WHEEL SERVICE MANUAL

SAFETY AND MAINTENANCE INSTRUCTIONS FOR ALCOA TRUCK, TRAILER, BUS AND MOTOR HOME WHEELS

February 2004

Supersedes July 2003

LIMITED WARRANTY

FOR HEAVY DUTY TRUCKS, TRUCK TRAILERS,
BUSES, RV and MOTORHOME WHEELS

(Wheels with bead seat diameters measured in .5 inch increments and Alcoa tube type wheels)

Alcoa warrants to the original purchaser, from Alcoa or its authorized distributor, that a new Alcoa aluminum disc heavy duty truck, truck trailer, bus, 19.5-inch and 22.5-inch RV or motorhome wheel is free from defects in material and workmanship. Alcoa agrees, without charge, to repair or replace a wheel that fails in normal use and service because of defects in material and workmanship. Truck, truck trailer, Dura-Flange® and the Dura-Bright® Surface Treatment wheels not used in transit service are warranted for 60 months from the date of manufacture as shown on the wheel except the Dura-Flange® rim flange treatment is warranted for a period of 24 months. Alcoa bus mount wheels (10-hole, 11.25 inch bolt circle, 8.670 inch hub bore with 1.22 inch diameter bolt holes) and other wheels used in transit service are warranted for 120 months from date of manufacture, except the Dura-Bright® Surface Treatment on bus and transit service wheels is warranted for a period of 60 months from the date of manufacture and the Dura-Flange® rim flange treatment is warranted for 24 months. Satin finish, polished and Dura-Bright® surface treatment 19.5-inch and 22.5-inch RV and motorhome wheels are warranted for 120 months from the date of manufacture as shown on the wheel. Alcoa does not warrant and will not repair or replace or make adjustment with respect to any wheel that has been subjected to misuse or abuse including the following:

(a) Using a tire that is oversized according to standards recommended by the Tire and Rim Association, Inc. or other recognized tire and rim agencies such as ETRTO (Europe) or others;

(b) Loading the wheel beyond the applicable maximum wheel load as specified by Alcoa;

(c) Inflating beyond the applicable maximum as specified by Alcoa;

(d) Changing the original condition of the wheel by alteration or by subjecting it to any processing such as welding or straightening.

(e) Accidents, abnormal or severe operating conditions including without limitation tire fires, brake fires, severe brake system drags or seizures or running with a flat tire; or

(f) Failure to follow maintenance and other instructions and warnings set forth in the Alcoa Heavy Duty Wheel Service Manual, Alcoa Technical Bulletins and other Alcoa literature. Recommended maintenance includes, without limitation, using proper torque, periodic cleaning, polishing, valve replacement, periodic inspection for damage, loose lug nuts and rim flange wear inspections and procedures.

(g) Nicks, scratches and other surface blemishes resulting from improper maintenance, cleaning, road debris, curbing, accident or operation are not warrantable.

(h) Damage due to cleaning with abrasives, abrasive brushes, steel wool, scouring pads, or strong chemicals (acids or alkaline).

Dura-Bright® Surface Treated Wheels are warranted against:

(a) Filiform corrosion (worm or hair like lines, generally milky in appearance, underneath surface protective treatment and emanating from damage to the surface treatment such as nicks, scratches or damage from mounting hardware or wheel weights)

(b) Blistering due to loss of adhesion of the surface treatment,

(c) Lift off of the surface treatment due to physical damage (nicks, scratches, gouges)

If nicks, dings, scratches or other damage does occur to the Dura-Bright® treatment that exposes the aluminum underneath, the metal exposed may naturally oxidize, but any corrosion will be confined to the metal exposed and will not extend into or underneath the Dura-Bright® treatment.

Normally, any washing materials or chemicals (including mild acid washes) that can safely be used on a vehicle, its painted surfaces and components, can safely be used on the Dura-Bright® surface treatment. The Dura-Bright® treatment prevents corrosion of aluminum wheels and protects their shine. So long as the treatment remains in place (see comments (g) and (h) above) and is maintained in accordance with the Alcoa Dura-Bright® Care and Maintenance manual, it is warranted against corrosion. If corrosion does occur within the treatment warranty period, subject to the limitations stated above, Alcoa will replace any wheel exhibiting such corrosion.

THERE IS NO WARRANTY THAT THE WHEEL SHALL BE MERCHANTABLE OR FIT FOR ANY PARTICULAR PURPOSE, NOR IS THERE ANY OTHER WARRANTY, EXPRESS OR IMPLIED, EXCEPT SUCH AS IS EXPRESSLY SET FORTH HEREIN.

ALCOA SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR ANY BREACH OF WARRANTY, ITS LIABILITY AND THE PURCHASER'S EXCLUSIVE REMEDY BEING LIMITED TO REPAIR OR REPLACEMENT OF THE WHEEL AS STATED IN THIS LIMITED WARRANTY.

Alcoa Wheel Service Manual. This limited warranty should be used in conjunction with the Alcoa Wheel Service Manual and the Alcoa Dura-Bright® Wheel Finish Care and Maintenance Manual. The Wheel Service Manual contains important safety information and warnings, and failure to read and understand this information may result in serious injury or death. The limited warranty is included with the Wheel Service Manual, but may appear elsewhere. If you do not have copies of the Wheel Service Manual you may obtain copies free of charge from Alcoa Wheel and Forged Products, 1600 Harvard Avenue, Cleveland, Ohio 44105, (800) 242-9898 and on the web at www.alcoawheels.com.

How to use this manual

This manual is written in a style called structured text.

Throughout the manual you will find numbers which look like this (See 3-1, page 18). These numbers are cross references to other sections of the manual. The numbers (3-1) refer to section 3, subtopic 1. When you turn to page 18 you will find the section number and subtopic number under the heading in each section as shown below:

Recommendations for mounting tubeless tires

3-1

The cross references will help you find related information in the manual. For example in section 4-1 you will read the following sentence...

"Make sure all wheel cap nuts are properly torqued–check them often (see 4-9, page 29)."

By turning to section 4, subtopic 9, on page 29 you will find information on proper torquing.

Note: The **Alcoa Heavy Duty Wheel Service Manual** contains information for proper service and operation of Alcoa heavy duty wheels. Alcoa heavy duty wheels for heavy duty trucks, truck trailers and buses are Alcoa tubeless wheels with bead seat diameters measured in .5 inch increments and Alcoa tube type wheels.

Note: Dura-Bright® wheels produced after November 2002 have Alcoa wheel part numbers ending with “DB” (earlier wheels have part numbers ending in a 4 or 7) with bead seat diameters measured in 0.5-inch increments. Not all Alcoa wheels are available with the Dura-Bright® surface treatment.

WARNING

WARNING Wheels that are not properly installed or maintained may not work properly.

Failure to follow proper wheel installation or maintenance practices may result in injury or death.

Follow the proper wheel installation and maintenance practices as contained in this Alcoa Service Manual. For additional copies of the manual, available free of charge from Alcoa, or for the most recent updates, contact Alcoa Wheel and Forged Products at 1-800-242-9898 option 1 or on the web at www.alcoawheels.com.

To obtain Alcoa rim flange wear gauge(s) at no charge and information on free training on proper installation and maintenance procedures, contact Alcoa Wheel and Forged Products at (800) 242-9898 option 1 or on the web at www.alcoawheels.com.

Table of Contents

1 Specifications

Alcoa aluminum disc wheel mounting dimensions are consistent with SAE Recommended Practice J694 Feburary 2001. Part numbers listed for all sizes are satin finish. Polished finishes are indicated by changing the last digit of the part number listed to one of the following: For polished outside only, part number should end in "1." For polished inside only, part number should end in "2." For polished both sides, part number should end in "3." Valve hole is on the inside.

Dura-Bright® surface treatment wheels are identified by using the regular numerical part number and the addition of "DB" at the end. Finishes are indicated by changing the last numerical digit of the part number to one of the following. For brushed both sides, the number is "0." For buffed outside only, the number is "1." For buffed inside only, the number is "2." For buffed both sides, the number is "3." Currently, only the wheel item numbers marked with DB are available with the Dura-Bright® surface treatment.

Dura-Flange® wheels are identified by using the regular numerical part number and the addition of "DF" at the end. Only the wheel item numbers marked with DF are available with the Dura-Flange® option and are only available as satin finish (last part number ends in "0").

CLASSIC TUBELESS WHEELS (round hand holes) (ENGLISH UNITS)

Item no.	Wheel description	Maximum wheel load[1] in lbs.	Wheel wt. lbs.	Outset inches[3]	Inset inches	Maximum inflation PSI—cold	Valve stem	Part number[2]	DiscMate	Stabilizer	Front Outer Cap Nuts	Rear Inner Cap Nuts Al/Al	Rear Inner Cap Nuts Al/Stl	Rear Outer Cap Nuts	Lug Nut Covers	Hub Cover System Kits Front/Rear
Six-hole, stud located mounting, ball seat — 8.750 in. bolt circle, 6.495 in. hub bore, 1.219 in. bolt hole dia.																
1.	17.5x6.75-15°DC	5070	32	5.55	4.72	125	TR543C	663170	—	2125	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	5988 L&R	7896 L&R	5996 L&R	150	–
10-hole, stud located mounting, ball seat — 8.750 in. bolt circle, 6.495 in. hub bore, 1.219 in. bolt hole dia.																
2.	17.5x6.75-15°DC	5070	31	5.55	4.72	125	TR543C	663070	—	2125	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	5988 L&R	7896 L&R	5996 L&R	150	–
10-hole, stud located mounting, ball seat — 11.25 in. bolt circle, 8.73 in. hub bore, 1.219 in. bolt hole dia.																
DB3.	22.5x7.50-15°DC	7200	53	6.28	5.32	120	TR545D	873100	3/4" - 016000, 1-1/8" - 017000	2225	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	5988 L&R	7896 L&R	5996 L&R	150	Front - 076015 Rear - 077015
DB4.	22.5x8.25-15°DC	7200	53	6.66	5.68	120	TR545D	883110	3/4" - 016000, 1-1/8" - 017000	2225	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	5988 L&R	7896 L&R	5996 L&R	150	Front - 076015 Rear - 077015
DB5.	22.5x9.00-15°DC	9000	60	6.94	5.94	130	TR543E	893000	3/4" - 016000, 1-1/8" - 017000	2127	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	5988 L&R	7896 L&R	5996 L&R	150	Front - 076015 Rear - 077015
6.	22.5x12.25-15°DC	11,400	62	.56 Reversible	—	125	005435	823000	3/4" - 016000, 1-1/8" - 017000	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	–	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	150	Front - 076015 Rear - 077015
7.	22.5x12.25-15°DC	11,400	66	3.88	2.76	125	TR543E outset TR545E inset	823050	3/4" - 016000, 1-1/8" - 017000	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	–	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	150	Front - 076015 Rear - 077015
8.	22.5x12.25-15°DC	11,000	70	5.84	4.68	120	TR545E	823060A	3/4" - 016000, 1-1/8" - 017000	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	–	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	150	Front - 076015 Rear - 077015
9.	22.5x13.00-15°DC	12,300	72	3.5	2.38	125	TR543E	833050	3/4" - 016000, 1-1/8" - 017000	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	–	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	150	Front - 076015 Rear - 077015
10.	22.5x13.00-15°DC	11,000	73	—*	5.3	120	TR545E	833060A	3/4" - 016000, 1-1/8" - 017000	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	–	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	150	Front - 076015 Rear - 077015
††11.	22.5x14.00-15°DC	12,800	71	2	0.87	125	TR543E outset TR545E inset	841100	3/4" - 016000, 1-1/8" - 017000	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	–	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	150	Front - 076015 Rear - 077015
DB**12.	24.5x8.25-15°DC	7200	59	6.6	5.59	120	TR545D	983120	3/4" - 016000, 1-1/8" - 017000	–	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	5988 L&R	7896 L&R	3/4" Stud 5995 L&R, 1-1/8" Stud 5996 L&R	150	Front - 076015 Rear - 077015
10-hole, stud located mounting, ball seat — 13.19 in. bolt circle, 10.65 in. hub bore, 1.360 in. bolt hole dia. (valve hole is on outside)																
13.	22.5x13.00-15°DC	11,000	76	—*	6.12	120	TR543	833070A	–	–	–	–	–	–	–	–
Eight-hole, hub piloted mounting — 6.50 in. bolt circle, 4.770 in. hub bore, .68 in. bolt hole dia. (use two-piece flange nuts)																
14.	17.5x6.75-15°DC	6050	30	–	0	130	TR542	661400	–	–	39946	–	–	–	190	–
Eight-hole, hub piloted mounting — 6.50 in. bolt circle, 4.880 in. hub bore, .68 in. bolt hole dia. (use two-piece flange nuts)																
15.	17.5x6.75-15°DC	6050	29.7	–	0	130	TR542	662400	–	–	39946	–	–	–	190	–
Eight-hole, hub piloted mounting — 275mm bolt circle, 221.1mm hub bore, 26.75mm bolt hole dia. (use two-piece flange nuts)																
DB16.	22.5x7.50-15°DC	7300	53	6.28	5.44	120	TR545D	873400	014000	2225	39874	–	–	39874	181	–
**17.	22.5x8.25-15°DC	7300	50	6.66	5.82	120	TR545D	883420	014000	2227	39874	–	–	39874	181	–
††18.	22.5x14.00-15°DC	12,800	71	2.0	0.87	125	TR543E outset TR545E inset	841400	014000	–	39874	–	–	39874	181	or 076_085‡
DB19.	24.5x8.25-15°DC	7300	62	6.6	5.77	120	TR509	983400	014000	2245	39874	–	–	39874	181	–

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10-hole, hub piloted mounting — 285.75mm bolt circle, 220.1mm hub bore, 26.75mm bolt hole dia. (use two-piece flange nuts)																
DB 20.	22.5x7.50-15°DC	7300	53	6.28	5.44	120	TR545D	873600	011000	2225	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
DB SF **21.	22.5x8.25-15°DC	7300	47	6.66	5.81	120	TR545D	883620	011000	2227	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
DB § SF 22.	22.5x8.25-15°DC	8000	55	6.66	5.69	120	TR543C	885600	011000	2225	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
DB 23.	22.5x9.00-15°DC	9000	60	6.94	6.04	130	TR543C	893600	011000	2127	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
24.	22.5x9.00-15°DC	10,000	53	—	3.12	130	TR545E	893630	011000	–	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
DB 25.	22.5x10.50-15°DC	10,500	68	66.1	5.5	130	TR544	803600	011000	–	39874	–	–	–	181	Front - 076018 or 076085‡
26.	22.5x12.25-15°DC	11,400	63	.56 Reversible	—	125	TR543E	823600	011000	–	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
DB 27.	22.5x12.25-15°DC	11,400	66	3.88	2.75	125	TR543E outset TR545E inset	823650	011000	–	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
28.	22.5x12.25-15°DC	11,000	71	5.8	4.68	120	TR545E	823660A	011000	—	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
29.	22.5x12.25-15°DC	10,000	74	6.24	5.12	120	TR545E	823670A	011000	–	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
30.	22.5x13.00-15°DC	12,300	73	3.5	2.38	125	TR543E outset TR545E inset	833650	011000	–	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
31.	22.5x13.00-15°DC	11,000	74	6.42	5.3	120	TR545E	833660A	011000	–	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
††32.	22.5x14.00-15°DC	12,800	71	2.0	0.87	125	TR543E outset TR545E inset	841600	011000	–	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
††33.	22.5x14.00-15°DC	12,800	71	1.13	0	125	TR543E outset TR545E inset	841610	011000	–	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
DB SF **34.	24.5x8.25-15°DC	7300	55	6.6	5.73	120	TR545D	983620	011000	2247	39874	– –	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
DB § SF 35.	24.5x8.25-15°DC	8000	65	6.6	5.63	120	TR545D	985600	011000	2245	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
10-hole, hub piloted bus mounting — 11.25 in. bolt circle, 8.670 in. hub bore, 1.219 in. bolt hole dia. (use two-piece flange nuts)																
DB 36.	22.5x8.25-15°DC	7300	53	6.66	5.82	120	TR545D	883610	015000	2225	–	–	–	–	1821	–
DB 37.	24.5x8.25-15°DC	7300	62	6.6	5.77	120	TR545D	983610	015000	2245	–	–	–	–	1821	–

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1 Specifications cont'd.

1

Item no.	Wheel description	Maximum wheel load[1] in lbs. (kilograms)	Wheel wt. lbs. (kilograms)	Outset inches[3] (mm)	Inset inches (mm)	Maximum inflation PSI—cold (KPa)	Valve stem	Part number[2]	DiscMate	Stabilizer	Front Outer Cap Nuts	Rear Inner Cap Nuts Al/Al	Rear Inner Cap Nuts Al/Stl	Rear Outer Cap Nuts	Lug Nut Covers	Hub Cover System Kits Front/Rear
		CLASSIC TUBELESS WHEELS — ENGLISH UNITS (METRIC UNITS)														
Eight-hole, hub piloted mounting — 275mm bolt circle, 221.1mm hub bore, 24.75mm bolt hole dia. (use two-piece flange nuts)																
38.	17.5x6.75-15°DC	5515 (2500)	29.5 (13.4)	5.55 (141)	4.72 (120)	142 (978)	TR543C	663470	014000	2126	39874	–	–	39874	181	–
DB39.	19.5x6.75RW-15°DC	5515 (2500)	37.0 (16.8)	5.55 (141)	4.72 (120)	142 (978)	TR543C	764480	014000	2126	39874	–	–	39874	181	–
40.	19.5x7.50RW-15°DC	6615 (3000)	37.7 (17.1)	6.10 (155)	5.28 (134)	142 (978)	TR543C	773400	014000	2126	39874	–	–	39874	181	–
10-hole, hub piloted mounting — 225mm bolt circle, 176.1mm hub bore, 26.5mm bolt hole dia. (use two-piece flange nuts)																
41.	17.5x6.00-15°DC	5515 (2500)	28.0 (12.7)	5.24 (133)	4.49 (114)	142 (976)	TR543D	663200		2125	–	–	–	–	–	–
10-hole, hub piloted mounting — 285.75mm bolt circle, 220.1mm hub bore, 26.75mm bolt hole dia. (use two-piece flange nuts)																
42.	19.5x7.50RW-15°DC	6615 (3000)	37.7 (17.1)	6.10 (155)	5.28 (134)	142 (978)	TR543C	773600	011000	2126	39874	–	–	39874	181	Front - 076018 or 076085‡ Rear - 077018 or 077085‡
10-hole, hub piloted mounting — 335mm bolt circle, 281.2mm hub bore, 26.75mm bolt hole dia. (use two-piece flange nuts)																
DB†43.	22.5x8.25-15°DC	7830 (3550)	55.1 (25.0)	6.60 (168)	5.70 (145)	138 (952)	60MS27	885530	013000	–	39874	–	–	39874	181	–
DB†44.	22.5x9.00-15°DC	8820 (4000)	58.0 (26.3)	6.93 (176)	6.02 (153)	142 (978)	60MS27	894530	013000	–	39874	–	–	39874	181	–
‡‡45.	22.5x13.00-15°DC	11,000 (4988)	75.0 (34.0)	—	6.12 (155)	120 (827)	TR543	833570A	013000	–	39874	–	–	39874	181	–
‡‡46.	22.5x13.00-15°DC	12,800 (5806)	76.0 (34.5)	—	6.12 (155)	120 (827)	TR543	833570B	013000	–	39874	–	–	39874	181	–
47.	24.5x8.25-15°DC	8500 (3855)	62.6 (28.4)	6.79 (172.5)	5.81 (147.5)	120 (827)	TR545D	983500	013000	–	39874	–	–	–	181	–
10-hole, hub piloted mounting — 335mm bolt circle, 281.2mm hub bore, 32.87mm bolt hole dia. (use two-piece sleeved cap nuts)																
DB†48.	22.5x8.25-15°DC (32mm bolt hole)	7830 (3550)	55.1 (25.0)	6.60 (168)	5.70 (145)	138 (952)	60MS27	885550	018000	–	430632	–	–	430732	–	–
DB†49.	22.5x9.00-15°DC (32mm bolt hole)	8820 (4000)	57.1 (25.9)	6.93 (176)	6.02 (153)	142 (978)	60MS27	894550	018000	–	430632	–	–	430732	–	–

Read carefully all sections of this Service Manual regarding proper inspection, installation and maintenance. Mishandled tires and wheels can explode, causing serious or fatal injury to you and others. Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating. Do not overinflate. Refer to tire manufacturer's recommendation for proper tire pressure. Before mounting the tire, perform a wheel fitment check to insure proper clearance from any obstructions. Never use any flammable material on tires or rims, to seat beads or for any other purposes. Always use safety cages or other approved restraining devices during inflation. Avoid wheel separation — tighten nuts in the order and to the torque value specified in this manual.

[1] Capacity ratings as dual or single in highway service – bias-ply or radial. Load ratings in lbs. for items 38 through 49 rounded to nearest multiple of 5.

[2] Some wheels may bear part numbers not shown in this manual. Before servicing these wheels contact your Alcoa Wheel Representative for proper load, inflation and part compatibility information.

[3] Outset (Positive)/Inset (Negative)—The distance from the rim centerline to the mounting face of wheel. Inset (negative) places the rim centerline inboard of the wheel mounting face and outset (positive) places the rim centerline outboard of the wheel mounting face (1/2 dual spacing = offset).

* These wheels must be installed only in the inset position because spherical ball seats are on only one side of the disc. **Indicates lighter weight Alcoa New Generation wheels.

† Indicates European New Generation Wheels. ‡Hub cover system kits P/N 076085 (front) and P/N 077085 (rear) contain screw-on Hug-a-lug® nut covers and require a minimum of four threads of the stud to extend above the tightened cap nut for use.

†† P/Ns 841100, 841400, 841600 and 841610 are recommended for use on drive axle and trailer axle positions.

‡‡ The minumum stud standout required for P/N 833570 is 2.375 inches (60.3mm) when using nut P/N39874. Taller nuts will require more stud standout.

§ P/Ns 885600 and 985600 are Alcoa Severe Service Wheels and are available with either the Dura-Flange® treatment option or the Dura-Bright® surface teatment option.

DB Wheels with the Dura-Bright® surface treatment option shine without polishing. Just wash with soap and water, do not polish or clean with abrasives. For more information call 800-242-9898 option 6 or visit www.dontpolish.com.

Specifications subject to change without notice. To request a copy of the current Alcoa Specifications Data brochure for aluminum wheels for trucks, trailers and buses, call toll-free 800-242-9898, option 1. To view online, go to www.alcoawheels.com. The Spec Data brochure contains current part number availability and complete specifications such as wheel dimensions, load rating, wheel weight, outset and inset, inflation pressure and accessory part numbers.

Alcoa provides training, live or on video, on proper wheel installation and maintenance practices free of charge. Contact Alcoa Wheel and Forged Products at 1-800-242-9898, option 4.

Note: Dura-Bright® wheels produced after November 2002 have Alcoa wheel part numbers ending with "DB" (earlier wheels have part numbers ending in a 4 or 7) with bead seat diameters measured in 0.5-inch increments. Not all Alcoa wheels are available with the Dura-Bright® surface treatment.

Note: The Dura-Bright® surface treatment and the Dura-Flange® options are not currently available together on the same wheel. Dura-Bright® is available in all polishing finishes, Dura-Flange® is only available in satin finish.

2 Inspection

Inspect thoroughly and frequently

2-1

Safe operation requires thorough examination of wheels and attaching hardware, at frequent intervals, both on and off the vehicle.

Wheels that have been in service need to be inspected at regular intervals to assure proper and safe performance.

Like tires and other vehicle components that work hard, wheels will eventually wear out. It isn't always possible to predict exactly when the useful life of a wheel will end. But generally, older wheels and wheels operating in extreme conditions should be examined more frequently for obvious signs that they should be removed from service.

As an aid to the owner in determining the period of time a wheel has been in service, it is recommended the owner stamp an "in service" date onto the wheel at the time of receipt. See 5-5, page 36 for recommended stamping locations.

Pay particular attention to front-end assemblies. Examine all exposed areas frequently. Clean wheels and look for cracks or other damage. Also check the inner dualed wheel when the outer wheel is removed.

During tire changes, thoroughly examine the entire wheel. Pay particular attention to the rim contour and the surfaces of the rim. On tube-type wheels, carefully inspect the gutter area normally concealed by the side rings.

Be sure that the best wheels are on the front of the vehicle.

Hidden damage

Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.

Do not overinflate. Use the tire manufacturer's recommended pressure, but under no circumstances exceed cold tire pressures listed in *Section 1 Specifications* of this manual. Before mounting the tire perform a wheel fitment check to insure proper clearance from any obstructions.

Some forms of wheel damage can be hidden beneath the tire, so whenever a tire is removed, thoroughly examine the complete wheel. Remove all grease and road dirt. Use a wire brush or steel wool to remove rubber from the bead seats.

Check mounting holes for the enlargement and elongation which can occur if the cap nuts are not kept tight (see 2-5, page 9). Dirt streaks radiating from stud holes may indicate loose cap nuts (see 4-9, page 29).

Excessive heat damage

2-2

2

WARNING

WARNING **Excessive heat from fire, brake malfunction, wheel bearing failure or other sources may weaken the metal and cause the wheel/tire assembly to separate explosively.**

Exploding wheel/tire assembly can cause death or serious injury.

Immediately and permanently remove from service any wheel that has been exposed to excessive heat.

Inspect for exposure to excessive heat. A wheel that has been subjected to excessive heat may appear charred or burned. A wheel that has been exposed to excessive heat may appear to be in good condition if it has been cleaned. Even if a wheel does not appear to be obviously burned, check the valve hole and labels for evidence of charring, melting, blistering or burning.

A wheel may discolor from excessive heat. It can appear a dull grayish color and will not polish to a bright finish as a typical wheel would.

Any wheel run with a flat tire longer than the time necessary to immediately pull off the road should be checked for excessive heat damage.

A blistered, charred, blackened or cracked-looking logo decal on an Alcoa wheel may indicate that the wheel has been exposed to excessive heat.

Dimension checks

2-3

Open side circumference check

WARNING

WARNING **Wheels that have been subjected to high pressure tire and rim separation, run flat, excessive heat or other physical damage may no longer have sufficient dimension and contour to retain tire bead while under pressure.**

Rims that lack proper dimension and contour can lead to explosive separation of tire and rim, causing injury or death.

Follow dimension check procedures described in this section during each wheel inspection.

The circumference of the bead seat on the open side of the wheel should be checked with each tire change. The open side is the side opposite the disc face. In the case of center flange wide base wheels, or wheels with insets less than 3 inches, both rim flanges should be checked. Measure the circumference of the bead seat on the open side (see illustration below) with a ball tape. Ball tapes used for measuring wheel circumference can be purchased from the Tire and Rim Association, Inc., 175 Montrose West Avenue, Copley, Ohio 44321.

If the circumference of the bead seat does not match the required dimension as indicated by the ball tape, remove the wheel from service. Be sure to clearly mark the wheel as out-of-service or otherwise render the wheel unusable.

Any wheel known to have been run with a flat tire or operated under abnormal conditions should be checked before continued service. If a ball tape is unavailable, roll the unmounted wheel without a tire several revolutions over a smooth, flat, level, clean surface. Any deviation from rolling in a straight line is an indication of a potential lack of proper dimension and contour. Remove the wheel from service until it can be properly checked with a ball tape.

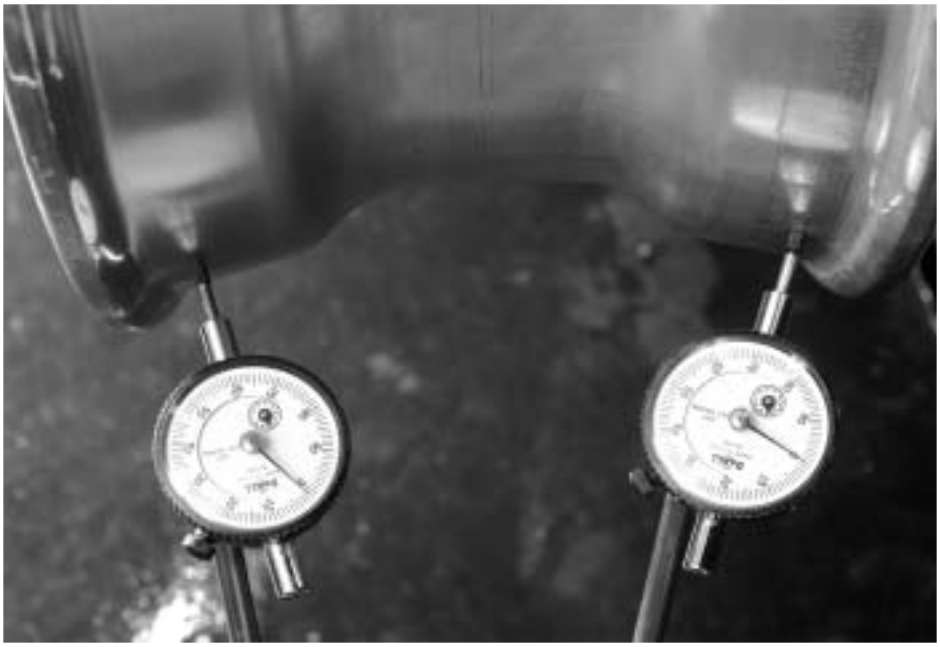
Continued on the next page

Dimension checks (continued)

Tire wear or ride problems

If you experience tire wear or ride problems it may be helpful to check radial run out. Remove the wheel from the vehicle, deflate and remove the tire (see 3-5, page 22 for recommendations and instructions for demounting tubeless tires and 6-5, page 43 for recommendations and instructions for demounting tube-type tires).

Remount the wheel on the vehicle without the tire. Be sure to follow proper mounting procedures to assure the wheel is well centered on the hub. Place a dial indicator as illustrated below to trace the bead seats of the wheel. Rotate the wheel noting the amount of variation shown on the dial indicator. *Note:* Alcoa aluminum wheels should be tested for radial run out only at the bead seat surface. A total indicator reading of .045 inches is acceptable.



Tire wear can also be caused by improperly seated tires. Inspect the tire for proper seating on the wheel. The tire beads may not be seated properly. If so, remove the wheel from the vehicle, deflate and break the bead seats (see 3-5, page 22 for recommendations and instructions for demounting tubeless tires and 6-5, page 43 for recommendations and instructions for demounting tube-type tires). Adequately lubricate the bead seats and properly reseat the tire beads. Reinflate the wheel in a safety cage or other suitable restraint (refer to OSHA rule 1910.177, paragraph b, see Section 7, page 44).

Cracked or damaged wheel checks

2-4

WARNING

WARNING **Cracked or damaged wheels may cause wheels to fail or come off the vehicle while the vehicle is moving.**

Wheels that fail or come off the vehicle while it is moving can cause serious injury or death.

Immediately remove cracked or damaged wheels from service.

Inspect wheels for cracks or damage according to the following sections of Chapter 2. Remove wheels from service with known or suspected damage.

Mounting area

2-5

Stud hole cracks are usually caused by improper torquing (see 4-9, page 29 and 5-2, page 35), excessive loading or insufficient mounting flange support by the hub or brake drum. Remove wheel from service.

Shown below are stud hole cracks emanating from stud hole to stud hole. Causes are: undersized diameter of wheel support surface (see specifications below), support surface not flat, incorrect attachment parts (see 4-12, page 34) and insufficient torque (see 4-9, page 29 and 5-2, page 35). Remove wheel from service.

Support surface should be flat to the diameter recommended on the chart on the following page.

Inspect the hub/drum contact area thoroughly for cracks or other damage.

Mounting area (continued)

Support surface diameters

Support surface (backup diameter) should be flat to the diameter recommended on the chart below:

Number of Bolts	Bolt Circle	Mounting Type	Backup Diameter	Thread Size
10	11.25 inch	U.S. Stud pilot	13.2-13.5 in.	.750/1.125 in.
10	285.75mm	Hub pilot	13.2-13.4 in.	22mm
10	335mm	Hub pilot	15.0-15.2 in.	22mm
8	275mm	U.S. Stud pilot	13.2-13.5 in.	22mm
8	275mm	ISO Hub pilot	12.4-12.6 in.	20mm

Corrosion

2-6

Due to aluminum's natural resistance to corrosion, Alcoa aluminum disc wheels do not need to be painted for most operating conditions. However, certain environments can lead to corrosion. Some of these are: salt, chloride compounds used for snow removal and highly alkaline materials. If the air used to fill tubeless tires, or the tire itself, is not dry, the areas of the wheel under the tire can corrode severely.

Bead seat and valve stem corrosion often are caused by entrapped moisture which contains corrosive elements. Mild corrosion should be removed thoroughly by wire brush and the rim protected with a coating of non-water-based lubricant (see 3-1, page 18). Remove any severely corroded wheel from service.

CAUTION

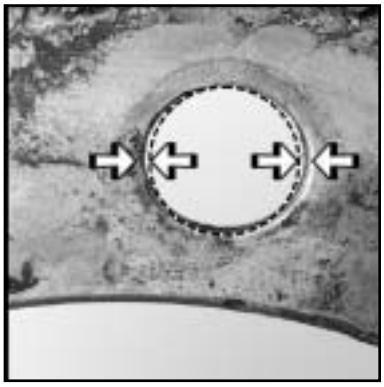
CAUTION The use of liquid tire balancers or sealants in Alcoa wheels may cause extremely rapid corrosion of the wheel rim surface.

Severely corroded wheels are unsuitable for service. Alcoa wheels corroded by the use of liquid tire balancers or sealants will not be replaced under the Alcoa limited warranty.

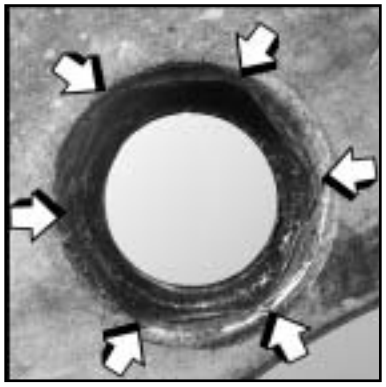
Stud holes

2-7

If wheels are run loose, both stud located wheels and hub piloted wheels can be damaged. Look for wallowed out or elongated ball seats on stud located wheels. On hub piloted wheels look for elongated stud holes. Over torquing can lead to damaged ball seats on stud located wheels and can damage the disc surface of hub piloted wheels. Remove damaged wheels from service.



Damaged hub piloted bolt hole. Elongation from true round (dashed circle) indicated by arrows.



Damaged ball seat contact area. Pounding of nut on ball seat contact area identified by arrows.

Disc area

2-8

Inspect both sides of disc area for hand hole cracks. If cracks are found, remove the wheel from service.

Rim area

Check the entire rim area for nicks, gouges and cracks. Loss of air may be caused by cracks in areas around the valve stem hole. Remove the wheel from service.

2-9

2

Gutter area

Projections on the side of the wheel gutter area on tube type wheels can cause uneven seating of the side and lock ring and chipping of the gutter. Such projections must be removed. Remove the wheel from service if damaged.

2-10

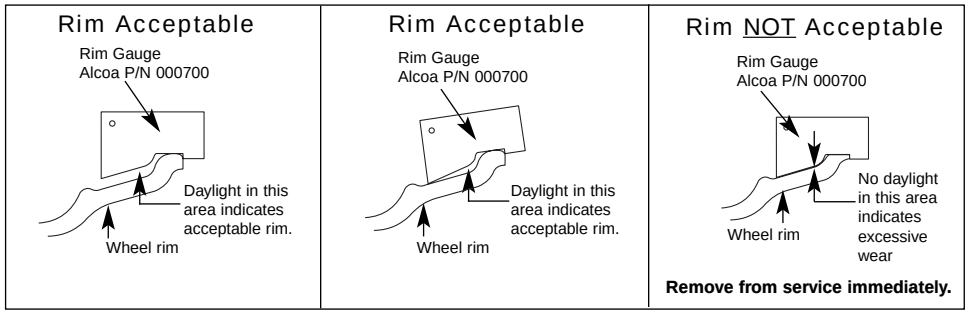
Cracking in bottom of gutter flange. Occasionally, circumferential cracks may appear in the bottom of the gutter area. This area should be thoroughly cleaned and carefully inspected after a tire is removed from the wheel. Also check the side underneath gutter flange for circumferential cracks. Gutter flange cracks can ultimately lead to the separation of the rim area from the disc. Immediately remove from service a wheel that exhibits any cracks.

Rim flange wear

2-11

Irregular wear on the surface of the rim flange is caused by abrasion from the tire chafer and sidewall. Rim flange wear happens most often in applications with heavy or shifting loads. If you are experiencing excessive rim flange wear in your operation, consider using Alcoa Dura-Flange® aluminum wheels. These wheels have been specially treated to significantly reduce rim flange wear. Remove wheels from service when rim flange wear is excessive. Excessive wear can be determined using an Alcoa approved wear gauge and procedures detailed below. If rim flange wear becomes sharp and/or cuts the tire, contact Alcoa for recommended maintenance procedures.

Alcoa Rim Flange Wear Gauge Instructions



To obtain a gauge(s) at no charge and information on free training on proper installation and maintenance procedures, contact **Alcoa Wheel and Forged Products** at (800) 242-9898 option 1 or on the web at **www.alcoawheels.com.**

Determining Rim Flange Wear

STEP 1. Remove the wheel/tire assembly from the vehicle. Remove the valve core to deflate the tire completely. Remove the tire from the wheel according to OSHA regulations, TMC recommended practices for tire and rim safety procedures and/or the Alcoa Wheel Service Manual.

Photo 1. Acceptable Rim Flange Wear Condition

Rim flange wear (continued)

2

STEP 2. After the wheel is separated from the tire, use a ball tape to verify the circumference of the bead seat on the open side is acceptable (see 2-3, page 7). Check the wheel flange with the Alcoa Rim Flange Wear Gauge to determine if the wheels must be removed from service for excessive rim flange wear (photo 1 on page 13).

See **Rim Flange Wear Gauge Instructions** illustrations above to make this determination. If you do not have an Alcoa Rim Flange Wear Gauge, contact Alcoa Wheel and Forged Products to obtain a gauge(s) at no charge.

STEP 3. If the wheel is deemed to be serviceable by the rim flange gauge, examine the wheel flange edge for sharpness by using a rubber sharpness gauge. These gauges are constructed by having a section of tire side wall or a suitable piece of rubber attached to a block of wood (photo 2). By running the sharpness indicator gauge along the wheel in the area of the wear, determine if the wear is sharp enough to cut or damage the rubber on the sharpness indicator (photo 3). If the rubber is cut, then follow the edge removal instructions below.

Photo 2. A rubber sharpness gauge constructed from a section of tire side wall or a suitable piece of rubber attached to a block of wood.

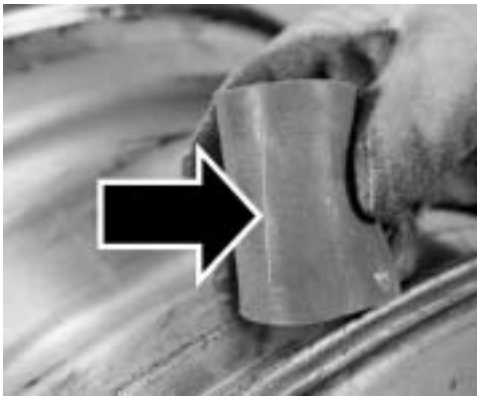


Photo 3. Run the sharpness indicator gauge along the wheel in the area of the wear to determine if the wear is sharp enough to cut or damage the rubber on the sharpness indicator.

NOTICE: Examine the tire for cuts in the bead area and side wall. If no damage occurred to these areas, return the tire to service. Cut tires should be removed from service. The tire should be inspected at this time for any other damage and be treated per normal tire procedures recommended by the tire manufacturer.

If the flange cuts or appears close to being sharp enough to cut the rubber on the sharpness indicator gauge, the edge can be removed per the edge removal procedures below. If the rubber is not cut, then the wheel can be returned to service without further work for rim flange wear.

NOTICE: Check the wheel at every tire change or ONCE PER YEAR for rim flange wear and any sharp edges. If you follow this practice, you will significantly reduce the possibility of a rim flange cutting into the tire.

CAUTION

CAUTION Do not run unprotected hands or fingers across worn rim flange areas of used wheels.

Worn rim flange areas are sharp and can cut hands or fingers. Cuts can lead to infection.

Always wear gloves when handling used wheels or when testing for edge sharpness.

Rim flange wear (continued)

Edge Removal Procedures

There are many tools available to remove the sharp edge on the wheel caused by rim flange wear. Here are some examples of commonly used tools:

File. A file can be used very effectively to remove the edge (photo 4).

Photo 4. Removing sharp edge by hand with a metal file.

Photo 5. Air or electric power sander.

Air or Electric Powered Sander. This provides a very quick and effective method of removing the edge. Operators should use all care to keep a uniform edge when using these tools (photo 5).

Air or Electric Grinder. Another quick and effective method of removing the sharp edge caused by rim flange wear. Be careful as grinding pads may "gum up" from the aluminum that is removed (photo 6). Care must be used to avoid gouging the wheel.

Photo 6. Air or electric grinder

Photo 7. Die grinder.

Rim flange wear (continued)

Die Grinder. Used with a sanding wheel, cutting stone or grinding tool, this is a version of an electric grinder. This tool is very quick and effective as well, and care must be taken to remove metal as uniformly as possible and not to gouge the wheel (photo 7 on page 15).

CAUTION Removing sharp edges with hand or power tools produces metal filings and sparks. Many power tools have edges that are sharp or may become hot during use. Some power tools produce excessive noise when used.

Metal filings can be sharp and, when projected by the action of power tools, can cause serious skin or eye damage. Excessive noise from power tools can harm hearing. Sharp edges can produce cuts and hot surfaces can cause burns. Cuts and burns can lead to infection.

Always wear appropriate safety gear such as protective eye wear, gloves, protective clothing and hearing protection when using hand or power tools (photo 8).

Photo 8. Always use proper safety gear.

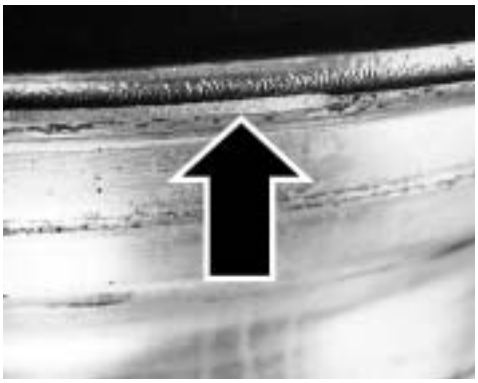


Photo 9. Adequate repair for sharp edge resulting from rim flange wear removes just enough metal to smooth the edge.

STEP 4. The photographs show the process of removing the edge. With whatever tool is selected, work the tool around the wheel's circumference removing only enough material to eliminate the sharp edge. This should only be a small amount of metal. Perform this work on both flanges if the there is evidence of sharpness.

Regardless of the method which you choose, the objective is to remove the sharp edge (photo 9). Remove just enough metal to smooth the edge. Take care to make sure the edge removal is as uniform as possible. Avoid gouging the wheel.

Rim flange wear (continued)

STEP 5. After the edge is removed, run the sharpness indicator gauge along the area of edge removal to check for any remaining sharpness. If the rubber is still cut, perform the steps again to remove the sharp edge. Always remove the minimum amount of material necessary to eliminate the sharp edge.

STEP 6. Check the rim flange height with the Alcoa Rim Flange Wear gauge to make sure there is adequate height remaining to safely support the tire. The photograph again shows how this gauge is used (photo 1). Be sure to move the gauge all around the wheel's circumference and make sure that no area of the flange is below what the gauge indicates is acceptable. If the entire wheel flange is within the limits of the rim flange wear gauge, the wheel may be returned to service.

STEP 7. Always inspect the wheel for any other conditions that would warrant removal from service. Consult the Alcoa Wheel Service Manual or the TMC User's Guide to Wheels and Rims.

WARNING **Welding or brazing the rim flange or any area of an Alcoa aluminum wheel will weaken the wheel. Weakened or damaged wheels can lead to an explosive separation of tires and wheels or wheel failure on the vehicle.**

Explosive separations of tires and wheels or wheel failure on the vehicle could cause injuries or death.

Never attempt to weld or braze any surface of an Alcoa aluminum wheel.

WARNING **Returning wheels to service with inadequate flange height as determined by the Alcoa Rim Flange Wear Gauge can lead to an explosive separation of tires and wheels.**

Explosive separation can result in serious injury or death.

Wheels with flange height that falls below the Alcoa gauge have inadequate rim flange height to support the tire on the rim. Permanently remove any wheel from service that has inadequate rim flange height.

Always follow safe mounting procedures as recommended using OSHA approved tire inflation cages. See the Alcoa Wheel Service Manual or OSHA safety wall charts and procedures.

3 Alcoa 15° Drop Center Wheel for Tubeless Tires

Recommendations for mounting tubeless tires

3-1

NOTICE: For complete information on tube type wheels, contact Alcoa.

WARNING **Damaged tires or wheels can lead to an explosive separation of tires and wheels.**

Explosive separation can result in serious injury or death.

Inspect tires and wheels for damage before removing from vehicle. If damage is found, the tire must be completely deflated before loosening cap nuts. Remove damaged tires or wheels from service.

WARNING

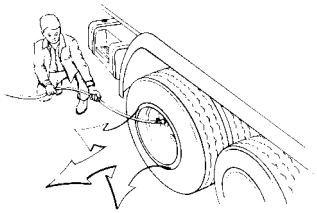
WARNING **Use of inner tubes in tubeless wheels will hide slow leaks. Slow leaks may indicate cracked (see section 2-9, page 12) or damaged wheels which lead to wheel failures.**

Wheel failures can cause accidents which may result in serious injury or death.

Never use an inner tube on an Alcoa tubeless wheel, and always remove cracked or damaged wheels from service.

WARNING

NOTICE: Alcoa aluminum 19.5"RW and non-symetrical well wide base wheels require special tire mounting techniques, See Section 3-2.



1. Do not gouge or nick the wheel. Place aluminum wheels on clean wooden floor or rubber mat when hand mounting tires. Additional care should be used when mounting Alcoa Dura-Bright® surface treated wheels since minor nicks and scratches cannot be polished out (see section 5-8, pages 37 & 38 for specific cautions, care and maintenance procedures). DiscMate wheel spacers are recommended for use with Alcoa Dura-Bright® surface treated wheels to protect the wheel contact surfaces from marring.

2. Always use a rubber, leather-faced or plastic mallet.

3. Inspect the wheel for damage. Do not use a damaged or severely corroded wheel. (See Section 2, page 5).

4. Clean the wheel face with mild detergent and the tire bead seat areas with a wire brush. Be sure the wheel is dry before applying tire lubricant.

5. Inspect the tire for damage. Be sure the inside of the tire is dry before it is mounted.

6. Use of a non-water-based lubricant is recommended as a rim surface protectant and tire mounting lubricant. Coat the entire rim surface. (See 3-2, page 19).

7. Lubricate the rim and tire bead immediately before mounting the tire. Do not use any lubricant which contains water. Water-based lubricants can promote corrosion attack on the rim surface. The use of non-water-based lubricants is especially important when mounting tubeless tires as the air in the tire is contained by the seal between the bead and tire rim.

8. Never lubricate the rim or tire bead with a flammable solution. This can lead to an explosion during airing of the tire or in subsequent operation of the vehicle **(see Warning below).**

9. If using a tire mounting/demounting machine on aluminum wheels, care should be taken to prevent gouging the wheel.

10. Use only dry air for tire inflation. The use of moisture traps in the air compressor feed line is recommended.

11. Do not overinflate. Use the tire manufacturer's recommended pressure, but under no circumstances exceed cold tire pressures listed in **Section 1 Specifications** of this manual (see page 2).

12. When inflating a tire in an inflation cage or while mounted on a vehicle, always use a clip-on air chuck or threaded straight chuck and a remote valve with pressure gauge. Securely anchor the inflation cage and during inflation or handling of an inflated wheel and tire assembly, stay out of the path of potential exploding parts or air blasts.

Recommendations for mounting tubeless tires (continued)

WARNING Use of a volatile or flammable material, such as ether or gasoline, as an aid to seating the tire beads on the wheel can lead to an uncontrolled pressure build-up in the tire and may result in an explosion.

Explosive separation of the tire and wheel can occur while seating beads in this manner, while adding air to the tire on or off the vehicle, or later on the road. Loss of vehicle control can result, which can cause serious injury or death.

Use only approved mechanical or pneumatic bead seating devices.

WARNING A pressurized tire/wheel assembly can explode and separate violently.

This violent separation can cause serious injury or death.

Always contain the tire/wheel assembly in an inflation cage during inflation.

Mounting tubeless tires

3-2

NOTICE: Not all tire mounting/demounting machines work alike. Be sure to read the operating or instruction manual for your particular machine before attempting to mount or demount tires.

NOTICE: Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.

Refer to tire manufacturer's recommendation for proper tire pressure. Before mounting the tire perform a wheel fitment check to insure proper clearance from any obstructions.

NOTICE: When match mounting tires on Alcoa wheels locate valve stem adjacent to low point mark on the tire.

NOTICE: Alcoa aluminum 19.5" RW and non-symmetrical wide base wheels require tires to be mounted and demounted over the disc side of the wheel only.

NOTICE: Refer to tire manufacturer's recommendation for proper tire pressure.

Position wheel on machine. Lubricate wheel (entire air chamber surface) and tire bead using approved lubricant. Tire beads should be mounted over the rim flange closest to the wheel well. Push bead over flange as far as possible.

Insert curved end of tool between bead and wheel flange with tool stop against flange. In circular motion, use short successive bites to work the bead over the flange. Push down on tool as bead is worked over flange.

Lubricate the second tire bead. Start second bead into the well, holding it in position with the clamp to the rim flange. Lubricate bead half way around. With curved end of tool between tire bead and flange, and the stop towards the wheel, push tool outward to work tire over flange. Continue to pry bead over flange using the tool until remaining bead is over flange. Seat the tire bead using an air ring or other mechanical bead seating aid.

Place tire/wheel assembly inside safety cage or other suitable restraint (refer to OSHA rule 1910.177, paragraph **b**, see Section 7, page 44). **Refer to tire manufacturer's recommendation for proper tire pressure.** Using a clip-on air chuck or a self-locking straight chuck with remote valve and pressure gauge, inflate the tire/wheel assembly to proper pressure. If air escapes, roll tire or use bead expander to force tire beads against rim. Be sure to stay out of the path of potential exploding parts or air blasts.

Mounting tubeless tires continued

3

NOTICE: Not all tire mounting/demounting machines work alike. Be sure to read the operating or instruction manual for your particular machine before attempting to mount or demount tires.

NOTICE: Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.

Refer to tire manufacturer's recommendation for proper tire pressure. Before mounting the tire perform a wheel fitment check to insure proper clearance from any obstructions.

NOTICE: When match mounting tires on Alcoa wheels locate valve stem adjacent to low point mark on the tire.

NOTICE: Alcoa aluminum 19.5" RW and non-symmetrical wide base wheels require tires to be mounted and demounted over the disc side of the wheel only.

NOTICE: Refer to tire manufacturer's recommendation for proper tire pressure.

NOTICE: Alcoa aluminum 19.5"RW and non-symetrical well wide base wheels require tires be mounted and demounted **over the disc side of the wheel only.** For a free instruction wall chart, contact: Alcoa Inquiry Fulfillment, Markinetics Inc., P.O. Box 809, Marietta, OH 45750.

WARNING

WARNING Use of a volatile or flammable material, such as ether or gasoline, as an aid to seating the tire beads on the wheel can lead to an uncontrolled pressure build-up in the tire and may result in an explosion.

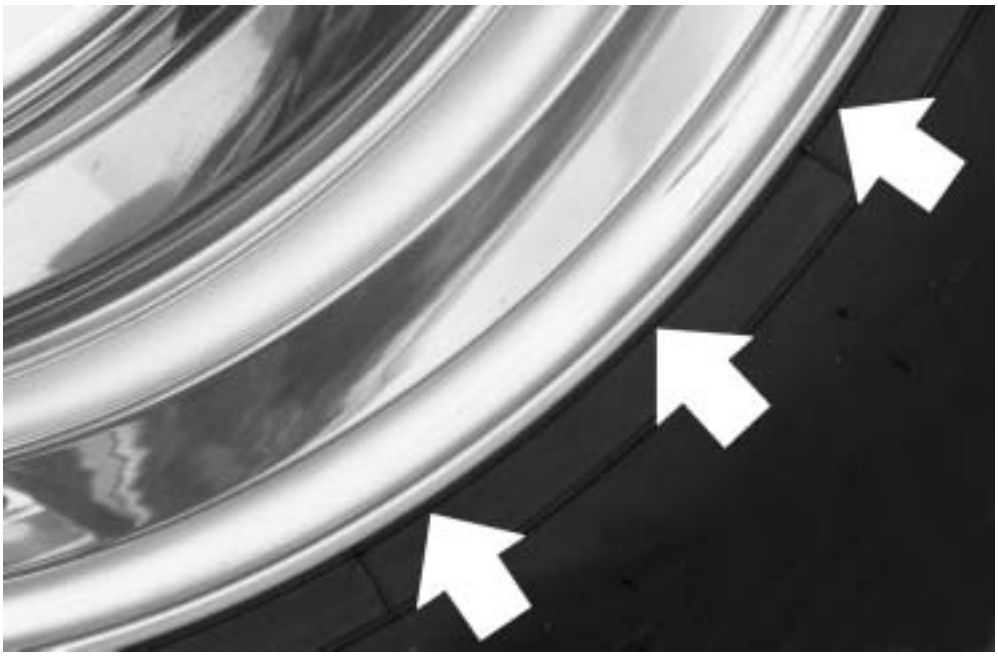
Explosive separation of the tire and wheel can occur while seating beads in this manner, while adding air to the tire or later on the road. Loss of vehicle control can result, which can cause serious injury or death.

Use only approved mechanical or pneumatic bead seating devices.

CAUTION

CAUTION The use of liquid tire balancers or sealants in Alcoa wheels may cause extremely rapid corrosion of the wheel rim surface.

Severely corroded wheels are unsuitable for service. Alcoa wheels corroded by the use of liquid tire balancers or sealants will not be replaced under the Alcoa limited warranty.



Heavy duty truck tires have a "guide rib" molded into the sidewall next to the tire bead. When the tire is inflated this ring should be evenly spaced from the wheel rim all the way around the wheel. Check the position of the ring before removing the assembly from the inflation cage. If the ring and wheel are not concentric, deflate the assembly in the cage and remount the tire.

Rim width to tire matching

3-3

Rim to tire matching chart for medium and heavy trucks.

Tire Size (for both radial and bias tires)		Approved Rim Widths	Tire Size (for both radial and bias tires)		Approved Rim Widths
8R	17.5HC	6.00HC	8	22.5	5.25, 6.00, 6.75
215/75R	17.5	6.00, 6.75	9	22.5	6.00, 6.75, 7.50
9R	17.5HC	6.75HC	10	22.5	6.75, 7.50, 8.25
10R	17.5HC	6.75HC, 7.50HC	245/75R	22.5	6.75, 7.50
245/75R	17.5	6.75, 7.50	11	22.5	7.50, 8.25
11R	17.5HC	8.25HC	255/70R	22.5	7.50, 8.25
			265/75R	22.5	7.50, 8.25
			12	22.5	8.25, 9.00
			295/75R	22.5	8.25, 9.00
			305/85R	22.5	8.25, 9.00
			315/80R	22.5	9.00, 9.75
			15	22.5	11.75, 12.25
			385/65R	22.5	11.75, 12.25
			425/65R	22.5	11.75, 12.25, 13.00
			16.5	22.5	12.25, 13.00
			18	22.5	13.00, 14.00
			445/50R	22.5	14.00
			445/55R	22.5	14.00
			445/65R	22.5	12.25, 13.00, 14.00
8	19.5	5.25, 6.00, 6.75	11	24.5	7.50, 8.25
225/70R	19.5	6.00, 6.00RW, 6.75, 6.75RW	275/80R	24.5	7.50, 8.25
245/70R	19.5	6.75, 6.75RW, 7.50, 7.50RW	285/75R	24.5	8.25
265/70R	19.5	7.50, 7.50RW, 8.25, 8.25RW	12	24.5	8.25, 9.00
285/70R	19.5	8.25, 8.25RW, 9.00	305/75R	24.5	8.25, 9.00
305/70R	19.5	8.25, 8.25RW, 9.00			
445/65R	19.5	13.00, 14.00			

There may be additional rim to tire matches not shown above. Contact the tire manufacturer or your Alcoa wheel representative for additional information.

Recommendations for demounting tubeless tires

3-4

WARNING

WARNING An aluminum wheel can be structurally weakened by uncontrolled excessive heat.

Tire/wheel assemblies using wheels that have been exposed to excessive heat may experience a sudden and unpredictable tire/wheel separation causing serious injury or death.

Immediately and permanently remove any wheel from service that has been subjected to uncontrolled excessive heat (such as a tire fire, wheel bearing failure or braking system drag/seize) or a high pressure tire/wheel separation.

WARNING

WARNING Damaged tires or wheels can lead to an explosive separation of tires and wheels.

Explosive separation can result in serious injury or death.

Inspect tires and wheels for damage before removing from vehicle. If damage is found, tire must be completely deflated before loosening cap nuts. Remove damaged tires or wheels from service.

Recommendations for demounting tubeless tires (continued)

1. When hand demounting tires from wheels, placing aluminum wheels on a clean wooden floor, or rubber mat is recommended. Additional care should be used when demounting Alcoa Dura-Bright® surface treated wheels since minor nicks and scratches can not be polished out (see section 5-8, pages 37-38 for specific cautions, care and maintenance procedures).

2. Always use a rubber, leather-faced or plastic mallet.

3. Keep tire tools smooth. Use them with care. Rim gouges or nicks may cause cracks.

4. If using a tire mounting/demounting machine on aluminum wheels, care should be taken to prevent gouging the wheel.

3

Demounting of tubeless tires

3-5

NOTICE: Not all tire mounting/demounting machines work alike. Be sure to read the operating or instruction manual for your particular machine before attempting to mount or demount tires.

Remove the valve core from the valve stem to ensure complete deflation. Place wheel on machine and position tool so flat end can be driven between tire bead and rim flange. Straighten tool to a vertical position until bead is separated from wheel.

Repeat procedure at intervals until bead is totally separated from wheel. Repeat procedure on other side of tire. Tire is now ready for demounting. Lubricate the tire bead.

Insert curved end of tire tools between tire and wheel, approximately 10 inches apart. Pull one tool toward center of wheel, then pull second tool in the same manner. To free bead, leave one tool in position, take out and reinsert the other tool, curved end between bead and flange, a short distance from the spanned area. Pry bead free of rim, repeating process until entire bead is free from wheel.

Insert straight end of tire tool between beads and both rim flanges, hooking stop on the tool over second flange. Position inserted tool at 90° angle to tire assembly at top of wheel and lubricate bead areas on both sided of tool. Lean tire assembly toward tool and rock or bounce to pry off the tire.

4 Wheel Installation

Recommendations for proper installation of wheels

4-1

NOTICE: Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.

Refer to tire manufacturer's recommendation for proper tire pressure. Before mounting the tire perform a wheel fitment check to insure proper clearance from any obstructions.

1. For the same reason the best tires are run on the front axle, the best wheels also should be used on the front axle.

2. Make sure all wheel cap nuts are properly torqued — check them often (see section 4-9, page 29). If the wheel is loose, the holes will pound out (deform). If some cap nuts are tight and others are loose, the wheel may develop cracks or studs may break. Dirt streaks radiating from stud holes can indicate loose nuts (see Section 2, pages 5-17).

3. Be sure the end of the wheel wrench is smooth or cover the wheel mounting surface with a protective shield prior to tightening the cap nuts. The wrench end will mar the wheel around the cap nuts if it is not smooth.

4. Keep all component contact surfaces smooth and clean. Dirt or projections on mounting surfaces may lead to loose wheels. Remove all projections resulting from burrs, nicks, etc. Be sure that loose dirt does not fall onto mounting surface during assembly.

5. Check for and replace bent, broken, cracked or damaged studs. When replacing broken studs, always replace the studs on each side of the broken stud. If two or more studs are broken, replace all the studs for that wheel position. Check with the stud manufacturer for regular maintenance and stud replacement practices. All wheel fastener hardware should be grade 8 or metric conversion 10.9. Follow the hardware manufacturer's recommendations when replacing studs.

6. Do not introduce any foreign objects such as spacers or high hats into the contact surface areas of the mounting system unless approved by Alcoa. Do not paint Alcoa forged aluminum wheels.

7. Additional care should be used when mounting Alcoa Dura-Bright® surface treated wheels since minor nicks and scratches cannot be polished out (see section 5-8, page 37-38 for specific cautions, care and maintenance procedures).

8. DiscMates are a protection gasket designed to be placed between the wheels and also the brake drum/wheel contact surfaces (see sections 4-5, page 24; 4-6, page 25; 4-7, page 26 and 4-10, page 31). DiscMates are recommended to be replaced when the tire/wheel assemblies are removed and reinstalled.

WARNING

WARNING Wheels that are not properly installed or maintained may not work properly.

Failure to follow proper wheel installation or maintenance practices may result in injury or death.

Follow the proper wheel installation and maintenance practices as contained in this Alcoa Wheel Service Manual. For training on proper installation and maintenance, available free of charge from Alcoa, or for the most recent updates, contact Alcoa Wheel and Forged Products at 1-800-242-9898 option 1 or on the web at www.alcoawheels.com.

Wheel cap nuts

4-2

WARNING **Use of chrome-plated cap nuts which have chrome plating on the surfaces which contact the wheel can cause reduced and inconsistent wheel clamping.**

This condition can cause wheels to loosen and disengage from the vehicle, causing injury or death.

Never use cap nuts with chrome-plated contact surfaces. Use only recommended hardware on Alcoa aluminum wheels.

There are many types of nuts and studs in use, and their design and specifications are not standardized. The “R” and “L” on cap nut part numbers indicate right and left-hand threads respectively. Alcoa recommends the following cap nuts for use with Alcoa aluminum truck wheels:

Cap Nuts

2-piece 33mm hex head flange nut. Mounts single and dualed wheels to wheel centering hubs. Right hand threads used on both sides of vehicle. Single wheels require 2” (50.8 mm) stud standout. Dualed wheels require 2-13/16 (71.44 mm) stud standout. P/N 39874 (supersedes P/Ns 39701 and 39691); M22-1.5 RH threads.

2-piece 30mm hex head flange nut. Mounts single and dualed wheels to wheel centering hubs. Right hand threads used on both sides of vehicle. P/N 39708; M20x1.5 RH threads.

2-piece 33mm hex head flange nut. Mounts dualed wheels with **32mm bolt holes** to wheel centering hubs. Right hand threads used on both sides of vehicle. P/N 4307.32; M22x1.5 RH threads.

1-1/8" cap nut. Mounts standard single wheels and wide base wheels to 1-1/8" studs. Also mounts outer dualed wheel to 1-1/8" inner cap nut. P/N 5996R, 5996L (replaces P/N 5552R, 5552L).

3/4"x16 cap nut. Mounts Alcoa wide base wheels to 3/4" studs. Do not use on steel wheels. P/N 5995R, 5995L (replaces P/N 5554R, 5554L).

2 piece 1-1/16” hex head flange nut. Mounts single and dualed wheels to wheel centering hubs. Right hand threads used in both sides of vehicle. P/N 39946; 5/8”x18 RH threads

2-piece 33mm hex head flange nut. Mounts single wheels to wheel centering hubs with 32mm bolt holes. Right hand threads used on both sides of vehicle. P/N 4306.32; M22x1.5 RH threads.

Inner cap nut, inner thread 3/4"x16, outer thread 1-1/8"x16. For use with steel inner dual wheel an aluminum outer dual wheel with 1.31" (1-5/16) to 1.44" (1-7/16) stud standout. P/N 7896R, 7896L (Grade 8).

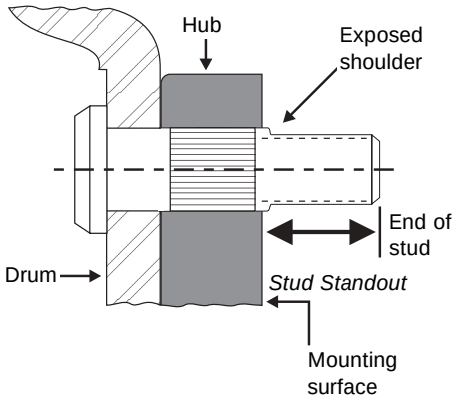
Inner cap nut, inner thread 3/4"x16, outer thread 1-1/8"x16. For use with standard length studs (1.31" [1-5/16] to 1.44" [1-7/16]) stud stand-out) or longer studs not to exceed 1.88" [1-7/8] stud standout. Full internal and external threads. P/N 5978R, 5978L (Grade 8). For studs without exposed shoulders. Do not use with steel inner dualed wheel.

Inner cap nut for use with standard length studs (1.31" [1-5/16] to 1.44" [1-7/16]) stud standout) or longer studs not to exceed 1.88" (1-7/8) stud standout. Full internal and external threads, counter bore 5/16" deep at open end. Prevents stud from bottoming out in cap nut. P/N 5988R, 5988L (Grade 8). For use with studs with exposed shoulders. Do not use with steel inner dualed wheel.

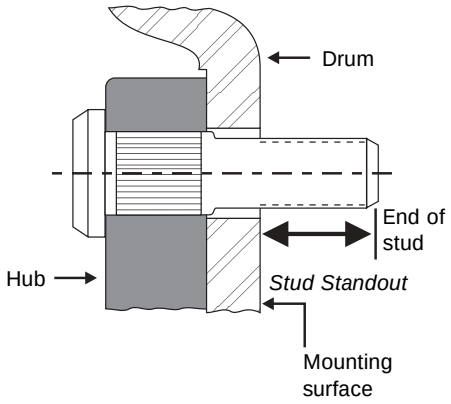
How to measure stud standout

4-3

Stud standout is measured from the axle end mounting surface to the end of the stud.



Inboard mounted drum

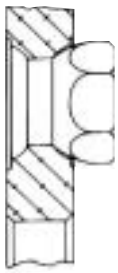


Outboard mounted drum

Stud located ball seats are spherical

4-4

The nut seat for the stud located ball seat mounting system is a precision-machined spherical surface. Cap nuts must be properly manufactured to assure correct seating. Never use one or two-piece flange nuts on a wheel designed with ball seats (see 4-12, page 34). Ball seat cap nuts may be obtained from your Alcoa Wheel Distributor.



Single wheel, stud located, ball seat mounting

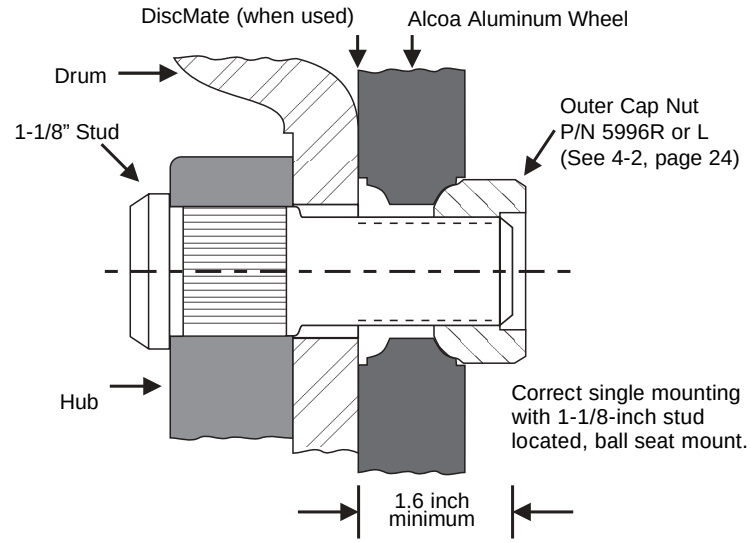
4-5

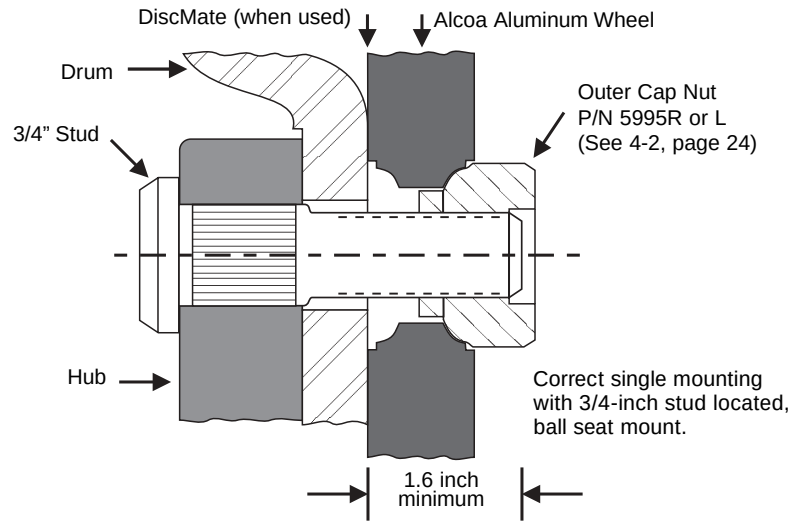
NOTICE: Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.

Refer to tire manufacturer's recommendation for proper tire pressure. Before mounting the tire perform a wheel fitment check to insure proper clearance from any obstructions.

Front wheels are mounted as singles and require 1.6" (1-39/64") minimum stud standout. Most vehicles have 1-1/8-inch studs on the front hubs. Alcoa single cap nuts, Part Nos. 5996R and 5996L, or equivalents, should be used. Some front hubs have 3/4-inch studs. On these hubs, use Alcoa single cap nuts, Part Nos. 5995R and 5995L or equivalents.

DiscMate wheel spacers are recommended for use with Alcoa Dura-Bright® surface treated wheels to protect the wheel contact surfaces from marring. DiscMate wheel spacers are placed between the contact surfaces of the Dura-Bright® wheel and the brake drum as shown below.





Dualed wheels, stud located, ball seat mounting

4-6

Rear wheels are most frequently mounted as duals. Each inner aluminum wheel is attached by 10 inner cap nuts. Alcoa recommends use of inner cap nuts 5978R, 5978L, or 5988R, 5988L (see 4-2, page 24).

Cap nuts recommended by Alcoa are compatible with Alcoa wheels. Hardware of equal dimensions and strength may be used.

Continued on next page.

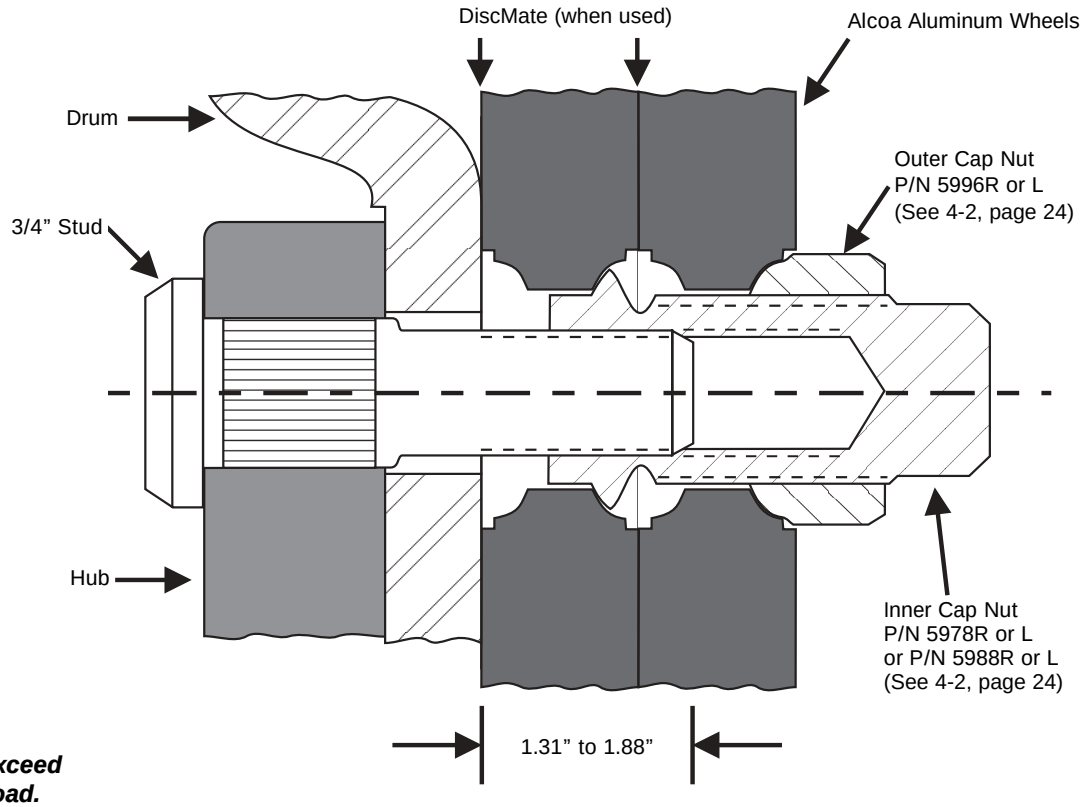
Dualed wheels, stud located, ball seat mounting (continued)

Most vehicles have standard length studs (1.31" [1-5/16"] to 1.44" [1-7/16"] stud standout). Some vehicles use studs longer than standard (up to 1.88" [1-7/8"] standout).

When changing types of brake drums be sure to check for excessive stud standout (greater than 1.88" [1-7/8"]). Excessive stud standout may cause the inner cap nut to bottom out on the longer stud preventing proper seating of the wheel.

Each outer dual wheel is attached by 10 single cap nuts which thread on the inner cap nuts. Use Alcoa outer cap nuts, Part Nos. 5996R, 5996L or equivalents. Match mounted dual wheels should be put on the vehicles with the valve stems180° apart.

DiscMate wheel spacers are recommended for use with Alcoa Dura-Bright® surface treated wheels to protect the wheel contact surfaces from marring. DiscMate wheel spacers are placed between the contact surfaces of the Dura-Bright® wheel and the brake drum and between the dual aluminum wheels as shown below.



Correct mounting for dual aluminum, stud located, ball seat mount, wheels.

NOTICE: Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.

Refer to tire manufacturer's recommendation for proper tire pressure. Before mounting the tire perform a wheel fitment check to insure proper clearance from any obstructions.

WARNING **Incorrect inner cap nuts used with dualed aluminum wheels can bottom out on the unthreaded portion of the stud before the wheels are properly seated.**

Improperly seated wheels can run loose, cause stud breakage and disengage from the vehicle which can cause serious injury or death. Loose running wheels can lead to stud breakage.

Use only cap nut 5978R or L, 5988R or L, or their equivalent when mounting dual aluminum wheels.

On occasion Alcoa aluminum truck wheels are operated dualed with a steel inner wheel. In the event a steel inner wheel is used, extreme care must be exercised to properly seat it to the hub or drum prior to mounting the outer aluminum wheel. Selection of an inner cap nut capable of fixing the steel inner wheel and providing adequate external thread length to secure the outer aluminum dualed wheel is critical to a safe assembly. Alcoa recommends the use of inner cap nuts 7896R and L (Grade 8), or equivalent, for this purpose.

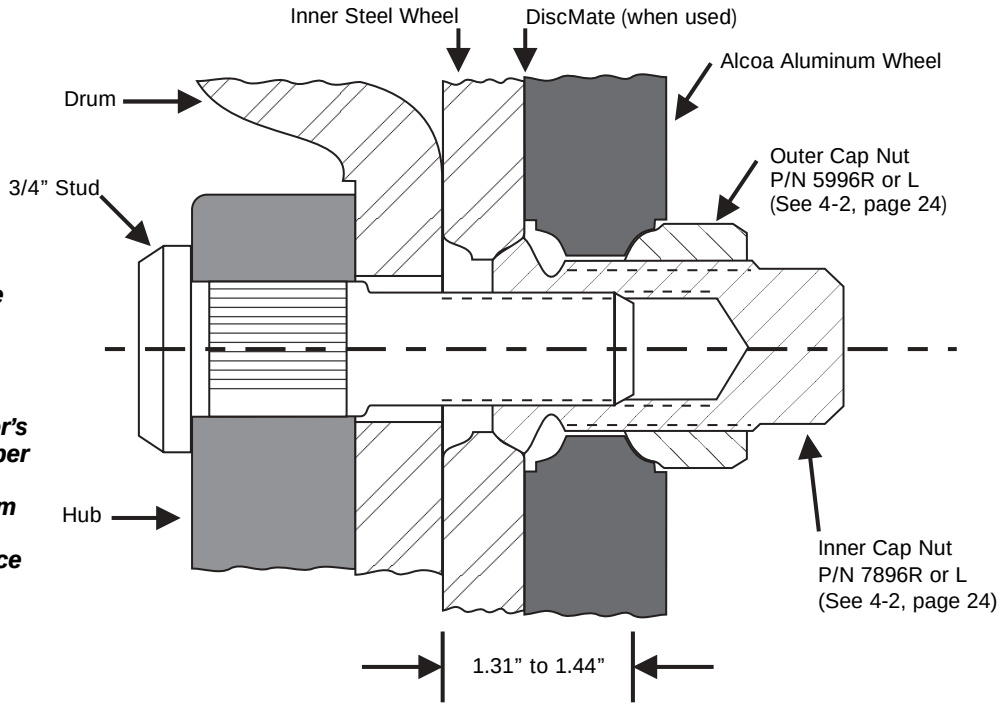
Dualed wheels, steel inner/ aluminum outer stud located ball seat mounting

4-7

NOTICE: Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.

Refer to tire manufacturer's recommendation for proper tire pressure. Before mounting the tire perform a wheel fitment check to insure proper clearance from any obstructions.

DiscMate wheel spacers are recommended for use with Alcoa Dura-Bright® surface treated wheels to protect the wheel contact surfaces from marring. DiscMate wheel spacers are placed between the contact surfaces of the Dura-Bright® wheel and the brake drum and between the steel and aluminum wheels as shown below.



Correct dual mounting for steel inner/aluminum outer stud located ball seat mount.

WARNING

WARNING Incorrect inner cap nuts used with steel wheels can bottom out on the unthreaded portion of the stud before the wheels are properly seated.

Improperly seated wheels can run loose, cause stud breakage and disengage from the vehicle which can cause serious injury or death. Loose running wheels can lead to stud breakage.

Use only cap nut 7896R or L or its equivalent when mounting steel inner duals.

WARNING

WARNING Inadequate wheel support surface can lead to stud hole-to-stud hole fracture resulting in separation of the outer disc and rim from the vehicle.

Separation of the wheel from the vehicle can cause injury or death.

Alcoa aluminum wheels with 11-1/4" diameter bolt circle require a support surface at least 13-3/16" in diameter. Check the outer support surface of the inner steel wheel for flatness and adequate diameter before installing the outer wheel. When the wheels are serviced, check the mounting surfaces of both wheels for stud hole to stud hole cracks. If cracks are found, remove the wheel from service. For the support surface diameter required by other bolt circle sizes, ask your Alcoa representative.

WARNING

WARNING Use of two-piece flange nuts on ball seat wheels or ball seat cap nuts on hub piloted wheels is dangerous.

Using the wrong cap nuts can cause loss of torque, broken studs and cracked wheels, conditions which can lead to injury or death.

Use only hardware designed specifically for each wheel type. See 4-2, page 24 for proper hardware assemblies.

Cap nut thread engagement, stud located wheels, ball seat mounting

4-8

The actual length of thread engagement present in an assembled wheel can not always be determined by visual inspection or measurement of a tightened assembly. The relationship of the wheel cap nut seat to the end of the stud may vary. If there is any doubt that enough thread engagement is present, the number of engaged threads may be counted. Tighten all nuts in the regular manner, then loosen one to hand-tightness. The number of turns to disengage a 1-1/8-inch nut should be at least five full turns. At least seven full turns should be required to disengage a 3/4-inch nut. Ideally, when torqued to the proper load, the stud should be flush with the face of the nut. The face of the nut may be recessed in nuts that are taller for improved wrenching. With most of the nuts in present use, a few unengaged threads at the outer end will cause no problem provided at least 5-7 full turns are required to disengage the nut depending on thread size.

Cap nuts made to Alcoa specification usually give more than the necessary thread engagement on a given stud.

Some states have laws which dictate full thread engagement or thread engagement past the nut body. Make sure you know the laws for the states in which you operate and comply.

Tightening stud located, ball seat cap nuts

4-9

The number of turns to disengage a 1-1/8-inch nut should be at least five full turns. At least seven full turns should be required to disengage a 3/4-inch nut.

WARNING Lubricants should not be applied to the cap nut seat or to the cap nut-to-wheel contact surface.

Oiled seats can lead to over-torquing which can stretch studs causing failure of studs. Failed studs can cause the wheel to disengage from the vehicle, causing injury or death.

Lubricants must be completely removed from the cap nut seats and contact surfaces if applied accidentally.

Cap nuts must be kept tight, and studs and nuts should be checked frequently. Nuts should be retorqued if necessary. At tire changes, nuts and studs should be inspected for cracks and stripped or damaged threads. After each wheel mounting, cap nut torque should be checked with a torque wrench.

Impact wrenches, if used, should be carefully adjusted to apply torques within the limits recommended. Torquing of cap nuts should be done in recommended sequences.

WARNING Undertorqued cap nuts allow wheels to run loose, pounding out (deforming) the ball seats, fatiguing studs or losing nuts. Overtorquing can stretch studs causing them to fail.

Both under and overtorquing can lead to wheels coming off, causing injury or death.

Check all parts, including wheels, studs and cap nuts. Check mounting faces of wheels, hubs and drums. Check for dirt, corrosion or damage. Remove dirt and rust; replace damaged parts. Follow correct tightening sequences and torque levels.

Continued on next page

Tightening stud located, ball seat cap nuts (continued)

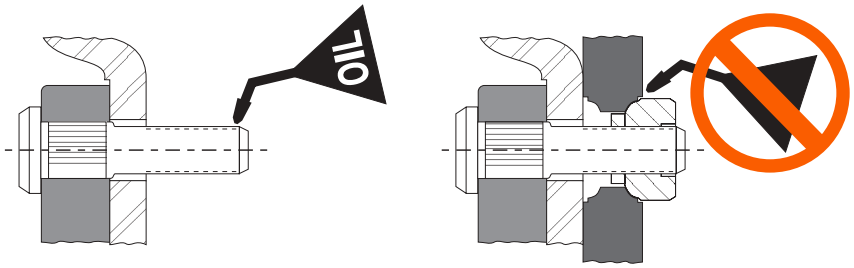
Stud located, ball seat mounting system.

It is recommended that stud threads on stud located mounting systems be lubricated with SAE 30W oil and torqued between 350 and 400 foot-pounds. If threads are not lubricated, torque to between 450 and 500 foot-pounds. Note: when dualing steel wheels with Alcoa aluminum wheels, follow the steel wheel manufacturer's recommendations regarding the proper torque and use of thread lubricants to mount the wheel.

WARNING Application of lubricant to the ball seats can cause excessive torque. Over torque can stretch studs causing them to fail.

Overtorquing can lead to wheel disengagement causing injury or death.

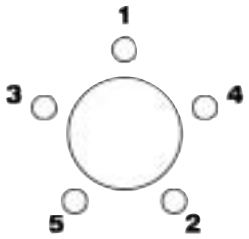
WARNING Do not allow oil to contact ball seats or mounting surfaces of the wheel, hub or drum. Do not use aerosol cans for lubrication of stud threads.



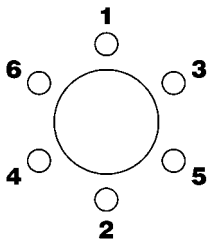
On vehicles equipped to accept wheels manufactured for use with the stud located ball seat mounting system, wheel studs on the right side of the vehicle have right-hand threads and those on the left have left-hand threads. The "R" and "L" on the studs and nuts indicate right and left-hand threads respectively (see 4-2, page 24).

After mounting a wheel over the studs, snug up the cap nuts in the order shown in the illustrations that follow. After all the cap nuts have been snugged, tighten the cap nuts to the recommended torques, following the same tightening sequence.

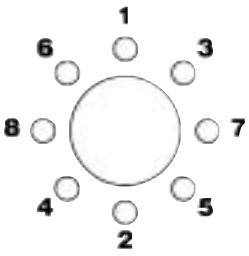
NOTICE: In service, stud dimensions and condition may change over time due to environmental conditions, multiple re-installations, improper torquing and other factors. Consult with your hub and stud manufacturer for maintenance and replacement recommendations.



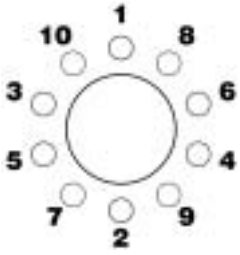
Five Stud



Six Stud



Eight Stud



Ten Stud

Continued on the next page

Tightening stud located, ball seat cap nuts (continued)

After 50-100 miles of operation, torque should be rechecked. Loosen outer cap nuts on every other stud to check the torque on inner cap nuts, then retorque outer cap nuts. Repeat steps on remaining studs. **Check torque frequently from then on.** If nuts require frequent tightening, studs break frequently, or wheel nut seats are pounding out, hardware and mounting practices should be reviewed. Note: whenever the outer cap nut is loosened **ALWAYS** retorque the inner cap nut before retorquing the outer cap nut.

Single, dualed and wide base wheels, hub piloted mounting, two-piece flange nuts

4-10

NOTICE: Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.

Refer to tire manufacturer's recommendation for proper tire pressure. Before mounting the tire perform a wheel fitment check to insure proper clearance from any obstructions.

Most U.S. manufacturers of highway trucks, tractors and trailers which incorporate the hub piloted wheel mounting system require wheel studs and cap nuts with metric threads. Most frequently these are M22x1.5.

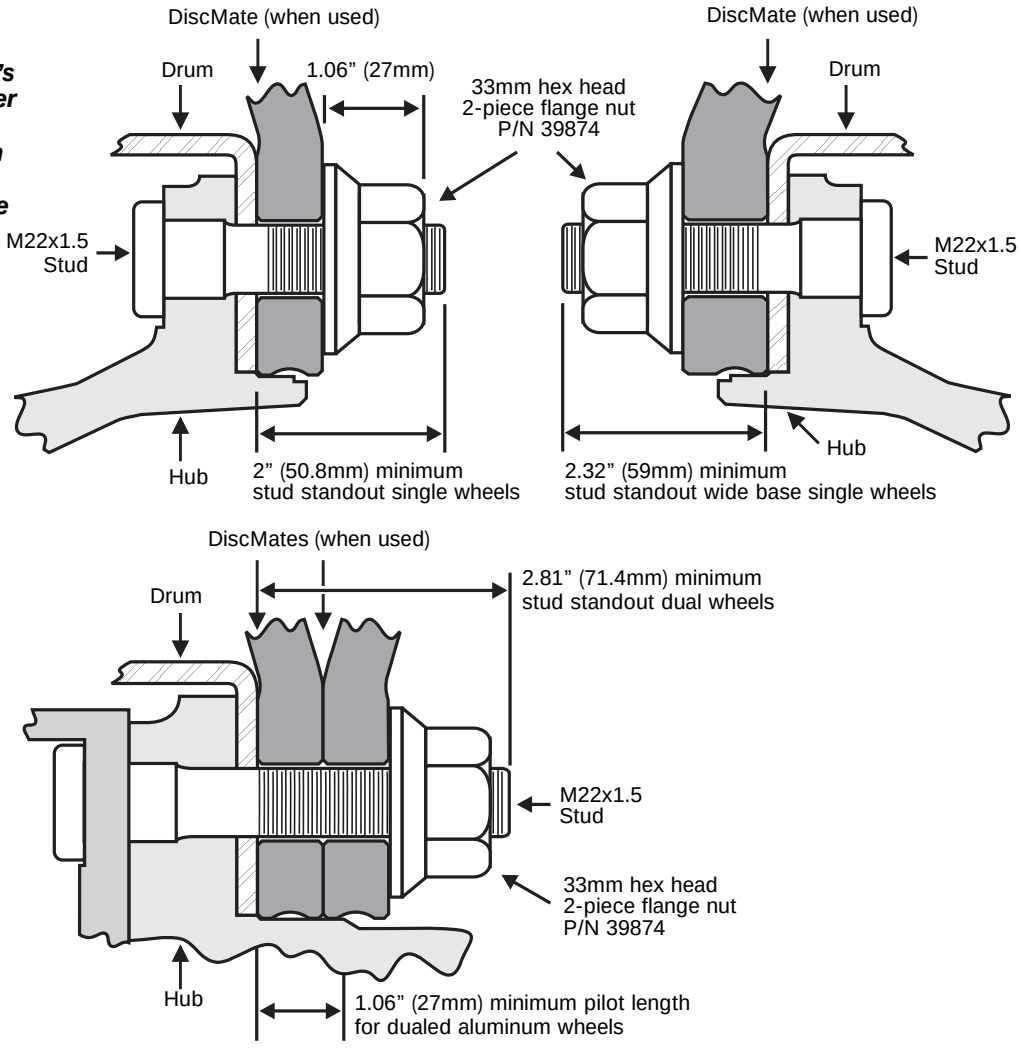
Generally the same diameter stud is used to mount either single or dualed wheels.

Studs on both sides of the vehicle are right-hand threads thereby eliminating the need for flange nuts peculiar to either the right or left side of the vehicle. The same flange nut is used to mount dualed or single wheels. Proper stud standout for single wheels is 2-inch (50.8mm) minimum, dualed wheels require 2.81-inch (71.4mm) minimum and single wide base wheels require 2.32-inch (59mm).

Some states have laws which dictate full thread engagement or thread engagement past the nut body. Make sure you know the laws for the states in which you operate and comply.

DiscMate wheel spacers are recommended for use with Alcoa Dura-Bright® surface treated wheels to protect the wheel contact surfaces from marring. DiscMate wheel spacers are placed between the contact surfaces of the Dura-Bright® wheel and the brake drum and between the dual wheels as shown below.

Note: Some stud located ball seat wheels have the same number of holes and bolt circle diameter as hub piloted wheels. They should not be mixed.



Typical assembly of single and dual wheels of hub piloted type with 33mm hex head two-piece flange nut, Part No. 39874. If hex nuts with greater overall height are used, more stud length is required.

Continued on the next page.

Single, dualed and wide base wheels, hub piloted mounting, two-piece flange nuts (continued)

Hubs designed for steel hub piloted wheels may not have enough pilot length to locate dualed aluminum wheels. Pay close attention to pilot length, particularly when converting from steel to aluminum duals. Measure the hub pilot to make sure the hub has a minimum pilot length of 1.06-inch or 27mm for dualed wheels.

When mounting painted steel inner dual wheels with outer aluminum wheels, be cautious of excessive paint build-up on the inner steel wheel. Excessive paint can reduce the clamping force and allow the wheels to become loose.

Match mounted dual wheels should be put on the vehicle with the valve stems 180° apart.

Tightening hub piloted mounting, two-piece flange nuts

4-11

Flange nuts must be kept tight, and studs and nuts should be checked frequently. At tire changes, nuts and studs should be inspected to be sure they are in good condition. If nuts require frequent tightening or studs break frequently, hardware and mounting practices should be reviewed.

Impact wrenches, if used, should be carefully adjusted to apply torques within the limits recommended. Torquing of flange nuts should be done in recommended sequences.

WARNING Undertorqued flange nuts allow wheels to run loose and fatigue studs or lose nuts. Overtorquing can stretch studs causing them to fail.

Both under and overtorquing can lead to wheel disengagement causing injury or death.

Check all parts including wheels, studs and flange nuts. Check mounting faces of wheels, hubs and drums. Check for dirt, corrosion or damage. Remove dirt and rust; replace damaged parts. Follow correct tightening sequences and torque levels.

Two-piece flange nuts with a 33mm hex head design (see 4-2, page 24), used with hub piloted wheels should be tightened to a torque of 450 to 500 foot-pounds. Two-piece flange nuts with 1-1/2-inch hex head design and other designs have different torque requirements. Inquire of the manufacturer for the proper torque values.

Wheel studs on both the right and left side hubs of vehicles utilizing the hub piloted wheel system have right-hand threads.

Prior to mounting hub piloted wheels, generously coat the wheel pilot or hub pads with a non-water-based lubricant to minimize corrosion product build-up between the wheel and hub pilot. Excessive corrosion build-up between the wheel and hub pilots can make wheel removal difficult. Do not lubricate the face of the wheel, hub or brake drum (see illustration on the next page).

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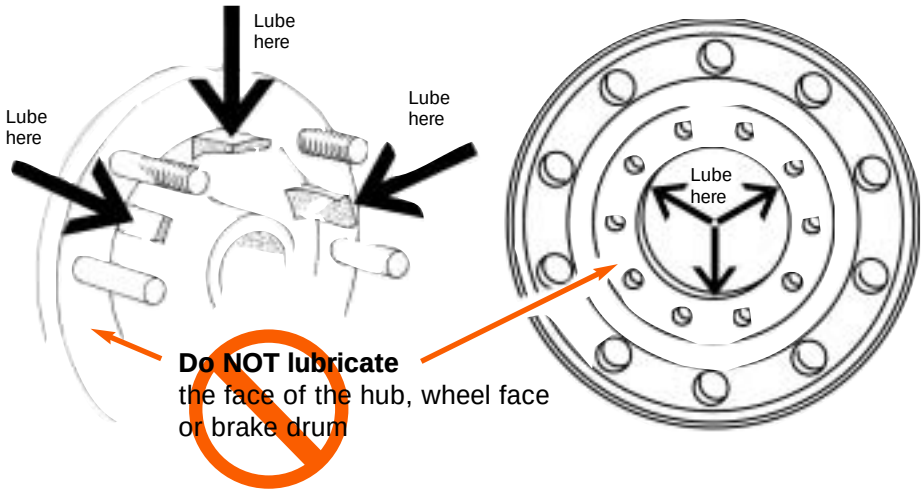
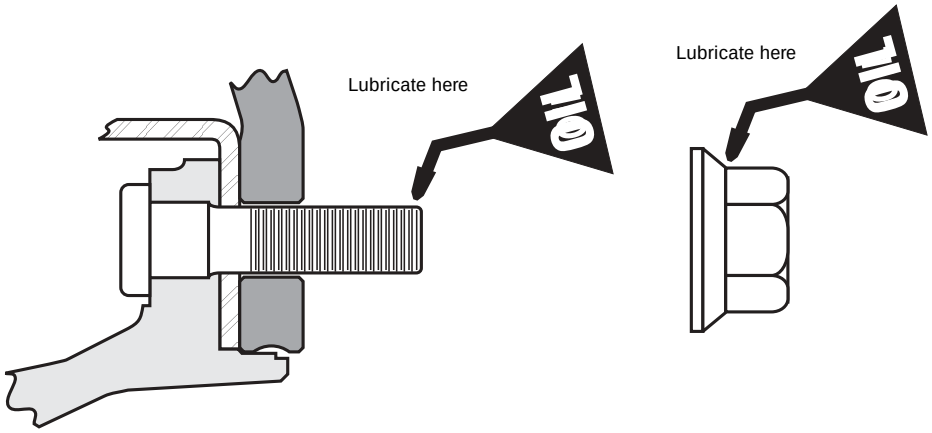
Tightening hub piloted mounting, two-piece flange nuts (continued)

Lubricate the hub pads or the wheel hub bore generously with a non-water-based lubricant.

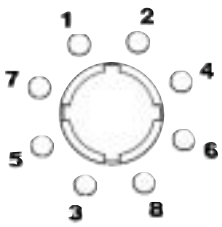


Before installing two-piece flange nuts, lightly lubricate the stud threads and the contact surfaces between the cap nut and the washer as illustrated below with an SAE 30W oil. This will minimize corrosion between the mating surfaces. Lubrication is not necessary with new hardware.

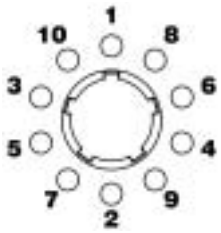


Position one of the hub's pilot pads at the twelve o'clock position. After positioning wheels on the pilot pads, hand tighten all two-piece flange nuts, then tighten to the recommended torque following the proper sequence shown below for your type wheel. After 50-100 miles of operation, torque should be rechecked. **Check torque frequently from then on.** If nuts require frequent tightening, studs break frequently, or wheel bolt holes are pounding out, hardware and mounting practices should be reviewed.

NOTICE: In service, stud dimensions and condition may change over time due to environmental conditions, multiple re-installations, improper torquing and other factors. Consult with your hub and stud manufacturer for maintenance and replacement recommendations.



Eight Stud



Ten Stud

Incorrect assemblies

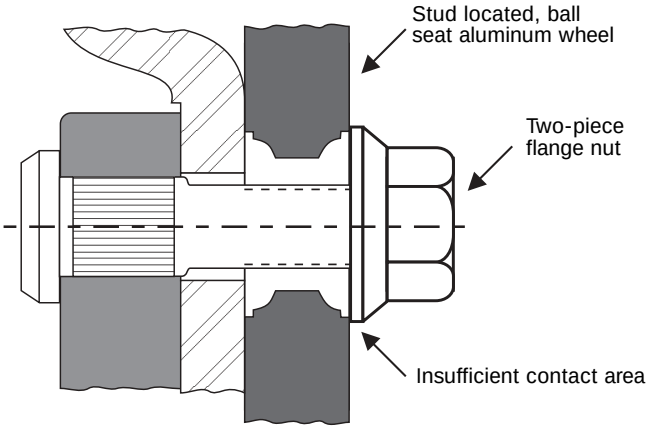
4-12

WARNING **Use of two-piece flange nuts on ball seat wheels, ball seat cap nuts on hub piloted wheels or single-piece flange nuts in place of 2-piece flange nuts is dangerous.**

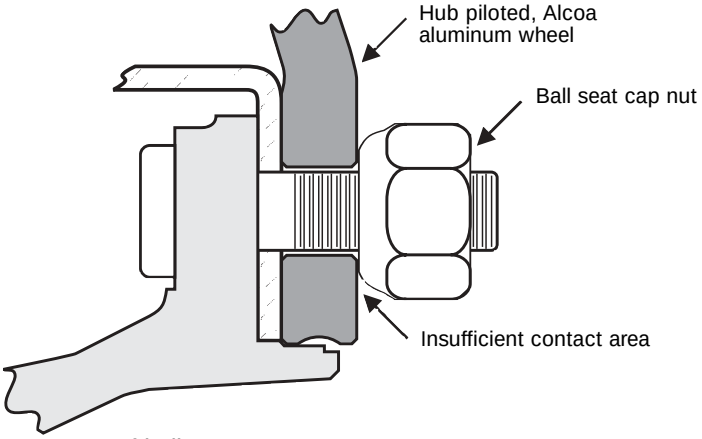
Using the wrong wheel nuts can cause loss of torque, broken studs and cracked wheels, conditions which can lead to injury or death.

Use only hardware designed specifically for each wheel type. See 4-2, page 24 for proper hardware assemblies.

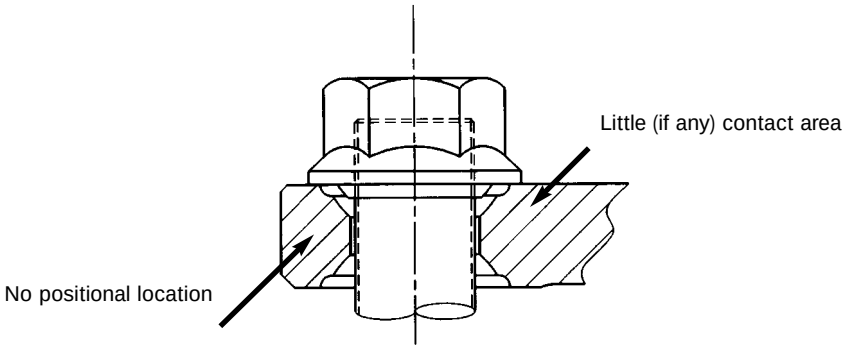
The following are examples of **incorrect** wheel assemblies.



Incorrect use of two-piece flange nut.
Do not use two-piece flange nuts with ball seat wheels.



Incorrect use of ball seat cap nut.
Do not use ball seat cap nuts with hub piloted wheels.



Incorrect use of one-piece flange nut positioned on Alcoa ball seat wheel.
Do not use one-piece flange nut on ball seat wheels.

5 Proper Torque, Wheel Identification, Valves and Surface Maintenance

Avoid abuse

5-1

Abuse can shorten the life of a wheel. Lack of care in changing a tire, heavy pounding of the wheel rim, overloading, exposure to excessive heat or hitting curbs at high speed or a sharp angle can damage wheels.

Do not overinflate. Use the tire manufacturer's recommended pressure, but under no circumstances exceed cold tire pressures listed in Section 1 Specifications of this manual. Before mounting the tire perform a wheel fitment check to insure proper clearance from any obstructions.

Refer to tire manufacturer's recommendation for proper tire pressure. Before mounting the tire perform a wheel fitment check to insure proper clearance from any obstructions.

Keep wheel nuts tight

5-2

Wheel cap nuts must be kept tight (see 4-9, page 29). When checking the cap nuts on dual disc wheels utilizing the stud located ball seat mounting system, loosen every other outer cap nut and then check the torque of the inner cap nuts. Retorque the loosened outer cap nuts. Repeat procedure with the rest of the nuts. Check all cap nuts for proper torque after the first use or any removal. Inspect wheels and check wheel nuts during service stops. (See Section 2, page 5). Dirt streaks from cap nuts may indicate looseness.

Flange nuts must be kept tight, and studs and nuts should be checked frequently. At tire changes nuts and studs should be inspected to be sure they are in good condition. If nuts require frequent tightening or studs break frequently, hardware and mounting practices should be reviewed.

For proper nut torque, refer to the chart below:

Mount Type	Nut Thread	Torque Level Ft-Lb Lubricated*	Torque Level Ft-Lb Dry*
Hub piloted using two-piece flange nut	11/16" - 16 M20 x 1.5 M22 x 1.5	300-400 280-330 450-500	
Stud piloted, double cap nut standard type (7/8" radius)	3/4" - 16 1-1/8" - 16	350-400 350-400	450-500 450-500
Stud piloted, double cap nut heavy duty type (1-3/16" radius)	15/16" - 12 1-1/8" - 16 1-5/16" - 12	650-800	750-900 750-900 750-900

For nuts used on **hub piloted wheels, apply two drops of oil to the point between the nut and flange and two drops to the first two or three threads at the tip of each stud (see 4-11, page 32).*

*For nuts used on **stud piloted wheels,** apply two drops of oil to the first two or three threads at the tip of each stud only (see 4-9, page 29).*

NOTE:

1. If using specialty fasteners (cap nuts), consult the manufacturer for recommended torque values.

2. Tightening wheel nuts to their specified torque is extremely important. Undertightening which results in loose wheels can damage wheels, studs and hubs, and can result in wheel loss. Overtightening can damage studs, nuts and wheels and results in loose wheels as well.

3. Regardless of the torque method used, all torque wrenches, air wrenches and any other tools should be calibrated periodically to ensure the proper torque is applied.

Lead balance weights (clip on)

5-3

Lead balance weights for Alcoa wheels are available from your Alcoa Wheel Distributor. With radial tires it may be necessary to temporarily reduce the tire pressure when installing clip-on weights to allow clearance of the weight clamp over the rim flange. Use of coated balance weights is recommended to avoid staining and corrosion of the aluminum wheel surface.

Excessive rim flange wear (see section 2-11, pages 13-17) could dictate the use of “stick-on” or adhesive wheel weights if there is inadequate rim to properly hold a clip-on style weight.

Improperly installed weights could “fly off” during use and damage the vehicle or cause personal injury. Always follow the recommended procedures in this manual or the wheel weight manufacturer. Adhesive weights should be applied only to a clean surface on the brake side of the wheel rim. These weights should be installed only in a location where they will not contact the brake components during vehicle operation.

Do not straighten wheels

5-4

Do not heat wheels in an attempt to soften them for straightening to repair damage from striking curbs or other causes. The special alloy used in these wheels is heat treated, and uncontrolled heating will weaken the wheel.

Do not rework, weld, heat or braze Alcoa aluminum wheels for any reason. This does not include normal wheel maintenance as described and approved by Alcoa.

WARNING An aluminum wheel can be structurally weakened by uncontrolled excessive heat.

Tire/wheel assemblies using wheels that have been exposed to excessive heat may experience a sudden and unpredictable tire/wheel separation causing serious injury or death.

Immediately and permanently remove any wheel from service that has been subjected to uncontrolled excessive heat (such as a tire fire, wheel bearing failure or braking system drag/seize) or a high pressure tire/wheel separation.

5

Owner/in-service identification

5-5

Some fleets wish to specially identify wheels as to OWNERSHIP and IN-SERVICE dates. Alcoa recommends that fleets and owner-operators adopt the practice of permanently stamping wheels with the date they are first placed into service.

1. Use "Lo-Stress" stamps or equivalent.

2. Location of stamped areas on outside disc should be in space outward from a line between hand hole centers and a minimum of one inch from the periphery of any hand hole.

3. Location of stamped identification on inside of wheel should be as close to the factory identification stamping as possible.

Note: Use of an impression stamp on Dura-Bright® surface treated wheels can affect the appearance and performance of the Dura-Bright® surface treatment local to the stamp.

Valves

5-6

Alcoa drop center wheels for tubeless tires come from the factory with air valves installed. If it becomes necessary to replace an air valve, install it using the following torque values.

10-14 foot-pounds for Part Nos.	7-11 foot-pounds for Part Nos.
TR 509 TR 510 TR 511	TR 542 Series TR 543 Series TR 544 Series TR 545 Series 60MS27N

Replacement valves may be obtained from your authorized Alcoa Wheel Distributor. Always use silicone o-rings – not rubber – when reinstalling valve stems. Metal valve stem caps are recommended instead of plastic.

When replacing valve stems, it is recommended to lubricate the threads and o-ring with a non-waterbased lubricant.

Maintenance against corrosion (non-Dura-Bright® surface treated wheels)

5-7

Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.

Refer to tire manufacturer's recommendation for proper tire pressure. Before mounting the tire, perform a wheel fitment check to ensure proper clearance from any obstructions.

The following information is for standard Alcoa forged aluminum wheels **without** the Dura-Bright® surface treatment. See section 5-8, page 37 for specific instructions on the care and clearing of Alcoa Dura-Bright® surface treated wheels.

1. Clean frequently with high pressure water from a hose. The use of a mild detergent will speed the cleaning process. Use no harsh alkaline cleaners.

2. When tires are removed the entire wheel must be cleaned and inspected. (See Section 2, page 5). With a wire brush, remove any foreign products from the tire side of the rim. Do not use a wire brush to remove dirt and corrosion products from the appearance surface of the wheel. Generously coat the entire air chamber surface with an approved surface protectant and lubricant each time the tire is removed (See 3-1, page 18).

3. To maintain the original appearance of your Alcoa wheels, the following procedures are recommended:

a. After installing new wheels and prior to operating your vehicle, use a sponge, cloth or soft fiber brush to wash exposed wheel surfaces with a mild detergent and warm water solution.

b. Rinse thoroughly with clean water.

c. Wipe dry to avoid water spots.

d. Wax the cleaned surface with **Alcoa Advanced Aluminum Care System Polish** or Simonize, Mothers, California Gold paste wax, No. 7 Car Wax or equivalent.

e. Clean your Alcoa truck wheels as frequently as required to maintain their appearance.

Dura-Bright® surface treated wheels cleaning and maintenance

5-8

Do not exceed maximum wheel load. Customer must compare OEM vehicle load rating to maximum wheel load rating.

Refer to tire manufacturer's recommendation for proper tire pressure. Before mounting the tire, perform a wheel fitment check to ensure proper clearance from any obstructions.

1. Clean frequently with high-pressure water from a hose. The use of a mild detergent will speed the cleaning process. Do not clean with abrasives, abrasive brushes, steel wool, scouring pads or strong chemicals, such as acids or lye-based products. Never spray cold water on extremely hot wheels. Always allow time to cool before cleaning.

2. When tires are removed, the entire rim must be cleaned and inspected (see section 2, page 5). With a brush, remove any foreign products from the tire side of the rim (portion of the wheel that supports the tire). Do not use an abrasive brush to remove dirt, corrosion or other foreign products from the Dura-Bright® wheel surfaces. Generously coat the entire air chamber surface with an approved surface protectant and lubricate each time the tire is removed (see 3-1, page 18 of the Alcoa Wheel Service Manual, July 2002).

3. To maintain the original appearance of your Alcoa Dura-Bright® wheels, the following procedures are recommended:

a. After installing new wheels and prior to operating your vehicle, use a sponge or cloth to wash exposed wheels surfaces with a mild detergent and warm water. Do not use abrasives, abrasive brushes, steel wool, scouring pads or strong chemicals (such as acids or lye-based products). Standard off-the-shelf car wash and wheel detergents are sufficient. Warm water and a mild detergent will speed the cleaning process.

b. Rinse thoroughly with clean water.

c. Wipe dry to avoid water spots.

Dura-Bright® surface treated wheels cleaning and maintenance (continued)

d. Clean your Alcoa Dura-Bright® wheels using the above procedures as frequently as required to maintain their appearance. Typical road soils, grime and brake dust trap moisture, which can cause corrosion over a period of time. These must be removed regularly. To assist in the removal of excessive dust, dirt and road grime, the use of warm, high-pressure water with a mild detergent is recommended. The surface of Alcoa Dura-Bright® wheels will be damaged, discolored or removed if abrasives, abrasive brushes, steel wool, scouring pads or strong chemicals (such as acids or lye-based products) are used to clean the wheel. DO NOT USE the Alcoa Aluminum Care System on Dura-Bright® wheels at any time during their service life.

4. Once in service, Dura-Bright® wheels can become nicked or scratched by road debris and/or mechanical damage. If this occurs, continue to follow the normal washing and cleaning instructions provided above. The surface of an Alcoa Dura-Bright® wheel is designed to limit cracking and peeling if nicked or scratched while in service.

5. Even as durable as Dura-Bright® wheels are, the mounting area can become scratched, marred or discolored when mounted against another wheel, hub or drum. The use of a wheel mounting surface guard, such as Alcoa DiscMates™, is highly recommended. The use of the Alcoa Hub Cover System on Alcoa Dura-Bright® wheels will also assist in limiting such damage and help maintain the appearance of your Alcoa Dura-Bright® wheels.

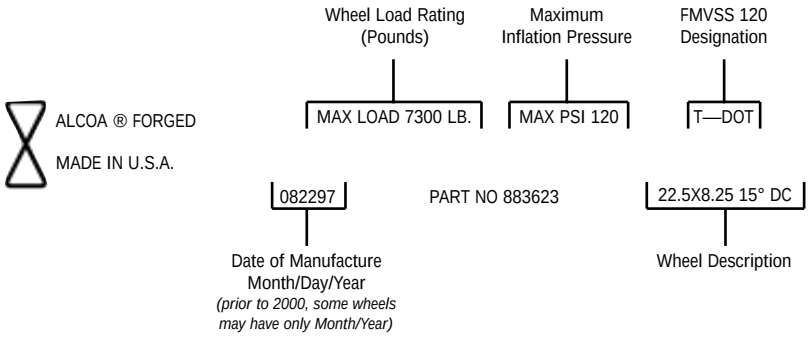
Identification

5-9

Alcoa wheel identification

Since 1977, all Alcoa aluminum disc wheels have been identified with a stamp that shows the wheel load rating, maximum inflation pressure, date of manufacture, part number, wheel description and DOT marking designation.

Prior to June 1996, all Alcoa heavy duty truck wheels had the Alcoa identification symbol on the outside of the disc neat the hand hole in line with the valve location. This marking was phased out on heavy duty truck wheels manufactured after June 1996.



All Dura-Bright® surface treated wheels are designated by the letters "DB" following the part number such as 883620DB.

Note: Dura-Bright® wheels produced after November 2002 have Alcoa wheel part numbers ending with “DB” (earlier wheels have part numbers ending in a 4 or 7) with bead seat diameters measured in 0.5-inch increments. Not all Alcoa wheels are available with the Dura-Bright® surface treatment.

6 Flat Base Wheel for Tube-type Tires

Tube-type wheel part interchangeability

WARNING **Mismatched rim/wheel components can lead to explosive separation of wheel components.**

Explosive separation of wheel parts can cause serious injury or death.

See chart below for matching components.

6-1

Multipiece Rim Matching Chart

The following is the Alcoa Aluminum Wheel interchangeability information from the OSHA Multipiece Rim Matching Chart. For a complete matching chart, write to: **U.S. Department of Labor, Occupational Health and Safety Administration, Publications Department, Room N4101, Washington, DC 20210**

Read across the chart to find interchangeable components for specific size and type of Alcoa wheel. The information which is found in the shaded areas of the OSHA Multipiece Rim Matching Chart is represented in the table below.

RIM SIZE	RIM BASE IDENTIFICATION STAMPING	2 PIECE ASSEMBLIES	3 PIECE ASSEMBLIES	
		SIDE RING IDENTIFICATION STAMPING	LOCK RING IDENTIFICATION STAMPING	FLANGE IDENTIFICATION STAMPING
20 x 7.5	20x7.5FL; B7520FL	20x7.5FL; R20X7.5FL; R7520FL	20X7.5FL; LR20X7.5FL; LR7520FL	20X7.5-5° -FL; 20X7.5-8.05° -7.5FL; F20X7.5FL; F7520FL
	1020 20-7.5; T/M 20-7.5 8-A3-190	1020 RC20-7.5; T/M 20-7.5 8-A3-190	NONE	NONE
	1120 10-7.5; D-13520 20-7.5; A-AA2951 20-7.5; K-H 20X7.5	1120 RC 20-7.5; D 20-7.5 D 13520SR; F20-7.5 A-AA2951-1	NONE	NONE
	20X7.5-5°; 20X7.50-5°; F20750B (2)	NONE	20X7.0-7.5-8.0-5°	20X7.5-5° -FL; 20X7.5-8.05° -7.5FL; F7520FL
	20X7.5LA; 20X7.5MS; B7520LA	R20X7.5LA; 20X7.5MS; R7520LA	NONE	NONE
	20X7.5LB; 20X7.5DT-LB (3); B7520LB; G20750B (2)	R20X7.5-8.0-9.0LB-LW; 20X7.5-8.0DT-LB-LW (3); R8020LW	NONE	NONE
	20X7.5LW; 20X7.50LW; B7520LW; G20750B (2)	20X7.5-8.0-9.0LW; 20X7.5-8.0-DT-LB-LW (3); R8020LW	NONE	NONE
	20X7.5M	R20X7.5-8.0-9.0LB-LW; 20X7.5-8.0DT-LB-LW (3); R8020LW	LR20X7.5-8.5-10.0M; LR20M	F20X7.5-8.5M; F7520M
	20X7.5DA5°	20X7.5DA5°; 20X7.5FLN; 20X7.5N5°	NONE	NONE
	20X7.5FLN	20X7.5FLN; 20X7.5DA5°; 20X7.5N5°	NONE	NONE
	20X7.5N5°	20X7.5N5°; 20X7.5FLN; 20X7.5DA5°	NONE	NONE
	B7520KB	R8020KW	NONE	NONE
	B7520KW	R8020KW	NONE	NONE
	B7520KWX	R8020KW	NONE	NONE
	BW-5 20X7.5	BW-5 20X7.5	BW-5 20X7.5-8.0V-8.5V	B-5° 20X7.5
20 x 8.0	20X8.0-5°; 20X8.00-5°; F20800B (2)	NONE	20X7.0-7.5-8.0-5.0°	20X8.0-5°; 20X7.5-8.05° -7.5FL
	20X8.0LW; 20X8.00LW; B8020LW; G20800B (2)	R20X7.5-8.0-9.0LB-LW; 20X7.5-8.0DT-LB-LW (3); R8020LW	LR20X7.5-8.5-10.0M; LR20M	F20X7.5-8.5M; F7520M
	B8020KW	R7520K	NONE	NONE
	BW-5 20X8.0	NONE	BW-5 20X7.5-8.0V-8.5V	BW-5 20X8.0V-8.5V
22 x 7.5	1022 22-7.5; T/M 22-7.5 8-A3-191	1022 RC22-75; T/M 22-7.5 8-A3-191	NONE	NONE
	1122 22-7.5; D-13522 22-7.5; A-AA2952 22-7.5	1122 RC22-7.5; D 22-7.5 D 13522-SR; F 22-7.5 A-AA2952-1	NONE	NONE
	22X7.5-5°; 22X7.50-5°; F22750B (2)	NONE	22X7.0-7.5-8.0-5°	22X7.5-5° -FL; 22X7.5-8.05° -7.5FL; F7522FL
	22X7.5FL; B7522FL	22X7.5FL; R22X7.5FL; R7522FL	22X7.5FL; LR22X7.5FL; LR7522FL	22X7.5-5° -FL; 22X7.5-8.05° -FL; F22X7.5FL; F7522FL
	22X7.5LB; 22X7.5DT-LB (3); B7522LB; G22750B (2)	R22X7.5-8.0-9.0LB-LW, 22X7.5-8.0DT-LB-LW (3); R8022LW	NONE	NONE
	22X7.5LW; 22X7.50LW; B7522LW; G22750B (2)	R22X7.5-8.0-9.0LB-LW, 22X7.5-8.0DT-LB-LW (3); R8022LW	NONE	NONE
	22X7.5M	R22X7.5-8.0LB-LW; R8022LW	LR22M; LR22X7.5-8.5-10.0M	F7522M
	22X7.5DA5°	22X7.5DA5°; 22X7.5FLN; 22X7.5N5°	NONE	NONE
	22X7.5FLN	22X7.5FLN; 22X7.5DA5°; 22X7.5N5°	NONE	NONE
	22X7.5N5°	22X7.5N5°; 22X7.5FLN; 22X7.5DA5°	NONE	NONE
	B7522KB	R8022KW	NONE	NONE
	B7522KW	R8022KW	NONE	NONE
	B7522KWX	R8022KW	NONE	NONE
	BW-5 22X7.5	BW-5 22X7.5	BW-5 22X7.5-8.0V-8.5V	B-5° 22X7.5
22 x 8.0	22X8.0-5°; 22X8.00-5°; F22800B (2)	NONE	22X7.0-7.5-8.0-5°	22X8.0-5°
	22X8.0LW; 22X8.00LW; B8022LW; G22800B (2)	R22X7.5-8.0-9.0-LB-LW; 22X7.5-8.0DT-LB-LW (3); R8022LW	LR22M	F7522M
	B8022KW	R7522KW	NONE	NONE
	BW-5 22X8.0	NONE	BW-5 22X7.5-8.0V-8.5V	BW-5 22X8.0V-8.5V

Part numbers listed by Alcoa are followed by one of the characters X-T-N-B, or current Alcoa part numbers (i.e., 371010) end in 0-1-2 or 3, indicating a finish condition which does not affect the interchangeability of parts as shown on the chart.

Mounting recommendations for tubed tires

6-2

1. Inspect the wheel for damage. Do not use a bent, cracked, damaged or severely corroded wheel. (See Section 2, page 5).

2. Inspect ring(s) for corrosion, bending or other damage and discard if any is apparent.

3. Thoroughly clean the wheel and rings. Clean the wheel face with a mild detergent. Clean the tire bead seat areas and gutter flange with a wire brush.

4. Do not gouge or nick the wheel. Place wheels on a wooden floor or rubber mat. Always use a rubber, leather-faced or plastic mallet.

5. Inspect and clean the tire, tube, and flap before mounting — replace if damaged, badly worn or defective.

6. Insert lubricated tube and flap in tire.

7. Lubricate the tire beads and rim, then mount tire, tube and flap assembly onto rim. Do not use any lubricant which contains water or a solvent which can injure rubber.

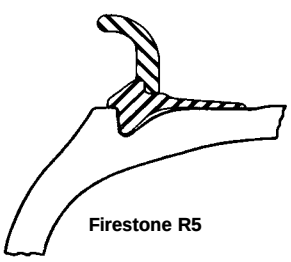
8. Select the proper rim components and assemble to rim (see 6-3, page 41). Discard bent, damaged or corroded side and lock rings. Do not use any side or lock ring which is not clearly identifiable.

WARNING

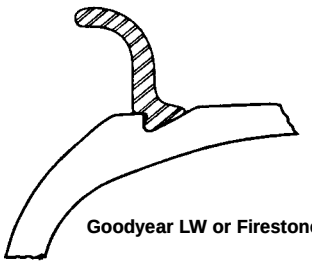
WARNING Use of a Firestone 5° side and lock ring assembly with a wheel machined for Firestone DT or Goodyear LW split side ring and vice versa can lead to explosive separation of wheel and tire.

An explosive separation of miss-matched wheel components can lead to injury or death.

Alcoa Aluminum Disc Wheels are available to accept (1) Firestone 5° side and lock rings or (2) Goodyear LW and Firestone DT split side rings. Select the proper side and lock rings by referring to the Multipiece Rim/Wheel Matching Chart on page of this manual.

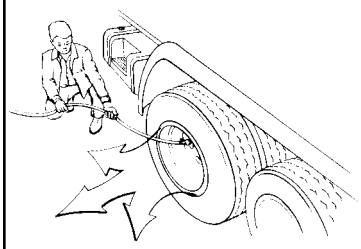


Firestone R5



Goodyear LW or Firestone DT

Always use the proper side and lock ring assembly or split side rings required for each particular wheel.



9. Do not overinflate. Use the tire manufacturer's recommended pressure, but under no circumstances exceed cold tire pressures listed in **Section 1 Specifications** of this manual (see page 2).

10. When inflating a tire in an inflation cage or while mounted on a vehicle, always use a clip-on air chuck and a remote valve with pressure gauge. During inflation or handling an inflated wheel and tire assembly, stay out of the path of potential exploding parts or air blasts.

Mounting of tubed tires

6-3

When mounting Alcoa flat base wheels for tube-type tires you must use the proper side ring or side and lock ring required for each wheel. The table below lists the Alcoa tube-type wheels currently in production and the proper side ring or side and lock ring identification recommended for each wheel. See the Multipiece Rim Matching Chart on page 39 for information on older wheels with part numbers not shown here.

Alcoa Flat Base Wheels for Tube-type Tires That Use Goodyear LW or Firestone DT Split Side Rings Only (2 Piece Assemblies)		
Wheel Size	Alcoa Part Number Identification Stamping	Side Ring Identification Stamping
22x8.00 LW	481010	R8022LW recommended or: R22X7.5-8.0-9.0LB-LW 22X7.5-8.0DT-LB-LW (3)
22x7.50 LW	471010	R8022LW recommended or: R22X7.5-8.0-9.0LB-LW 22X7.5-8.0DT-LB-LW (3)
Current Alcoa part numbers (i.e., 481010) end in 0-1-2 or 3, indicating a finish condition which does not affect the compatibility of parts as shown in the table.		

Lubricate tube, flap and wheel. Insert tube and flap into tire. Place them on the wheel so that the valve is aligned with the valve slot.

Place side ring on wheel and tire and stand on the ring to position it below the lock ring groove. If a split side ring is required, start the leading edge and walk the side ring onto the wheel

If the wheel requires a lock ring, start the leading edge of the lock ring being sure that it is seating in the machined groove. Then walk the lock ring onto the wheel, as illustrated

Seat the second end of the split side ring or lock ring with a rubber, plastic or leather-facet mallet as shown. Check carefully to see that the split side ring or side ring and lock ring assembly is in the proper position. If not, completely remove the components and start over.

Inflate to 10 psi. Check to see that all components are properly in place. If not, deflate the tire by removing the valve core and reposition components properly. Place in a safety cage or other suitable restraining device (refer to OSHA rule 1910.177, paragraph B, see Section 7, page 44). Use clip-on chuck and stand behind barrier during inflation. Do not lean on cage. Inflate to recommended pressure. Deflate completely to avoid localized over-stretching of the tube. Reinflate to the tire manufacturer's recommended pressure.

Demounting recommendations for tubed tires

6-4

WARNING

WARNING An inflated tire contains air under pressure which can be a dangerous explosive force.

Explosive separation of a tire and wheel can cause serious injury or death.

Follow proper service procedures to avoid injury or death.

WARNING An aluminum wheel can be structurally weakened by uncontrolled excessive heat.

Tire/wheel assemblies using wheels that have been exposed to excessive heat may experience a sudden and unpredictable tire/wheel separation causing serious injury or death.

Immediately and permanently remove any wheel from service that has been subjected to uncontrolled excessive heat (such as a tire fire, wheel bearing failure or braking system drag/seize) or a high pressure tire/wheel separation.

1. Before removing wheel from vehicle, remove the valve core from the valve stem to ensure complete deflation of tire.

2. Do not gouge or nick the wheel. Place aluminum wheels on a clean wooden floor or rubber mat.

3. Always use a rubber, leather-faced or plastic mallet.

4. Keep tire tools smooth. Use them with care. Rim gouges or nicks near the fixed flange can cause cracks.

5. Remove steel side rings carefully. If bead is well-loosened, rings can be removed without gouging the wheel.

6. Discard bent, damaged or corroded side and lock rings. Using bent, damaged or corroded rings can shorten service life of wheel and introduce the danger of an explosive separation.

Demounting of tubed tires

6-5

NOTICE: Tire must be completely deflated and valve core removed before demounting.

If manually breaking the tire beads from the wheel, it is important to use the proper tools. Tire tools may be inserted next to the tire side wall and the side ring or locking ring. Tools must be smooth and used with care if gouging the rim is to be avoided. A stop, welded to the tool, is recommended.

Once the tool is inserted, pry down and out as illustrated. Leaving one tool in position, work the other around the tire until the bead is completely free.

Insert the tapered end of the tire tool into the notch on the locking ring. Pry up carefully to avoid bending the ring and gouging the wheel.

Using the same procedures as outlined in Step 1, loosen the bead on the opposite side of the wheel. Do not drive tools into rim area. Lift wheel from tire.

7 OSHA Regulations

OSHA Regulations

7-1

Sec. 1910.177 Servicing multi-piece and single piece rim wheels.

(a) Scope

(1) This section applies to the servicing of multi-piece and single piece rim wheels used on large vehicles such as trucks, tractors, trailers, buses and off-road machines. It does not apply to the servicing of rim wheels used on automobiles, or on pickup trucks and vans utilizing automobile tires or truck tires designated ``LT''.

(2) This section does not apply to employers and places of employment regulated under the Construction Safety Standards, 29 CFR part 1926; the Agriculture Standards, 29 CFR part 1928; the Shipyard Standards, 29 CFR part 1915; or the Longshoring Standards, 29 CFR part 1918.

(3) All provisions of this section apply to the servicing of both single piece rim wheels and multi-piece rim wheels unless designated otherwise.

(b) Definitions

Barrier means a fence, wall or other structure or object placed between a single piece rim wheel and an employee during tire inflation, to contain the rim wheel components in the event of the sudden release of the contained air of the single piece rim wheel.

Charts means the U.S. Department of Labor, Occupational Safety and Health Administration publications entitled ``Demounting and Mounting Procedures for Truck/Bus Tires'' and ``Multi-piece Rim Matching Chart,'' the National Highway Traffic Safety Administration (NHTSA) publications entitled ``Demounting and Mounting Procedures Truck/Bus Tires'' and ``Multi-piece Rim Matching Chart,'' or any other poster which contains at least the same instructions, safety precautions and other information contained in the charts that is applicable to the types of wheels being serviced.

Installing a rim wheel means the transfer and attachment of an assembled rim wheel onto a vehicle axle hub. Removing means the opposite of installing.

Mounting a tire means the assembly or putting together of the wheel and tire components to form a rim wheel, including inflation. **Demounting means the opposite of mounting.**

Multi-piece rim wheel means the assemblage of a multi-piece wheel with the tire tube and other components.

Multi-piece wheel means a vehicle wheel consisting of two or more parts, one of which is a side or locking ring designed to hold the tire on the wheel by interlocking components when the tire is inflated.

Restraining device means an apparatus such as a cage, rack, assemblage of bars and other components that will constrain all rim wheel components during an explosive separation of a multi-piece rim wheel, or during the sudden release of the contained air of a single piece rim wheel.

Rim manual means a publication containing instructions from the manufacturer or other qualified organization for correct mounting, demounting, maintenance, and safety precautions peculiar to the type of wheel being serviced.

Rim wheel means an assemblage of tire, tube and liner (where appropriate), and wheel components.

Service or servicing means the mounting and demounting of rim wheels, and related activities such as inflating, deflating, installing, removing, and handling.

Service area means that part of an employer's premises used for the servicing of rim wheels, or any other place where an employee services rim wheels.

Single piece rim wheel means the assemblage of single piece rim wheel with the tire and other components.

Single piece wheel means a vehicle wheel consisting of one part, designed to hold the tire on the wheel when the tire is inflated.

Trajectory means any potential path or route that a rim wheel component may travel during an explosive separation, or the sudden release of the pressurized air, or an area at which an airblast from a single piece rim wheel may be released. The trajectory may deviate from paths which are perpendicular to the assembled position of the rim wheel at the time of separation or explosion. (See appendix A for examples of trajectories.)

Wheel means that portion of a rim wheel which provides the method of attachment of the assembly to the axle of a vehicle and also provides the means to contain the inflated portion of the assembly (i.e., the tire and/or tube).

(c) Employee Training

(1) The employer shall provide a program to train all employees who service rim wheels in the hazards involved in servicing those rim wheels and the safety procedures to be followed.

(i) The employer shall assure that no employee services any rim wheel unless the employee has been trained and instructed in correct procedures of servicing the type of wheel being serviced, and in the safe operating procedures described in paragraphs (f) and (g) of this section.

(ii) Information to be used in the training program shall include, at a minimum, the applicable data contained in the charts (rim manuals) and the contents of this standard.

(iii) Where an employer knows or has reason to believe that any of his employees is unable to read and understand the charts or rim manual, the employer shall assure that the employee is instructed concerning the contents of the charts and rim manual in a manner which the employee is able to understand.

(2) The employer shall assure that each employee demonstrates and maintains the ability to service rim wheels safely, including performance of the following tasks:

(i) Demounting of tires (including deflation);

(ii) Inspection and identification of the rim wheel components;

(iii) Mounting of tires (including inflation with a restraining device or other safeguard required by this section);

(iv) Use of the restraining device or barrier, and other equipment required by this section;

(v) Handling of rim wheels;

(vi) Inflation of the tire when a single piece rim wheel is mounted on a vehicle;

(vii) An understanding of the necessity of standing outside the trajectory both during inflation of the tire and during inspection of the rim wheel following inflation; and

(viii) Installation and removal of rim wheels.

(3) The employer shall evaluate each employee's ability to perform these tasks and to service rim wheels safely, and shall provide additional training as necessary to assure that each employee maintains his or her proficiency.

(d) Tire servicing equipment.

(1) The employer shall furnish a restraining device for inflating tires on multi-piece wheels.

(2) The employer shall provide a restraining device or barrier for inflating tires on single piece wheels unless the rim wheel will be bolted onto a vehicle during inflation.

(3) Restraining devices and barriers shall comply with the following requirements:

(i) Each restraining device or barrier shall have the capacity to withstand the maximum force that would be transferred to it during a rim wheel separation occurring at 150 percent of the maximum tire specification pressure for the type of rim wheel being serviced.

(ii) Restraining devices and barriers shall be capable of preventing the rim wheel components from being thrown outside or beyond the device or barrier for any rim wheel positioned within or behind the device;

(iii) Restraining devices and barriers shall be visually inspected prior to each day's use and after any separation of the rim wheel components or sudden release of contained air. Any restraining device or barrier exhibiting damage such as the following defects shall be immediately removed from service:

(A) Cracks at welds;

(B) Cracked or broken components;

(C) Bent or sprung components caused by mishandling, abuse, tire explosion or rim wheel separation;

(D) Pitting of components due to corrosion; or

(E) Other structural damage which would decrease its effectiveness.

(iv) Restraining devices or barriers removed from service shall not be returned to service until they are repaired and reinspected. Restraining devices or barriers requiring structural repair such as component replacement or rewelding shall not be returned to service until they are certified by either the manufacturer or a Registered Professional Engineer as meeting the strength requirements of paragraph (d)(3)(i) of this section.

(4) The employer shall furnish and assure that an air line assembly consisting of the following components be used for inflating tires:

(i) A clip-on chuck;

(ii) An in-line valve with a pressure gauge or a presettable regulator; and

(iii) A sufficient length of hose between the clip-on chuck and the in-line valve (if one is used) to allow the employee to stand outside the trajectory.

(5) Current charts or rim manuals containing instructions for the type of wheels being serviced shall be available in the service area.

(6) The employer shall furnish and assure that only tools recommended in the rim manual for the type of wheel being serviced are used to service rim wheels.

(e) Wheel component acceptability.

(1) Multi-piece wheel components shall not be interchanged except as provided in the charts or in the applicable rim manual.

(2) Multi-piece wheel components and single piece wheels shall be inspected prior to assembly. Any wheel or wheel component which is bent out of shape, pitted from corrosion, broken, or cracked shall not be used and shall be marked or tagged unserviceable and removed from the service area. Damaged or leaky valves shall be replaced.

(3) Rim flanges, rim gutters, rings, bead seating surfaces and the bead areas of tires shall be free of any dirt, surface rust, scale or loose or flaked rubber build-up prior to mounting and inflation.

(4) The size (bead diameter and tire/wheel widths) and type of both the tire and the wheel shall be checked for compatibility prior to assembly of the rim wheel.

(f) Safe operating procedure - multi-piece rim wheels.

The employer shall establish a safe operating procedure for servicing multi-piece rim wheels and shall assure that employees are instructed in and follow that procedure. The procedure shall include at least the following elements:

(1) Tires shall be completely deflated before demounting by removal of the valve core.

(2) Tires shall be completely deflated by removing the valve core before a rim wheel is removed from the axle in either of the following situations:

(i) When the tire has been driven underinflated at 80% or less of its recommended pressure, or

(ii) When there is obvious or suspected damage to the tire or wheel components.

(3) Rubber lubricant shall be applied to bead and rim mating surfaces during assembly of the wheel and inflation of the tire, unless the tire or wheel manufacturer recommends against it.

(4) If a tire on a vehicle is underinflated but has more than 80% of the recommended pressure, the tire may be inflated while the rim wheel is on the vehicle provided remote control inflation equipment is used, and no employees remain in the trajectory during inflation.

(5) Tires shall be inflated outside a restraining device only to a pressure sufficient to force the tire bead onto the rim ledge and create an airtight seal with the tire and bead.

(6) Whenever a rim wheel is in a restraining device the employee shall not rest or lean any part of his body or equipment on or against the restraining device.

(7) After tire inflation, the tire and wheel components shall be inspected while still within the restraining device to make sure that they are properly seated and locked. If further adjustment to the tire or wheel components is necessary, the tire shall be deflated by removal of the valve core before the adjustment is made.

(8) No attempt shall be made to correct the seating of side and lock rings by hammering, striking or forcing the components while the tire is pressurized.

(9) Cracked, broken, bent or otherwise damaged rim components shall not be reworked, welded, brazed, or otherwise heated.

(10) Whenever multi-piece rim wheels are being handled, employees shall stay out of the trajectory unless the employer can demonstrate that performance of the servicing makes the employee's presence in the trajectory necessary.

(11) No heat shall be applied to a multi-piece wheel or wheel component.

(f) Safe operating procedure - single piece rim wheels.

The employer shall establish a safe operating procedure for servicing single piece rim wheels and shall assure that employees are instructed in and follow that procedure. The procedure shall include at least the following elements:

(1) Tires shall be completely deflated by removal of the valve core before demounting.

(2) Mounting and demounting of the tire shall be done only from the narrow ledge side of the wheel. Care shall be taken to avoid damaging the tire beads while mounting tires on wheels. Tires shall be mounted only on compatible wheels of matching bead diameter and width.

(3) Nonflammable rubber lubricant shall be applied to bead and wheel mating surfaces before assembly of the rim wheel, unless the tire or wheel manufacturer recommends against the use of any rubber lubricant.

(4) If a tire changing machine is used, the tire shall be inflated only to the minimum pressure necessary to force the tire bead onto the rim ledge while on the tire changing machine.

(5) If a bead expander is used, it shall be removed before the valve core is installed and as soon as the rim wheel becomes airtight (the tire bead slips onto the bead seat).

(6) Tires may be inflated only when contained within a restraining device, positioned behind a barrier or bolted on the vehicle with the lug nuts fully tightened.

(7) Tires shall not be inflated when any flat, solid surface is in the trajectory and within one foot of the sidewall.

(8) Employees shall stay out of the trajectory when inflating a tire.

(9) Tires shall not be inflated to more than the inflation pressure stamped in the sidewall unless a higher pressure is recommended by the manufacturer.

(10) Tires shall not be inflated above the maximum pressure recommended by the manufacturer to seat the tire bead firmly against the rim flange.

(11) No heat shall be applied to a single piece wheel.

(12) Cracked, broken, bent, or otherwise damaged wheels shall not be reworked, welded, brazed, or otherwise heated.

[GRAPHIC] [TIFF OMITTED] TC27OC91.036

Appendix B - Ordering Information for NHTSA Charts

OSHA has printed two charts entitled ``Demounting and Mounting Procedures for Truck/Bus Tires'' and ``Multi-piece Rim Matching Chart,'' as part of a continuing campaign to reduce accidents among employees who service large vehicle rim wheels.

Reprints of the charts are available through the Occupational Safety and Health Administration (OSHA) Area and Regional Offices. The address and telephone number of the nearest OSHA office can be obtained by looking in the local telephone directory under U.S. Government, U.S. Department of Labor, Occupational Safety and Health Administration.

Single copies are available without charge.

Individuals, establishments and other organizations desiring single or multiple copies of these charts may order them from the OSHA Publications Office, U.S. Department of Labor, Room N-3101, Washington, DC 20210, Telephone (202) 219-4667.

[49 FR 4350, Feb. 3, 1984, as amended at 52 FR 36026, Sept. 25, 1987; 53 FR 34737, Sept. 8, 1988; 61 FR 9239, Mar. 7, 1996]

8 Glossary of Common Terms

Glossary of Common Terms

8-1

1/2 DUAL SPACING - One half the distance between the two center lines of dualed wheels. The dimension is the same as the OUTSET dimension.

2-PIECE FLANGE NUT - A two-piece washer and nut combination used to secure hub piloted wheels.

AIR CHAMBER - The space enclosed by a tire and wheel rim or inner tube.

BEAD SEAT - The area along the outer edges of the rim where the mounted tire and rim are in contact.

BOLT CIRCLE - The circle defined by the centers of the bolt holes (stud holes) of a wheel, dimensions stated in diameter inches or millimeters.

BOLT HOLE - Hole found in the disc of the wheel through which the bolt (stud) passes.

BORE - See "HUB BORE."

CENTER BORE - See "HUB BORE."

CONE LOCK CAP NUT - See "2-PIECE FLANGE NUT."

DC - Abbreviation for drop center.

DISC AREA - The vertical wheel face which supports the rim.

DISC WHEEL - A one-piece (forged) or two-piece (welded) assembly of a disc and a rim.

DROP CENTER - The well or center portion of the wheel rim.

FLAT BASE WHEEL - A multi-piece wheel with a removable side ring.

FOOT-POUNDS - The measure of the amount of torque applied to a cap nut or other part. May be measured with a torque wrench.

GUTTER FLANGE - A groove which supports the removable portion of a multi-piece wheel.

HUB BORE - The center hole of a disc wheel, dimensions stated in diameter inches or millimeters.

HUB PILOTED MOUNTING - A wheel mounting system which uses the hub to center the wheel and two-piece flange nuts to secure it.

in. - Abbreviation for inches.

INNER CAP NUT - Cap nut used to mount the inner wheel in a dualed stud located wheel system.

INSET - The distance from the wheel mounting surface to the rim centerline when the centerline is placed inboard of the mounting surface.

kg - Abbreviation for kilogram (weight measurement), equal to 1000 grams.

kPa - Abbreviation for kilo Pascals (pressure measurement).

Glossary of Common Terms (continued)

LOCK RING - The third piece of a three rim assembly which positions and supports the side ring to the rim base.

MAXIMUM INFLATION - The highest amount of air pressure allowed, measured at normal ambient temperatures.

mm - Abbreviation for millimeters.

MULTI-PIECE WHEEL - A wheel assembly in which the rim portion of the wheel consists of two or more separate parts.

OFFSET - See "OUTSET."

OPEN SIDE - The side of the wheel opposite the disc face.

OSHA - Abbreviation for the U.S. Department of Labor, Occupational Health and Safety Administration.

OUTER CAP NUT - A cap nut used to secure the outer stud located wheel in a dualed wheel pair and thread onto the inner cap nut.

OUTSET - The distance from the mounting surface of the wheel to the rim centerline when the rim centerline is mounted outboard of the hub face. This dimension is the same as the 1/2 DUAL SPACING dimension.

PILOT PAD - The raised surfaces on a hub used to center a hub piloted wheel.

PSI - Abbreviation for pounds per square inch.

REVERSIBLE - Term applied to a disc wheel which can be reversed on the hub without changing the position of the tire centerline.

RIM CENTERLINE - A line to the radial axis of the wheel running through the mid point between the rim flanges.

RIM FLANGE - That portion of the rim which extends above the rim surface which retains the tire bead.

RIM - That portion of the wheel which supports the tire.

SIDE RING - A removable piece of a multi-piece wheel assembly which provides lateral support for one tire bead.

SINGLE CAP NUT - A cap nut used to secure single wheels or outer dual wheels.

STUD - A threaded bolt extending from the hub surface to which the wheels are secured by the cap nuts.

STUD LOCATED, BALL SEAT MOUNTING - A wheel mounting system which uses the studs and spherical ball seat cap nuts to center and secure the wheel.

TIRE BEAD - That surface of the tire which contacts the angled surface of the wheel rim.

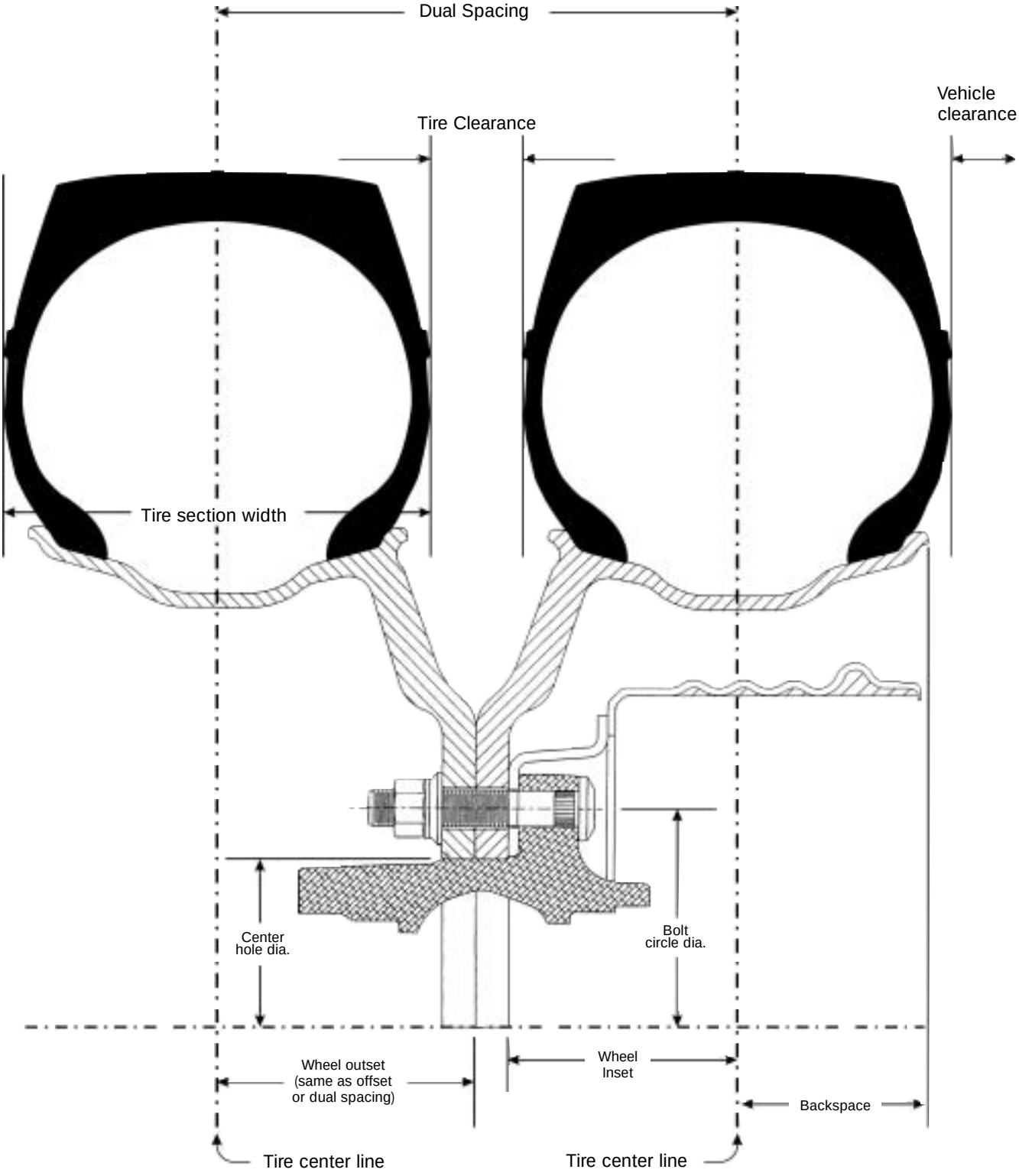
TORQUE - The amount of force used to tighten cap nuts. Usually stated in foot-pounds or kilograms and measured with a torque wrench.

WHEEL MOUNTING FACE - That portion of the wheel face which contacts the hub or brake drum.

wt. - Abbreviation for weight.

How to measure minimum dual spacing

Minimum dual spacing measurement is determined by the tire manufacturer and may be obtained from the tire manufacturer's handbook. To determine if the Alcoa aluminum dual wheel assembly has adequate minimum dual spacing for the selected tires, double the wheel outset measurement of the Alcoa wheel used. If the doubled outset measurement is equal to or greater than the tire manufacturer's recommendation, there will be sufficient minimum dual spacing. Wheel inset and outset is given for each Alcoa wheel on pages 2 and 3. Both inset and outset wheels are measured from the mounting surface of the wheel to the center line of the rim. Maintaining proper tire inflation and load ratings are essential to maintaining proper minimum dual spacing.



9 Conversion Tables

Inch Fraction, Decimal and Millimeter Equivalents Chart (Up to 1 inch)

9-1

Inches	Decimals	Millimeters
1/64	0.0156	0.3969
1/32	0.0313	0.7938
3/64	0.0469	01.1906
1/16	0.0625	1.5875
5/64	0.0781	1.9844
3/32	0.0938	2.3813
7/64	0.1094	2.7781
1/8	**0.1250**	**3.1750**
9/64	0.1406	3.5719
5/32	0.1563	3.9688
11/64	0.1719	4.3656
3/16	0.1875	4.7625
13/64	0.2031	5.1594
7/32	0.2188	5.5563
15/64	0.2344	5.9531
1/4	**0.2500**	**6.3500**
17/64	0.2656	6.7469
9/32	0.2813	7.1438
19/64	0.2969	7.5406
5/16	0.3125	7.9375
21/64	0.3281	8.3344
11/32	0.3438	8.7313
23/64	0.3594	9.1281
3/8	**0.3750**	**9.5250**
25/64	0.3906	9.9219
13/32	0.4063	10.3188
27/64	0.4219	10.7156
7/16	0.4375	11.1125
29/64	0.4531	11.5094
15/32	0.4688	11.9063
31/64	0.4844	12.3031
1/2	**0.5000**	**12.7000**

Inches	Decimals	Millimeters
33/64	0.5156	13.0969
17/32	0.5313	13.4938
35/64	0.5469	13.8906
9/16	0.5625	14.2875
37/64	0.5781	14.6844
19/32	0.5938	15.0813
39/64	0.6094	15.4781
5/8	**0.6250**	**15.8750**
41/64	0.6406	16.2719
21/32	0.6563	16.6688
43/64	0.6719	17.0656
11/16	0.6875	17.4625
45/64	0.7031	17.8594
23/32	0.7188	18.2563
47/64	0.7344	18.6531
3/4	**0.7500**	**19.0500**
49/64	0.7656	19.4469
25/32	0.7813	19.8438
51/64	0.7969	20.2406
13/16	0.8125	20.6375
53/64	0.8281	21.0344
27/32	0.8438	21.4313
55/64	0.8594	21.8281
7/8	**0.8750**	**22.2250**
57/64	0.8906	22.6219
29/32	0.9063	23.0188
59/64	0.9219	23.4156
15/16	0.9375	23.8125
61/64	0.9531	24.2094
31/32	0.9688	24.6063
63/64	0.9844	25.0031
1	**1.000**	**25.4000**

Conversion Factors

9-2

Inches to Millimeters

Inches	x	25.4	=	Millimeters

Millimeters to Inches

Millimeters	x	0.03937	=	Inches

PSI to kPa

PSI	x	6.8948	=	kPa

kPa to PSI

kPa	x	0.145	=	PSI

Pounds to Kilograms

Pounds	x	0.4536	=	kg

Kilograms to Pounds

kg	x	2.2050	=	Pounds

Foot-pounds to Kilogram Meters

Ft-lbs	x	0.13826	=	kgm

Kilogram Meters to Foot-pounds

kgm	x	7.23	=	Ft-lbs

Alcoa Wheel and Forged Products
1600 Harvard Avenue
Cleveland, Ohio 44105
(800) 242-9898

www.alcoawheels.com

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