 234099K |
| B61290 | T16 | Conventional | 234189K |

| Diaphragm Part No. | Application | Diaphragm Type | Aftermarket use |
|---|---|---|---|
| B64322 | T24 | Conventional | 234100K |
| B66412 | T24 | Conventional | 234100K |
| B74479 | T12 & 14 | Conventional | 234226K |
| B75383 | T30 | Conventional | 234101K |
| B79883 | T14 & 16 | Conventional | 234189K |
| B81573 | T10.5 | Conventional | B81573 |
| B91475 | T24 | Conventional | 234100K |
| C31949 | T10 & 12 | Convntnl (with pip) | C31949 |
| C34578F | T12 & 14 | Rolling (with pip) | C34578F |
| C52066 | T22 | Conventional | 234099K |
| C60220 | T22 | Conventional | 234099K |
| C60489 | T20 | Conventional | 234099K |
| C60491 | T16 | Conventional | 234189K |
| C66410 | T16 & 18 | Conventional | 234189K |
| C66411 | T18 & 20 | Conventional | 234099K |
| C66412 | T24 | Conventional | 234100K |
| C67204 | T14 | Conventional | 234189K |
| C72336 | T18 & 20 | Rolling | C72336 |
| C72337 | T24 | Rolling | C72337 |
| C72568 | T27 | Conventional | 234101K |
| C72580 | T30 | Rolling | C72580 |
| C72596 | T16 | Rolling | C72596 |
| EB00612 | T24 | Angled Bead | EB00612 |
| EB00747 | T20 | Angled Bead | 20LS |
| EB00758/1 | T16 | Conventional | 16LS |
| EB00758/2 | T16 | Angled Bead | 16LS |
| EB00759 | T30 | Angled Bead | 30LS |
| K025090 | T16 | Conventional | K025090 |
| K025113 | T20 | Rolling | K025113 |
| K025114 | T24 | Rolling | K025114 |
| KY1505/1 | T9 | Conventional | KY1505/1 |
| KY1505/2 | T12 | Conventional | KY1505/2 |
| Z012791 | T22 | Rolling (with pip) | C72337 |

*NOTES: The replacement numbers shown are only to be read in the direction shown, i.e. the reverse is not necessarily true. The diaphragm that has been selected for Aftermarket use has been carefully chosen to provide the technical requirements of the diaphragm it is replacing as a minimum.*

*The Knorr-Bremse replacement part numbers ending in 'K' are improved versions of the the base number. Diaphragms from other manufacturers using the same base number do not have the improved characteristics of the Knorr-Bremse diaphragms.*


Knorr-Bremse Systeme für Nutzfahrzeuge GmbH · Moosacher Straße 80 · 80809 Munich · Germany · Tel: +49 89 3547-0 · Fax: +49 89 3547-2767 · www.knorr-bremse.com · www.knorr-bremseCVS.com