

# Compliant brake chambers/actuators



## Technical Advisory Procedure



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#### **About this Technical Advisory Procedure (TAP):**

**This Technical Advisory Procedure is published by the Australian Trucking Association Ltd (ATA) to assist the road transport industry to improve the quality of brake chambers.**

**This TAP is not, nor is it intended to be, complete or without exceptions.**

**The Technical Advisory Procedure is a guide only, and its use is entirely voluntary. Recommendations or procedures may not be suitable for or applicable to all operators. Operators should consider their own circumstances, practices and procedures when using this Technical Advisory Procedure.**

**Operators must comply with the Australian Design Rules (ADRs), the Australian Vehicle Standards Regulations, roadworthiness guidelines and any specific information and instructions provided by manufacturers in relation to the vehicle systems and components.**

**No endorsement of products or services is made or intended. Brand names, where used in this Technical Advisory Procedure, are for illustrative purposes only.**

**Suggestions or comments about this Technical Advisory Procedure are welcome. Please write to the Industry Technical Council, Australian Trucking Association, Minter Ellison Building, 25 National Circuit, Forrest ACT 2603.**

#### **DISCLAIMER**

The ATA makes no representations and provides no warranty that the information and recommendations contained in this Technical Advisory Procedure are suitable for use by or applicable to all operators, up to date, complete or without exception. Reliance or use upon the information or recommendations is voluntary and the user accepts all risks and responsibility for any such reliance or use and to the maximum extent permitted by law the ATA excludes all liability to any person arising directly or indirectly out of any such reliance or use.

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## 1. Introduction

The ATA Industry Technical Council (ITC) produced this Technical Advisory Procedure (TAP) to provide operators with key information about commercial vehicle air brake chambers and to assist with identifying the standards that they comply to.

Brake chambers are often seen as a commodity. This view is wrong. They are of high importance in achieving effective braking, but the lowest cost items often do not live up to expectations. The use of substandard parts may void the ADR compliance of the brake unit. Additionally, the use of substandard chambers could create an unstable vehicle combination and negatively affect the brake balance across an axle or axle group.

The following table provides confirmation, for the brands listed of the standards to which the brake chambers comply.

Brake chambers are a critical part of brake systems and are essential to ADR compliance. This TAP was originally produced to counter a run of very premature brake chamber failures and highlight the suppliers who were building to a recognised standard.

## 2. Australian Design Rules (ADR) and vehicle compliance

The ADRs are national standards for vehicle safety, anti-theft and emissions. They are generally performance based and cover issues such as occupant protection, structures, lighting, noise, engine exhaust emissions, braking and a range of miscellaneous items.

The ADRs are a type approval system, where a representative sample vehicle is tested with the use of a quality control system to ensure ongoing build compliance to the ADR. Part number traceability and part equivalence via the quality control system will maintain ADR compliance. Any change in the part number or the performance of the part will require either the system to be retested or an analysis of the parts in question to ensure that they are equivalent and will maintain the performance of the originally tested component or system.

## 3. Acceptable air brake chamber build standards

### **J1469 - Air Brake Actuator Test Procedure, Truck-Tractor, Bus, and Trailers**

This SAE Recommended Practice provides procedures and methods for testing service, spring applied parking, and combination brake chambers with respect to durability, function, and environmental performance. A minimum of five test units designated A, B, C, D, and E are to be used to perform all tests per 1.1 and 1.2.

Source: <http://standards.sae.org/wip/j1469/>

### **J2318 - Air Brake Actuator Test Performance Requirements - Truck & Bus**

This procedure provides test performance requirements for service, spring applied parking, and double diaphragm combination air brake chambers with respect to durability, function, and environmental performance when tested in accordance to SAE J1469.

Source: <http://standards.sae.org/wip/j2318/>

## DIN 74060-3 (2002-02) Air Braking Systems - Pneumatic Actuator - Part 3: Brake Chamber - Technical Data for Disc Brake

DIN 74060-3 is the European standard and applies to brake chambers used in disc brake systems. It covers technical data, marking, operating pressure, and operating temperature.

### 4. Brake chamber compliance table

The following table provides confirmation, for the brands supplying data, of the standards to which the brake chambers comply.

Make	Standards			Marketed or distributed by:
	Airbrake test procedure*	Airbrake actuator test performance requirements*	Air Braking Systems - Pneumatic Actuator - Part 3: Brake Chamber - Technical Data For Disc Brake*	
	SAE J1469	SAE J2318	DIN 74060-3	
<b>Bendix</b>	YES	YES	NA	<b>Knorr-Bremse</b>
<b>BPW</b>	NA	NA	<b>For Annex 19 ECE Reg 13</b>	<b>BPW Transpec</b>
<b>Di-Pro</b>	YES	YES	NA	<b>BPW Transpec</b>
<b>Fuwa K-Hitch</b>	YES	YES	NA	<b>K Hitch/Air Brake Systems.</b>
<b>GP Actuator</b>	YES	YES	NA	<b>GP Truck Products</b>
<b>Haldex</b>	YES	YES	<b>YES for EU units only</b>	<b>Various OEM, OES and AM distributors</b>
<b>Maxus</b>	YES	YES	NA	<b>MAXIParts</b>
<b>MBA</b>	YES	YES	NA	<b>BAPCOR COMMERCIAL VEHICLE GROUP</b>
<b>MGM</b>	YES	YES	NA	<b>Meritor</b>
<b>ProVia</b>	YES	YES	NA	<b>Wabco</b>
<b>TRP</b>	YES	YES	NA	<b>TRP (division of Paccar Parts)</b>
<b>TSE</b>	YES	YES	NA	<b>Meritor/Air Brake Corp</b>
<b>Wabco</b>	NA	YES	YES	<b>Wabco</b>

Table 1: Listing on compliant chambers/actuators

GP Truck Products – GP Actuator product added.

Note

Should operators require test reports, they should contact their supplier directly.

\* Air brake chambers will typically comply to either an SAE when used with drum foundation brake systems or to the DIN when used with disc foundation brake systems.

NA Not applicable or not available

OEM Original Equipment Manufacturer

OES Original Equipment Spare parts supplier

AM After Market Supplier

BAPCOR Commercial Vehicle Group – MBA product added 2019.

## 5. Components of a brake chamber

The terms brake chamber, actuator and booster can be used interchangeably.

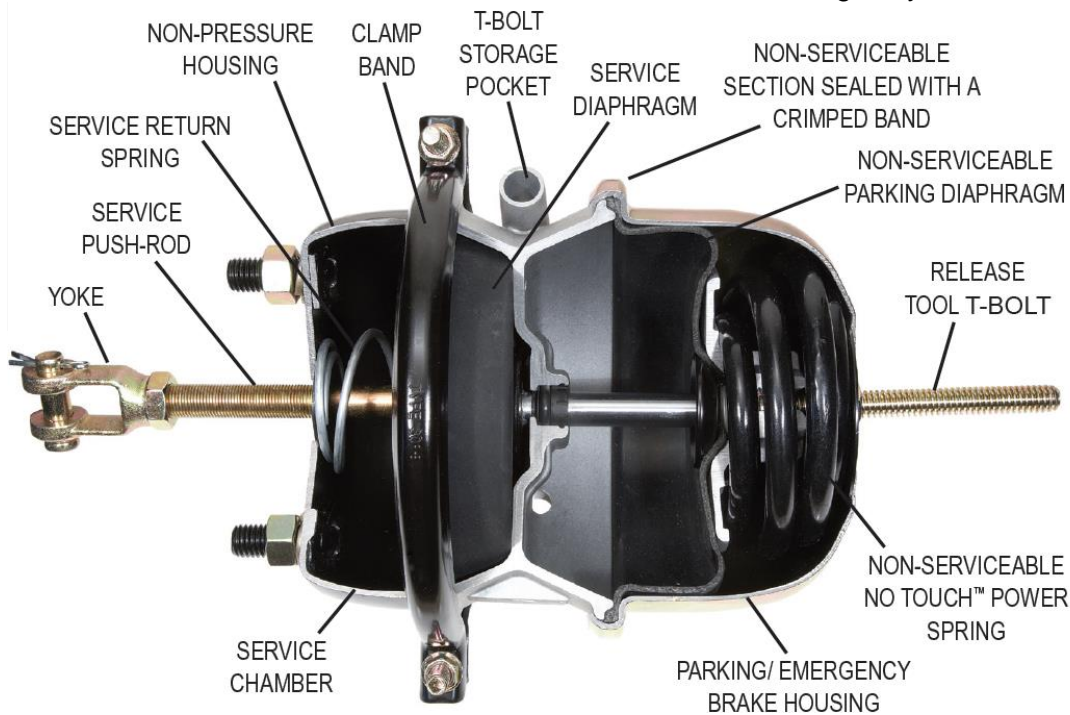
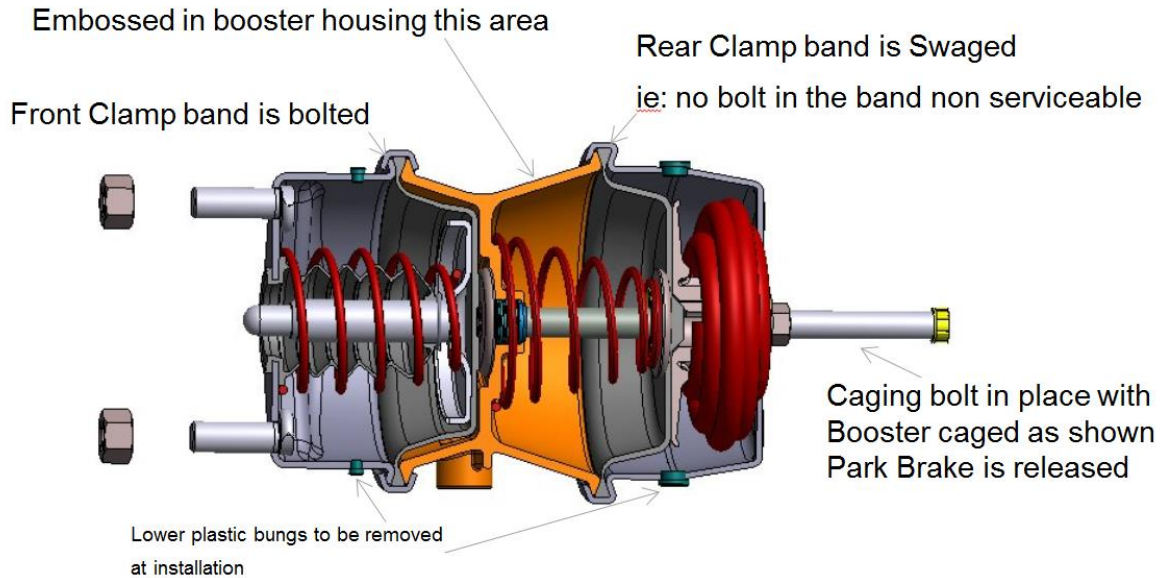


Figure 1: Sectioned chamber with the spring brake chamber element compressed, used in drum brakes. Source Bendix.

## 6. Spring brake chamber – warnings

### 6.1 Do not disassemble the chamber

**“DANGER! DO NOT OPEN SPRING LOADED”**



**Figure 2:- sectioned spring brake chamber**  
Source BPW Transpec

#### Warning:

Never attempt to disassemble a spring brake air chamber. The spring forces inside the spring brake chamber can be deadly if the heavy-duty spring is suddenly released by disassembly! Some suppliers are fitting non-removable bands.

Examples wording on chambers, include:

- WARNING - HEAVY SPRING LOAD
- WARNING - HEAVY SPRING LOAD - NOT SERVICEABLE - DO NOT TAKE APART
- NON-SERVICEABLE - DO NOT TAKE APART - IMPROPER HANDLING OR USE WILL RESULT IN INJURY OR DEATH
- WARNING SPRING LOADED DO NOT DISASSEMBLE

Note: Normally, the spring in the park brake chamber of the chamber/actuator is fully compressed whenever the park brakes are released, or the vehicle is in motion. However, when the park brake is applied the spring force is still considerable. As a result, these springs may fatigue and weaken over time/use resulting in less park brake force being available. Good quality chambers are tested and should outlast cheaper untested units.

### 6.2 Do not use a rattle guns!

Do not use a rattle guns or impact wrenches for any procedures involving brake chambers, particularly when manual releasing or applying the spring park brakes. Rattle guns will damage the components, resulting in premature component failure and possible injury.

## TAP development process, history and validation

### The process

The ITC will approve the need for the creation of a new TAP or the triennial routine review of an existing TAP. The nominated editor(s), who are listed below, with support of the ITC and specialist industry technical members as required, will agree on the TAP content with approval by an ITC member majority vote. A suitably qualified and experience ATA appointed peer reviewer will further review the publication and if necessary, recommended changes. These changes will then be reviewed and approved again by an ITC member majority vote before the document is released.

### Document version control

<b>Edition</b>	<b>Date</b>	<b>Nature of change / comment</b>	<b>Editor(s)</b>
<b>First</b>	2010	Initial release	David Coonan ATA, National Manager - Policy
<b>Second</b>	November 2016	Updated and expanded with additional background	Chris Loose, ATA, Senior Adviser Engineering
<b>2.1</b>	January 2017	Section 6.2 added and table 1 included an additional supplier	Chris Loose, ATA, Senior Adviser Engineering
<b>2.2</b>	November 2017	2 new brands (ProVia & TPR) were added to table 1.	Samuel Marks, ATA, Policy Officer
<b>2.3</b>	September 2019	1 new brand (MBA) added to Table 1	Bob Woodward, ATA, Chief Engineer
<b>2.4</b>	January 2020	1 new brand (GP Actuator) added to table 1	Bob Woodward, ATA, Chief Engineer

The next review is expected on or before January 2023

**Support for content and references were provided by the suppliers of the brake chambers/actuators.**

### Peer review, second edition

<b>Edition</b>	<b>Date</b>	<b>Peer Reviewer</b>	<b>Organisation / Qualifications</b>
2.2	September 2017	Ian Thomson	BPW Transpec, Engineering manager / BEng
2.3	September 2019	Keith Mackinlay	BISITECNIKS, Director
<b>2.4</b>	<b>January 2020</b>	<b>Keith Mackinlay</b>	<b>BISITECNIKS, Director</b>





### **About the ATA Industry Technical Council:**

The Industry Technical Council (ITC) is a standing committee of the Australian Trucking Association (ATA). The ITC's mission is to improve trucking equipment, its maintenance and maintenance management. The ITC was established in 1995.

As a group, the ITC provides the ATA with robust professional advice on technical matters to help underpin the ATA's evidence-based policymaking. It is concerned with lifting technical and maintenance standards, improving the operational safety of the heavy vehicle sector, and the development of guidelines and standards for technical matters.

ITC performs a unique service in the Australian trucking industry by bringing operators, suppliers, engineers and other specialists together in a long-term discussion forum. Its members provide expert and independent advice in the field to inform the work of the ITC. The outcomes from ITC benefit all ITC stakeholders and the heavy vehicle industry at large.

The ITC operates under the Australian Trucking Association's Council, which formulates industry policy for implementation by the organisation.

### **Joining ITC:**

We welcome applications to join the ITC. For further information,

please call the ATA (02) 6253 6900

email [ata@truck.net.au](mailto:ata@truck.net.au)

or download information from [www.truck.net.au](http://www.truck.net.au) and follow the links under the members tab.

## Appendix 1 Listing of compliant brake chambers from first edition 2010

Make	SAE - Standards				Brake stroke indicator design guideline for cam or disc airbrake actuators SAE J1953	Marketed/distributed by:
	Airbrake actuator diaphragm test procedure SAE J1450	Airbrake actuator test Procedure SAE J1469	Long stroke airbrake actuator marking SAE 1817	Airbrake actuator test performance requirements SAE J2318		
Di-Pro	YES		YES	YES		BPW Transpec
FUWA BTC	YES	YES	YES	YES	YES	IVECO
Haldex		YES		YES		IVECO as Anchor-Lok
Haldex		YES		YES		PBR as Anchor-Lok
MGM				YES		Arvin Meritor *
MGM				YES		DANA
MGM				YES		HDTE
MGM				YES		IVECO
TRUCKRAFT		YES		YES		Australian Brake Centre
TSE	YES	YES	YES	YES	YES	Air Brake Corporation

Table 2: listing of compliant chambers from first edition of this TAP, released 2010

### Notes:

- The above table was applicable when it was originally released in 2010 for brake chambers available at that time. Refer to section 4 of this TAP for a current listing of compliant brake chambers.
- Operators requiring test reports should contact their appropriate supplier directly.
- In 2011 Arvin Meritor changed its name to Meritor HVS.

## Appendix 2 Listing of compliant brake chambers from second edition 2017

	Standards			Marketed or distributed by:
	Airbrake test procedure*	Airbrake actuator test performance requirements*	Air Braking Systems - Pneumatic Actuator - Part 3: Brake Chamber - Technical Data For Disc Brake*	
<b>Make</b>	SAE J1469	SAE J2318	DIN 74060-3	
<b>Bendix</b>	YES	YES	NA	<b>Knorr-Bremse</b>
<b>BPW</b>	NA	NA	<b>For Annex 19 ECE Reg 13</b>	<b>BPW Transpec</b>
<b>Di-Pro</b>	YES	YES	NA	<b>BPW Transpec</b>
<b>Fuwa K-Hitch</b>	YES	YES	NA	<b>K Hitch/Air Brake Systems.</b>
<b>Haldex</b>	YES	YES	<b>YES for EU units only</b>	<b>Various OEM, OES and AM distributors</b>
<b>Maxus</b>	YES	YES	NA	<b>MAXIParts</b>
<b>MGM</b>	YES	YES	NA	<b>Meritor</b>
<b>ProVia</b>	YES	YES	NA	<b>Wabco</b>
<b>TRP</b>	YES	YES	NA	<b>TRP (division of Paccar Parts)</b>
<b>TSE</b>	YES	YES	NA	<b>Meritor/Air Brake Corp</b>
<b>Wabco</b>	NA	YES	YES	<b>Wabco</b>

Table 3: Listing on compliant chambers/actuators 2017:

Brands ProVia and TRP added compliant list.

**Appendix 3  
edition 2019**

**Listing of compliant brake chambers from third**

Make	Standards			Marketed or distributed by:
	Airbrake test procedure*	Airbrake actuator test performance requirements*	Air Braking Systems - Pneumatic Actuator - Part 3: Brake Chamber - Technical Data For Disc Brake*	
	SAE J1469	SAE J2318	DIN 74060-3	
<b>Bendix</b>	<b>YES</b>	<b>YES</b>	<b>NA</b>	<b>Knorr-Bremse</b>
<b>BPW</b>	<b>NA</b>	<b>NA</b>	<b>For Annex 19 ECE Reg 13</b>	<b>BPW Transpec</b>
<b>Di-Pro</b>	<b>YES</b>	<b>YES</b>	<b>NA</b>	<b>BPW Transpec</b>
<b>Fuwa K-Hitch</b>	<b>YES</b>	<b>YES</b>	<b>NA</b>	<b>K Hitch/Air Brake Systems.</b>
<b>Haldex</b>	<b>YES</b>	<b>YES</b>	<b>YES for EU units only</b>	<b>Various OEM, OES and AM distributors</b>
<b>Maxus</b>	<b>YES</b>	<b>YES</b>	<b>NA</b>	<b>MAXIParts</b>
<b>MBA</b>	<b>YES</b>	<b>YES</b>	<b>NA</b>	<b>BAPCOR COMMERCIAL VEHICLE GROUP</b>
<b>MGM</b>	<b>YES</b>	<b>YES</b>	<b>NA</b>	<b>Meritor</b>
<b>ProVia</b>	<b>YES</b>	<b>YES</b>	<b>NA</b>	<b>Wabco</b>
<b>TRP</b>	<b>YES</b>	<b>YES</b>	<b>NA</b>	<b>TRP (division of Paccar Parts)</b>
<b>TSE</b>	<b>YES</b>	<b>YES</b>	<b>NA</b>	<b>Meritor/Air Brake Corp</b>
<b>Wabco</b>	<b>NA</b>	<b>YES</b>	<b>YES</b>	<b>Wabco</b>

Table 4: Listing on compliant chambers/actuators 2019:

BAPCOR Commercial Vehicle Group – MBA product added.