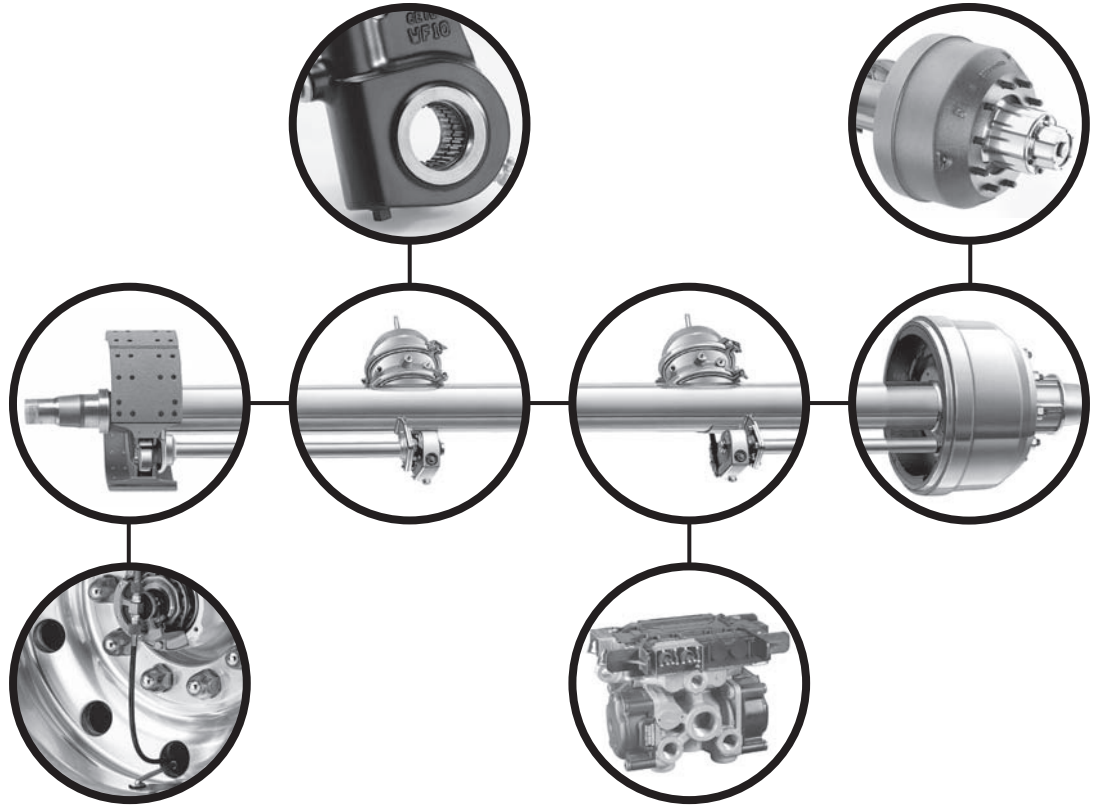


Trailer Axles

Applications and Specifications Guide



Section 1: Introduction	1
Section 2: Applications	3
Section 3: Axle Identification	6
Section 4: Gross Axle Weight Rating	14
Section 5: Axle Ratings	17
Section 6: Service Brake Ratings	25
Section 7: Parking Brake Ratings	35
Section 8: Wheel-End Equipment Ratings	37
Section 9: Weights	41
Section 10: Installation	48
Section 11: Engineering Policies	57

Introduction

This Trailer Axle Application Guide provides load ratings for Meritor trailer axle products that may be installed on trailers, chassis and dollies. **Figure 1.1.**

Figure 1.1



The objective of this guide is:

1. To provide trailer manufacturers with methods for selecting and rating Meritor Trailer Axle Products operated **within** the equipment and operational limitations set forth in this guide.
2. To provide trailer manufacturers with methods for obtaining Meritor Engineering review and ratings for Meritor Trailer Axle Products operated **outside** the equipment and operational limitations set forth in this guide.

Warranty coverage for Meritor Trailer Axle Products is as follows:

1. Meritor Trailer Axle Products operated **within** the equipment and operational limitations set forth in this guide are covered by Meritor warranty.
2. Meritor Trailer Axle Products operated **outside** the equipment and operational limitations set forth in this guide are covered by Meritor warranty only if an Application Approval Request Form has been submitted to and approved by Meritor Engineering.

Section 1

Introduction



To Obtain Publications Specified in This Bulletin

Visit Literature on Demand at meritor.com to access and order product, service, aftermarket, and warranty literature for Meritor's truck, trailer and specialty vehicle components.

Warranty

Refer to Vocational Warranty brochure SP-95155 that includes warranty information for the vocations listed below that includes:

- What is covered and not covered by Meritor's Commercial Warranty
- Designation of vocational use required
- Vocations covered in the brochure include the following:

City Coach	Motor Home
City Delivery	Oil Field
Construction	Refuse
Fire Service	Rescue
Heavy Haul	School Bus
Linehaul	Tandem Axle (Cummins)
Logging	Transit Bus
Mining	Yard Tractor

Components Referenced in This Guide

- Trailer Axles
(Maintenance Manual 14)
- Trailer Axles with Unitized Wheel Ends
(Maintenance Manual MM-0420)
- Meritor Tire Inflation Systems by P.S.I.[™]
(Installation and Maintenance Manual 14P)
- Meritor Tire Inflation Systems by P.S.I.
(Technical Guide TP-9914)
- Cam Brakes and Automatic Slack Adjusters
(Maintenance Manual 4)
- Air Disc Brakes
(Maintenance Manual 4M)
- RSA and RDA Series Wedge Brakes
(Maintenance Manual 4R)

Also Available:

- Preventative Maintenance and Lubrication
(Maintenance Manual 1)
- **Literature on Demand DVD (LODonDVD).**
The LODOndVD contains product, service and warranty information for Meritor components. To order the DVD, visit Literature on Demand at meritor.com and specify TP-0742.
- Trailer Axle Specifications
(Publication TP-8301)

Applications

This guide provides information on specifying trailer axle products and determining load ratings for these products. Note the following in regard to this activity.

- If Meritor Trailer Axle Products are to be operated **within** the equipment and operational limitations set forth in this guide, then the sections which follow provide information for determining their load ratings.
- If Meritor Trailer Axle Products are to be operated **outside** the equipment and operational limitations set forth in this guide, then a Trailer Axle Application Approval request form which provides appropriate ratings should be submitted and approved by Meritor Engineering.

Requirements

Trailer Axle Application Approval request forms should be filled out for situations such as, but not limited to, the following:

- A rating is desired which lies outside the equipment ratings published in this document.
- A rating is desired for equipment not listed in this document.
- An add-on device is desired which may affect the equipment rating.
- A customer requires assistance in specifying equipment or determining equipment load rating.

Process

A sample Trailer Axle Application Approval request form is included in this section. This form can be copied and submitted to Meritor for engineering review. Either contact your Meritor Account Manager or send the form to:

Application Engineer
Trailer Product Engineering
Meritor Heavy Vehicle Systems, LLC
2135 West Maple Road
Troy, Michigan 48084-7186

Meritor will try to address all customer requests for assistance whether or not the equipment is included in this guide. Note the following in regard to the application process.

- The customer fills out page one with information on the equipment and submits to Meritor.
- Meritor will then review the submission and either reject or approve it. If the submission is rejected, Meritor will inform the customer of the reason and may suggest alternate equipment, ratings and/or components. If the submission is approved, Meritor will fill out page two and return the form with the equipment rating to the customer.

Responsibilities

Proper use of this application system involves responsibilities for both the customer and Meritor.

- Customer is responsible for using the Application Guide to determine the ratings of Meritor trailer axle products either by obtaining the rating directly from the guide or by submitting a Trailer Axle Application Approval request form to Meritor.
- Meritor is responsible for furnishing the customer with ratings for standard trailer axle products used under standard operating conditions, as well as a method for obtaining engineering review of both non-standard equipment and/or operating conditions. This Application Guide serves this function.



Trailer Axle Application

Approval Number

Purchase Order Number	Contact Person
Customer	Title
E-Mail Address	Telephone Number
	Fax Number

Trailer Information					
Trailer Body Type		Trailer Suspension		Trailer Duty Cycle	
Trailer Length ft.		Manufacturer		☐ Linehaul ☐ Mining	
Trailer Width in.		Model		☐ City Delivery ☐ Heavy Haul	
☐ Van ☐ Tanker		No. of Axles	Vehicle Track in.	Axle Spread in.	☐ Refuse ☐ Oil Field
☐ Flatbed ☐ Dolly		Choose One Only:			☐ Construction ☐ Logging
☐ Dump		☐ Air Suspension			Maximum Speed mph
☐ Container Chassis		Trail Arm Centers in.			Trailer Gross Loading
☐ Auto Transporter		☐ Spring Suspension			Kingpin lbs.
☐ Other		Spring Centers in.			Suspension lbs.
					Total Trailer lbs.

Required Component Information			
Trailer Axle Requested		Brakes	
☐ Straight Axle ☐ Crank Axle ☐ Drop Axle		☐ Standard Lining ☐ Other	
Model	Track	☐ 12.25 X 7.5 Cam ☐ 16.5 X 7 Cam	
Tires		☐ 15 X 8.625 Cam ☐ 16.5 X 8 Cam	
☐ Single ☐ Dual		☐ 1560 Disc ☐ 16.5 X 8.625 Cam	
Size		☐ 15 X 7 Wedge ☐ 16.5 X 10 Cam	
Tire Static Loaded Radius in.			

Optional Component Information			
Slack Adjusters		Disc Wheel System	
☐ Manual ☐ Automatic		☐ Single Wheel ☐ Dual Wheel	☐ Aluminum Hubs ☐ Steel Hubs
Length in.	If Single, Wheel Offset in.	Number of Studs	Bolt Circle in.
	Wheel Manufacturer	Wheel Model	Hub Manufacturer
			Hub Model
Air Chambers		Spoke Wheel System	
Size sq. in.	Spoke Wheel Manufacturer	Spoke Wheel Model	

Remarks - Attach Additional Information If Required		
Customer Signature	Title	Date

RA-4901-B-901-A

Engineering Axle Specification (EAS)

Approval Number

Meritor Information

Note:

1. Details on the Meritor trailer axle application system, to include applicable policies and procedures, are contained in the Meritor Trailer Axle Product Application Guide (Document SP-8320).
2. To obtain proper equipment performance as well as full warranty coverage, the equipment must be installed, operated and maintained as detailed in the Application Guide.
3. Unless noted in the remarks, the brakes approved are certified to meet the applicable dynamometer requirements of FMVSS-121, paragraph S5.4 applied within the limiting conditions of this application approval.
4. Unless noted in the remarks, the structural rating of Meritor specified hubs or spoke wheels, bearings and brake components will meet or exceed the ratings listed below.
5. Approval is based on the customer-supplied information shown on the application form. Approval does not apply if the application is altered.
6. Approval is valid for 5 years from the date of issue.

Axle Approval - For Meritor Use Only

- **Engineering Axle Specification (EAS)** _____
- **Axle Rating** is _____ pounds when installed on a _____ Suspension
with _____ inch Vehicle Track and _____ inch spring centers on a spring suspension or trailing arm centers on an air suspension.
- **Brake Rating** is _____ pounds based on _____ brakes fitted
with _____ linings, _____ Square Inch chambers, _____ inch slacks
and with a _____ tire static loaded radius.

Remarks

Meritor Engineering Signature

Title

Date

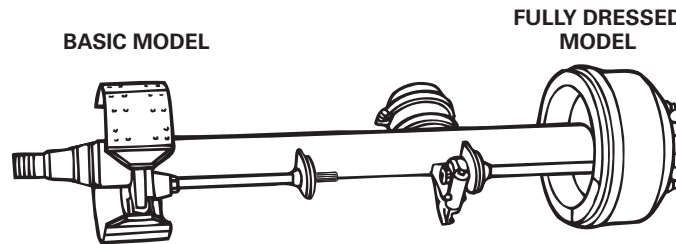
Engineering Axle Specification (EAS)

Section 3 Axle Identification



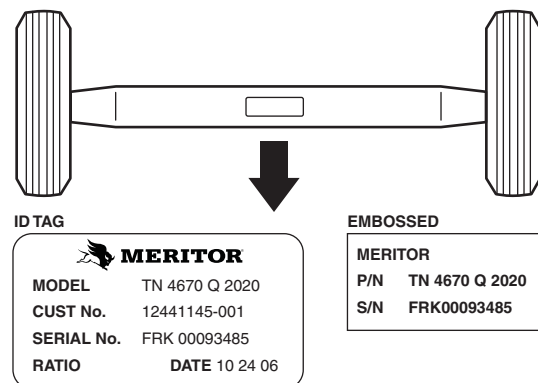
Axle Identification

Trailer axles can be furnished in a variety of configurations, from a basic model in which only the brake camshafts and shoes are installed, to a fully dressed model in which wheel-end equipment air chambers and slack adjusters are installed.



ID Tag

All Meritor trailer axles can be identified using the ID tag or an embossing located directly on the axle. All of the information necessary to identify a particular trailer axle is located on this tag or embossing, including the axle model number, serial number and date of manufacture.



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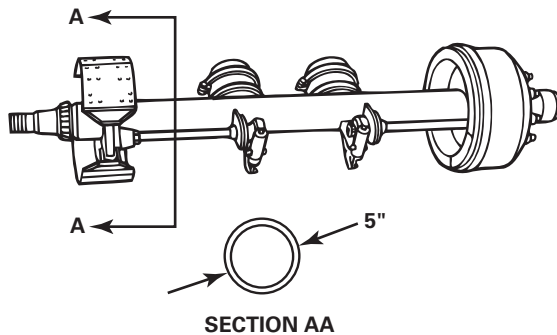
1. The model number is composed of letters and digits (for example, TN 4670 Q 2020). This number is used to identify the axle assembly when ordering replacement parts.
2. The serial number is composed of letters and digits (for example, FRK 38050685). This number is used to identify a particular trailer axle, and the material and components used to build the axle.
3. The date of manufacture is indicated either by a conventional or Julian date.
 - A. Conventional date (for example, 10/03/00)
 - B. Julian date (for example, 27600). The first three digits (276) indicate the 276th day of the year, or October 3rd. The last 2 digits (00) indicate the year, or 2000.

Production Model Numbers

Model numbers for Meritor production trailer axles are composed of letters and digits; for example, TQD 4670 QH 2020. These letters and digits indicate the weight capacity and type of components installed on the axle as follows. For a more comprehensive list of Meritor current production trailer axle models, refer to publication TP-8301, Trailer Axle Specifications.

TQD 4670 QH 2020

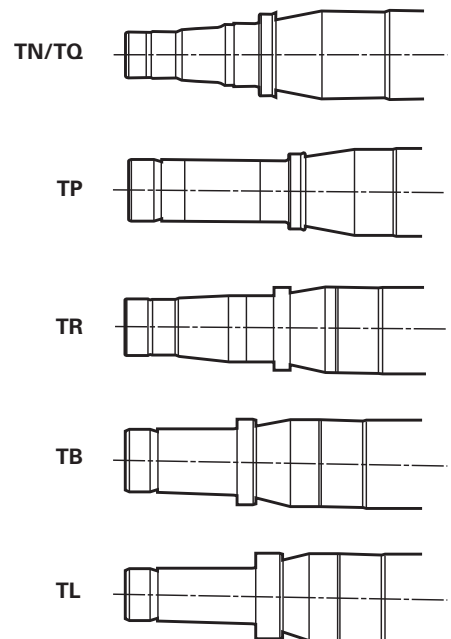
The first position indicates that trailer axles are made from 5-inch diameter steel tube.



TQD 4670 QH 2020

The second position indicates the type of spindle design.

- TN/TQ series axles use the most common bearings in the trailer industry.
- TP series axles use bearings compatible with Fruehauf axles.
- TR series axles use bearings compatible with drive axles.
- TB series axles use unitized bearings (Discontinued).
- TL series axles use unitized bearings.

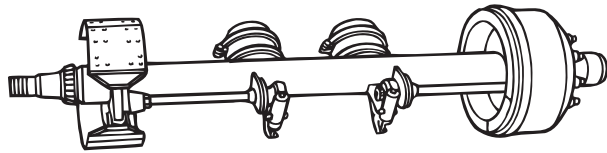


Section 3 Axle Identification

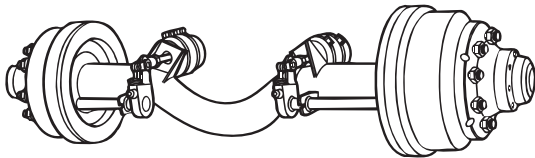


TQD 4670 QH 2020

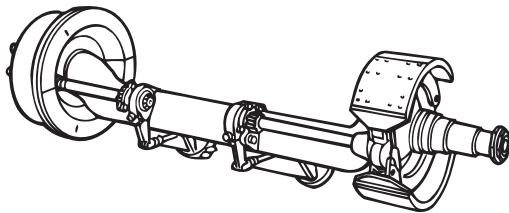
The third position indicates whether the axle is a straight, drop or crank type model.



STRAIGHT AXLE



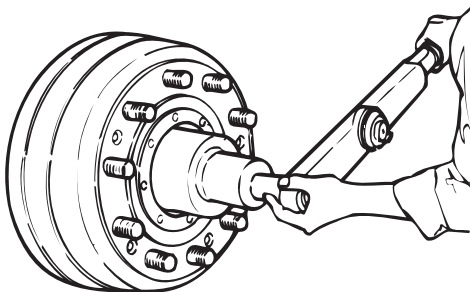
DROP AXLE



CRANK AXLE

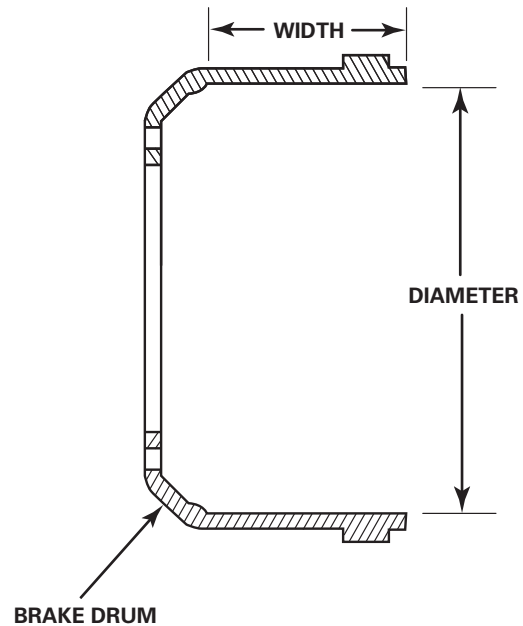
TQD 4670 QH 2020

The fourth position identifies the type of bearing adjustment as well as the axle tube wall thickness.



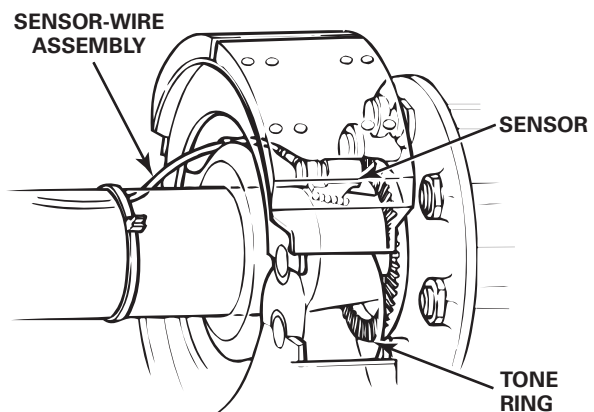
TQD 4670 QH 2020

The fifth and sixth positions indicate the size of the brake.



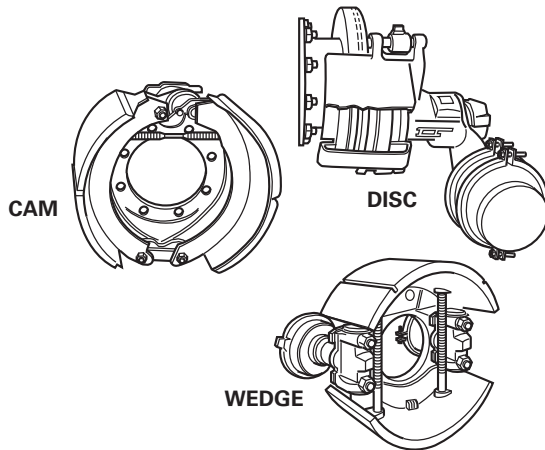
TQD 4670 QH 2020

The seventh position indicates whether the axle is built with ABS provisions.



TQD 4670 QH 2020

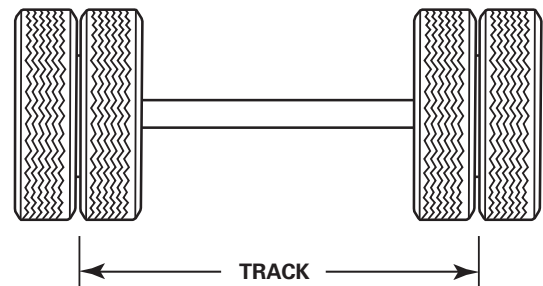
The eighth position indicates whether the axle is built with cam, disc or wedge brakes.



TQD 4670 QH 2020

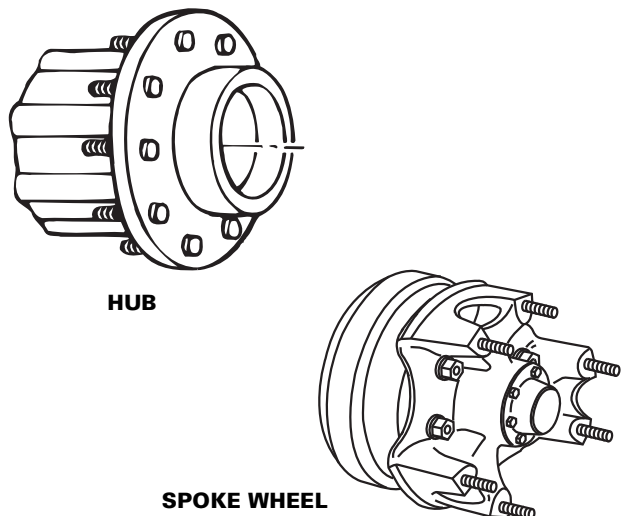
The final number group completes the trailer axle model number. These digits together with the other letters and digits identify all parameters which completely describes the trailer axle. Axle parameters described include, but are not limited to the following.

Axle Track

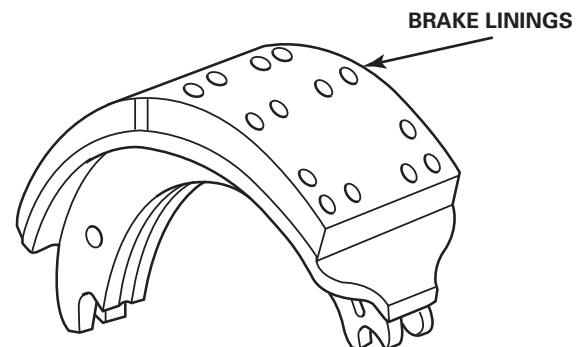


TQD 4670 QH 2020

The ninth position indicates whether the axle is furnished with hub or spoke wheel wheel-end equipment.



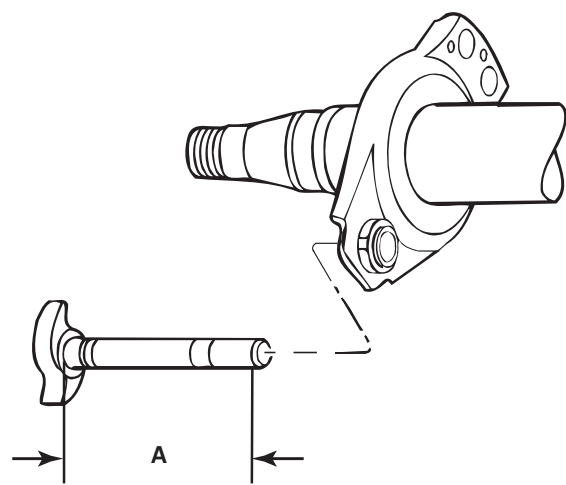
Brake Linings



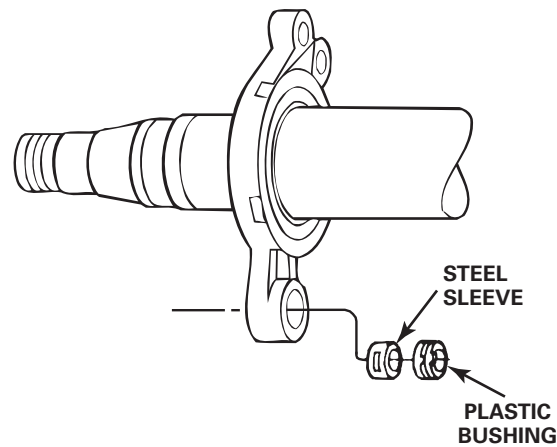
Section 3
Axle Identification



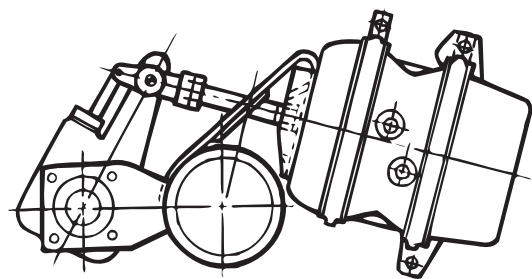
Camshaft Length



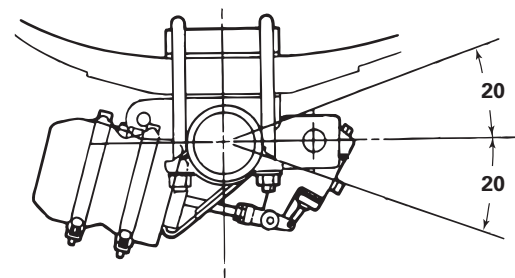
Camshaft Bushings



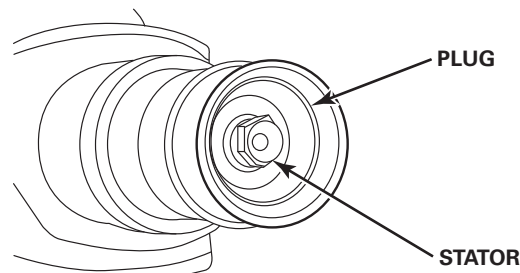
Air Chamber and Slack Provisions



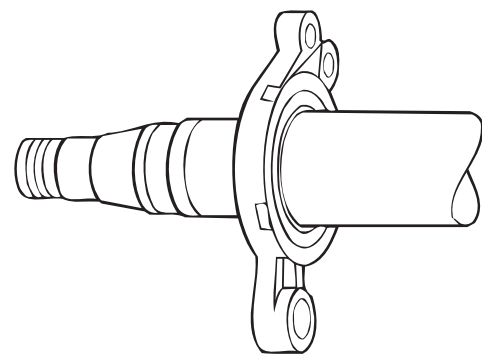
Brake Clocking



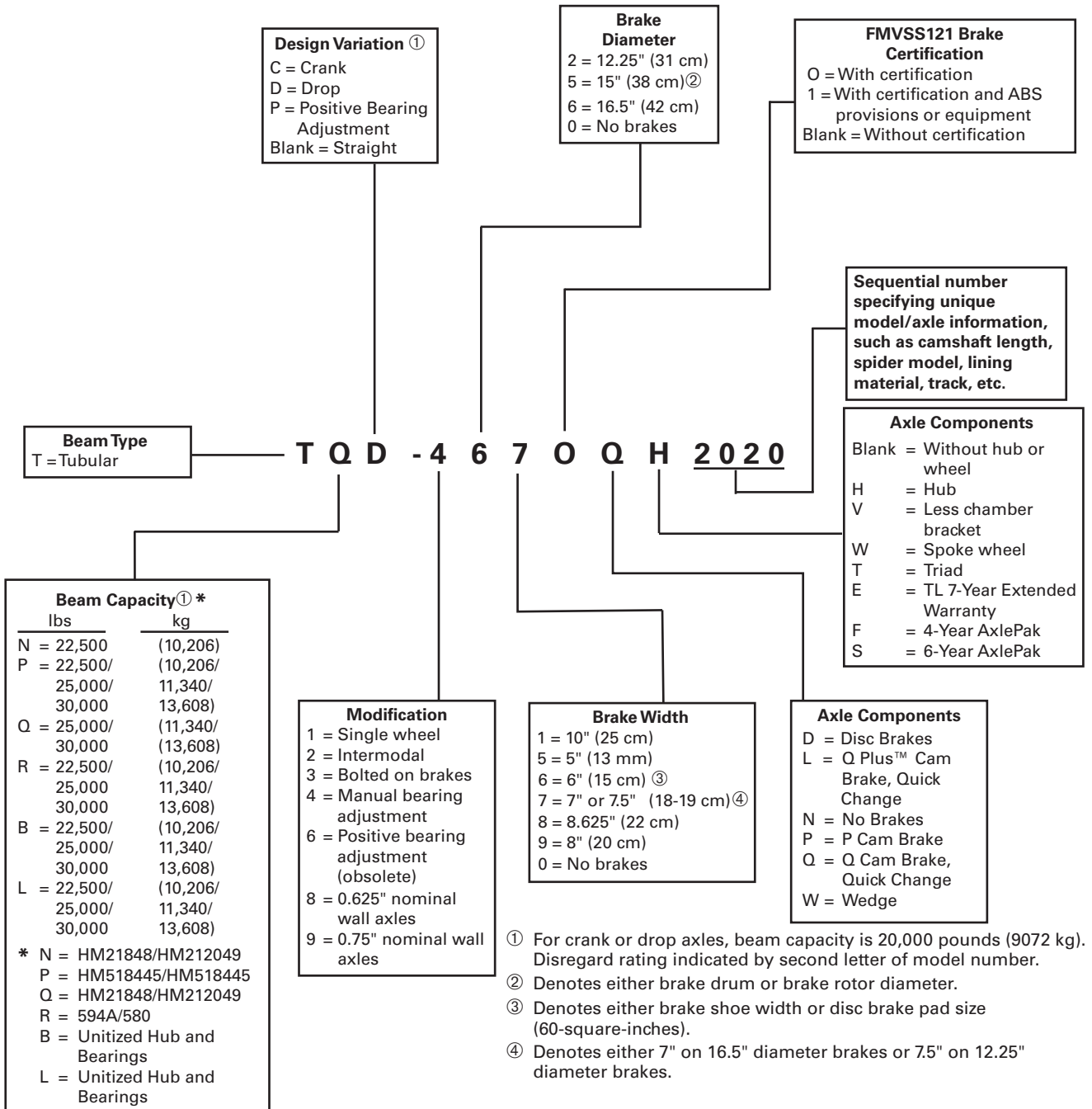
Tire Inflation System Provisions



Spider



Production Axle Model Numbers



① For crank or drop axles, beam capacity is 20,000 pounds (9072 kg). Disregard rating indicated by second letter of model number.

② Denotes either brake drum or brake rotor diameter.

③ Denotes either brake shoe width or disc brake pad size (60-square-inches).

④ Denotes either 7" on 16.5" diameter brakes or 7.5" on 12.25" diameter brakes.

Section 3 Axle Identification



Aftermarket Model Numbers

Model numbers for Meritor aftermarket trailer axles are composed of letters and digits; for example: TQD 4670 QR 1120. When compared to the production numbering system, the aftermarket numbering system provides a more complete description of the axle.

TQD 4670 QR 1120

The highlighted group above describes the same information detailed in the previous section for production model numbers.

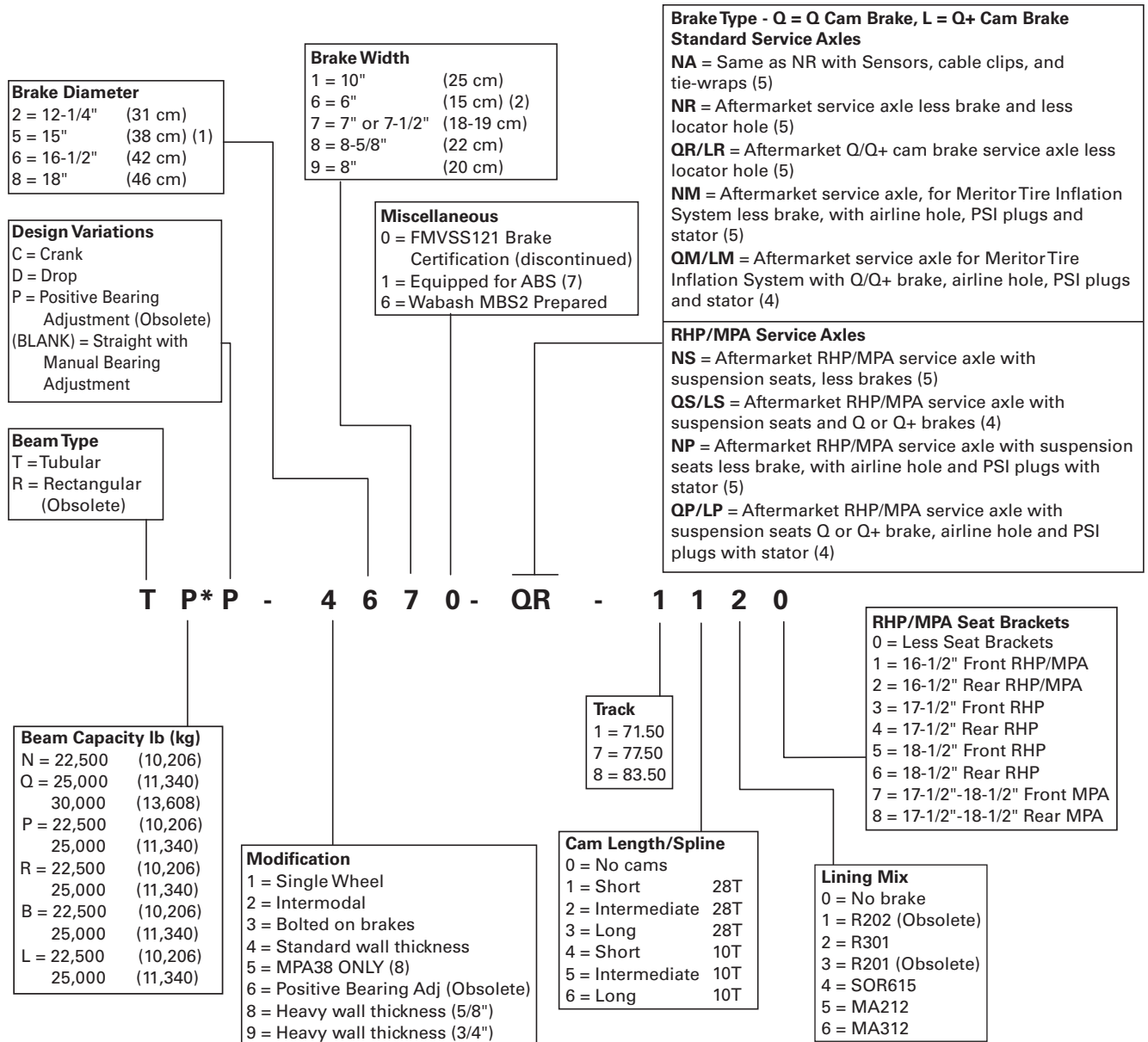
TQD 4670 **QR** 1120

The second group indicates the type of brake and identifies the axle as an aftermarket model.

TQD 4670 QR **1120**

The third group identifies the specific axle track, camshaft, linings, slack adjusters and air chambers used, as detailed in the Aftermarket model numbers chart which follows.

Aftermarket Axle Model Numbers



* Bearings

N = HM218248/HM212049
P = HM518445/HM518445
Q = HM218248/HM212049
R = 594A/580
B = Unitized hub and bearings (discontinued)
L = Unitized hub and bearings (discontinued)

NOTE: The last four digit designations apply to Aftermarket Axle Model Numbers only. These designations do not apply to Production Axle Model Numbers.

- (1) Drum or rotor
- (2) Denotes brake shoe width or pad size
- (3) Service beam only
- (4) Equipped with brake shoes and camshafts
- (5) Equipped with camshafts but no brake shoes
- (6) Not available in crank or drop center axles
- (7) All axles will have ABS blocks installed
- (8) Use standard nomenclature rules for MPA40

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Section 4

Gross Axle Weight Rating

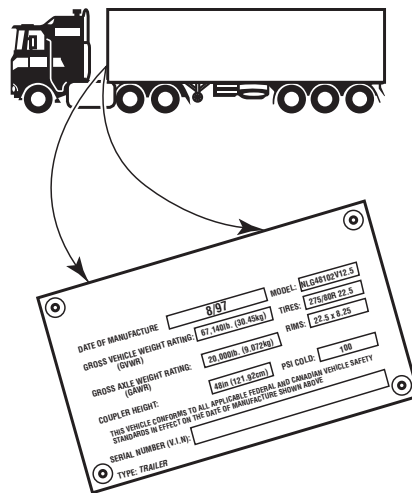


Gross Axle Weight Rating

This section is intended to assist vehicle manufacturers in understanding the principles for determining vehicle Gross Axle Weight Rating (GAWR) in order to help ensure that properly rated components are specified for over-the-road vehicles.

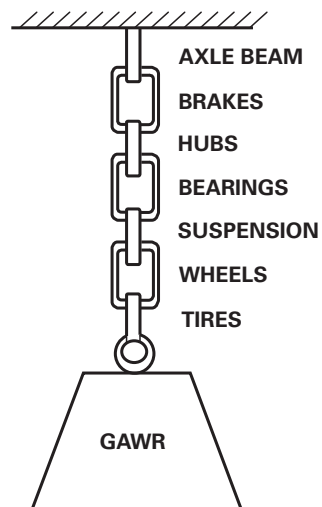
- GAWR is a term used to specify the load-carrying capacity of a single axle assembly. Federal law requires that vehicle manufacturers determine the GAWR for their vehicles and display this information on the front of appropriate over-the-road trailer equipment. **Figure 4.1.**

Figure 4.1

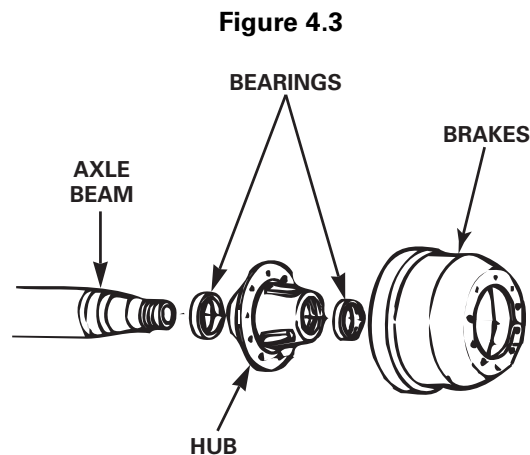


- GAWR is determined by the lowest rated vehicle component from the following: axle beam, brakes, hubs, bearings, suspension, wheels and tires. For example, a vehicle built such that all of these components are rated at 25,000 pounds would have a GAWR of 25,000 pounds. However, if any single component has a lower rating, such as 20,000 pounds, the GAWR must be established based on that lowest rated component and would be 20,000 pounds. Therefore, GAWR can be visualized as a chain of components in which GAWR is determined by the component with the lowest rating or the weakest link. **Figure 4.2.**

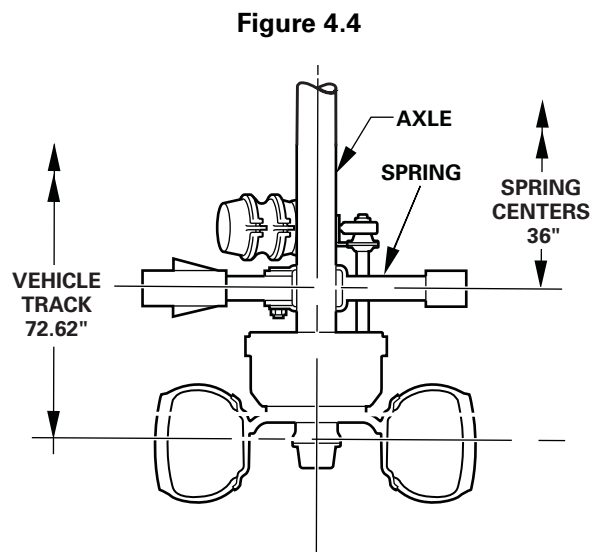
Figure 4.2



- Meritor cannot determine the GAWR that a manufacturer will assign to a vehicle, since Meritor does not furnish all of the components that will be installed.
- Meritor has prepared this guide to enable vehicle manufacturers to determine the rated capacity of Meritor trailer products. Vehicle manufacturers should use it to determine the rating of Meritor-supplied axle beams, brakes, hubs and bearings. **Figure 4.3.**



- Meritor manufactures straight trailer axles with nominal wall thickness of 1/2-, 5/8- or 3/4-inch. The nominal beam ratings for straight axles with these thicknesses are 22,500, 25,000 and 30,000 pounds respectively. These nominal ratings are the maximum structural capacity of these three axle types. These nominal ratings are dependent on the specific installation conditions such as suspension mounting centers and vehicle track detailed in this document. The axle beam rating will change if installation conditions differ from these values. Therefore, the equipment selections of a vehicle manufacturer can reduce the beam rating to less than the stated nominal beam rating. **Figure 4.4.**



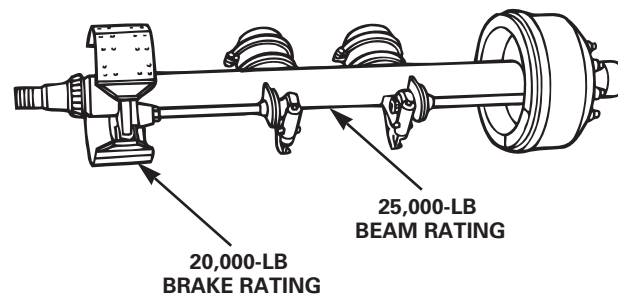
Section 4

Gross Axle Weight Rating



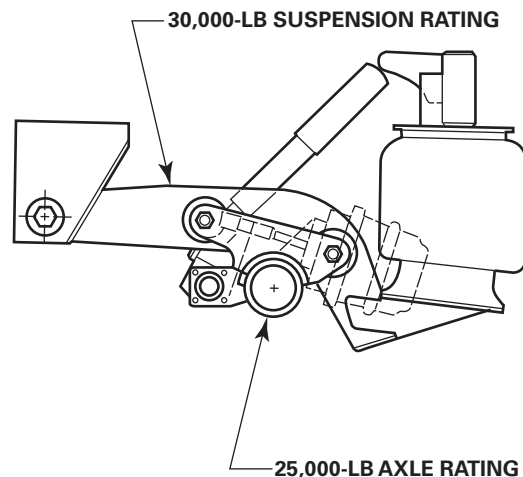
- Ratings for the components within an individual Meritor-supplied axle assembly, including the brakes, hubs and bearings, may vary and may not be equal to the nominal beam rating. For example, axles with a 25,000-pound nominal beam rating are often furnished with brakes rated at 20,000 pounds. This may be due to a number of factors such as customer preference for selected components, component over-specification and economics. **Figure 4.5.**

Figure 4.5



- Vehicle manufacturers must address all of the components comprising GAWR. For example, manufacturers should expect durability issues to arise if an axle with 25,000-pound rated components is installed in service where it has been determined that either due to load capacity or operating conditions, a 30,000-pound rated suspension is required. **Figure 4.6.**

Figure 4.6



- Vehicle manufacturers must follow the instructions in this document to determine the rating for Meritor-supplied equipment. Vehicle manufacturers must also follow the instructions supplied by other component manufacturers to determine the ratings for components not produced by Meritor. Taking into consideration all of the components used to determine GAWR will help ensure that the vehicle manufacturer is in compliance with Federal regulations governing the determination of GAWR.

Axle Ratings

This section is used to determine the axle rating. Included are instructions for determining the axle beam rating and the axle spindle rating. To determine axle rating, both of these parameters must be calculated. Axle rating will be equal to the lowest of these two ratings.

Axle Beam Rating

Nominal beam ratings for Meritor trailer axle models are listed below. These nominal ratings represent the maximum rating for these models and are dependent upon the specific loading conditions which follow. The axle beam rating can be reduced if axle loading conditions differ.

Table A: Nominal Axle Beam Rating

Axle Series	Axle Model	Nominal Axle Beam Rating (lbs)
TB	TB4000	22,500
	TB8000	25,000
	TB9000	30,000
TL	TL4000	22,500
	TL8000	25,000
	TL9000	30,000
TN/TQ	TN1000	22,500
	TN2000	22,500
	TN4000	22,500
	TQ1000	25,000
	TQ4000	25,000
	TQ9000	30,000
TP	TP4000	22,500
	TP8000	25,000
	TP9000	30,000
TR	TR4000	22,500
	TR8000	25,000
	TR9000	30,000
Crank	TBC8000	20,000
	TQC1000	20,000
	TQC4000	20,000
Drop	TBD8000	20,000
	TBD9000	22,500
	TQD4000	20,000
	TQD9000	22,500
	TRD8000	20,000
	TRD9000	22,500

Section 5 Axle Ratings



Trailer axles installed on trailers, chassis and dollies are subject to a four-point loading. **Figure 5.1.**

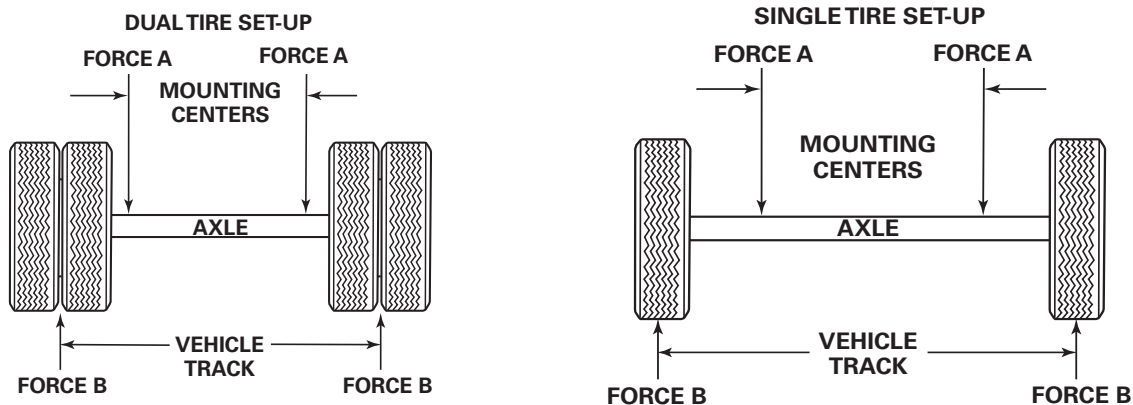
Forces A — Vehicle and cargo loads are applied downward at the mounting centers.

- For spring suspensions, the mounting center distance is equal to the spring center distance.
- For air suspensions, the mounting center distance is equal to a term calculated from air suspension geometry.

Forces B — Reaction loads are applied upward at the vehicle track.

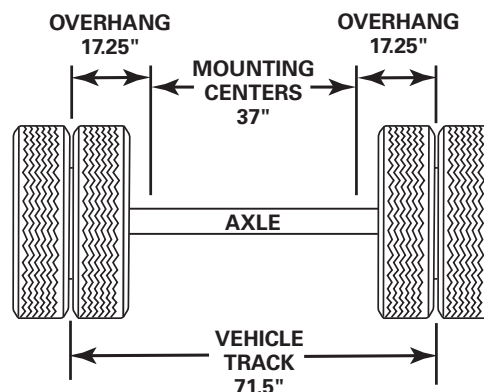
- For dual tire applications, the vehicle track is equal to the distance between the center lines of the roadside and curbside dual tires.
- For single tire applications, the vehicle track is equal to the distance between the center lines of the roadside and curbside single tires.

Figure 5.1



The applied load at the mounting centers and the reaction loads at the vehicle track result in an axle overhang. For example, an axle with a vehicle track of 71.5-inches and mounting centers of 37-inches will have an overhang of 17.25-inches. **Figure 5.2.**

Figure 5.2



The nominal beam rating (maximum rating) is achieved when this overhang is equal to 17.25-inches. If the overhang is greater than 17.25-inches, the axle beam must be de-rated using one of the following methods depending on whether the axle is installed on a spring or air suspension.

Spring Suspensions

To calculate axle beam rating on spring suspensions use the following technique:

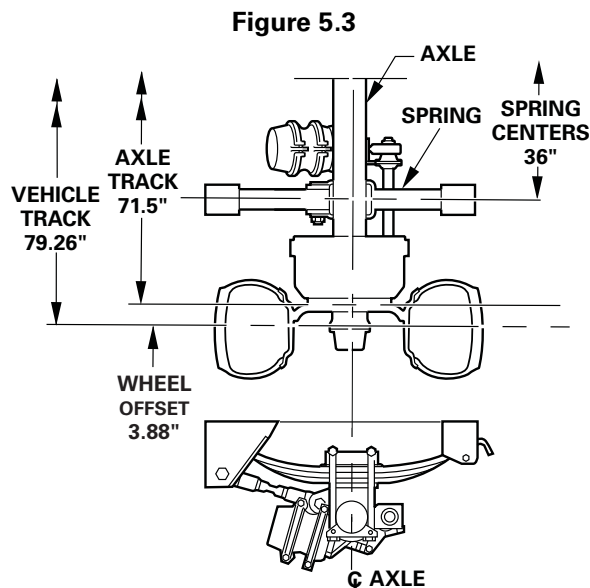
1. Find the axle nominal rating from **Table A**.
2. Determine the mounting centers. For a spring suspension, mounting centers are equal to the spring centers.
3. Determine the vehicle track.
 - For dual wheels, this will be the axle track.
 - For single wheels, vehicle track is equal to the distance between the centers of the tires. Vehicle track is calculated by taking the axle track and adding/subtracting the wheel offsets.
4. Determine the overhang by subtracting the mounting centers from the vehicle track and dividing by two.
5. Refer to the Axle Beam Rating Graph. Locate the overhang on the horizontal axis. Read the percent of nominal rating on the vertical.
6. Multiply the axle nominal rating by the percent of nominal rating.

Example 1:

Refer to the spring suspension shown in **Figure 5.3**. Assume you intend to use a TN4000 model axle with a 71.5-inch track. The suspension is a spring model with 36-inch spring centers. A single wheel is to be employed which has an outset of 3.88-inches. Axle beam rating is calculated as follows:

- A. Nominal Rating TN4000 = 22,500 pounds
- B. Mounting Centers = 36-inches
- C. Vehicle Track = $71.5 + 2(3.88) = 79.26$ -inches
- D. Overhang = $\left[\frac{79.26 - 36}{2} \right] = 21.63$ -inches
- E. From graph, percent of nominal rating = 79%
- F. Axle beam rating = $22,500 (0.79) = 17,775$ pounds

NOTE: Since an outset single wheel is being used, the axle spindle rating must be calculated. Refer to the axle spindle rating information in this section. Axle rating will be the lowest of the two ratings.



Section 5 Axle Ratings



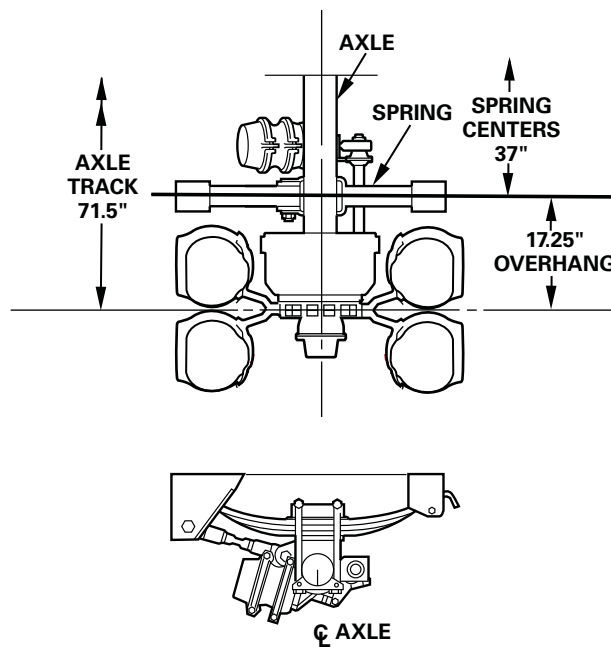
Example 2:

Refer to the spring suspension shown in **Figure 5.4**. Assume you intend to use a TN4000 axle model with a 71.5-inch track. The suspension is a spring model with 37-inch spring centers. Axle beam rating is calculated as follows:

- A. Nominal Rating TN4000 = 22,500 pounds
- B. Mounting Centers = 37-inches
- C. Vehicle Track = 71.5-inches
- D. Overhang = $\left[\frac{71.5 - 37}{2} \right] = 17.25$ -inches
- E. From graph, percent of nominal rating = 100%
- F. Axle beam rating = 22,500 (1.00) = 22,500 pounds

NOTE: Since dual wheels are being used, the axle spindle rating does not have to be calculated. Refer to the axle spindle rating information in this section.

Figure 5.4



Air Suspensions

To calculate axle beam rating on air suspensions, use the following technique:

1. Find the axle model nominal rating from **Table A**.
2. Determine the mounting centers. For an air suspension, use the following formula:

$$\text{Mounting Centers} = \left[\frac{B}{A + B} \right] \times \text{Trailing Arm Center Distance} + \left[\frac{A}{A + B} \right] \times \text{Air Bag Center Distance}$$

Where:

A = Distance from trailing arm pivot center line to the axle center line.

B = Distance from the axle center line to the air bag center line.

NOTE: If air bag rests on top of axle, B = 0.

NOTE: Air bags tend to move the mounting center distance inboard of the actual point that the air suspension trailing arms are attached to the axle.

3. Determine the vehicle track.
 - For dual wheels, this will be the axle track.
 - For single wheels, vehicle track is equal to the distance between the centers of the tires. Vehicle track is calculated by taking the axle track and adding/subtracting the wheel offsets.
4. Determine the overhang by subtracting the calculated mounting centers from the vehicle track and dividing by two.
5. Refer to the Axle Beam Rating Graph. Locate the overhang on the horizontal axis. Read the percent of nominal rating on the vertical.
6. Multiply the axle nominal rating by the percent of nominal rating.

Example 3:

Refer to the air suspension shown in **Figure 5.5**. Assume you intend to use a TQ4000 model axle with a 71.5-inch track. The suspension is an air ride model with 35-inch trailing arm centers, 30-inch air bag centers, A=20-inches and B=15-inches. Standard dual wheels are to be used. Axle beam rating is calculated as follows:

A. Nominal Rating TQ4000 = 25,000 pounds

B. Mounting Centers = 32.1-inches

$$MC = \left[\frac{15}{20 + 15} \right] \times 35 + \left[\frac{20}{20 + 15} \right] \times 30$$

$$MC = 32.1 \text{ inches}$$

C. Vehicle Track = 71.5-inches

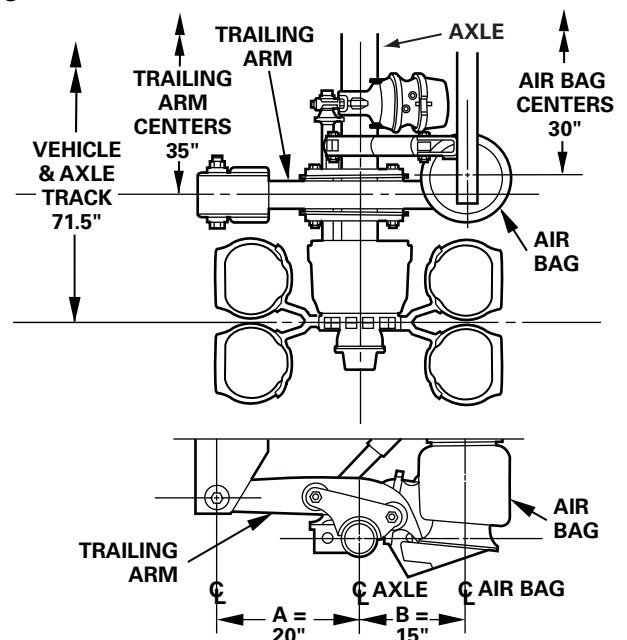
$$D. \text{ Overhang} = \left[\frac{71.5 - 32.1}{2} \right] = 19.7\text{-inches}$$

E. From graph, percent of nominal rating = 87%

F. Axle rating = 25,000 (0.87) = 21,750 pounds

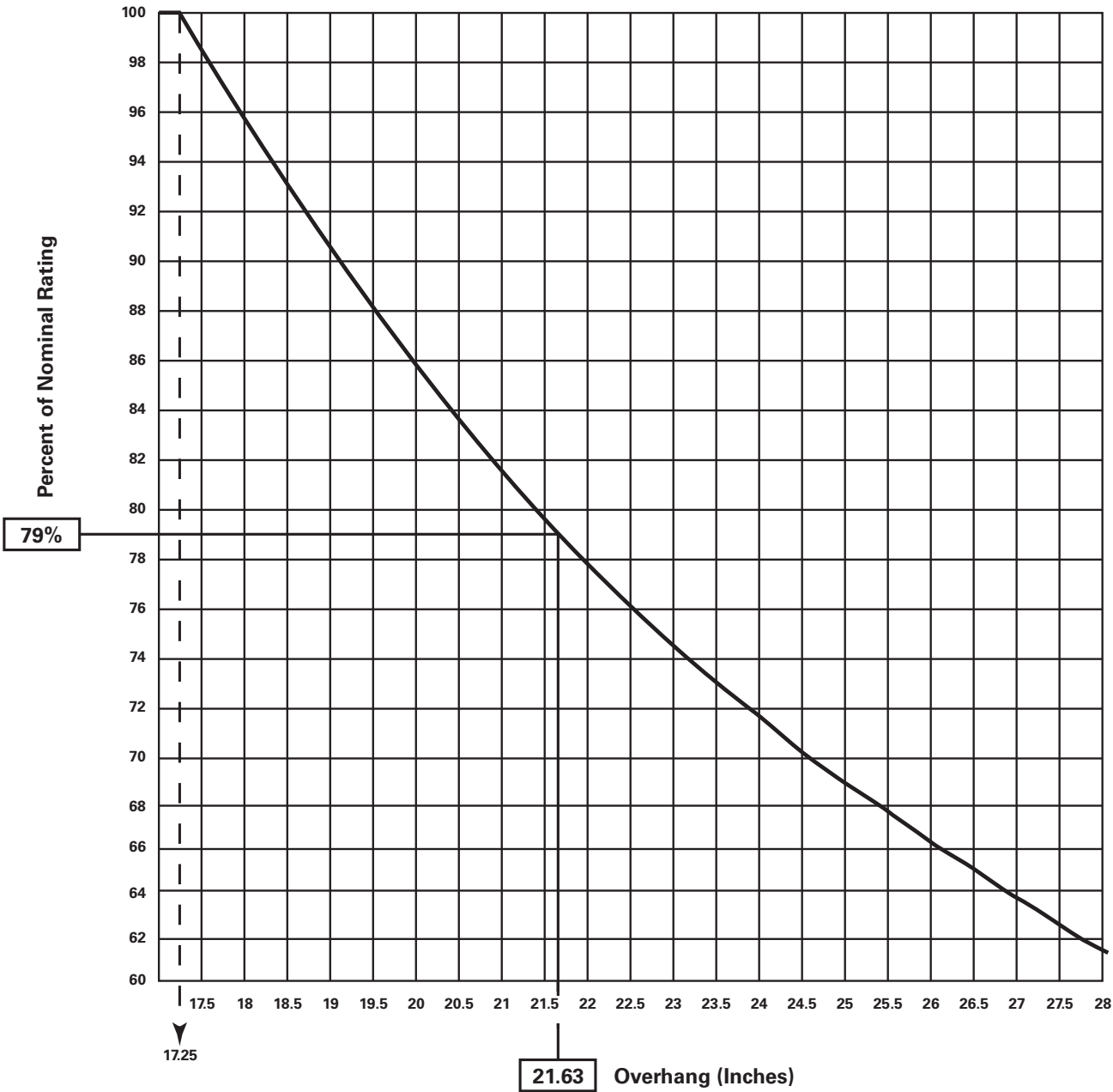
NOTE: Since dual wheels are being used, the axle spindle rating does not have to be calculated. Refer to the axle spindle rating information in this section.

Figure 5.5





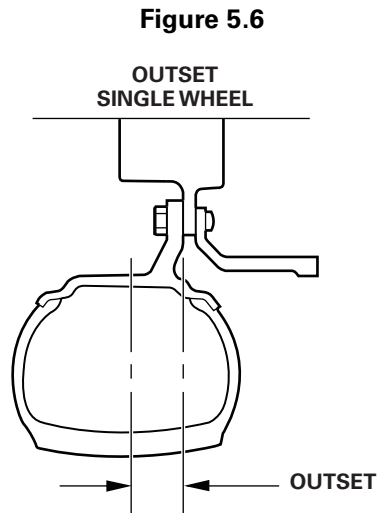
Axle Beam Rating Graph



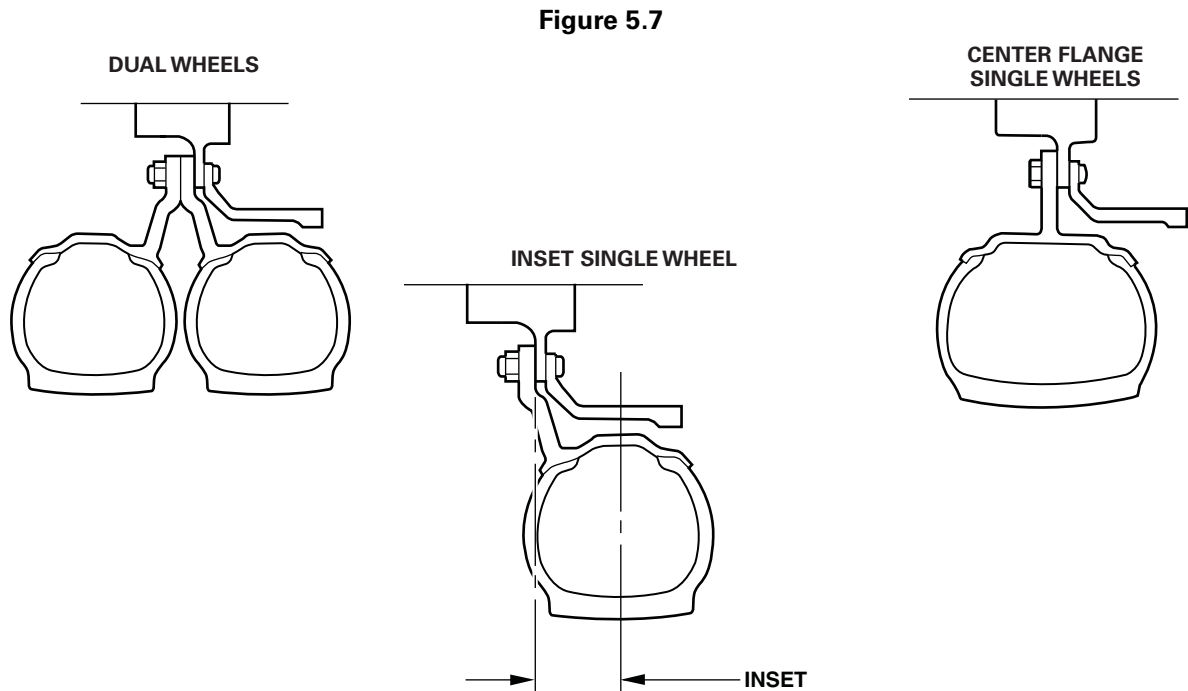
Axle Spindle Rating

Use this section only if single wheels are installed on a trailer axle.

Outset single wheels move the vehicle load outboard of the axle, resulting in an increased bending moment on the axle spindle. This loading condition can occur either when only the outer dual tire of a dual wheel set is installed on an axle or when an outset super single tire is used. **Figure 5.6.**



Dual wheels, center flange single wheels and inset wheels either have no wheel offset or move the vehicle load point toward the inboard side of the axle. Hub ratings for these conditions must be acquired from the hub manufacturer. **Figure 5.7.**



Section 5 Axle Ratings

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Use the following graph to determine the axle spindle rating only when single wheels with an outset of 3-inches or more are installed on trailer axles. To determine the axle spindle rating, locate the wheel outset on the horizontal axis. Read the axle rating on the vertical axis. Note that this is the total rating for the two spindles on a trailer axle. Hub ratings, which are separate from the spindle ratings, must be obtained from the hub manufacturer.

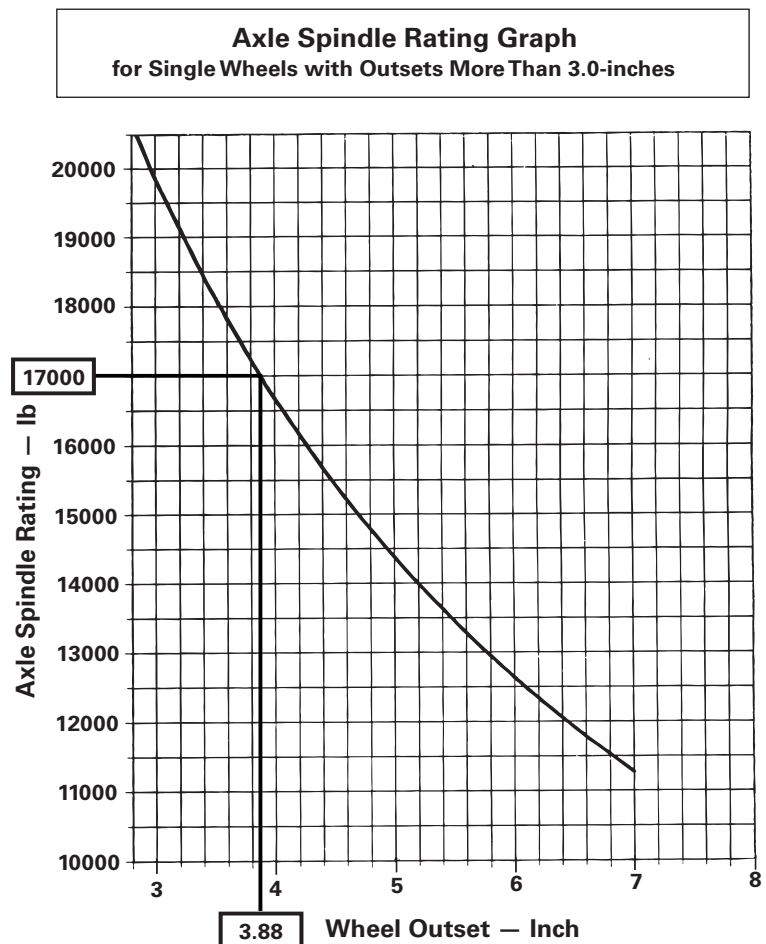
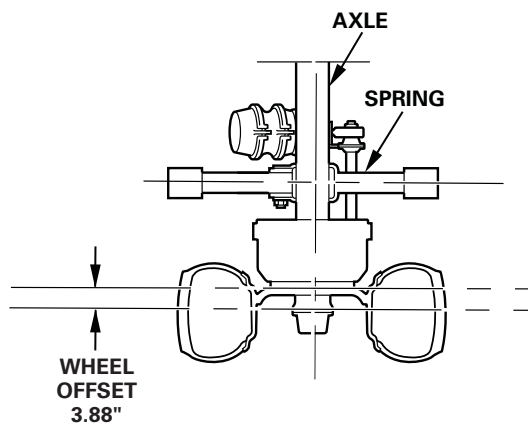
Example:

Refer to the suspension shown in **Figure 5.8**. Assume you intend to install a 3.88-inch outset wheel on a trailer axle. Axle spindle rating is determined as follows.

- Locate 3.88-inch on the horizontal axis of the graph.
- Read axle spindle rating of 17,000 pounds on the vertical axis.

NOTE: Axle beam rating will also have to be calculated using the information in the axle beam rating section. Axle rating will be the lowest of the two ratings.

Figure 5.8



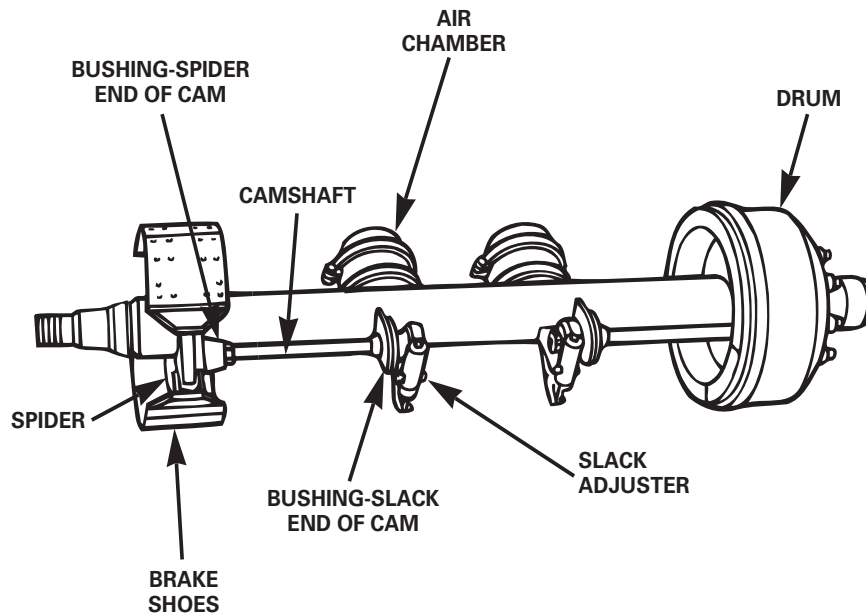
Service Brake Ratings

Air brake systems in the United States must comply with Federal Motor Vehicle Safety Standard FMVSS-121. In Canada the regulation is CMVSS-121. Any reference in this guide to FMVSS also applies to CMVSS.

It is the responsibility of the vehicle manufacturer to meet the FMVSS-121 regulations. Meritor will, however, assist manufacturers in meeting the dynamometer certification requirements of the regulation (FMVSS-121 paragraph S5.4) by providing the information in this section.

For the service brake rating of cam, disc and wedge brakes, use the guidance in this section. Note that the vast majority of trailers, containers and dollies are fitted with cam brakes; therefore, the majority of this section will focus on this brake model. **Figure 6.1.**

Figure 6.1



Section 6

Service Brake Ratings

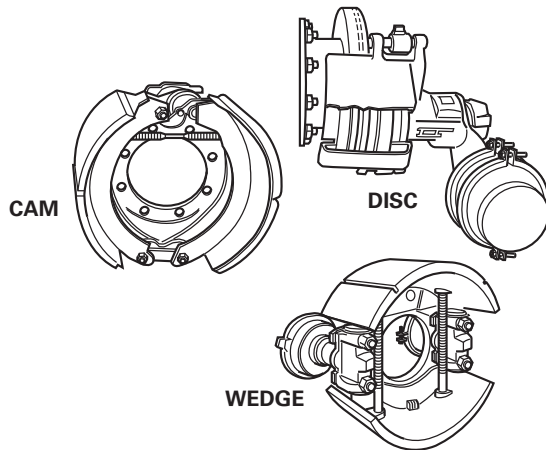


The service brake rating is a function of the brake type, brake linings, brake input power, brake structural rating and tire static loaded radius.

Brake Type

Most Meritor trailer axle models can be ordered with either cam brakes, wedge brakes or disc brakes. **Figure 6.2.**

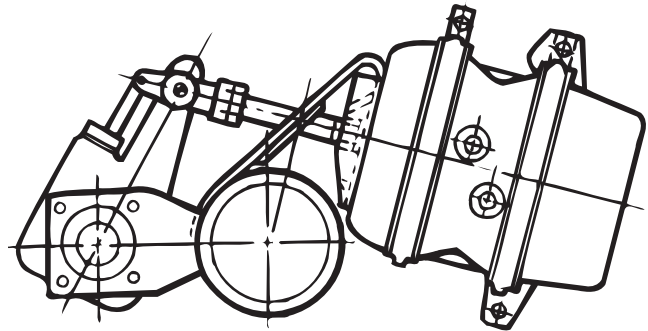
Figure 6.2



Brake Power

Brake power for cam and disc brakes includes the air chamber size and the slack adjuster length. Brake input power for wedge brakes includes the air chamber size and the wedge angle. **Figure 6.4.**

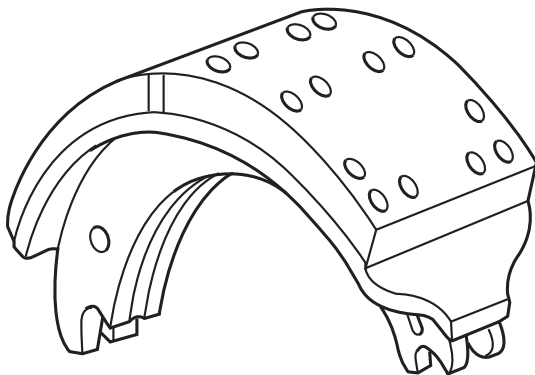
Figure 6.4



Brake Linings

Various brake lining materials are available on Meritor brakes. These materials are categorized as either standard or specification. **Figure 6.3.**

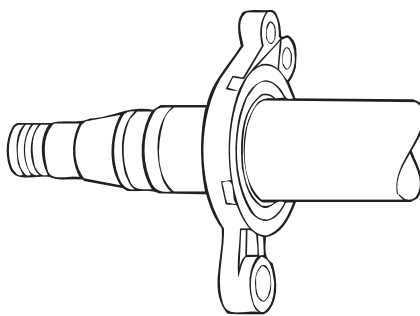
Figure 6.3



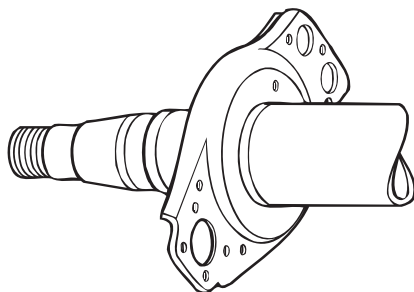
Brake Structural Rating

Each of the sections pertaining to various brake models has a maximum brake structural rating listed. This rating is not an FMVSS-121 brake rating, but rather the maximum load that the brake equipment can structurally handle. Components involved in this rating are the brake spiders, shoes, rotors, drums and various other associated brake equipment. The rating of any trailer brake cannot exceed this listed structural capacity. **Figure 6.5.**

Figure 6.5 BRAKE EQUIPMENT



**FORGED SPIDER —
EXCEEDS 23,000 LBS. RATING**

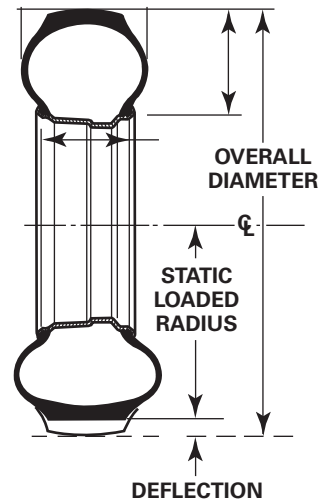


**STAMPED SPIDER —
UP TO 25,000 LBS. RATING**

Tire Static Loaded Radius

The braking torque required to comply with FMVSS-121 at a specified GAWR increases as the tire static loaded radius (SLR) increases. Therefore, a large SLR can reduce the brake rating at a given load and brake input power. The tire SLR must therefore be known in order to obtain a brake rating. The attached chart lists the SLR for various tire sizes. This data is reprinted from currently available tire catalogues. Note that a given size tire can vary from manufacturer to manufacturer. SLR can even vary within a given manufacturer's product line depending on tread type. Therefore, to be completely accurate, data for the specific tire should be used. **Figure 6.6.**

Figure 6.6



Section 6 Service Brake Ratings



Generic Tire Size Information

Tires Sorted by Static Loaded Radius (SLR)

SLR (in.)	Tire Size
14.3	215/75RR17.5
14.3	8.00R17.5
14.7	8.50R17.5
15.0	225/70R19.5
15.3	9.00R17.5
15.6	10.00R17.5
15.7	245/70R19.5
15.8	265/70R19.5
16.0	8.00R19.5
16.2	8.00X19.5
17.0	7.50R20.0
17.0	255/70R22.5
17.1	8.00R22.5
17.2	235/80R22.5
17.3	245/75R22.5
17.7	7.50X20.0
17.8	255/80R22.5
18.0	9.00R22.5
18.1	265/75R22.5
18.1	8.25R20.0
18.4	9.00X22.5
18.4	8.25X20.0
18.6	10/90R20.0
18.7	275/80R22.5
18.8	295/75R22.5
18.9	10.00R22.5
18.9	13/80R20.0

SLR (in.)	Tire Size
18.9	9.00R20.0
19.1	9.00X20.0
19.2	16.50X19.5
19.2	18.00R19.5
19.2	10.00X22.5
19.3	275/80R24.5
19.3	295/80R22.5
19.5	445/65R19.5
19.5	10.00R20.0
19.5	11.00R22.5
19.5	285/75R24.5
19.6	385/65R22.5
19.6	315/80R22.5
19.7	14/80R20.0
19.8	11.00X22.5
19.8	18.00X19.5
19.9	10.00X20.0
19.9	305/75R24.5
20.0	12.00R22.5
20.0	11.00R20.0
20.0	15.00R22.5
20.1	365/80R20.0
20.1	15.00X22.5
20.1	12.00X22.5
20.3	16.50R22.5
20.3	12.50X22.5
20.5	10.00R22.0

SLR (in.)	Tire Size
20.5	11.00R24.5
20.5	425/65R22.5
20.5	12.00R20.0
20.5	11.00X20.0
20.7	11.00X24.5
20.9	10.00X22.0
20.9	445/65R22.5
21.0	18.00R22.5
21.0	16.50X22.5
21.0	12.00R24.5
21.0	12.00X20.0
21.1	11.00R22.0
21.2	13.00R20.0
21.3	12.00R22.0
21.4	11.00X22.0
21.6	18.00X22.5
21.9	12.00R24.0
22.0	11.00R24.0
22.3	14.00X20.0
22.4	14.00R20.0
22.8	11.00X24.0
23.0	16.00X20.0
23.4	12.00X24.0
24.1	24.00X21.0
24.7	14.00R24.0
25.1	14.00X24.0

Tires Sorted by Tire Size

Tire Size	SLR (in.)
8.00R17.5	14.3
8.50R17.5	14.7
9.00R17.5	15.3
10.00R17.5	15.6
215/75RR17.5	14.3
8.00R19.5	16.0
8.00X19.5	16.2
16.50X19.5	19.2
18.00R19.5	19.2
18.00X19.5	19.8
225/70R19.5	15.0
245/70R19.5	15.7
265/70R19.5	15.8
445/65R19.5	19.5
7.50R20.0	17.0
7.50X20.0	17.7
8.25R20.0	18.1
8.25X20.0	18.4
9.00R20.0	18.9
9.00X20.0	19.1
10.00R20.0	19.5
10.00X20.0	19.9
10/90R20.0	18.6
11.00R20.0	20.0
11.00X20.0	20.5
12.00R20.0	20.5
12.00X20.0	21.0

Tire Size	SLR (in.)
13.00R20.0	21.2
13/80R20.0	18.9
14.00R20.0	22.4
14.00X20.0	22.3
14/80R20.0	19.7
16.00X20.0	23.0
365/80R20.0	20.1
24.00X21.0	24.1
10.00R22.0	20.5
10.00X22.0	20.9
11.00R22.0	21.1
11.00X22.0	21.4
12.00R22.0	21.3
8.00R22.5	17.1
9.00R22.5	18.0
9.00X22.5	18.4
10.00R22.5	18.9
10.00X22.5	19.2
11.00R22.5	19.5
11.00X22.5	19.8
12.00R22.5	20.0
12.00X22.5	20.1
12.50X22.5	20.3
15.00R22.5	20.0
15.00X22.5	20.1
16.50R22.5	20.3
16.50X22.5	21.0

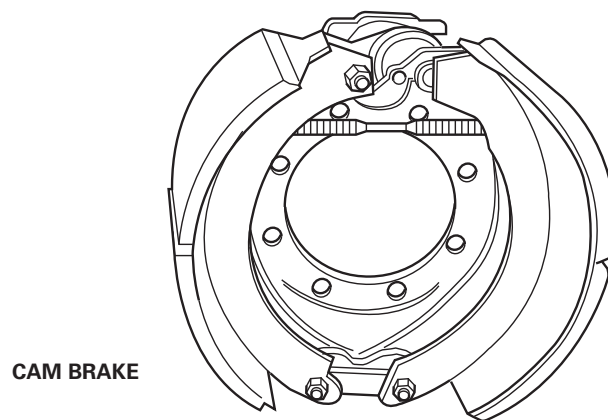
Tire Size	SLR (in.)
18.00R22.5	21.0
18.00X22.5	21.6
235/80R22.5	17.2
245/75R22.5	17.3
255/70R22.5	17.0
255/80R22.5	17.8
265/75R22.5	18.1
275/80R22.5	18.7
295/75R22.5	18.8
295/80R22.5	19.3
315/80R22.5	19.6
385/65R22.5	19.6
425/65R22.5	20.5
445/65R22.5	20.9
11.00R24.0	22.0
11.00X24.0	22.8
12.00R24.0	21.9
12.00X24.0	23.4
14.00R24.0	24.7
14.00X24.0	25.1
11.00R24.5	20.5
11.0X24.5	20.7
12.00R24.5	21.0
275/80R24.5	19.3
285/75R24.5	19.5
305/75R24.5	19.9

Cam Brake Ratings

Cam brakes are used on over 95% of today's North American vehicles equipped with air brakes. The popularity of this brake stems from its adequate stopping capabilities and inherent advantages with respect to purchase price and maintenance costs.

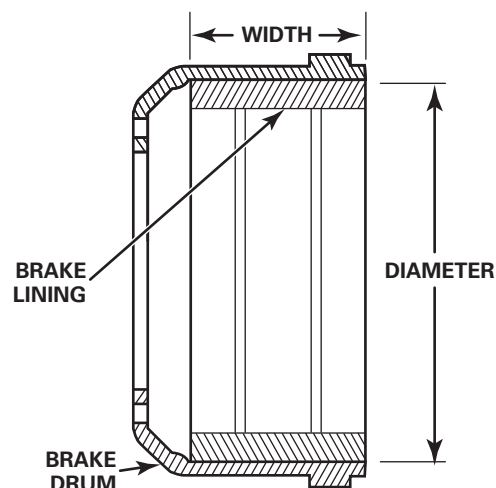
The Meritor brake is a two-anchor design with dual web brake shoes. Cam brakes are so named since the design uses a camshaft to actuate the brakes. As the air chamber and slack adjuster rotate the camshaft, the cam head lifts the shoe and lining assembly outward against the rotating brake drum to stop the vehicle. The cam profile is designed such that a constant shoe input force is provided throughout the lining life. The lining is designed to provide complete lining wear down to the rivet heads along the complete brake shoe arc length. **Figure 6.7.**

Figure 6.7



Cam brake size is a function of brake drum diameter and lining width. For example, a 16.5 x 7-inch cam brake has a 16.5-inch drum diameter and a 7-inch lining width. Larger diameter brake drums will achieve a higher brake rating. Wider brake drums do not increase brake rating. Wider brake linings do, however, provide a greater heat capacity for heavy-duty braking applications such as stopping vehicles during long downhill runs. **Figure 6.8.**

Figure 6.8



16.5-Inch — Standard-Duty

Standard-duty cam brakes include brake ratings up to 23,000 pounds. The maximum structural rating of this family of brakes is also 23,000 pounds. For higher brake ratings, refer to the 16.5-Inch — Heavy-Duty section. Two categories of linings are available on this family of brakes.

Standard Linings

Standard linings are the linings Meritor recommends. They are fully proven after laboratory, vehicle test, and actual production usage in the field.

FMVSS-121 Brake Rating for 16.5 x 7, 8, 8.625 and 10-Inch Cam Brakes

Lining	Tire Static Loaded Radius	Axle Rating (lbs)				Notes
		Brake Power (inch ² x inch)				
		24 x 5.5	30 x 5	30 x 5.5	30 x 6	
MA212	17.0 to 18.6	16,000-18,000	17,000-20,000	17,000-20,000	N.R.	Standard 20,000
MA212	18.7 to 20.8	16,000-16,500	16,000-18,500	17,000-20,000	17,000-20,000	
MA210	17.0 to 18.6	N.R.	17,000-20,000	17,000-20,000	N.R.	Optional long life
MA210	18.7 to 20.8	N.R.	17,000-20,000	17,000-20,000	N.R.	
MA312	17.0 to 18.6	16,000-19,000	17,000-20,000	20,001-23,000	N.R.	Standard 23,000
MA312	18.7 to 20.8	16,000-17,000	17,000-18,000	20,001-22,000	20,001-23,000	

N.R. = Not Recommended

Specification Linings

Specification linings are materials in which Meritor has limited experience. Included may be newly developed compounds or materials Meritor provides in low volume. A number of specification linings are currently available on 16.5-inch cam brakes by customer request. Meritor wishes to comply with customer requests. Therefore, whenever possible the use of specification linings is approved. Meritor will certify that our brakes equipped with specification linings will meet applicable dynamometer requirements of FMVSS-121. Note however, that any lining problems that are encountered such as poor lining life, lining cracking, drum wear, drum cracking, poor brake balance, and tire flat spotting must be handled directly with the lining manufacturer.

FMVSS-121 Brake Rating for 16.5 x 7, 8, 8.625 and 10-Inch Cam Brakes

Lining	Tire Static Loaded Radius	Axle Rating (lbs)				Notes
		Brake Power (inch² x inch)				
		24 x 5.5	30 x 5	30 x 5.5	30 x 6	
SOR206	17.0 to 18.6	16,000-18,000	17,000-20,000	17,000-20,000	N.R.	
SOR206	18.7 to 20.8	16,000-16,250	16,000-18,000	17,000-20,000	17,000-20,000	
SOR211	17.0 to 18.6	16,000-18,000	17,000-18,500	17,000-20,000	N.R.	
SOR211	18.7 to 20.8	16,000-18,000	16,000-20,000	17,000-20,000	17,000-20,000	
SOR215	17.0 to 18.6	16,000-18,000	17,000-18,500	17,000-20,000	N.R.	
SOR215	18.7 to 20.8	16,000	16,000-18,500	17,000-20,000	17,000-20,000	
SOR611	17.0 to 18.6	16,000-18,500	17,000-20,000	17,000-20,000	N.R.	Container chassis only
SOR611	18.7 to 20.8	16,000-18,500	17,000-20,000	17,000-20,000	17,000-20,000	
SOR303	17.0 to 18.6	N.R.	N.R.	21,000-23,000	N.R.	Optional 23,000
SOR303	18.7 to 20.8	N.R.	N.R.	21,000-23,000	N.R.	

N.R. = Not Recommended

Section 6 Service Brake Ratings



16.5-Inch — Heavy-Duty

Heavy-duty cam brake ratings include ratings from 23,000 to 26,000 pounds. The maximum structural rating of this family of brakes is 26,000 pounds. For lower brake ratings, refer to the 16.5-Inch — Standard-Duty section. Note that to obtain a brake structural rating exceeding 25,000 pounds, a forged spider must be used. Note also that the standard fabricated brake shoe structural rating is 24,999 pounds and that special brake shoes must be used for ratings which exceed this value.

FMVSS-121 Brake Rating for 16.5 x 7, P cast shoe and 16.5 x 7 Q Plus H.D. Fab. Shoe

Lining	Tire Static Loaded Radius	Axle Rating (lbs)				Notes
		Brake Power (inch ² x inch)				
		24 x 5.5	30 x 5	30 x 5.5	30 x 6	
R403	18.7 to 20.8	N.R.	N.R.	23,000-24,000	24,000-26,000	

N.R. = Not Recommended

15-Inch

The maximum structural rating of the Meritor 15-inch trailer axle cam brake is 20,000 pounds. This is the maximum brake rating allowed for this brake. When this brake is used in conjunction with 19.5-inch wheels, the maximum brake power allowed is 24 x 5.5-inch. This brake is not recommended to be used in conjunction with 22.5- or 24.5-inch wheels.

FMVSS-121 Brake Rating for 15 x 8.625-Inch Cam Brakes

Lining	Tire Static Loaded Radius	Axle Rating (lbs)				Notes
		Brake Power (inch ² x inch)				
		24 x 5.5	30 x 5	30 x 5.5	30 x 6	
MA212	15.6 to 16.8	17,000-20,000	N.R.	N.R.	N.R.	

N.R. = Not Recommended

12.25-Inch

The maximum structural rating of the Meritor 12.25-inch trailer axle cam brake is 17,500 pounds. This is the maximum brake rating allowed for this brake. The maximum brake power allowed on this brake is 24 x 6-inch.

FMVSS-121 Brake Rating for 12.25 x 7.5-Inch Cam Brakes

Lining	Tire Static Loaded Radius	Axle Rating (lbs)			Notes
		Brake Power (inch ² x inch)			
		24 x 5.0	24 x 5.5	24 x 6 *	
MA312	13.0 to 14.3	17,500	N.R.	N.R.	
MA312	14.4 to 16.9	15,000	16,500	17,500	

N.R. = Not Recommended

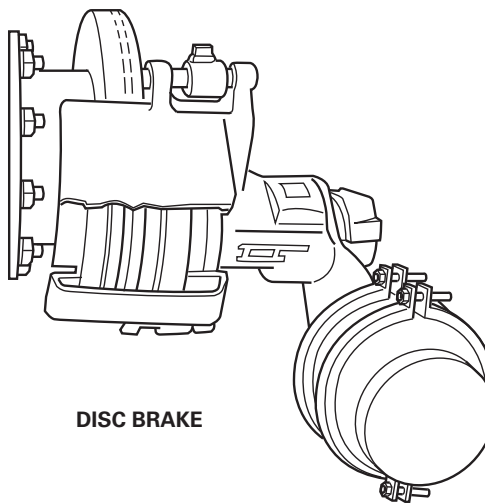
* Long-stroke 24-square-inch air chamber required.

Disc Brake Ratings

The main benefit of Meritor's disc brake is its fade-resistant braking performance and consistent torque at varying vehicle speeds and under severe braking conditions. This, in turn, leads to superior braking performance at high speeds and shorter stopping distances compared to cam brakes under similar conditions. Through the use of application-specific lining materials, Meritor's air disc brake can offer comparable lining life to conventional drum brakes in some applications.

The ADB-1560 model disc brake is available on trailer axles. This brake has a single piston, power screw design caliper. The rotor is ventilated for increased cooling capacity. The ADB-1560 disc brake uses an externally mounted automatic slack adjuster to maintain consistent brake adjustment throughout brake lining life. **Figure 6.9.**

Figure 6.9



The model number for the Meritor disc brake available on trailer axles is ADB-1560. The 15 refers to the disc diameter in inches and 60 to the brake lining surface area in square inches.

The maximum structural rating of Meritor's trailer axle disc brake is 23,000 pounds. This is the maximum brake rating allowed for this model brake. The maximum input power allowed for this model brake is 30-inch² x 5.5-inches.

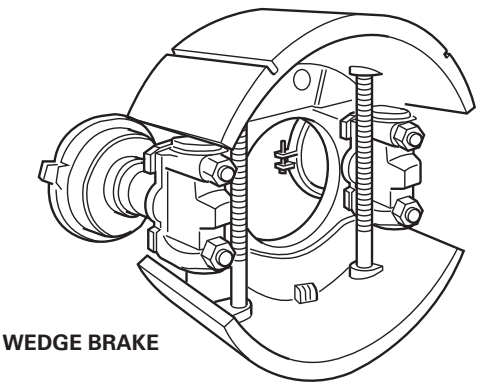
FMVSS-121 Brake Rating for ADB-1560 Disc Brakes

Lining	Tire Static Loaded Radius (inch)	Brake Power	Brake Rating (lbs)
R701	17.0 to 20.8	24-inch ² x 5.5-inch	20,000
PMI 7033-10	17.0 to 20.8	24-inch ² x 5.5-inch	20,000

Wedge Brake Ratings

The wedge brake is smaller and lighter than a typical cam brake providing for increased vehicle payload. **Figure 6.10.**

Figure 6.10



Meritor’s standard wedge brakes are available on trailer axles in a standard 15 x 7-inch size. The first number refers to the brake drum diameter and the second number to the brake shoe width. Brake power is expressed in air chamber square inches and wedge angle.

The maximum structural rating of Meritor’s 15 x 7-inch trailer axle wedge brake is 23,000 pounds. This is the maximum brake rating allowed for this model brake.

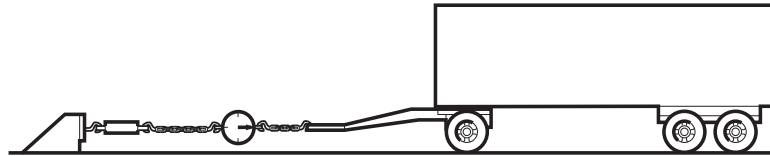
FMVSS-121 Brake Rating for 15 x 7-Inch Wedge Brakes

Lining	Tire Static Loaded Radius (inch)	Brake Power	Brake Rating (lbs)
R501	17.0 to 20.8	12-inch ² x 12°	20,000
R502	17.0 to 20.8	12-inch ² x 14°	17,000
	17.0 to 20.8	12-inch ² x 12°	20,000

Parking Brake Ratings

Vehicle manufacturers are required to comply with the vehicle parking requirements of Paragraph S5.6 of FMVSS-121. This standard requires that when a tractor is detached from a trailer, the trailer must achieve a parking brake capability that can be demonstrated either through a static retardation force test or a hill-holding test. **Figure 7.1.**

Figure 7.1



Drawbar Pull

This test uses a static drawbar pull in both the forward and rearward directions. It is conducted by applying the trailer parking brakes and determining the force required to move the vehicle. Trailer brakes must be able to hold a force equal to 0.28 times the GAWR for each trailer axle in both directions. For example, a single axle trailer with a GAWR of 20,000 pounds must have a drawbar pull performance in both directions of at least 5,600 pounds. For specific information on this test, refer to FMVSS-121.

Hill-Holding

This test requires that the vehicle remain stationary on a 20% grade when facing uphill or downhill with all parking brakes applied, both fully loaded and unloaded plus 500 pounds. For specific information on this test, refer to FMVSS-121.

Cam Brake Ratings

Drawbar pull performance is a vehicle test. Neither parking nor hill-holding capability is under the control of Meritor when approving brakes for a vehicle. It is, therefore, the responsibility of the vehicle manufacturer to ensure that the vehicle achieves satisfactory performance and/or complies with the federal requirements.

The parking brake rating is a function of the following:

- Brake Type
- Brake Lining
- Brake Input Power
- Tire Static Loaded Radius

Meritor has performed tests on a variety of brake equipment. Attached is a summary of this data. Copies of test reports documenting this data are available upon request from Meritor Trailer Product Engineering or contact your Meritor Account Manager.

Section 7 Parking Brake Ratings



Drawbar Pull Test Report Summary

Brake Lining	Brake Size	Brake Drum	Spring Brake	Slack	GAWR lbs. (kg)	SLR	Test Report Number
R201	15 x 8.625 Cam	Hayes Lemmerz Centrifuse	MGM 2424	5.5" Meritor	20,000 (9072)	16.3"	RAI-RWT-03
R201	15 x 8.625 Cam	Hayes Lemmerz Centrifuse	MGM 3030	5.5" Meritor	21,000 (9525)	20.7"	RAI-RWT-03
R201	16.5 x 7 Cam	Hayes Lemmerz Centrifuse	MGM 3030	5.5" Gunitite	19,000 (8636)	N/A	93-0570
R201	16.5 x 7 Cam	Dayton Cast	MGM 3030	5.5" Meritor	20,000 (9072)	20.6"	RAI-CTEA-1
R202	16.5 x 7 Cam	Webb Cast	TSE 3030	5.5" Meritor	20,000 (9072)	18.9"	C/R E145
R202	16.5 x 7 Cam	Webb Cast	TSE 3030	6.0" Meritor	20,000 (9072)	18.9"	C/R E145
R301	12.25 x 7.5 Cam	Webb Cast	Anchorlok 2424	6.0" Meritor	18,000 (8165)	15.4"	RAI-MERT-07
R301	16.5 x 7 Cam	Dayton Cast	MGM 3030	6.0" Meritor	23,000 (10 433)	20.5"	RAI-RWT-01
R301	16.5 x 8 Cam	Webb Cast	MGM 3030	6.0" Meritor	23,000 (10 433)	20.5"	RAI-RWT-02
MA206	16.5 x 7 Cam	Webb Cast	MGM 3030	5.5" Meritor	20,000 (9072)	20.3"	537
MA206	16.5 x 7 Cam	Webb Cast	MGM 3030	6.0" Meritor	20,000 (9072)	20.3"	537
MA206	16.5 x 7 Cam	Dayton Cast	MGM 3030	5.5" Meritor	20,000 (9072)	20.9"	569
MA206	16.5 x 8.625 Cam	Webb Cast	MGM 3030	5.5" Meritor	20,000 (9072)	19.0"	555
MA210	16.5 x 7 Cam	Webb Cast	MGM 3030	5.5" Meritor	20,000 (9072)	20.6"	RAI-BBA-01
MA212	15 x 8.625 Cam	Webb Cast	MGM 2424	5.5" Meritor	20,000 (9072)	16.0"	RAI-MERT-05
MA212	15 x 8.625 Cam	Webb Cast	MGM 3030	6.0" Meritor	20,000 (9072)	20.3"	RAI-MERT-05
MA212	16.5 x 7 Cam	Webb Cast	MGM 3030	5.5" Meritor	20,000 (9072)	20.7"	15507
MA212	16.5 x 8 Cam	Webb Cast	MGM 3030	5.5" Meritor	20,000 (9072)	20.3"	RAI-MERT-06
MA212	16.5 x 8 Cam	Webb Cast	MGM 3030	6.0" Meritor	20,000 (9072)	20.3"	RAI-MERT-06
MA212	16.5 x 8.625 Cam	Webb Cast	MGM 3030	5.5" Meritor	20,000 (9072)	20.3"	RAI-MERT-04
MA212	16.5 x 8.625 Cam	Webb Cast	MGM 3030	6.0" Meritor	20,000 (9072)	20.3"	RAI-MERT-04
SOR215	16.5 x 7 Cam	Dayton Cast	MGM 3030	5.5" Meritor	20,000 (9072)	20.7"	RAI-Abex-13
SOR611	16.5 x 7 Cam	Dayton Cast	MGM 3030	5.5" Meritor	20,000 (9072)	20.7"	RAI-Fras-Le-02
MA312	16.5 x 7 Cam	ARM (Dayton) Cast	MGM 3030	6" Meritor	23,000 (10 433)	20.6"	RAI-MER-57
MA312	12.25 x 7.5 Cam	Webb Cast	MGM 2424	5.5" Meritor	20,000 (9072)	15.4"	RAI-MER-70
MA312	12.25 x 7.5 Cam	Webb Cast	MGM 2430	5.5" Meritor	20,000 (9072)	15.4"	RAI-MER-70
SOR215	15 x 8.625 Cam	Dayton Cast	MGM 2424	5.5" Meritor	20,000 (9072)	16"	RAI-MER-74

Wheel-End Equipment Ratings

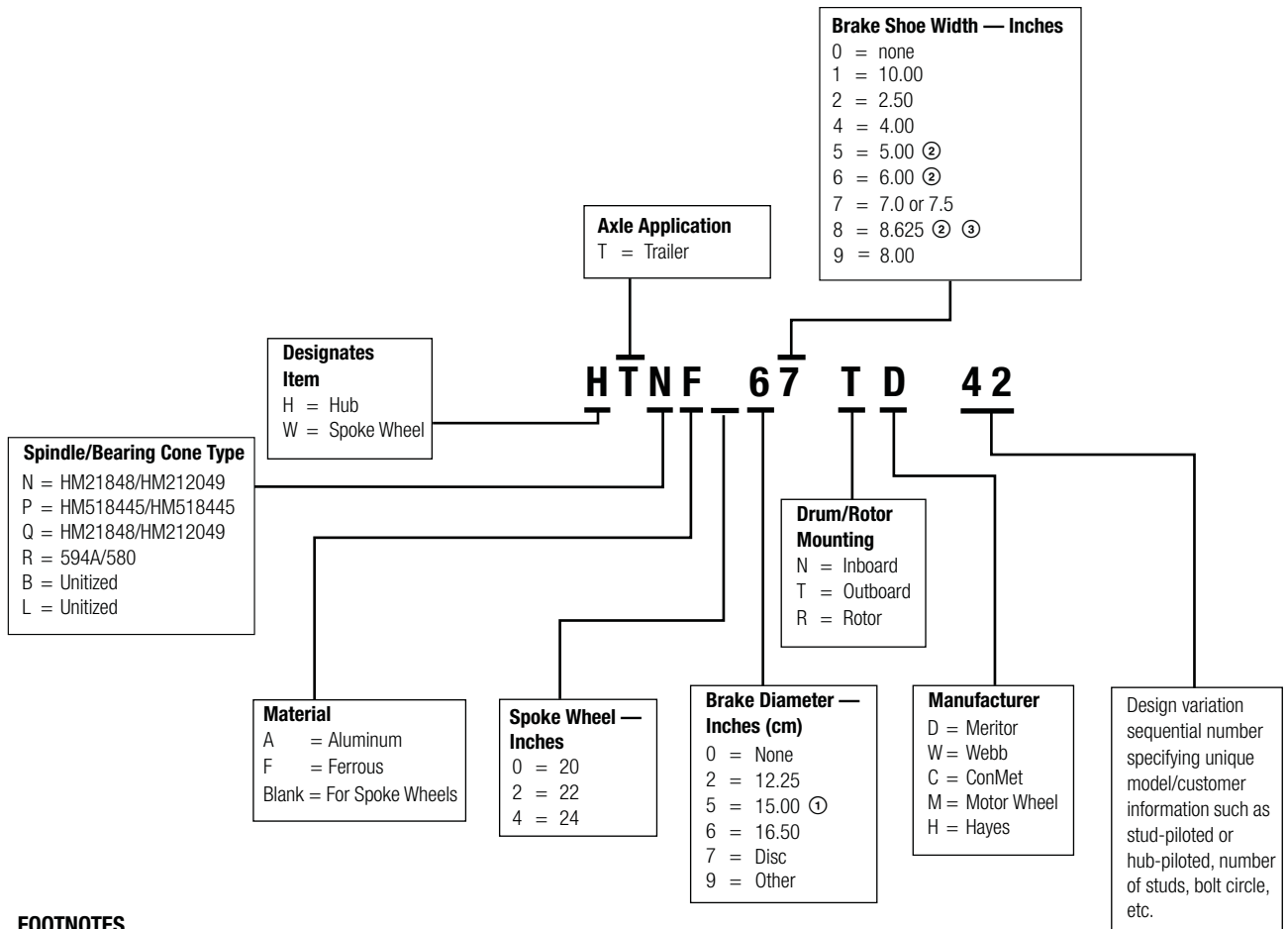
Both disc and spoke wheel-end equipment can be installed on Meritor trailer axles.

Wheel-end equipment is defined in this section as:

1. The hubs used on disc wheel systems.
2. The spoke wheels used on spoke wheel systems.
3. The bearings used on both systems.

Hubs and Spoke Wheels/Drums and Rotors Model Numbers

Model numbers for hubs, spoke wheels, drum and rotors are designated by letters and digits (example, HTNF-67-T-42). Each letter and digit indicates specific information as shown below.



FOOTNOTES

- ① Denotes either cam or wedge brake drum dia. or disc brake rotor dia.
② Denotes either cam or wedge brake shoe width or disc brake pad size (In tens of sq. inch).
③ Denotes either 7-inch on 16.5-inch dia.brakes or 7.5-inch on 12.25-inch dia. brakes.

Section 8

Wheel-End Equipment Ratings

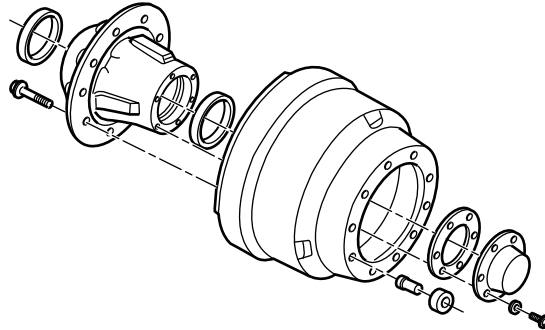


Hub Ratings

Disc wheel systems incorporate a hub which mounts onto the trailer axle wheel bearings. Brake drums for cam and wedge brakes or brake rotors for disc brakes are fastened to the hub. Tire and wheel assemblies are then fastened to the hub using studs and nuts. Meritor manufactures a line of hub and drum/rotors assemblies designed to mate to most commercially available Meritor and competitive axles. **Figure 8.1.**

Figure 8.1

DISC WHEEL SYSTEM



The nominal hub rating depends on the number of studs, bolt circle and material. **Table B** outlines the ratings for hubs which are operated within the limitations set forth in this guide. For the ratings of brake drums and rotors associated with these assemblies, refer to the Service Brake Ratings section of this manual. The values on the next page are the total capacity of two hubs that are fitted to a single axle.

Table B: Nominal Hub Ratings

Axle Type	No. of Studs	Bolt Circle	Meritor Hub Family Series	Material	Dual Wheel Axle Hub Rating (2 Hubs) (lbs)	2" Offset Single Wheel Axle Hub Rating** (2 Hubs) (lbs)		
TB	10	11.25-inches	333T4232	Ferrous	22,500	20,000		
TL	10	11.25-inches	16030		20,000	18,000		
TN/TQ	8	275 mm	15541		22,500	17,000		
			16075					
			15683*					
	10	8.75-inches	16027		17,500	13,000		
			15501					
		11.25-inches	15571*		22,500	17,000		
			15604*					
			15640*					
			15857*					
			15984				23,000	17,000
			16041					
			16048					
		335 mm	15413		25,000	17,000		
			15479					
TP	8	275 mm	15537		25,000	17,000		
			15945					
			16077*					
	10	11.25-inches	15502		25,000	20,000		
			15593*					
			15605*					
			15641*					
			15656					
			15711*					
			15837					
			15843					
			15912*					
			15963*					
			15968					
			15944*					
335 mm	15412	20,000	15,000					
		25,000	20,000					
TR	10	11.25-inches	15579	25,000	20,000			
			15607					
			15675	23,000	20,000			
			15716					
			15642*					
			15741					
			15985	27,000	20,000			
		335 mm	15728	26,000	20,000			

***OBSOLETE**

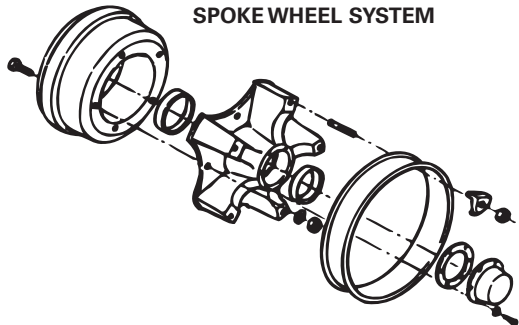
** Any single wheel application not described in this table must be reviewed by Meritor for the appropriate rating. Refer to the Applications section in the manual.

Spoke Wheel Ratings

Spoke wheel systems incorporate ferrous spoke wheels which mount onto the trailer axle wheel bearings. Brake drums for cam and wedge brakes or brake rotors for disc brakes are fastened to the wheel. Tire and rims are mounted to the wheels using rim clamps, spacers, studs and nuts. For the ratings of brake drums and rotors associated with these assemblies, refer to the Service Brake Ratings section of this manual.

Figure 8.2.

Figure 8.2



Meritor spoke wheels are rated at 25,000 pounds. This is the total capacity of two spoke wheels that are fitted to a single axle. For the ratings of brake drums and rotors associated with these assemblies, refer to the Service Brake Ratings section of this manual.

Bearings

Bearings which fit on the various available Meritor axle and hub models are listed in **Table C**. For a more complete list of axle models and weights, refer to Section 9 in this manual.

Table C: Bearing Part Numbers

Axle Series	Bearings			
	Inner		Outer	
	Cup	Cone	Cup	Cone
TN/TQ	HM218210	HM218248	HM212011	HM212049
TR	592A	594A	572	580
TP	HM518410	HM518445	HM518410	HM518445
TB	Unitized Bearings — Non-serviceable			
TL	Unitized Bearings — Non-serviceable			

Weights

Trailer axles are most commonly available in two configurations as shown in **Figure 9.1**.

Standard Axles

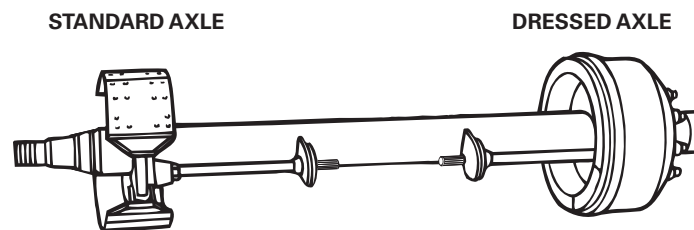
- Axle tube
- Standard spindle nut pack
- Standard brake spider
- Cam and air chamber support brackets
- Brake shoe and lining assemblies
- Short cams
- Cam bushings

Dressed Axles

The same features as a standard axle plus:

- 10-stud x 11.25 BC hubs with studs for hub-piloted dual-steel wheels
- Outboard-mounted cast brake drums
- Bearings
- Wheel-end seals
- Hubcaps
- Wheel-end lubricant

Figure 9.1



With these two configurations in mind, the weight of trailer axles is determined as follows:

1. Use **Table D** to find the weight of either the standard or dressed axle. The chart breaks up the axle product line by axle series, axle model, brake and axle track. (Refer to **Table E** for standard hub and drum specifications.)
2. Use **Table F** to adjust the weight of the axle for various options.

Example: Determine the weight of a 77.5-inch track TQ model built with 3/4-inch axle walls, ferrous hubs and drums, 16-1/2 x 7 cam brakes, automatic slack adjusters, long cams and ABS provisions.

Table D — TQ9670 dressed axle with 3/4-inch walls, ferrous hubs and drums and 77.5-inch track 719 lbs.

Table F — Add weight of automatic slack adjusters. + 17

Table F — Add weight of long cams + 7

Table F — Add weight of ABS provisions + 3

Total Axle Assembly Weight = 746 lbs.

Section 9 Weights



Table D

			Axle Assembly Weight (lbs)						Footnotes	
			Standard Axles Without Hubs		Dressed Axles With Ferrous Hubs		Dressed Axles With Aluminum Hubs			
	Brakes	Nominal Beam Capacity (lbs) ⁹	Tracks (Inches)							
			71.5	77.5	71.5	77.5	71.5	77.5		
TB Axle Models	TB Axle Series									
TB-4670	16.5" x 7"Q	22,500	—	—	635	646	—	—		a
TB-4580	15" x 8.625"Q	22,500	—	—	643	654	—	—	a	
TB-4650	16.5" x 5"Q	22,500	—	—	562	573	—	—	a	
TB-4690	16.5" x 8"Q	22,500	—		659	670	—	—	a	
TB-4680	16.5" x 8.625"Q	22,500	—	—	678	689	—	—	a	
TB-4570	15" x 7" Wedge	22,500	—	—	608	619	—	—	ae	
TB-8670	16.5" x 7"Q	25,000	—	—	664	677	—	—	a	
TB-8580	15" x 8.625"Q	25,000	—	—	672	685	—	—	a	
TB-8650	16.5" x 5"Q	25,000	—	—	591	604	—	—	a	
TB-8690	16.5" x 8"Q	25,000	—	—	688	701	—	—	a	
TB-8680	16.5" x 8.625"Q	25,000	—	—	707	720	—	—	a	
TB-8570	15" x 7" Wedge	25,000	—	—	637	650	—	—	ae	
TB-9670	16.5" x 7"Q	30,000	—	—	704	717	—	—	a	
TB-9580	15" x 8.625"Q	30,000	—	—	712	725	—	—	a	
TB-9650	16.5" x 5"Q	30,000	—	—	631	644	—	—	a	
TB-9690	16.5" x 8"Q	30,000	—	—	728	741	—	—	a	
TB-9680	16.5" x 8.625"Q	30,000	—	—	747	760	—	—	a	
TB-9570	15" x 7" Wedge	30,000	—	—	677	690	—	—	ae	
TL Axle Models	TL Axle Series									
TL-4670	16.5" x 7"Q	22,500	—	—	635	646	—	—	a	
TL-4580	15" x 8.625"Q	22,500	—	—	643	654	—	—	a	
TL-4690	16.5" x 8"Q	22,500	—		659	670	—	—	a	
TL-4680	16.5" x 8.625"Q	22,500	—	—	678	689	—	—	a	
TL-8670	16.5" x 7"Q	25,000	—	—	664	677	—	—	a	
TL-8580	15" x 8.625"Q	25,000	—	—	672	685	—	—	a	
TL-8690	16.5" x 8"Q	25,000	—	—	688	701	—	—	a	
TL-8680	16.5" x 8.625"Q	25,000	—	—	707	720	—	—	a	
TL-9670	16.5" x 7"Q	30,000	—	—	704	717	—	—	a	
TL-9580	15" x 8.625"Q	30,000	—	—	712	725	—	—	a	
TL-9690	16.5" x 8"Q	30,000	—	—	728	741	—	—	a	
TL-9680	16.5" x 8.625"Q	30,000	—	—	747	760	—	—	a	

			Axle Assembly Weight (lbs)						Footnotes
			Standard Axles Without Hubs		Dressed Axles With Ferrous Hubs		Dressed Axles With Aluminum Hubs		
	Brakes	Nominal Beam Capacity (lbs) ^g	Tracks (Inches)						
			—	85.25	—	85.25	—	—	
TN/TQ Axle Models	TN/TQ Axle Series								
TN-1670	16.5" x 7"Q	22,500	—	338	—	691	—	—	b
TQ-1670	16.5" x 7"Q	25,000	—	352	—	705	—	—	b
			Tracks (Inches)						
			71.5	77.5	71.5	77.5	71.5	77.5	
TN-2670	16.5" x 7"Q	22,500	288	299	642	652	601	612	cd
TN-4670	16.5" x 7"Q	22,500	284	295	638	648	597	608	
TN-4270	12.25" x 7.5"Q	22,500	278	289	594	604	553	564	d
TN-4580	15" x 8.625"Q	22,500	282	293	646	656	605	616	
TN-4650	16.5" x 5"Q	22,500	271	282	565	575	524	535	
TN-4690	16.5" x 8"Q	22,500	288	299	662	672	621	632	
TN-4680	16.5" x 8.625"Q	22,500	293	304	681	691	640	651	
TN-4610	16.5" x 10"Q	22,500	302	313	766	776	725	736	
TN-4570	15" x 7" Wedge	22,500	271	282	611	621	570	581	e
TN-4560	Disc	22,500	—	—	655	665	614	625	f
TQ-4670	16.5" x 7"Q	25,000	313	326	667	679	626	639	
TQ-4270	12.25" x 7.5"Q	25,000	307	320	623	635	582	595	d
TQ-4580	15" x 8.625"Q	25,000	311	324	675	687	634	647	
TQ-4650	16.5" x 5"Q	25,000	300	313	594	606	553	566	
TQ-4690	16.5" x 8"Q	25,000	317	330	691	703	650	663	
TQ-4680	16.5" x 8.625"Q	25,000	322	335	710	722	669	682	
TQ-4610	16.5" x 10"Q	25,000	331	344	795	807	754	767	
TQ-4570	15" x 7" Wedge	25,000	300	313	640	652	599	612	e
TQ-4560	Disc	25,000	—	—	684	696	643	656	f
TQ-9670	16.5" x 7"Q	30,000	350	366	703	719	663	679	
TQ-9270	12.25" x 7.5"Q	30,000	344	360	659	675	619	635	d
TQ-9580	15" x 8.625"Q	30,000	348	364	711	727	671	687	
TQ-9650	16.5" x 5"Q	30,000	337	353	630	646	590	606	
TQ-9690	16.5" x 8"Q	30,000	354	370	727	743	687	703	
TQ-9680	16.5" x 8.625"Q	30,000	359	375	746	762	706	722	
TQ-9610	16.5" x 10"Q	30,000	368	384	831	847	791	807	
TQ-9570	15" x 7" Wedge	30,000	337	353	676	692	636	652	e
TQ-9560	Disc	30,000	—	—	720	736	680	696	f

Section 9 Weights



			Axle Assembly Weight (lbs)						Footnotes
			Standard Axles Without Hubs		Dressed Axles With Ferrous Hubs		Dressed Axles With Aluminum Hubs		
	Brakes	Nominal Beam Capacity (lbs) ^g	Tracks (Inches)						
			71.5	77.5	71.5	77.5	71.5	77.5	
TP Axle Models	TP Axle Series								
TP-4670	16.5" x 7"Q	22,500	286	297	652	663	616	627	
TP-4270	12.25" x 7.5"Q	22,500	280	291	608	619	572	583	d
TP-4580	15" x 8.625"Q	22,500	284	295	660	671	624	635	
TP-4650	16.5" x 5"Q	22,500	273	284	579	590	543	554	
TP-4690	16.5" x 8"Q	22,500	290	301	676	687	640	651	
TP-4680	16.5" x 8.625"Q	22,500	295	306	695	706	659	670	
TP-4610	16.5" x 10"Q	22,500	304	315	780	791	744	755	
TP-4570	15" x 7" Wedge	22,500	273	284	625	636	589	600	e
TP-4560	Disc	22,500	—	—	669	680	633	644	f
TP-8670	16.5" x 7"Q	25,000	315	328	681	694	645	658	
TP-8270	12.25" x 7.5"Q	25,000	309	322	637	650	601	614	d
TP-8580	15" x 8.625"Q	25,000	313	326	689	702	653	666	
TP-8650	16.5" x 5"Q	25,000	302	315	608	621	572	585	
TP-8690	16.5" x 8"Q	25,000	319	332	705	718	669	682	
TP-8680	16.5" x 8.625"Q	25,000	324	337	724	737	688	701	
TP-8610	16.5" x 10"Q	25,000	333	346	809	822	773	786	
TP-8570	15" x 7" Wedge	25,000	302	315	654	667	618	631	e
TP-8560	Disc	25,000	—	—	698	711	662	675	f
TP-9670	16.5" x 7"Q	30,000	353	369	719	735	683	699	
TP-9270	12.25" x 7.5"Q	30,000	347	363	675	691	639	655	d
TP-9580	15" x 8.625"Q	30,000	351	367	727	743	691	707	
TP-9650	16.5" x 5"Q	30,000	340	356	646	662	610	626	
TP-9690	16.5" x 8"Q	30,000	357	373	743	759	707	723	
TP-9680	16.5" x 8.625"Q	30,000	362	378	762	778	726	742	
TP-9610	16.5" x 10"Q	30,000	371	387	847	863	811	827	
TP-9570	15" x 7" Wedge	30,000	340	356	692	708	656	672	e
TP-9560	Disc	30,000	—	—	736	752	700	716	f
TR Axle Models	TR Axle Series								
			72.22	77.5	72.22	77.5	72.22	77.5	
TR-4670	16.5" x 7"Q	22,500	288	299	674	685	620	631	
TR-4580	15" x 8.625"Q	22,500	286	297	682	693	628	639	
TR-4650	16.5" x 5"Q	22,500	275	286	601	612	547	558	
TR-4690	16.5" x 8"Q	22,500	292	303	698	709	644	655	
TR-4680	16.5" x 8.625"Q	22,500	297	308	717	728	663	674	
TR-4610	16.5" x 10"Q	22,500	306	317	802	813	748	759	
TR-4570	15" x 7" Wedge	22,500	275	286	647	658	593	604	e
TR-4560	Disc	22,500	—	—	691	702	637	648	f

			Axle Assembly Weight (lbs)						Footnotes
			Standard Axles Without Hubs		Dressed Axles With Ferrous Hubs		Dressed Axles With Aluminum Hubs		
	Brakes	Nominal Beam Capacity (lbs) ^g	Tracks (Inches)						
			72.22	77.5	72.22	77.5	72.22	77.5	
TR-8670	16.5" x 7"Q	25,000	317	330	703	716	649	662	
TR-8580	15" x 8.625"Q	25,000	315	328	711	724	657	670	
TR-8650	16.5" x 5"Q	25,000	304	317	630	643	576	589	
TR-8690	16.5" x 8"Q	25,000	321	334	727	740	673	686	
TR-8680	16.5" x 8.625"Q	25,000	326	339	746	759	692	705	
TR-8610	16.5" x 10"Q	25,000	335	348	831	844	777	790	
TR-8570	15" x 7" Wedge	25,000	304	317	676	689	622	635	e
TR-8560	Disc	25,000	—	—	720	733	666	679	f
TR-9670	16.5" x 7"Q	30,000	354	369	740	755	686	701	
TR-9580	15" x 8.625"Q	30,000	352	367	748	763	694	709	
TR-9650	16.5" x 5"Q	30,000	341	356	667	682	613	628	
TR-9690	16.5" x 8"Q	30,000	358	373	764	779	710	725	
TR-9680	16.5" x 8.625"Q	30,000	363	378	783	798	729	744	
TR-9610	16.5" x 10"Q	30,000	372	387	868	883	814	829	
TR-9570	15" x 7" Wedge	30,000	341	356	713	728	659	674	e
TR-9560	Disc	30,000	—	—	757	772	703	718	f

			Axle Assembly Weight (lbs)						Footnotes
			Standard Axles Without Hubs		Dressed Axles With Ferrous Hubs		Dressed Axles With Aluminum Hubs		
	Brake Size	Nominal Beam Capacity (lbs) ^g	Tracks (Inches)						
			71.5	77.5	71.5	77.5	71.5	77.5	
Crank Axle Models	Crank Axle Series — 3.375-Inch Drop								
TQC-4670	16.5" x 7"Q	20,000	340	353	693	706	653	666	
Drop Axle Models	Drop Axle Series — 6.0-Inch Drop								
TQD-4670	16.5" x 7"Q	20,000	318	331	671	684	631	644	
TRD-8670	16.5" x 7"Q	20,000	322	335	708	721	654	667	

- a TB Series available only with ferrous unitized hubs and Q-Plus brakes.
- b 1000 series standard with 85.25-inch track.
- c Approved for piggyback and chassis applications only.
- d With intermediate length cams.
- e With service air chambers with short tubes.
- f With automatic slack adjusters.
- g Use of axles, components and capacity ratings vary with application and service.

Section 9 Weights



Table E: Standard Hub and Drum Specification

Axle Model	Type/Size
TN/TP/TQ-4270	10 Stud 8.75" BC
TP-8270	
TP/TQ-9270	
All Other Models	10 Stud 11.25" BC

Table F: Adjust the Weight of Axles for Various Options

Component	Add/Subtract	Pounds/Axle
Substitute Q+ brakes for Q brakes	Add	3
Substitute P brakes for Q brakes	Add/Subtract	0
Substitute forged spiders for stamped spiders	Add	3
Substitute positive bearing adjustment for conventional bearing adjustment	Add/Subtract	0
Substitute Wheel Studs Listed Below for Hub-Piloted Dual Steel Wheel Studs		
Studs for hub-piloted aluminum wheels	Add	4
Studs for stud-piloted aluminum or steel wheels	Subtract	4
Add Disc Wheel System Retention Nuts		
Hub-piloted nuts (20 nuts required per axle)	Add	10
Stud-piloted nuts (40 nuts required per axle)	Add	15
Increase/Decrease Axle Beam Length by 1 Inch		
Axle with 1/2" thick wall	Add/Subtract	1.86
Axle with 5/8" thick wall	Add/Subtract	2.22
Axle with 3/4" thick wall	Add/Subtract	2.66
Substitute Solid Spindles for Integrally Formed Spindles		
Axle with 1/2" thick wall	Add	12
Axle with 5/8" thick wall	Add	7
Add 2 Slack Adjusters		
Manual slack adjusters	Add	9
Automatic slack adjusters — Meritor	Add	17
Add 2 Service Only Air Chambers		
24 sq-in	Add	17
30 sq-in	Add	20
36 sq-in	Add	32
Add 2 Service and Spring Air Chambers		
24 sq-in	Add	33
30 sq-in	Add	40
36 sq-in	Add	62
Substitute 2 Lightweight Centrifugal Brake Drums for 2 Standard Cast Brake Drums		
12.25 x 7.5 brake drums	Not Available	
15 x 7 brake drums	Subtract	34

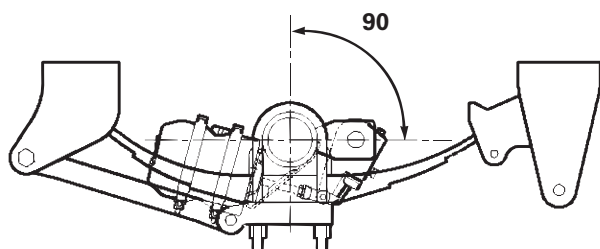
Table F: Adjust the Weight of Axles for Various Options — Continued

Component	Add/Subtract	Pounds/Axle
15 x 8.625 brake drums	Subtract	36
16.5 x 5 brake drums	Subtract	10
16.5 x 7 brake drums	Subtract	50
16.5 x 8 brake drums	Subtract	60
16.5 x 8.625 brake drums	Subtract	52
16.5 x 10 brake drums	Not Available	
Substitute Longer Length Cams for Short Cams		
Intermediate Length Cams	Add	4
Long Length Cams	Add	7
Add Cam Covers — Including Grease		
Short length	Add	7
Intermediate length	Add	8
Long length	Add	10
Wedge Brakes — Substitute one service and spring brake chamber with long tubes for one service brake chamber with short tubes	Add	25
Add Hubodometer	Add	2
Add Dust Shields	Add	5
Add ABS Provisions (Includes 2 tone rings, 2 sensor blocks and 2 sensor-wire assemblies)	Add	3

Installation

The axle must be installed so there is no interference between the trailer axle and other trailer components. All vehicle articulations and movements due to over-the-road operation must be taken into account during this installation. **Figure 10.1.**

Figure 10.1



For purposes of aiding vehicle manufacturers in making these fits the following two sections are included in this Application Guide.

- **AXLE DIMENSIONS** — This section provides envelope dimensions for Meritor trailer axles.
- **AXLE-SUSPENSION FITS** — This section provides information on the fit of axle models to suspension models.

Axle Dimensions

This section details the dimensions of various Meritor trailer axle models fitted with standard Meritor components. The drawings provide coverage of axles built with and without wheel-end equipment.

Terms in the layout drawings are as follows:

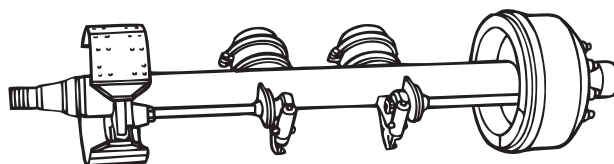
BSOB — Inner bearing shoulder to outer bearing	P — Brake centerline to bearing shoulder
BSS — Inner bearing shoulder to inner bearing shoulder	R — Axle centerline to cam centerline
CBA — Slack adjuster to air chamber angle	RB — Axle centerline to sensor block centerline
CBCB — Air chamber bracket to air chamber bracket	SBDI — Spindle inner bearing diameter
CHRG — Cam head edge to snap ring groove	SBDO — Spindle outer bearing diameter
DBCM — Wheel stud bolt circle diameter	SL — Slack length
DPDM — Brake drum mounting pilot diameter	SSD — Spindle seal diameter
DD — Brake drum to brake drum	STS — Spindle thread size
L — Axle length with wheel-end equipment	SX — Bearing shoulder to sensor block
OL — Axle length without wheel-end equipment	TR — Axle track
	W — Oil seal collar flat width
	Y — Axle centerline to face of air chamber

These drawings do not attempt to show the vehicle to trailer axle clearances that must be maintained. Vehicle manufacturers must provide sufficient clearances to take into account such items as vehicle articulations during over the road service and component tolerances.

Straight Axles

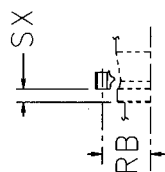
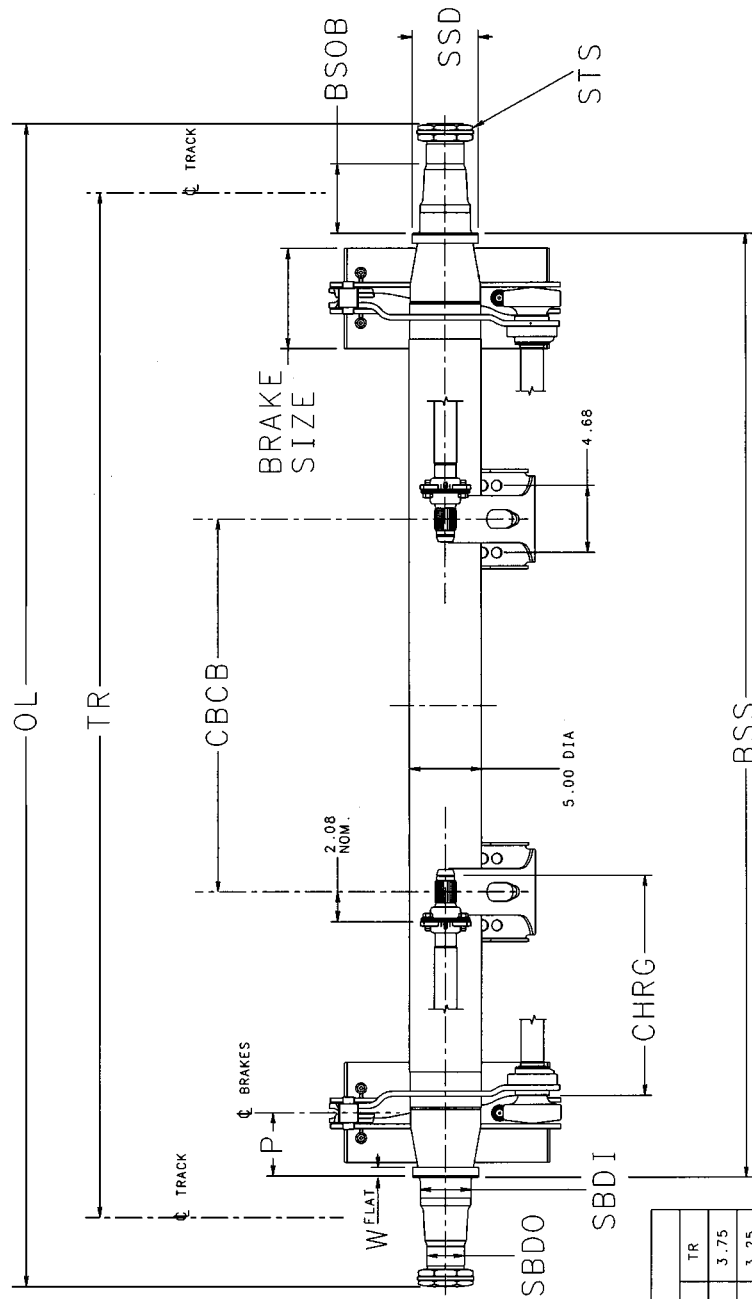
Straight axles are the most common product available from Meritor and will be used in most applications. **Figure 10.2.**

Figure 10.2



STRAIGHT AXLE

Standard Axle



"ABS" SENSOR BLOCK

AXLE MODEL	RB	SX
TN	3.39	.91
TP	3.39	.78
TB	3.39	.25
TR	3.39	.91

	AXLE MODEL			
	TN	TB	TP	TR
SBDI	3.54	3.68	3.50	3.75
SBD	2.62	3.68	3.50	3.25
BSDB REF	4.81	4.58	6.00	5.37
SSD	4.62	—	4.25	4.77
STS	2.62	3.38	3.48	3.25
W	.75	—	.68	.94
OL TR BSS	81.13	77.86	82.12	81.78
	71.48	71.50	71.58	72.22
	65.89	66.12	63.68	64.84
	87.13	83.86	88.12	87.06
	77.48	77.50	77.58	77.50
	71.89	72.12	69.88	70.12

FOR "CBB", "BRAKE SIZE", "CHRG"
AND "P" SEE SEPARATE CHART

MERITOR®

FOR "DD" AND "CBCB" SEE SEPARATE CHART

AXLE MODEL			
DBCM	TN	TB	TP
	10.83(275)	11.25(285.75)	11.25(285.75)
	11.25(285.75)	11.25(285.75)	11.25(285.75)
	13.19(335)		

IN (MM)			
DBCM	TN	TB	TP
	275	285.75	285.75
	285.75	285.75	285.75
	335		

OL TR	SHORT TRACK		WIDE TRACK	
	IN	MM	IN	MM
	83.58	81.34	92.92	87.50
	71.48	71.50	71.58	72.22
	89.58	87.34	98.92	92.78
	77.48	77.50	77.58	77.50

BRAKE DIA	SL	CBA	R	Y
12.25	5.6.0	107	4.38	2.18
15.00	5.50	105	5.52	2.50
16.50	5.5.5.6.0	105	6.00	2.50

Brake Dia	SL	CBA	R	Y
12.25	5.6.0	107	4.38	2.18
15.00	5.50	105	5.52	2.50
16.50	5.5.5.6.0	105	6.00	2.50

AXLE MODEL					IN (MM)
TN	TB	TP	TR		
DBCM	10.83(275)				
	11.25(285.75)	11.25(285.75)	11.25(285.75)	11.25(285.75)	
	13.19(335)				
DPDM	9.00(228.6)				
	8.78(223)	8.78(223)	8.78(223)	8.78(223)	
	11.25(285.75)				
$\frac{OL}{TR}$	83.58	81.34	92.92	87.50	
	71.48	71.50	71.58	72.22	
SHORT TRACK					
WIDE TRACK	89.58	87.34	98.92	92.78	
	77.48	77.50	77.58	77.50	

AXLE MODEL	TR	P	DD										CBCB CHRG		
			BRAKE SIZE										LONG	INTERMEDIATE	SHORT
			16.5 X 7.0	16.5 X 8.0	16.5 X 8.62	16.5 X 10.0	15.0 X 8.62	12.25 X 7.5							
TN	SHORT	4.55	49.52									8.71	16.05	22.23	
		4.55										24.14	20.47	17.38	
		5.47	48.42									6.71	16.05	22.23	
		5.47		45.94								24.14	20.47	17.38	
		4.79			44.24							6.81	14.15	20.33	
	WIDE	4.79				47.08						24.14	20.47	17.38	
		4.99										9.65		22.23	
		4.55	55.52				48.18					23.38		17.12	
		4.55										8.77	14.43		
		5.47		54.42								23.30	20.47		
TP	SHORT	5.47		51.94								14.71	22.05	28.23	
		5.47										24.14	20.47	17.38	
		4.79										14.71	22.05	28.23	
		4.99										24.14	20.47	17.38	
		4.99			50.24							12.81	20.15	26.33	
	WIDE	4.79				53.08						24.14	20.47	17.38	
		4.99										12.81	20.15	26.33	
		3.50	49.62				54.18					24.14	20.47	17.38	
		3.50		48.52								8.74	16.08	22.26	
		4.06			46.74							24.14	20.47	17.38	
TP	SHORT	4.59										9.81	14.97	21.15	
		3.50										23.00	20.47	17.38	
												8.82		20.04	
												23.00		17.38	
												9.04		22.80	
	WIDE					47.18						23.30		17.12	
		3.50	55.62									14.74	22.08	28.26	
		3.50		52.74								24.14	20.47	17.38	
		4.06			52.74							14.74	22.08	28.26	
WIDE	4.59										24.14	20.47	17.38		
	3.50										13.62	20.97	27.15		
	3.88										23.00	20.47	17.38		
											12.52		26.04		
											24.14		17.38		
										16.22					
										23.38					
										15.04					
										23.30					
										54.15					

Section 10 Installation

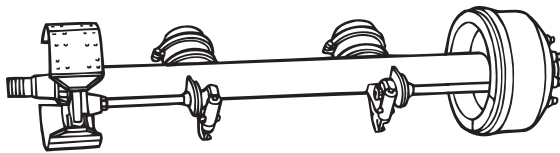


AXLE MODEL	TR	P	DO										CBCB CHRG		
			BRAKE SIZE										LONG	INTERMEDIATE	SHORT
			16.5 X 7.0	16.5 X 8.0	16.5 X 8.62	16.5 X 10.0	15.0 X 8.62	12.25 X 7.5							
TB	SHORT	4.60	49.61									8.77 24.14	16.11 20.47	22.29 17.38	
		4.60		48.05								8.77 24.14	16.11 20.47	22.29 17.38	
		5.52			46.74							6.93 24.14		20.44 17.38	
		5.04					46.74					9.36 23.38			
	WIDE	4.60	55.61									14.77 24.14	22.11 20.47	28.29 17.38	
		4.60		54.05								14.77 24.14	22.11 20.47	28.29 17.38	
		5.52			52.74							12.93 24.14		28.44 17.38	
		5.04					52.74					15.36 23.38			
TR	SHORT	3.56	50.26									9.82 24.14	17.16 20.47	23.34 17.38	
				49.16								9.82 24.14	17.16 20.47	23.34	
		3.56					47.82					11.30 23.38		23.68 17.12	
	WIDE	3.56	55.24									15.10 24.14	22.44 20.47	28.62 17.38	
		3.56		54.44								15.10 24.14	22.44 20.47	28.62 17.38	
		3.56													
		3.56					53.10					16.58 23.38		28.96 17.12	

1000 Series Axles

The 1000 series axle is designed for use in applications such as furniture delivery vans where a premium is placed on obtaining maximum interior cargo volume. This model incorporates a special hub with an outboard flange which when used with super single tires pushes the wheel-end package to the outside of the trailer. **Figure 10.3.**

Figure 10.3



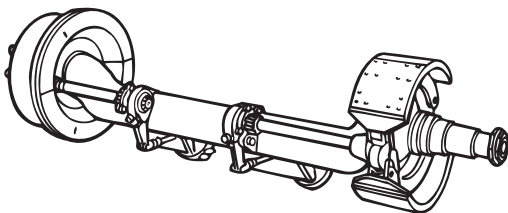
1000 SERIES AXLE

Crank Axles

Crank axles are designed for use in applications such as furniture delivery vans where a premium is placed on obtaining maximum interior cargo volume. This model incorporates a crank feature in the axle beam that lowers the top of the axle thus allowing the trailer floor to be lowered to maximize trailer cargo volume.

When combined with 1000 series axle features, the package offers the potential for minimizing trailer axle assembly intrusion into the trailer cargo area and maximizing trailer interior volume. **Figure 10.4.**

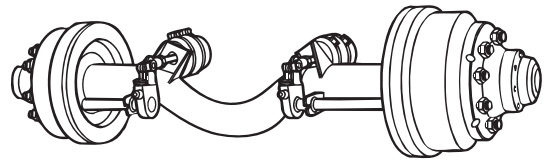
Figure 10.4



Drop Axles

Drop axles provide a recessed area in the center of the axle beam. This model is most commonly used in the pusher position on a tractor. In this application, the tractor driveshaft passes through the axle envelope. Another use for the model is on either dry bulk hopper or tanker trailers where clearance is required for trailer piping. **Figure 10.5.**

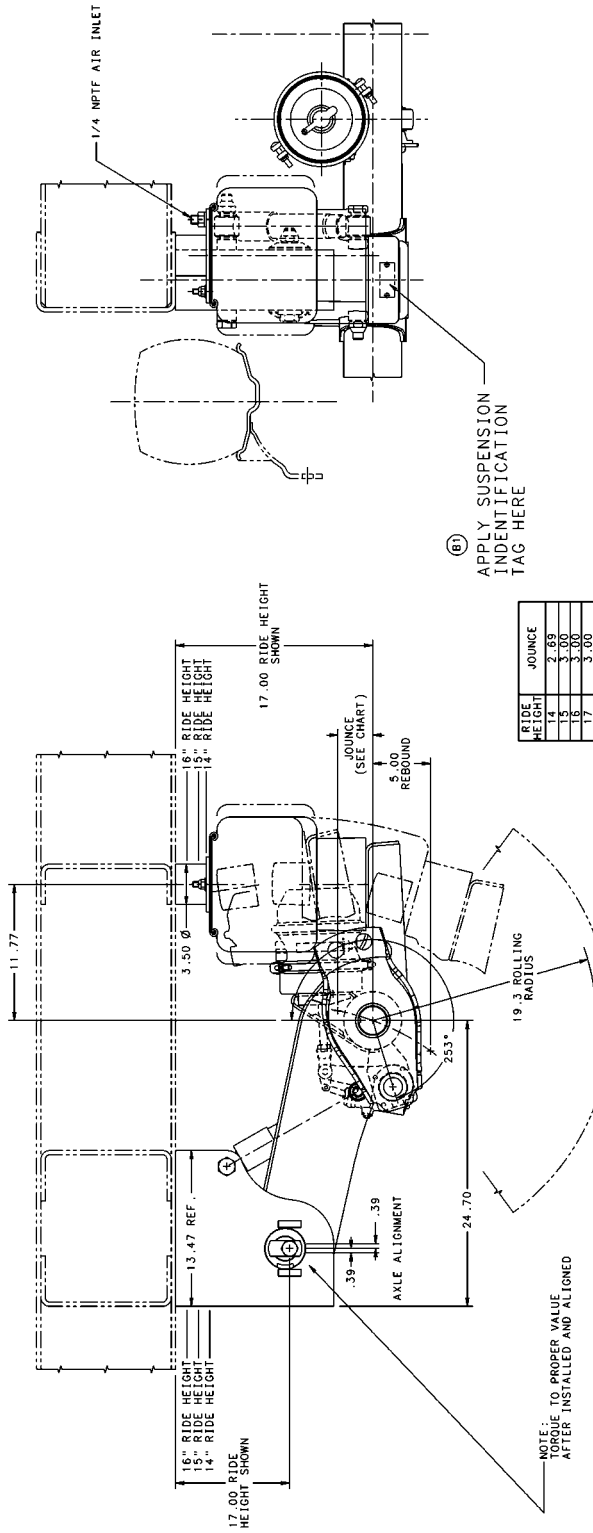
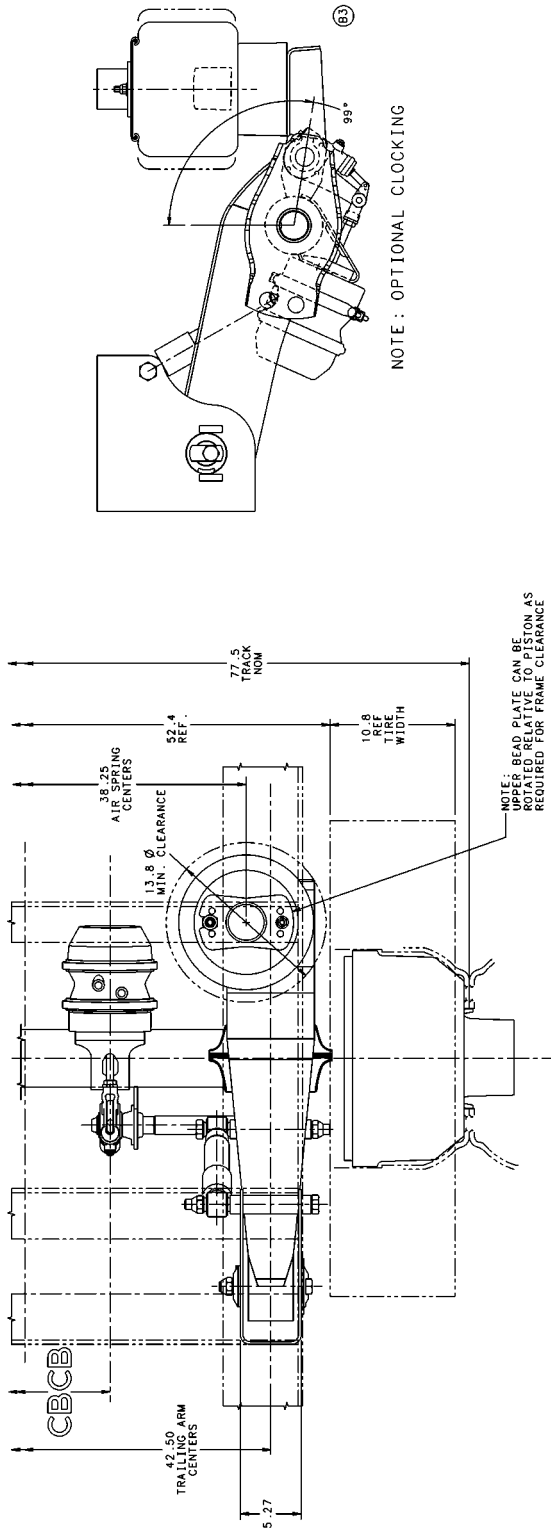
Figure 10.5

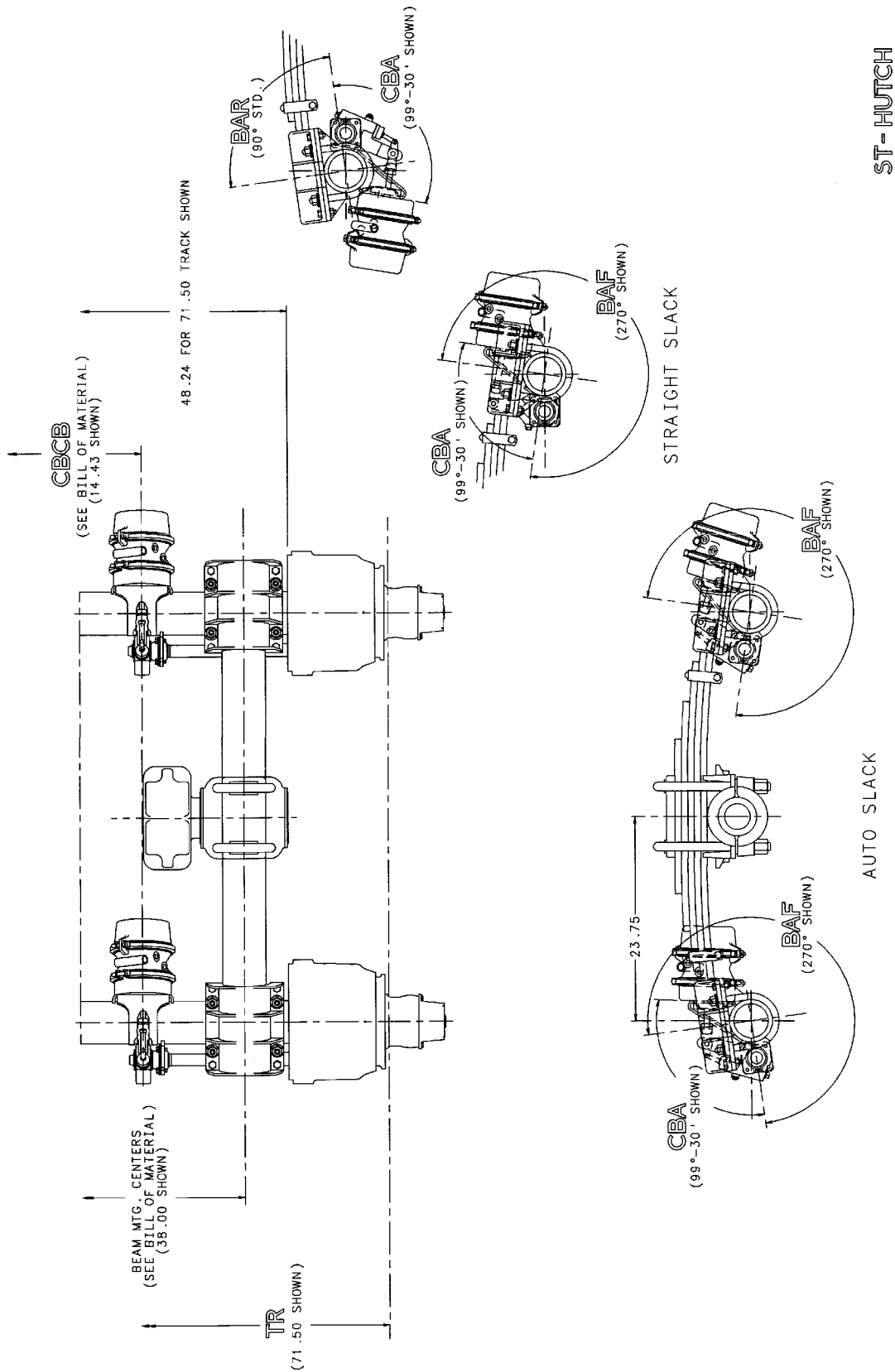


Axle-Suspension Fits

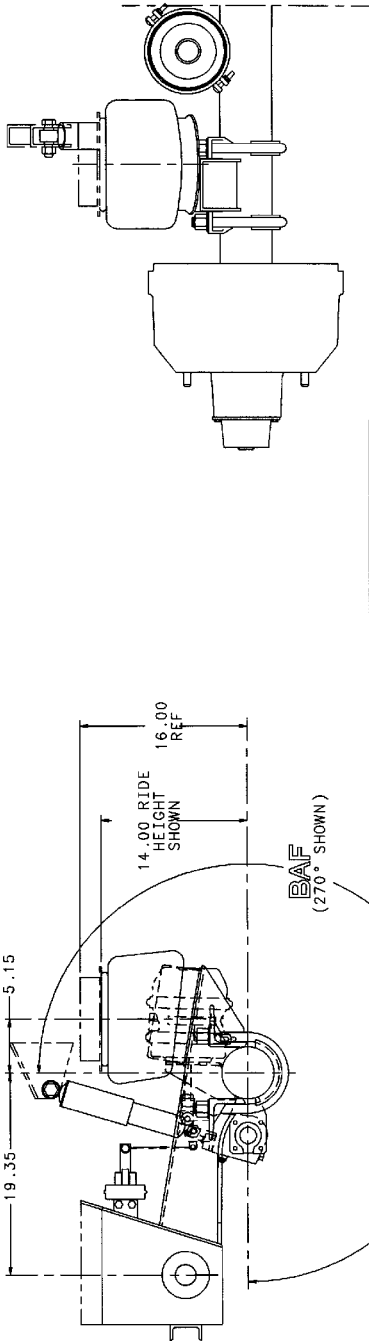
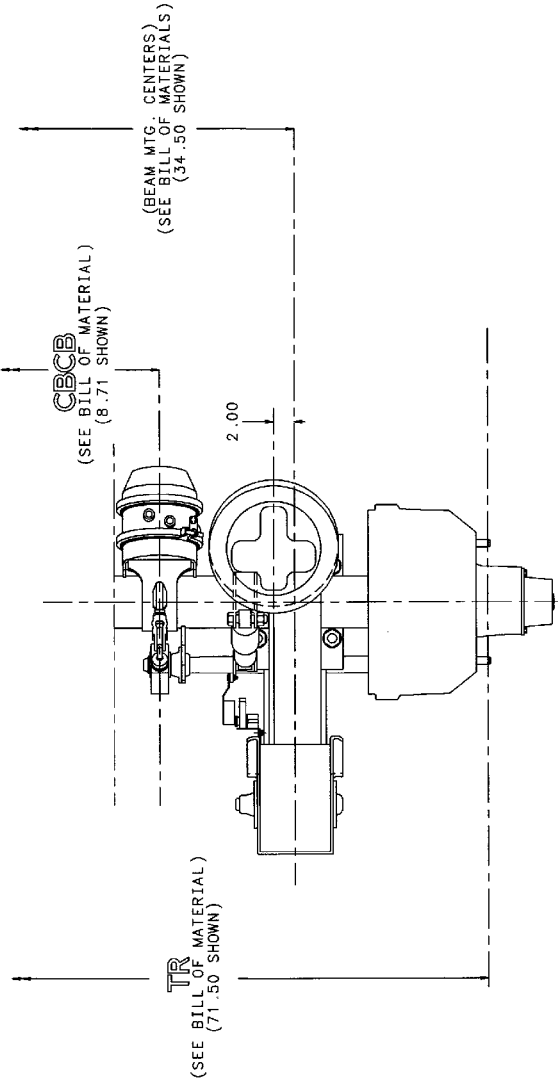
Trailer Product Engineering maintains files on the proper installation of various Meritor axle models on many current production suspension models from various manufacturers. Attached are examples of this information detailing several suspension models. For information on the fit of a specific trailer axle model to a specific suspension model, contact Meritor. Note that Meritor cannot be aware of the location of the components that an OEM may locate on a trailer. Also, Meritor cannot be aware of the changes that manufacturers make to their suspension models. As a result, this information is included for reference only. Final determination of trailer axle fit on vehicles is the responsibility of the vehicle manufacturer.

Section 10 Installation





ST-TURNER



HT190T-040 (14 THRU 17 SLIDER)				OBSOLETE REPLACED BY	
HT190-14	001	002		HT190T-14	002
HT190T-14	001	002	009 032	HT190T-14	002
HT190TA-14				HT190TA-14	
HT190-16	001	002		HT190T-16	002
HT190T-16	001	002	009 032	HT190T-16	002
HT190TA-16				HT190TA-16	
HT230-14		003 004		HT230TA-14	
HT230TA-14				HT230TA-14	
HT230-16		003 004		HT230TA-16	
HT230TA-16				HT230TA-16	

VM

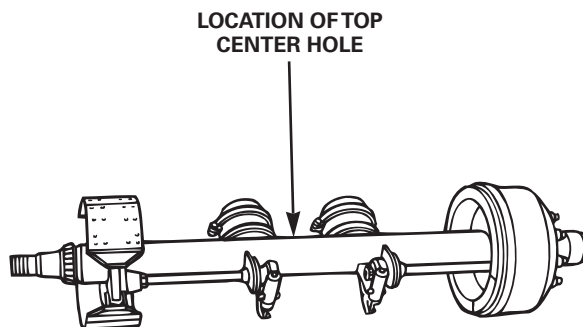
Engineering Policies

This section documents various Meritor Trailer Product Engineering policies and requirements. Following these instructions will help ensure trouble-free operation by helping to ensure the axle is properly installed, operated and maintained. Failure to follow these instructions can cause performance problems and may void the axle warranty.

Installation

The axle must be installed properly. This includes properly positioning the top and front of the axle with respect to the vehicle. Refer to Maintenance Manual 14 for information on installing trailer axles. **Figure 11.1.**

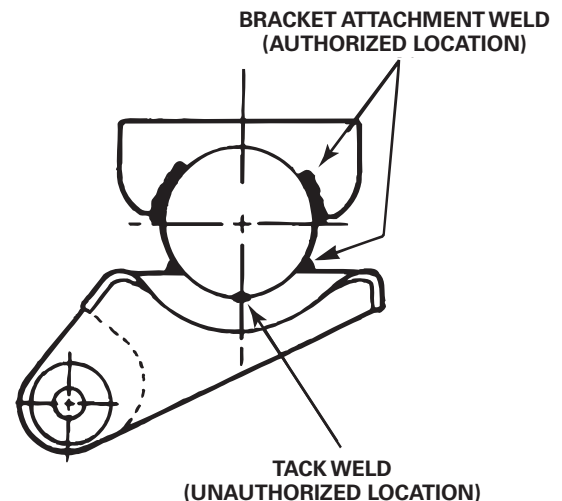
Figure 11.1



Welding

Hardware must be properly welded to the axle. This includes such items as using the correct weld wire, properly preparing the axle, welding in the proper location and using correct sized welds. Refer to Maintenance Manual 14 for information on welding hardware to axle. **Figure 11.2.**

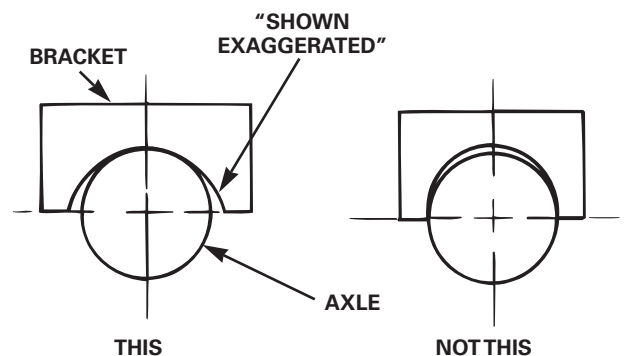
Figure 11.2



Hardware Fit

Suspension brackets must properly fit the axle. This is important since vehicle loads are delivered to the axle through this interface. An improper fit may cause axle damage. Refer to Maintenance Manual 14 for information on fitting suspension brackets to axles. **Figure 11.3.**

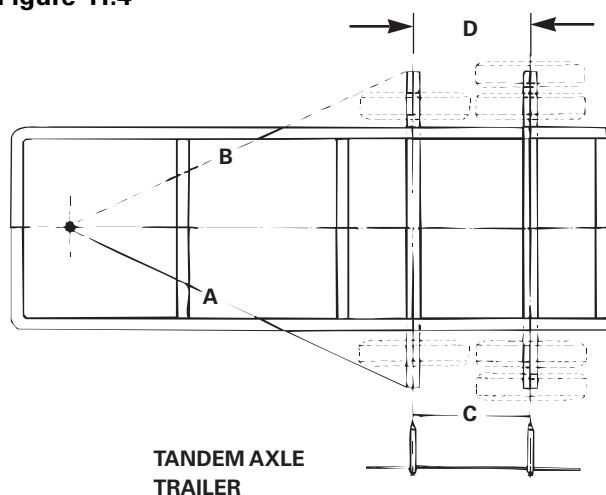
Figure 11.3



Alignment

The axle must be properly aligned with respect to the vehicle. Refer to Meritor Maintenance Manual 14 for information on axle alignment. **Figure 11.4.**

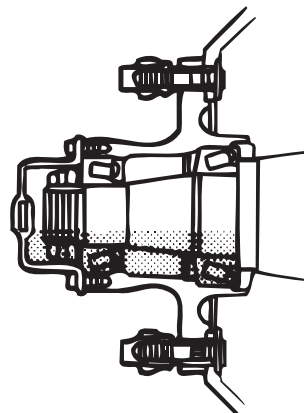
Figure 11.4



Lubrication

Axle components must be properly lubricated. This involves filling components to the proper level with the specified lubricants at the required maintenance intervals. Refer to Maintenance Manual 14 for information on axle lubrication. **Figure 11.6.**

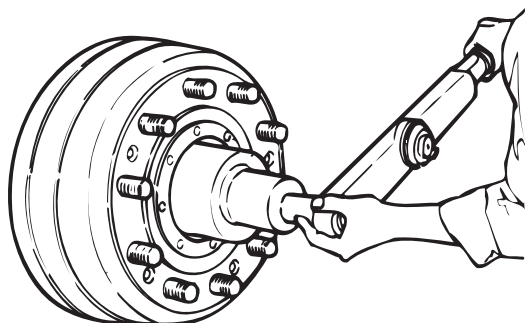
Figure 11.6



Conventional Bearing Adjustment

Conventional bearings must be properly adjusted. Adjustments must be performed using a torque wrench and the final wheel bearing end play must be checked with a dial indicator. Refer to Maintenance Manual 14 for information on bearing adjustment. **Figure 11.5.**

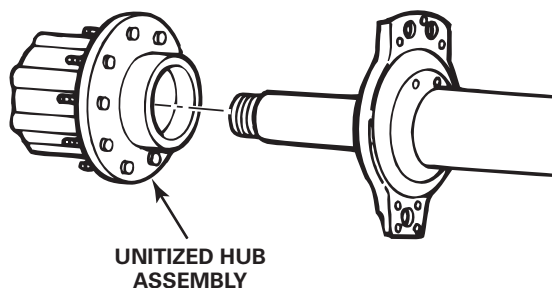
Figure 11.5



Unitized Model

For information on the installation, operation and maintenance of the unitized hub assembly used on the TB and TL model trailer axle, refer to Maintenance Manual MM-0420. **Figure 11.7.**

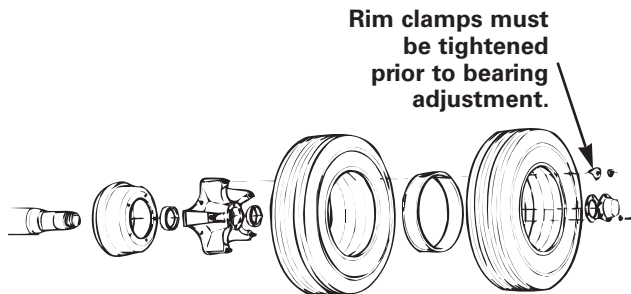
Figure 11.7



Spoke Wheel Assembly Sequence

When installing spoke wheels on Meritor trailer axles, Meritor requires that the wheel rim clamps be tightened prior to adjusting wheel bearings. This helps eliminate excessive bearing and spindle stresses resulting from wheel clamping pressures. **Figure 11.8.**

Figure 11.8

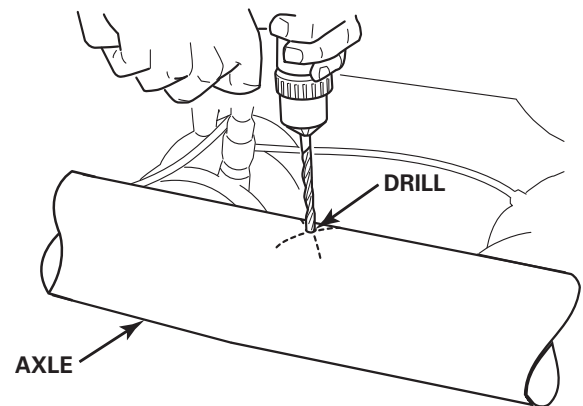


NOTE: This only applies when the entire wheel-end is disassembled. If only the rim clamps are removed as is necessary when replacing a flat tire, a new bearing adjustment is not necessary if rim clamp fasteners are retightened in the correct sequence and with the correct torque.

MTIS Installation

Meritor can supply trailer axles prepped for the Meritor Tire Inflation System (MTIS). However, if the system is to be retrofitted onto an in-service trailer at a fleet, the installation requires drilling and tapping the axle tube. Meritor requires that this operation be performed as detailed in Maintenance Manual 14P. Installations, which vary from the published instructions regarding fitting location or installation, may affect the structural integrity of the beam and must be approved by the axle manufacturer. **Figure 11.9.**

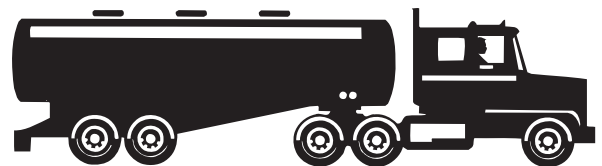
Figure 11.9



30,000-Pound Axles

Meritor offers a 30,000-pound rated axle. While the published rating of this model is 30,000 pounds, it was actually developed to be a heavy-duty version of the 25,000-pound axle, with the intent of using it in applications where durability issues were encountered with the 25,000-pound models. Gasoline tankers, fitted with an air suspension, in a city-delivered environment is an example of an application where this model has been successful. Note further that 30,000-pound rated axles should be used in applications where either due to load or severity of application, a 30,000-pound rated suspension is required. **Figure 11.10.**

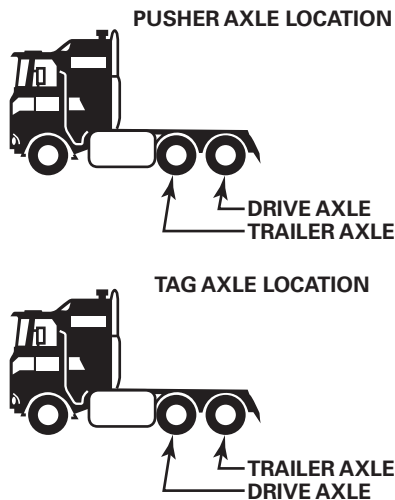
Figure 11.10



Tag and Pusher Axles

Trailer axles may be installed at the tag or pusher locations of tractors. In the pusher position, the trailer axle is installed forward of the drive axle and a drop axle is used to provide clearance for the tractor driveshaft. In the tag position, the trailer axle is installed to the rear of the drive axle and a straight axle can be used. Note that Trailer Axle Product Engineering does not handle tractor running gear. Therefore, applications for trailer axles used in these applications should be submitted to Meritor Drive Axle Engineering. **Figure 11.11.**

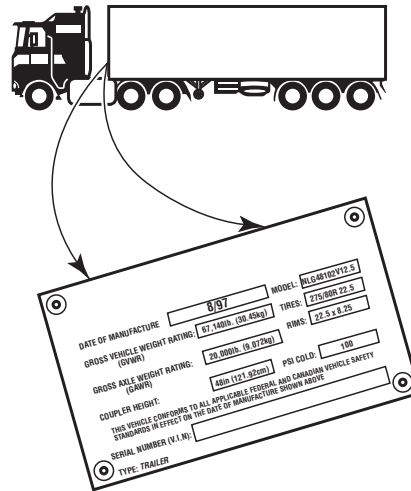
Figure 11.11



GAWR

The axle must be operated at or below the Gross Axle Weight Rating (GAWR). Note that GAWR includes not only the ratings of Meritor-supplied components, but also the ratings of components supplied by other manufacturers. Operating at a load which exceeds this GAWR can damage the axle assembly. Refer to the Gross Axle Weight Rating section of this guide for additional information. **Figure 11.12.**

Figure 11.12



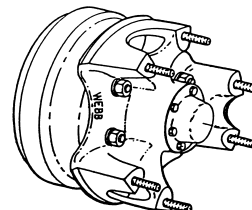
Location

The axle must be operated within the United States and Canada to obtain full warranty coverage. Refer to Vocational Warranty brochure SP-95155 for complete warranty information.

Non-Meritor Equipment Ratings

Meritor often installs, at customer request, components from competitors that Meritor does not design, test or manufacture. Meritor will install these components. Note, however, that it is the responsibility of the customer to determine their rating. Additionally, the customer is responsible for properly applying the rating of these components to determine final axle GAWR. **Figure 11.13.**

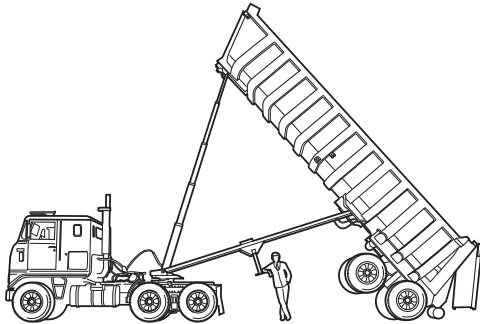
Figure 11.13



Service Environment

The axle must be operated in the service environment for which it was intended. Meritor recognizes eight different service environments for trailer axles including Linehaul, City Delivery, Refuse, Construction, Mining, Heavy Haul, Oil Field and Logging. The warranty coverage can vary for trailer axle equipment operated in these different environments. **Figure 11.14.**

Figure 11.14

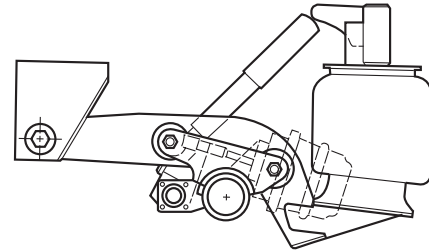


Air Suspensions

Trailing arm air suspensions have been found to impose higher stresses on trailer axles than spring suspensions. This is due to the torsion loading imposed on the axle during air suspension articulations. Therefore, Meritor has generally required the use of heavy-duty 5/8- or 3/4-inch wall axles on air suspensions. Some manufacturers have made provisions in their suspension designs for reducing the effect of this torsion loading on the axle.

Meritor will review these designs for their effect on the axle using the system detailed in the Applications section of this guide. Note that in order to obtain proper performance and warranty coverage for Meritor axles installed on air suspensions, either heavy-duty axles must be used or application approval must be obtained for the use of 1/2-inch wall axles. **Figure 11.15.**

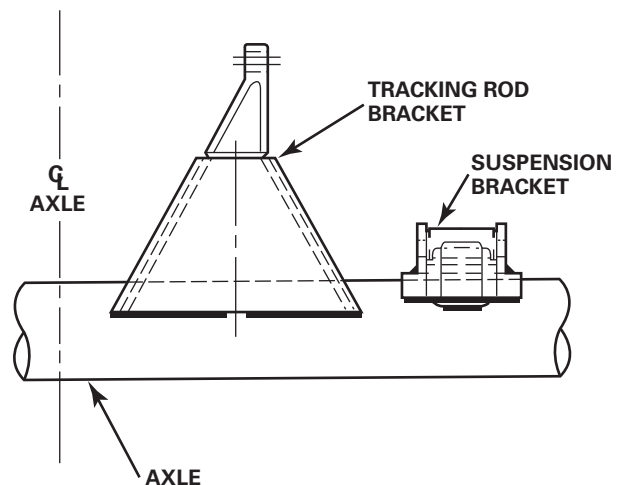
Figure 11.15



Suspension Effects

The rating of a trailer axle beam is a function of suspension and axle geometry and is calculated using the method detailed in this guide. Overall axle performance within this load rating may be affected by the design of the suspension. For example, a suspension that employs an extremely stiff bracket welded to the axle can reduce axle life by causing an excessive change in overall section stiffness. **Figure 11.16.**

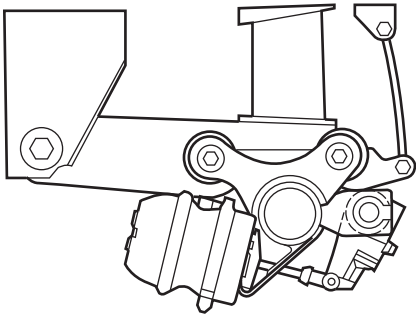
Figure 11.16



Suspension Review

Meritor Engineering cannot keep track of all the suspensions available from various manufacturers. Meritor will, however, review customer requests for assistance in determining the effect that these suspensions have on our axles. To obtain a review, submit an application form listing the suspension manufacturer and model (i.e., Neway model RC-122) as well as other drawings and pertinent information. **Figure 11.17.**

Figure 11.17



Lift Axles — Tandem Suspensions

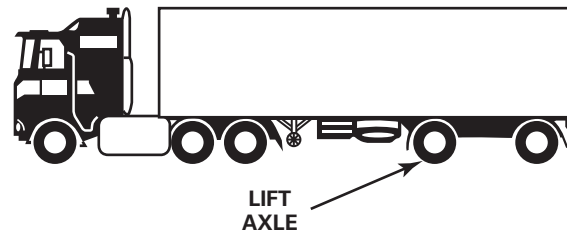
Dump valves are often used on spread axle tandem trailers equipped with air ride suspensions to raise one axle off the ground. When used properly, dump valves increase spread axle trailer low-speed maneuverability in yards where tight turns must be made. When used improperly, dump valves can cause overload and damage the axle which remains on the ground if the system is actuated and the trailer is driven at relatively high speeds.

Therefore, Meritor requires that a dump valve system operate in a manner generically similar to the following description.

1. When system is off:
 - The air bag is inflated and the axle connected to the system remains loaded.
2. When the system is switched on:
 - The air bag deflates and the axle connected to the system is unloaded. Remaining axle or axles must now handle suspension load.
 - Air bag inflates and axle is reloaded if speed exceeds 7 mph.
 - Air bag inflates and axle is reloaded after system is switched on for 5 minutes.

Meritor will offer full warranty on axles under a trailer fitted with a dump valve system which operates as described above as long as the additional load on the axle or axles which remain on the ground is not more than doubled (i.e., Meritor will accept one axle of a tandem or tri-axle to be fitted with the system, but will not accept two axles of a tri-axle to be fitted with the system). **Figure 11.18.**

Figure 11.18



Suspension Lockout Devices

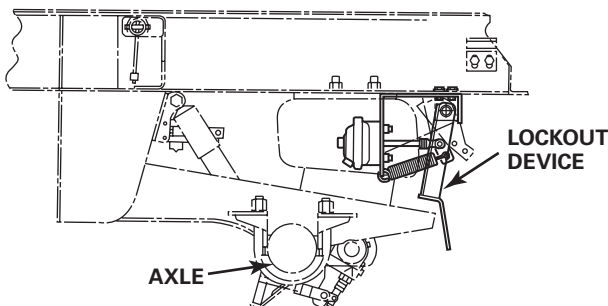
Dock walk can result in the forward movement of a trailer, which can damage trailer components. Dock walk is caused by suspension deflections, which occur during repeated cycling of a forklift truck in and out of a trailer equipped with trailing arm air suspensions.

Suspension lockout devices are available to prevent dock walk. These devices, which eliminate suspension deflections by inserting a stop between the trailer and axle, also tend to change the magnitude and location of the loads imposed on the axle. **Figure 11.19.**

Meritor is aware of these devices and approves their use as long as the device meets the following criteria:

- The locking device must only engage when the vehicle is stationary and must automatically release when the vehicle is in motion.
- The locking device must load the axle at the designed beam centers or wider.
- The locking device will preferably engage the suspension arms. If it is necessary to engage the axle beam itself, the load must be spread over at least 16-square-inch at each engagement point.
- The vehicle load must be such that the locking device does not impose more than 50,000 pounds on any individual axle.

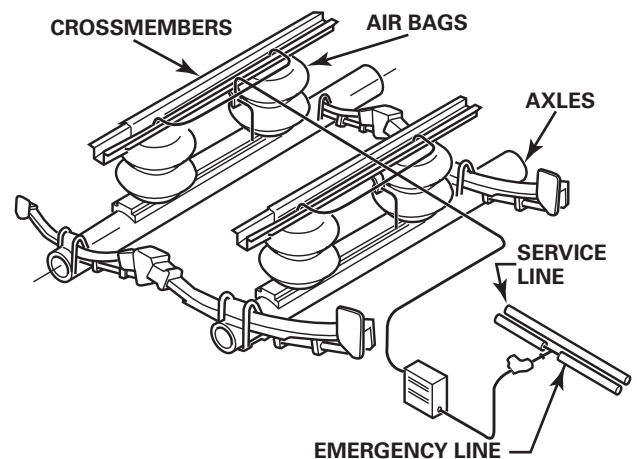
Figure 11.19



Add-On Devices

Devices are available which may change trailer axle loading. Customers should contact Meritor if they determine that a device may change the manner that load is applied to the axle. Meritor will then review the device to determine its effect on axle rating or performance. **Figure 11.20.**

Figure 11.20



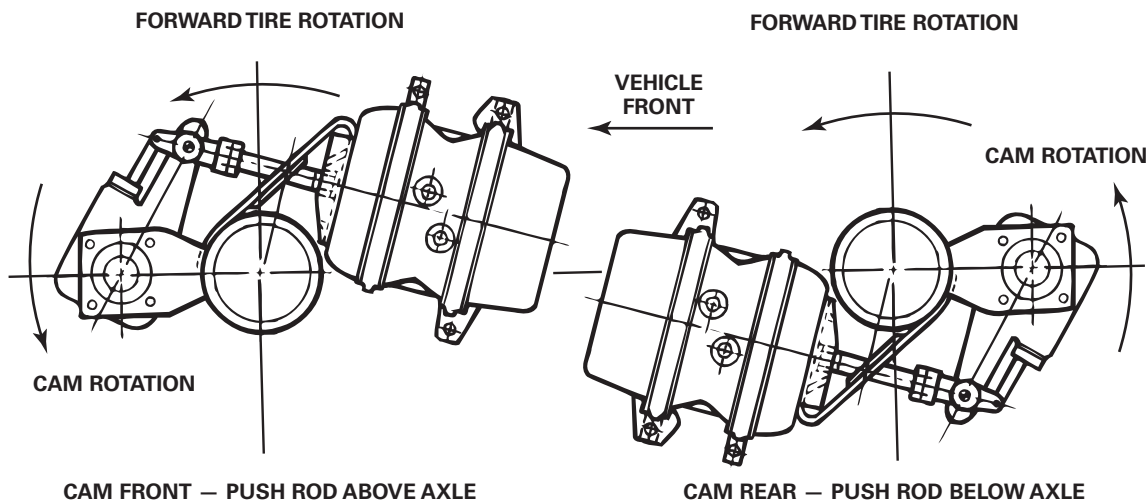
Cam Brake Rotation

Trailer axles built with cam brakes should be installed such that, when the brakes are actuated, the camshaft rotates in the same direction as the tire when the vehicle is moving forward. Installations with opposite rotation can cause severe vibrations, which can cause structural damage to components attached to the axle such as air chamber brackets and air chambers. This guidance allows the following set-ups:

- Cams front and air chamber push rod above the axle.
- Cams rear and air chamber push rod below the axle.

The decision on which configuration to use is up to the customer and is usually based on obtaining adequate clearance between axle and other vehicle components, maximizing ground clearance or locating components for ease of maintenance access. **Figure 11.21.**

Figure 11.21

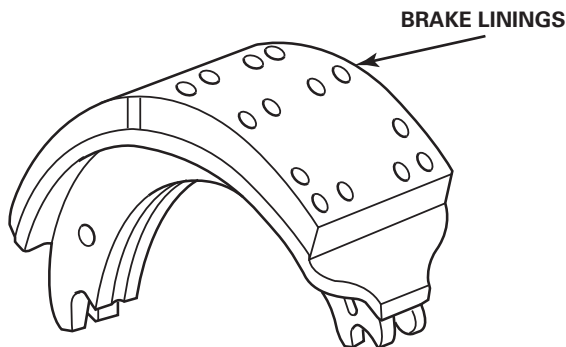


Linings

Various brake lining materials are available on Meritor brakes. These materials are categorized as either standard or specification. **Figure 11.22.**

- Standard linings are the linings Meritor recommends. They are fully proven after laboratory, vehicle test and actual production usage in the field.
- Specification linings are materials in which Meritor has limited experience. Included may be newly developed compounds or materials Meritor provides in low volume. A number of specification linings are currently available on 16.5-inch cam brakes by customer request. Meritor wishes to comply with customer requests; therefore, whenever possible, the use of specification linings is approved. Meritor will certify that its brakes equipped with specification linings will meet applicable dynamometer requirements of FMVSS-121. Any lining problems that are encountered such as poor lining life, lining cracking, drum wear, drum cracking, poor brake balance and tire flat spotting must be handled directly with the lining manufacturer.

Figure 11.22



Drums

In order to meet FMVSS-121 brake dynamometer requirements, brake drums must meet all specifications listed in the Meritor Air Brake Applications Guideline Manual. Included in this manual and listed below are minimum weight recommendations for outboard-mounted cast brake (SAE G3000 material) drums. For other drum weights and/or materials, contact the drum manufacturer.

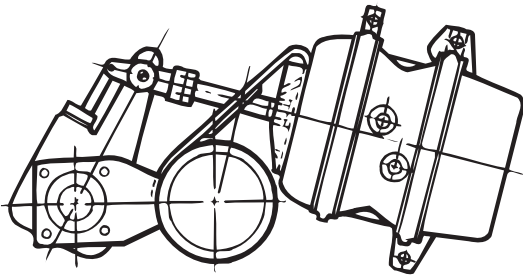
Drum Size	Cast Weight (lbs)
15 x 7	100
15 x 8.625	120
16.5 x 7	107
16.5 x 7 (for 25k GAWR and over)	135
16.5 x 8	116
16.5 x 8.625	125
16.5 x 10	150
Rotor Size	Rotor Weight (lbs)
ADB-1560	63

Brake Input Power

Meritor certifies its brakes to meet the applicable FMVSS-121 requirements for the various brake powers listed in this guide. Meritor recommends the use of the lowest brake input power required to meet the applicable FMVSS-121 requirements. Note that the use of larger brake input powers than necessary may cause problems such as premature lining wear, drum cracking, premature wheel lockup under empty conditions, flat spotted tires, and improper brake balance.

These conditions should not occur if the recommended brake power is used. Therefore, Meritor will not honor warranty claims for problems associated with excessive brake power. **Figure 11.23.**

Figure 11.23

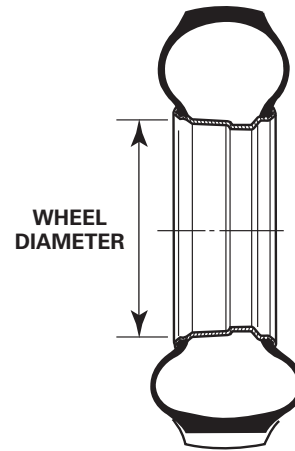


Wheels

Use the following guidance for the use of wheels on the various brake sizes:

- 16.5-inch diameter brakes are intended for use with 22.5 and 24.5-inch diameter wheels.
- 15-inch diameter brakes are intended for use with 19.5-inch diameter wheels.
- 12.25-inch diameter brakes are intended for use with 17.5-inch diameter wheels. **Figure 11.24.**

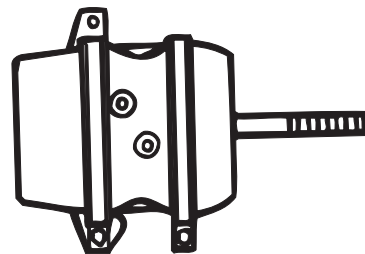
Figure 11.24



Type 24 Chambers

Long-stroke Type 24 air chambers (2.5-inch stroke) are required when using 6-inch slack adjusters. **Figure 11.25.**

Figure 11.25



Vehicle Brake Requirements

In order to obtain proper brake performance, the vehicle on which Meritor brakes will be installed must meet the following requirements:

Air pressure available at the reservoir must be limited to keep camshaft torque for cam model brakes from exceeding 25,000 lb-in and brake shoe force for wedge-type brakes from exceeding 9,144 pounds.

The following are NOT under the control of Meritor when approving brakes. They are the responsibility of the vehicle manufacturer to ensure satisfactory brake performance and/or comply with NHTSA requirements:

- Parking/Hill-Holding Requirements
- Emergency Performance Requirements
- Vehicle Stopping Distance Requirements
- Pneumatic Balance
- Combination Vehicle (Tractor/Trailer) Brake Compatibility
- Brake Lining Wear Balance
- Camshaft Rotation
- Packaging Considerations

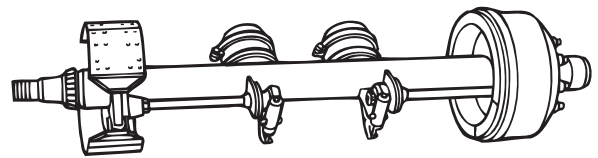
If and when spring brake application chambers are employed, the air system must be equipped with an interlock device which prevents simultaneous (compound) application of the brakes by both the service air system and the spring system.

If and when hand control application valves are employed, the supply circuit for the hand valve must incorporate a pressure limiting device set at 85 P.S.I. maximum. For Dumps, Transit Mixers, and Refuse Haulers, this limit is reduced to 75 P.S.I. maximum.

Pneumatic systems must be so designed as to provide the required braking performance under all operating conditions, including but not limited to sufficient pressure to completely release all spring brake chambers.

Brake adjustment must be all automatic or all manual. Manuals permitted on FMVSS-121 exempt vehicles only. **Figure 11.26.**

Figure 11.26



Popular Trailer Axle Options*

Meritor's **Q Plus™ 7-inch cam brakes** are the trailer industry's leading long-life brakes, and Q Plus™ 8-inch cam brakes provide up to 30% more brake life between relines over 7-inch Q Plus™. Add the optional LX500 Extended Lube** or the MX500 Long Life** package, and the brakes require no lubrication or lining and drum maintenance for three years/500,000 miles.

Meritor WABCO's **Easy-Stop™ trailer anti-lock braking systems** (ABS) have been proven to increase vehicle braking control and stability. Trailer ABS also helps to increase safety and reduce operating costs.

Maintaining correct tire inflation addresses the second-highest operating cost incurred by fleets: tires and tire-generated problems. The **Meritor Tire Inflation Systems™ (MTIS™) by P.S.I.™** — the leading trailer tire inflation systems in North America — help to reduce in-service failure, fuel consumption and excessive tread wear.

The **RideSentry™ trailer air suspension system** by Meritor includes an integrated slider, trailer axles and brakes. The unique suspension system design features upper and lower control arms that create vertical, rather than horizontal, frame movement, which eliminates dockwalk. Loads are equalized from axle to axle, and roll steer is virtually eliminated.

Meritor's **automatic slack adjusters (ASAs)** pay you back by keeping your vehicles on the road. ASAs allow for optimum brake performance while keeping brakes in constant adjustment, eliminating the need for frequent under-the-trailer brake adjustments.

Meritor's **DaytonLite™ hubs** meet the challenge of reducing weight without sacrificing strength and durability. They're as strong — or stronger than other ductile iron hubs, and much more durable than aluminum hubs.

Meritor's **SteelLite™ X30™ brake drum** sets a new standard in advanced wheel-end design and development. It's the only one-piece drum available today without welded seams or weld-on balance weights.

* Verify the compatibility of these products with specific axle and brake system configurations. Call ArvinMeritor's Customer Service Center at 800-535-5560 for more information.

** Use of the LX500 and MX500 packages must be approved by Meritor trailer products engineering to ensure correct coverage. Call ArvinMeritor's Customer Service Center at 800-535-5560 for more information. MX500 three-year/500,000 miles warranty terms are limited to on-highway linehaul single van applications only. Engine brake and dust covers are required. Tractor hand valves must not be used with these trailers. Coverage does not apply in Canada. Limited to one lining and drum replacement only.



Meritor Heavy Vehicle Systems, LLC
2135 West Maple Road
Troy, MI 48084 USA
800-535-5560
meritor.com

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