

# GENERAL INFORMATION INDEX

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## PUBLICATIONS FOR DRAFTING AND COMPONENT STANDARDS

- Metric Dimensioning and Tolerances – ANSI Y14.5 2009
- Metric Limits and Fits – ANSI B4.2 1978
- Units and Metric/U.S. Customary Conversion – NAAMS, Pages GEN-4, 5, 6 and 7
- DIN 74 Form K SCR.: C' BORE
- Dowels – ISO-8735 1987
- Preferred Numbers – ISO 497 1973 R'10 Series
- Letter and Geometric Symbol References – ANSI Y10, Y32 Series
- Single Rod Cylinders – ISO 6431, ISO 3320 1992
- Cylinder Rod Envelope and Mounting Specifications – VDMA 24 562 1992
- Cylinder Rod Thread Specifications – DIN ISO 4395 1985

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# CONTACTS FOR STANDARDS

Copies of referenced standards are available from the following sources:

## **ANSI**

American National Standards Institute  
25 West 43rd Street, 4th floor  
New York, NY 10036-7417

Phone: (212) 642-4900

FAX: (212) 398-0023

## **ISO**

American National Standards Institute  
25 West 43rd Street, 4th floor  
New York, NY 10036-7417

Phone: (212) 642-4900

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10787 Berlin

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## **VDMA**

VDMA  
P.O. Box 710864  
D-60498 Frankfurt, Germany  
Attn.: Mr Brodmann

Phone: 011-49-69-660-3252

FAX: 001-49-69-660-3816

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# METRIC EQUIVALENT CHART (1 OF 2)

## METRIC/U.S. CUSTOMARY UNIT EQUIVALENTS

Multiply: by: to get: | Multiply: by: to get:

### LINEAR

inches	X 25.40	= millimetres (mm)	X 0.03937	= inches
feet	X 0.3048	= metres (m)	X 3.281	= feet
yards	X 0.9144	= metres (m)	X 1.0936	= yards
miles	X 1.6093	= kilometres (km)	X 0.6214	= miles
inches	X 2.540	= centimetres (cm)	X 0.3937	= inches
microinches	X 0.0254	= micrometres (µm)	X 39.37	= microinches

### AREA

inches <sup>2</sup>	X 645.16	= millimetres <sup>2</sup> (mm <sup>2</sup> )	X 0.00155	= inches <sup>2</sup>
inches <sup>2</sup>	X 6.452	= centimetres <sup>2</sup> (cm <sup>2</sup> )	X 0.155	= inches <sup>2</sup>
feet <sup>2</sup>	X 0.0929	= metres <sup>2</sup> (m <sup>2</sup> )	X 10.764	= feet <sup>2</sup>
yards <sup>2</sup>	X 0.8361	= metres <sup>2</sup> (m <sup>2</sup> )	X 1.196	= yards <sup>2</sup>
acres	X 0.4047	= hectares (10 <sup>4</sup> m <sup>2</sup> ) or (ha)	X 2.471	= acres
miles <sup>2</sup>	X 2.590	= kilometres <sup>2</sup> (km <sup>2</sup> )	X 0.3861	= miles <sup>2</sup>

### VOLUME

inches <sup>3</sup>	X 16387	= millimetres <sup>3</sup> (mm <sup>3</sup> )	X 0.000061	= inches <sup>3</sup>
inches <sup>3</sup>	X 16.387	= centimetres <sup>3</sup> (cm <sup>3</sup> )	X 0.06102	= inches <sup>3</sup>
inches <sup>3</sup>	X 0.01639	= litres (L)	X 61.024	= inches <sup>3</sup>
quarts	X 0.94635	= litres (L)	X 1.0567	= quarts
gallons	X 3.7854	= litres (L)	X 0.2642	= gallons
feet <sup>3</sup>	X 28.317	= litres (L)	X 0.03531	= feet <sup>3</sup>
feet <sup>3</sup>	X 0.02832	= metres <sup>3</sup> (m <sup>3</sup> )	X 35.315	= feet <sup>3</sup>
fluid oz	X 29.57	= millilitres (mL)	X 0.03381	= fluid oz
yards <sup>3</sup>	X 0.7646	= metres <sup>3</sup> (m <sup>3</sup> )	X 1.3080	= yards <sup>3</sup>
teaspoons	X 4.929	= millilitres (mL)	X 0.2029	= teaspoons
cups	X 0.2366	= litres (L)	X 4.227	= cups

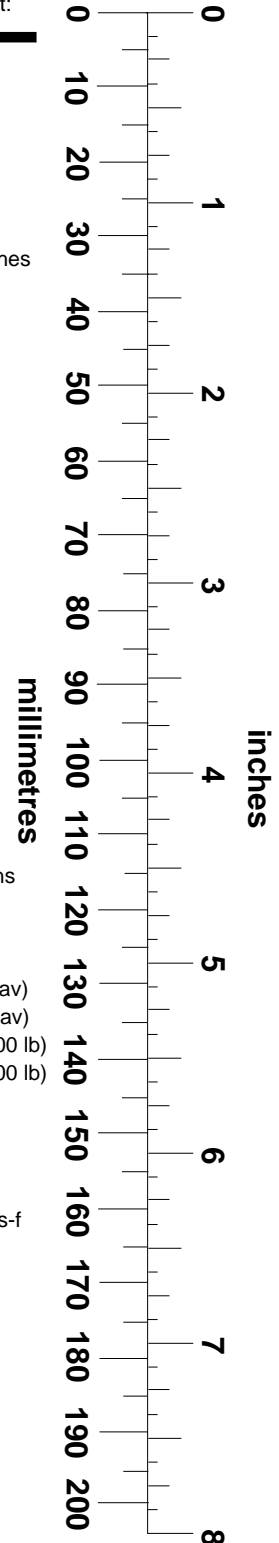
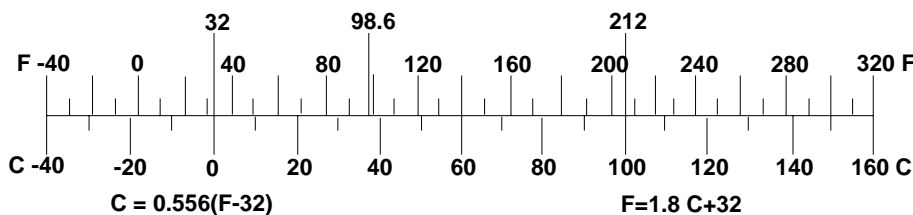
### MASS

ounces (av)	X 28.35	= grams (g)	X 0.03527	= ounces (av)
pounds (av)	X 0.4536	= kilograms (kg)	X 2.2046	= pounds (av)
tons (2000 lb)	X 907.18	= kilograms (kg)	X 0.001102	= tons (2000 lb)
tons (2000 lb)	X 0.90718	= metric tons (t)	X 1.1023	= tons (2000 lb)

### FORCE

ounces-f	X 0.278	= newtons (N)	X 3.597	= ounces-f
pounds-f	X 4.448	= newtons (N)	X 0.2248	= pounds-f
kilograms-f	X 9.807	= newtons (N)	X 0.10197	= kilograms-f

### TEMPERATURE



# METRIC EQUIVALENT CHART (2 OF 2)

## METRIC/U.S. CUSTOMARY UNIT EQUIVALENTS

Multiply: \_\_\_\_\_ by: \_\_\_\_\_ to get: \_\_\_\_\_ | Multiply \_\_\_\_\_ by: \_\_\_\_\_ to get: \_\_\_\_\_

### ACCELERATION (Standard gravity = 9.807 m/s<sup>2</sup>)

feet/sec <sup>2</sup>	X 0.3048	=metres/sec <sup>2</sup> (m/s <sup>2</sup> )	X 3.281	= feet/sec <sup>2</sup>
inches/sec <sup>2</sup>	X 0.0254	=metres/sec <sup>2</sup> (m/s <sup>2</sup> )	X 39.37	= inches/sec <sup>2</sup>

### ENERGY OR WORK (watt-second = joule = newton-metre)

foot-pounds	X 1.3558	= joules (J)	X 0.7376	= foot-pounds
pounds calories (heat)	X 4.187	= joules (J)	X 0.2388	= calories
(int'l)				
Btu (int'l)	X 1055	= joules (J)	X 0.000948	= Btu (int'l)
watt-hours	X 3600	= joules (J)	X 0.0002778	= watt-hours
hours				
kilowatt-hours	X 3.600	= megajoules (MJ)	X 0.2778	= kilowatt-hours

### PRESSURE OR STRESS (newton/sq metre = pascal)

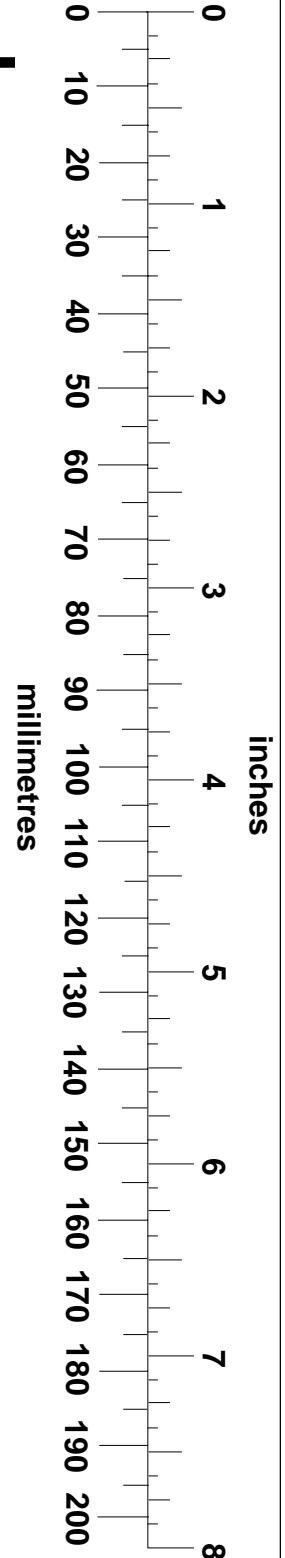
inches Hg(60°F)	X 3.377	= kilopascals (kPa)	X 0.2961	= inches Hg
pounds/sq in	X 6.895	= kilopascals (kPa)	X 0.145	= pounds/sq in
sq in				
pounds/sq in	X .06895	= Bars	X 14.504	= pounds/sq in
sq in				
inches H <sub>2</sub> O(60°F)	X 0.2488	= kilopascals (kPa)	X 4.0193	= inches H <sub>2</sub> O
H <sub>2</sub> O				
bars	X 100	= kilopascals (kPa)	X 0.01	= bars
pounds/sq ft	X 47.88	= pascals (Pa)	X 0.02088	= pounds/sq ft
sq ft				
kgf/cm <sup>2</sup>	X 98.07	= kilopascals (kPa)	X 0.010197	= kgf/cm <sup>2</sup>

### POWER

horsepower	X 0.746	= kilowatts (kW)	X 1.34	= horsepower
power				
ft-lbf/min	X 0.0226	= watts (W)	X 44.25	= ft-lbf/min

### TORQUE

pound-inches	X 0.11298	= newton-metres (Nm)	X 8.851	= pound-inches
inches				
pound-feet	X 1.3558	= newton-metres (Nm)	X 0.7376	= pound-feet
feet				
kgf-cm	X 0.09807	= newton-metres (Nm)	X 10.197	= kgf-cm
kgf-m	X 9.807	= newton-metres (Nm)	X 0.10197	= kgf-m



# SELECTED RULES FOR COMMUNICATING IN THE SI METRIC SYSTEM

**Examples:**

**APPLICATION OF PREFIXES**

1. Approved prefixes (instead of powers of ten) should be used to indicate orders of magnitude.
2. Prefixes must be combined with units and not used alone
3. Avoid using multiple prefixes.
4. Avoid mixing prefixes within a text of drawing.
5. Choose prefixes representing steps of 1000.
6. Choose prefixes giving numerical values of 0.1 through 1000.

	<b>CORRECT</b>	<b>INCORRECT</b>
	12.3 km	12.3x10 <sup>3</sup> m
	kilogram	kilo
	pF	μμF
10mm <input type="text"/>	1000 mm	100 cm
	mN,N,kN	
	3.94 mm	0.003 94 m

**PUNCTUATION**

1. The decimal sign is the dot on the line.
2. Periods should not be used after symbols for SI units except at the end of a sentence.
3. Separate symbols from numerical values by a space

25.26	25,26 or 25 26
ms	m.s or ms.
21 m	21m

**SPELLING AND CAPITALIZATION**

1. Names of SI units and prefixes are not capitalized except at the beginning of a sentence.  
(Exceptions: See items 2 and 3 below.)
2. Symbols for SI units derived from proper names have the first letter capitalized; symbols for other units are lower case  
(Except L for litre).
3. Symbols for prefixes are not capitalized except for T, G and M.
4. Symbols for units and prefixes are always written in singular form.
5. Place the symbol for a prefix immediately before the unit which it modifies.
6. Avoid hand-drawn Greek letters ( Ω , μ , etc.); Spell out words where possible.

metre	Metre
kilo-----	Kilo-----
Pa, J	pa, j
cd	Cd
m (for milli)	
M (for mega)	
10 metres=10 m	10 metres=10 ms
km	k m
microsecond for μs	
ohm for Ω	

**OTHER USAGE CONVENTIONS**

1. Express metric figures with one digit on either side of the decimal point.
  - a. For whole numbers, where a decimal is used it should be followed by a zero.
  - b. When the value is less than unity, the decimal should be preceded by a zero.
2. Numbers having four or more digits should be placed in groups of three separated by a space; do not use commas (some countries use a comma for the decimal point). For four digits, the space is optional.
3. Avoid mixing customary units and SI units.
4. When expressing compound units in symbolic form, use nothing between the units or a raised dot to indicate the product. Do not use an "x".

25.0 kg or 25 kg	25. kg
0.25 kg	.25 kg
11 532	11,532
1532	1,532
kg/m <sup>3</sup>	kg/ft <sup>3</sup>
mkg/m•kg	m x kg

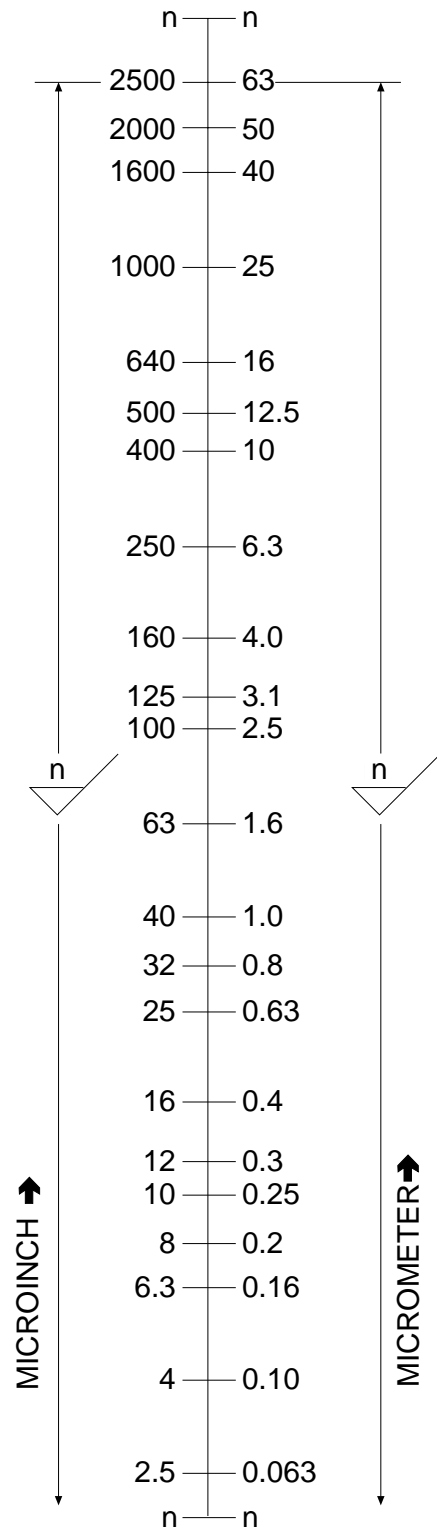
# SURFACE ROUGHNESS CONVERSION

Absolute surface roughness is indefinite; therefore surface roughness, whether measured by the method of arithmetic average or by root mean squared average (RMS), will be considered equivalent.

1 micrometer ( $\mu\text{m}$ )  $\cong$  40 microinches ( $\mu\text{ in.}$ )

1 microinch = 0.000 001 in

1 micrometer = 0.001mm



# COMPONENT IDENTIFICATION, PAGE FORMATTING, LOGSHEET

## COMPONENT IDENTIFICATION

Each part to be marked with the manufacturers identification and NAAMS code where possible.

## PAGE FORMATTING

In the previous published version of these standards, odd numbered (right hand) pages were offset to the right and even numbered (left hand) pages offset to the left to allow for binding. The pages are now centered. This format allows the pages to be punched in the left margin for insertion into a ring binder. Changes since the original publication are indicated by capital letters placed in boxes in the right hand margins. The latest revision date is indicated in the title block of each page.

## LOGSHEET

The logsheet allows the user to determine the latest change to any standard by referring to the date in the last column. Individual pages are accessed by clicking onto the page number in the first column. The change level (A, B, etc.) and a brief description of each change are listed in their respective columns for each page.

## SAFETY COLOR PAINT SPECIFICATIONS

The following safety paint colors are in accordance with SAE\USCAR-9 paint specifications, and are the recommended colors for NAAMS components where safety paint is specified.

<u>Color</u>	<u>Munsell Number</u>
Safety Black	N 0.75
Safety Blue	2.5PB 3/10
Safety Green	7.5G 4/8
Safety Orange	3.75YR 6/14
Safety Purple	10P 5/10
Safety Red	7.5R 4/14
Safety White	N 9.5
Safety Yellow	3.75Y 8.5/12

A

B



# NAAMS SEARCH FUNCTIONS

GLOBAL STANDARD COMPONENTS



Assembly

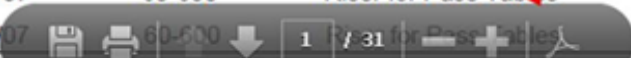
04/30/15

NAAMS documentation is published in PDF format.

Search Functions are executed utilizing the core functionality that comes with Adobe software.

RISER ANGLE BRACKETS COMPONENTS INDEX		GLOBAL STANDARD COMPONENTS NAAMS Assembly 08/13/07	
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<a href="#">E-3</a>	08/18/03	450-800 mm	Maximum Recommended Loads
<a href="#">E-4</a>	08/13/07	100-400 mm	Riser Angle Bracket
<a href="#">E-4.1</a>	09/24/04	100-400 mm	Riser Angle Bracket
<a href="#">E-5</a>	08/13/07	100-800 mm	Riser Angle Bracket
<a href="#">E-6</a>	09/24/04	100-800 mm	Riser Angle Bracket
<a href="#">E-7</a>	08/13/07	100-400 mm	Riser Angle Bracket
<a href="#">E-8</a>	08/13/07	100-400 mm	Riser Angle Bracket
<a href="#">E-9</a>	08/13/07	450-800 mm	Riser Angle Bracket
<a href="#">E-10</a>	09/24/04	450-800 mm	Riser Angle Bracket
<a href="#">E-11</a>	08/13/07	---	Riser Angle Bracket
<a href="#">E-12</a>	08/13/07	150-500 mm	Stack Riser
<a href="#">E-13</a>	08/13/07	400&800 mm	Stack Riser
<a href="#">E-14</a>	03/01/99	---	Maximum Recommended Loads
<a href="#">E-15</a>	08/18/03	300-500 mm	Maximum Recommended Loads
<a href="#">E-16</a>	08/18/03	550-750 mm	Maximum Recommended Loads
<a href="#">E-17</a>	08/18/03	800-1400 mm	Maximum Recommended Loads
<a href="#">E-18</a>	08/18/03	1450-1600 mm	Maximum Recommended Loads
<a href="#">E-19</a>	08/13/07	---	Tubular Riser Construction
<a href="#">E-20</a>	07/15/03		
<a href="#">E-21</a>	07/15/03		
<a href="#">E-22</a>	09/24/04		
<a href="#">E-23</a>	07/15/03		Maximum Recommended Loads
<a href="#">E-24</a>	10/06/03	850-1600	Tubular Riser Maximum Recommended Loads
<a href="#">E-25</a>	08/13/07	100-400	Riser Angle Bracket - Aluminum
<a href="#">E-26</a>	08/01/03	100-400	Riser Angle Bracket - Aluminum
<a href="#">E-27</a>	08/01/03	100-400	Maximum Recommended Loads
<a href="#">E-28</a>	08/01/03	100-400	Maximum Recommended Loads
<a href="#">E-29</a>	07/09/07	60-600	Riser for Pass Tables
<a href="#">E-30</a>	05/08/07		

**ACTIVATE ADOBE SEARCH FUNCTION BY SELECTING THIS ICON (SEE NEXT PAGE)**



# NAAMS SEARCH FUNCTIONS

GLOBAL STANDARD COMPONENTS



Assembly

04/30/15

ONCE THE TOOLBAR IS ACTIVATED, USE THE BINOCULAR ICON TOOL TO SEARCH FOR NAAMS CODES.

www.naamsstandards.org

www.naamsstandards.org/Standards/chapters/assembly/E.pdf

5 / 31 80.4%

Search

What word or phrase would you like to search for?

**AAB200**

Whole words only  
 Case-Sensitive  
 Include Bookmarks  
 Include Comments

Search

Show More Options

Find a word in the.

**RISER ANGLE BRACKETS COMPONENTS INDEX**

GLOBAL STANDARD COMPONENTS  
**NAAMS**  
Assembly 08/13/07

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<a href="#">E-3</a>	08/18/03	450-800 mm	Maximum Recommended Loads
<a href="#">E-4</a>	08/13/07	100-400 mm	Riser Angle Bracket
<a href="#">E-4.1</a>	09/24/04	100-400 mm	Riser Angle Bracket
<a href="#">E-5</a>	08/13/07	100-800 mm	Riser Angle Bracket
<a href="#">E-6</a>	09/24/04	100-800 mm	Riser Angle Bracket
<a href="#">E-7</a>	08/13/07	100-400 mm	Riser Angle Bracket
<a href="#">E-8</a>	08/13/07	100-400 mm	Riser Angle Bracket
<a href="#">E-9</a>	08/13/07	450-800 mm	Riser Angle Bracket
<a href="#">E-10</a>	09/24/04	450-800 mm	Riser Angle Bracket
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<a href="#">E-12</a>	08/13/07	150-500 mm	Stack Riser
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<a href="#">E-14</a>	03/01/99	---	Maximum Recommended Loads
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<a href="#">E-19</a>	08/13/07	---	Tubular Riser Construction
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<a href="#">E-23</a>	07/15/03	---	Tubular Riser Maximum Recommended Loads
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<a href="#">E-26</a>	08/01/03	100-400	Riser Angle Bracket - Aluminum
<a href="#">E-27</a>	08/01/03	100-400	Maximum Recommended Loads
<a href="#">E-28</a>	08/01/03	100-400	Maximum Recommended Loads
<a href="#">E-29</a>	07/09/07	60-600	Riser for Pass Tables
<a href="#">E-30</a>	05/08/07	60-600	Riser for Pass Tables

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# FREQUENTLY ASKED QUESTIONS

## FREQUENTLY ASKED QUESTIONS:

Q: I HAVE A NAAMS CODE AND CANNOT LOCATE IT ON THE WEB SITE. DOES THIS NUMBER EXIST?

A: USE THE SEARCH FUNCTION AS DEFINED ON THE SHEETS GEN - 9 AND GEN - 10 ON ALL CHAPTERS THAT MAY CONTAIN THE COMPONENT. IF THE NUMBER CAN NOT BE LOACTED ON THE WEB SITE, **IT DOES NOT EXIST.**

Q: IF A DISCONTINUED NAAMS CODE EXISTS ON THE WEBSITE, ARE THERE REPLACEMNET CODES?

A: WHEN NAAMS CODES ARE DISCONTINUED, THEY REMAIN ON THE WEB SITE FOR LEGACY TOOLING PURPOSES. DISCONTINUED COMPONENTS CAN STILL BE MANUFACTURED. A SIMILAR NEW PART MAY EXIST.

Q: SOME PARTS HAVE A "M" SUFFIX, WHILE OTHERS DO NOT. WHAT IS THE DIFFERENCE?

A: FOR THE PART CATEGORIES THAT HAVE INCH AND METRIC PARTS THE "M" SUFFIX SIGNIFIES THE PART IS A METRIC COMPONENT.

A