

**Manufacturer of Stainless Ornamental and Structural Tubing  
CERTIFICATION OF TEST**

Sold To: RYERSON  
6600 HIGHWAY 85

Ship To: RYERSON  
6600 HIGHWAY 85

COMMERCE CITY, CO 80022  
USA

COMMERCE CITY, CO 80022  
USA

CUSTOMER ORDER#: 4500785917

Phone# 2870101 Ext:

GUST REF NBR:

ORDER#: 413940

DATE SHIPPED: 12/2016

QTY SHIPPED: 500.0

SIZE: 2SQ X 11GA P180

GRADE: 304L WELD: TIG

SOURCE: USA

HEAT#: 231B

VENDOR: NAS

TEST REPORT#: TR013885

**Specification:**

**Report Date:** 12/13/16

ASTM A554-16  
ASTM A240-16  
AMS5511 HIAMS5513J

T304U304 DUAL CERTIFIED MT NO WELD REPAIR  
RAW MATERIAL SPEC. RoHS COMPLIANT  
UNS# 30400130403 AISI 304L

EN 10204 2.2  
NACE MR0175IMR0103

MERCURY IS NOT USED BY US ASAN ALLOYING MATERIAL NOR IS METALLIC MERCURY HANDLED IN THE VICINITY OF OUR PROCESSING LINES. MATERIAL IS FREE OF MERCURY CONTAMINATION.  
MFG USING ANNEALED AND PICKLED PLATE, SHEET, OR STRIP. MATERIAL IS FULL SOLUTION ANNEALED, AND SHOWS NO CONTINUOUS CARBID PRECIPITATION. MIN SOLUTION ANNEAL TEMP 1900F WATER QUENCHED

**Physical Analysis**

Hardness	YIELD		TENSILE		OTHER	
	PSI	MPA	PSI	MPA	Percent E L	Percent RA
FB 85	46310	NIA	46310	NIA	50	NIA

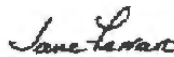
**Chemical Analysis**

C	MN	P	S	SI	CR	NI	MO	CU	CO	N2	TI
.017	1.73	.025	.010	.26	18.14	8.07	.31	.38	N/A	.08	N/A

THE CHEMICAL ANALYSES ARE CORRECT AS CONTAINED IN OUR CORPORATE RECORDS.  
PHYSICAL PROPERTIES ARE DETERMINED WHILE MATERIAL IS IN STRIP FORM.

THIS MATERIAL INCLUDING THE BILLETS, WAS  
Melted & MFG in USA DFARS 252.226 Subsection Compliant, FAR BAA, DFAR BAA, FAR TAA Complies

CERTIFIED BY Inventory Control Dept.



1185 WIN DR, BETHLEHEM, PA., 18017 - (610) 865-5337  
FAX NUMBER: 610-865-4073

Manufacturer of Stainless Ornamental and Structural Tubing  
**CERTIFICATION OF TEST**

Sold To: RYERSON  
 6600 HIGHWAY 85

Ship To: RYERSON  
 6600 HIGHWAY 85

COMMERCE CITY CO 80022  
 USA

COMMERCE CITY, CO 80022  
 USA

CUSTOMER ORDER#: 4500773720

Phone# 287D1D1 Ext:

CUST REF NBR: 100014711

ORDER#: 408454

DATE SHIPPED: 10/17/16

QTY SHIPPED: 176D.0

SIZE: 1.660RD X 9GA P180

GRADE: 304L WELD: TIG

SOURCE: USA

HEAT#: 008R

VENDOR: NAS

TEST REPORT#: TR013388

Report Date: 05/18/16

**Specification:**

ASTM A554-15A	T3D4U304 DUAL CERTIFIED MT NO WELD REPAIR
	RAW MATERIAL SPEC. RoHS COMPLIANT EN 10204 2.2
MFG USING	ANNEALED AND PICKLED PLATE, SHEET OR STRIP NACE MR0175/MR0103
ANNEALED, AND SHOWS NO	CONTINUOUS CARBIDE PRECIPITATION. MATERIAL IS FULL SOLUTION
19DOF WATER QUENCHED.	UNS# 30400 / 30403 AMS5511 H/AMS5513J MIN. SOLUTION ANNEAL TEMP

MERCURY IS NOT USED BY US AS AN ALLOYING MATERIAL NOR IS METALLIC MERCURY HANDLED IN THE VICINITY OF OUR PROCESSING LINES. MATERIAL IS FREE OF MERCURY CONTAMINATION.

**Chemical Analysis**

C	MN	P	S	SI	CR	NI	MO	CU	CO	N2	Ti
.02	1.87	.03	.011	.26	18.21	8.03	.34	.47	N/A	.38	N/A

**Physical Analysis**

Hardness	YIELD		TENSILE		OTHER	
	PSI	MPA	PSI	MPA	Percent EL	Percent RA
RB84	45530	N/A	91290	N/A	51	N/A

THE CHEMICAL ANALYSES ARE CORRECT AS CONTAINED IN OUR CORPORATE RECORDS.  
 PHYSICAL PROPERTIES ARE DETERMINED WHILE MATERIAL IS IN STRIP FORM.

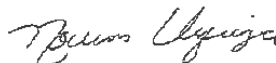
**Physical Analysis**

Hardness	YIELD		TENSILE		OTHER	
	PSI	MPA	PSI	MPA	Percent EL	Percent RA
RB 84	45530	N/A	91290	N/A	51	N/A

THE CHEMICAL ANALYSES ARE CORRECT AS CONTAINED IN OUR CORPORATE RECORDS.  
 PHYSICAL PROPERTIES ARE DETERMINED WHILE MATERIAL IS IN STRIP FORM.

THIS MATERIAL INCLUDING THE BILLETS, WAS  
 Melted & MFG in USA DFARS 252.225 Subsection Compliant, FAR BAA, DFAR BAA, FAR TAA Complies

CERTIFIED BY Inventory Control Dept.



1185 WIN DR, BETHLEHEM, PA., 18017 - (610) 895-5337  
 FAX NUMBER: 610-965-4073

Manufacturer of Stainless Ornamental and Structural  
Tubing

## CERTIFICATION OF TEST

**Sold To:** RYERSON  
6600 HIGHWAY 85

**Ship To:** RYERSON  
6600 HIGHWAY 85

COMMERCE CITY, CO 80022  
USA

COMMERCE CITY, CO 80022  
USA

CUSTOMER ORDER#: 4500795118

**Phone#** 2870101 Ext:

GUST REF NBR: 161001712

ORDER#: 417271

DATE SHIPPED: 03/02/17

QTY SHIPPED: 4240.0

SIZE: 2" X 1/4" HRAP

GRADE: 304L NO WELD: BAR

SOURCE: USA

HEAT#: 280N

VENDOR: NAS

**TEST REPORT#:** TR014013

**Report Date:** 02/06/17

**Specification:**

CHEMISTRY THIS COLUMN:	<b>RoHS Compliant</b>		QTY SHIPPED EQUALS LBS,
ASTM A276-16a	ASTMA262-14, PRACT/ E	ASTM A240-16a	TYPE 304/304L DUAL CERTIFIED
ASME SA276-13A COND. A	CORROSION OK, HRAP	ASME SA240-13	UNS# 30400 / 30403
<b>ASTM A479-16a</b>	ASTM A484-15	MILS 5059DAMEND 3	ASTM A666-15
ASME SA479/13	ASME SA484-13	AMS5511 J/AMS5513J	AMS-QQ-S-7630 CONDA
NO WELD REPAIR	ASTM A480-148	NACE MR0175/MR0103	QQ-S-766F, COND. A
EN 10204 2.2	ASME SA480-13	AMS 5639H / AMS 5647J	CHEMISTRY ONLY

MERCURY IS NOT USED BY US AS AN ALLOYING MATERIAL NOR IS METALLIC MERCURY HANDLED IN THE VICINITY OF OUR PROCESSING LINES. MATERIAL IS FREE OF MERCURY CONTAMINATION.  
MATERIAL HAS BEEN HEATED TO A MINIMUM OF 1900 DEG. F AND IS SUBSEQUENTLY COOLED RAPIDLY TO PREVENT CARBIDE PRECIPITATION, SOLUTION ANNEALED

**Chemical Analysis**

C	MN	P	S	SI	CR	NI	MO	CU	CO	N2	TI
.020	1.82	.029	.001	.21	18.15	8.07	.32	.45	NA	03	NA

**Physical Analysis**

Hardness	YIELD		TENSILE		OTHER	
	PSI	MPA	PSI	MPA	Percent EL	Percent RA
RB 84	46390	NA	90020	NA	50	54

THE CHEMICAL ANALYSES ARE CORRECT AS CONTAINED IN OUR CORPORATE RECORDS.  
PHYSICAL PROPERTIES ARE DETERMINED WHILE MATERIAL IS IN STRIP FORM.

Melted & MFG in USA DFARS 252.225 Subsection Compliant, FAR BAA, DFAR BAA, FAR TAA Complies

CERTIFIED BY Inventory Control Dept.



1185 WIN DR, BETHLEHEM, PA., 18017 - (610) 865-5337

FAX NUMBER: 610-865-4073

<b>Certificate:</b> 235095 10	<b>Mail To:</b>	<b>Ship To:</b>	<b>Date:</b> 11/04/2016 <b>Page:</b> 1
<b>Customer:</b> 000075 809	RYERSON, INC. 6600 HWY #85 COMMERCE CITY, CO 80022	RYERSON, INC. 6600 HWY #85 COMMERCE CITY, CO 80022	<b>Steel:</b> 304/304L
<b>Your Order:</b> 4500762135	<b>NAS Order:</b> P110072051 01		<b>Finish:</b> HRAP
			<b>Corrosion:</b> ASTM A262 Prac A/E OK

<b>PRODUCT DESCRIPTION :</b>	<b>REMARKS :</b>
Angle m-1S S30400/\$30403, EN10204 3.1 ASTM A276/15, ASTM A479/15 ASME SA479/13, SOLUTION ANNEAL TEMP 1900F MIN AMS QQS-763D, QQS-763F AMS 5639H, ALFS 5647J,	COMPLIES W/REQUIREMENTS OF DFAR 252,225 7009 EU DIRECTIVE 2011/65/EU, RoHS, EAF+AOD+CC, NO WELD REPAIR, MELTED AND MFG IN USA FREE FROM MERCURY AND LOW MELTING ALLOY CONTAMINATION

Product Id	Skid#	Thickness	Size	Weight	-----Length-----	Mark	Pieces	Commodity Code
VC5074 9		.1250	2.0000	1,736	252.00	2	1	160008422

Lab Accreditation Bureau, ISO/IEC 17025, Certificate# L2323

**CHEMICAL ANALYSIS** CM(Country of Melt) ES(Spain) US(United States) ZA(South Africa) JP(Jpat1) Chemical Analysis per ASTM A751/14a

HEAT	CM	C %	CO %	CR %	CU %	MN %	MO %	N %	NI %	P %
127K	US	.0176	.2305	18.4300	.3965	1.8190	.2960	.0837	8.0390	.0285
		S %	SX %							
		.0010	.2080							

**MECHANICAL PROPERTIES**

Product Id	l o c	d i r	HB No.	.2YS KSI	UTS KSI	RA %	Elong % 2"
VCS074 9	R	L	205.0	74.95	109.09	57.94	37.96

NAS hereby certifies that the analysis on this certification is correct. Based upon the results and the accuracy of the test methods used, the material meets the specifications stated. These results relate only to the items tested and this report cannot be reproduced, except in its entirety, without the written approval of NAS.

**Technical**  
Dept. Mgr.

**Manufacturer of Stainless Ornamental and Structural Tubing**  
**CERTIFICATION OF TEST**

Sold To: RYERSON  
1085 PEACE RD

Ship To: RYERSON  
1085 PEACE RD

DEKALB IL 60115  
USA

DEKALB IL 60115  
USA

CUSTOMER ORDER#: 4500777281

Phone# 7582100 Ext:

GUST REF NBR: 160010330

ORDER#: 410411

DATE SHIPPED: 11/21/16

QTY SHIPPED: 1000.0

SIZE: 1RD X 11GAAW

GRADE: 304L WELD: TIG

SOURCE: USA

HEAT#: 170T

VENDOR: NAS

TEST REPORT#: TR013805

Report Date: 10/12/16

**Specification:**

ASTM A554-15A

T304LI304 DUAL CERTIFIED MT NO WELD REPAIR

EN 10204 2.2

ASTM A240-16

RAW MATERIAL SPEC.

RoHS COMPLIANT

NACE MR0175/MR0103

AMS5511 HIAMS5513J

UNS# 30400 | 30403

AISI 304L

MERCURY IS NOT USED BY US AS AN ALLOYING MATERIAL NOR IS METALLIC MERCURY HANDLED IN THE VICINITY OF OUR PROCESSING LINES. MATERIAL IS FREE OF MERCURY CONTAMINATION.  
MFG USING ANNEALED AND PICKLED PLATE, SHEET, OR STRIP. MATERIAL IS FULL SOLUTION ANNEALED, AND SHOWS NO CONTINUOUS CARBID PRECIPITATION. MIN SOLUTION ANNEAL TEMP 1900F WATER QUENCHED

**Chemical Analysis**

C	MN	P	S	SI	CR	NI	MO	CU	CO	N2	TI
022	1.74	.035	.013	.21	18.21	8.02	.36	18.21	N/A	.08	N/A

**Physical Analysis**

Hardness	YIELD		TENSILE		OTHER	
	PSI	MPA	PSI	MPA	Percent EL	Percent RA
RB 86	44990	N/A	90760	N/A	52	N/A

THE CHEMICAL ANALYSES ARE CORRECT AS CONTAINED IN OUR CORPORATE RECORDS.  
PHYSICAL PROPERTIES ARE DETERMINED WHILE MATERIAL IS IN STRIP FORM.

THIS MATERIAL INCLUDING THE BILLETS, WAS

Melted & MFG in USA DFARS 252.225 Subsection Compliant, FAR BAA, DFAR BAA, FAR TAA Complies

CERTIFIED BY Inventory Control Dept.



1185 WIN DR, BETHLEHEM, PA., 18017 - (610) 865-6337

FAX NUMBER: 610-865-4073

Manufacturer of Stainless Ornamental and Structural Tubing  
**CERTIFICATION OF TEST**

**Sold To:** RYERSON  
 6600 HIGHWAY 85

**Ship To:** RYERSON  
 6600 HIGHWAY 85

COMMERCE CITY, CO 80022  
 USA

COMMERCE CITY, CO 80022  
 USA

CUSTOMER ORDER#: 4500760374

Phone# 2870101 Ext:

GUST REF NBR: 100010543

ORDER#: 402071

DATE SHIPPED: 07/06/16

QTY SHIPPED: 1095.0

SIZE: 2" X 112" HRAP

GRADE: 304L NOWELD: SAR

SOURCE: USA

HEAT#: 038L

VENDOR: NAS

TEST REPORT#: TR013475

Report Date: 06/20/16

**Specification:**

**CHEMISTRY THIS COLUMN:**

ASTM A276-16	ASTM A262-14, PRACT/ E	ASTM A240-15b
ASME SA276-13A COND. A	CORROSION OK, HRAP	ASME SA240-13
ASTMA479-16	ASTM A484-15	MILS 6059D AMEND 3
ASME SA479/13	ASME SA484-13	AMS5511 J/AMS5613J
NO WELD REPAIR	ASTM A480-14B	NACE MR0175/01 / MR0103
EN 102042.2	ASME SA 480-13	AMS 5639H /AMS 5647J

**RoHS Compliant**

TYPE 304U304 DUAL CERTIFIEC  
 UNS# 30400 / 30403  
 ASTM A666-15  
 AMS-QQ-S-763F CONDA  
 OQ-S-766D, COND. A  
 CHEMISTRY ONLY

MERCURY IS NOT USED BY US AS AN ALLOYING MATERIAL NOR IS METALLIC MERCURY HANDLED IN THE VICINITY OF OUR PROCESSING LINES. MATERIAL IS FREE OF MERCURY CONTAMINATION.  
 MATERIAL HAS BEEN HEATED TO A MINIMUM OF 1900 DEG. F AND IS SUBSEQUENTLY COOLED RAPIDLY TO PREVENT CARBIDE PRECIPITATION

**Chemical Analysis**

C	MN	P	S	SI	CR	NI	MO	CU	CO	N2	TI
.022	1.82	.032	.001	.27	18.13	8.05	.35	.54	NA	.07	NA

**Physical Analysis**

Hardness	YIELD		TENSILE		OTHER	
	PSI	MPA	PSI	MPA	Percent EL	Percent RA
RB 87	46810	NA	93120	NA	57	80

THE CHEMICALANALYSES ARE CORRECT AS CONTAINED IN OUR CORPORATE RECORDS.  
 PHYSICAL PROPERTIES ARE DETERMINED WHILE MATERIAL IS IN STRIP FORM.

Melted & MFG in USA DFARS 252.225 Subsection Compliant, FAR BAA, DFAR BAA, FAR TAA Complies

CERTIFIED BY Inventory Control Dept.



1185 WIN DR, BETHLEHEM, PA. 18017 - (610) 865-5337

FAX NUMBER: 610-865-4073

Manufacturer of Stainless Ornamental and Structural Tubing  
**CERTIFICATION OF TEST**

 Sold To: RYERSON  
 514 WEST PICKETT CIRCLE  
 SUITE A  
 SALT LAKE CITY UT 84115  
 USA

 Ship To: RYERSON  
 514 WEST PICKETT CIRCLE  
 SUITE A  
 SALT LAKE CITY UT 84115  
 USA

CUSTOMER ORDER#: 4500621828

GUST REF NBR: 100010468

DATE SHIPPED: 04/14/11

SIZE: 1-114" X 118" HRAP

SOURCE: USA D

VENDOR: NAS

Phone# 8201180 Ext:

ORDER#: 335179

QTY SHIPPED: 570.0

GRADE: 304L NOWELD: BAR

HEAT#: L0T0

TEST REPORT#: TR011538

Report Date: 01/20/11

**Specification:**

## CHEMISTRY THIS COLUMN:

ASTM A276-13A	ASTM A262, PRACTICE E	ASTM A240-13C	TYPE 304L/304 DUAL CERTIFIED
ASME SA276-08 COND. A	CORROSION OK, HRAP	ASME SA240-13C	LINS# 30400 / 30403
ASTM A479-13	ASTM A484-13	MILS 5059D AMEND 3	ASTM A666-10
ASME SA479-13	ASME SA484-13	AMS 5639H & AMS 5647J	AMS5653HIAMS5513J
QQ-S-763F. CONDA	NO WELD REPAIR	ASTM A480-13	QQ-S-766D, COND. A
EN 10204 2.2	ASME SA 480-13	NACE MR0175101 IMR0103	

MERCURY IS NOT USED BY US AS AN ALLOYING MATERIAL NOR IS METALLIC MERCURY HANDLED IN THE VICINITY OF OUR PROCESSING LINES. WE ARE NOT PRESENTLY AWARE OF ANY MERCURY CONTAMINATION. MATERIAL HAS BEEN HEATED TO A MINIMUM OF 1900 DEG. F AND IS SUBSEQUENTLY COOLED RAPIDLY TO PREVENT CARBIDE PRECIPITATION

**Chemical Analysis**

C	MN	P	S	SI	CR	NI	MO	CU	CO	N2	TI
.020	1.76	.03	.002	.21	18.13	8.03	.38	.40	0	.10	0

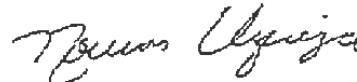
**Physical Analysis**

Hardness	YIELD		TENSILE		OTHER	
	PSI	MPA	PSI	MPA	Percent EL	Percent RA
RB 86	48370	0	92660	0	51	56

THE CHEMICAL ANALYSES ARE CORRECT AS CONTAINED IN OUR CORPORATE RECORDS.  
 PHYSICAL PROPERTIES ARE DETERMINED WHILE MATERIAL IS IN STRIP FORM.

Melted &amp; Manufactured In the USA FAR BAA complies, DFARS BAA complies, FAR TAA complies

CERTIFIED BY Quality Control Dept.

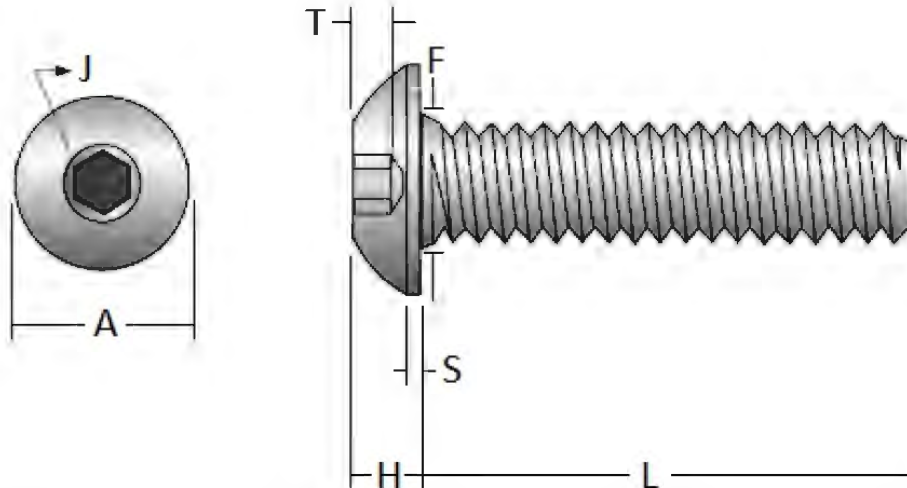


1185 WIN DR, BETHLEHEM, PA., 18017 - (610) 865-5337

FAX NUMBER: 610-865-4073

## Button Head Socket Cap Screws, Stainless Steel

The information below lists the required dimensional, chemical and physical characteristics of the products in this purchase order. If the order received does not meet these requirements, it may result in a supplier corrective action request, which could jeopardize your status as an approved vendor. Unless otherwise specified, all referenced consensus standards must be adhered to in their entirety.



Nominal Size or Basic Screw Diameter	A		H		S	J		T	F		
	Head Diameter		Head Height		Side Height	Hex Socket		Key Engagement	Fillet Transition Diameter		
	Max.	Min.	Max.	Min.	Ref.	Max.	Min.	Min.	Max.	Min.	
#0	0.0600	0.114	0.104	0.032	0.026	0.010	0.0355	0.0350	0.020	0.080	0.070
#1	0.0730	0.139	0.129	0.039	0.033	0.010	0.0510	0.0500	0.028	0.093	0.083
#2	0.0860	0.164	0.154	0.046	0.038	0.010	0.0510	0.0500	0.028	0.106	0.096
#3	0.0990	0.188	0.176	0.052	0.044	0.010	0.0635	0.0625	0.035	0.119	0.109
#4	0.1120	0.213	0.201	0.059	0.051	0.015	0.0635	0.0625	0.035	0.132	0.122
#5	0.1250	0.238	0.226	0.066	0.058	0.015	0.0791	0.0781	0.044	0.145	0.135
#6	0.1380	0.262	0.250	0.073	0.063	0.015	0.0791	0.0781	0.044	0.158	0.148
#8	0.1640	0.312	0.298	0.087	0.077	0.015	0.0952	0.0937	0.052	0.194	0.184
#10	0.1900	0.361	0.347	0.101	0.091	0.020	0.1270	0.1250	0.070	0.220	0.210
1/4	0.2500	0.437	0.419	0.132	0.122	0.031	0.1587	0.1562	0.087	0.290	0.280
5/16	0.3125	0.547	0.527	0.166	0.152	0.031	0.1900	0.1875	0.105	0.353	0.343
3/8	0.3750	0.656	0.636	0.199	0.185	0.031	0.2217	0.2187	0.122	0.415	0.405
1/2	0.5000	0.875	0.851	0.265	0.245	0.046	0.3160	0.3125	0.175	0.560	0.540
5/8	0.6250	1.000	0.970	0.331	0.311	0.062	0.3790	0.3750	0.210	0.685	0.665

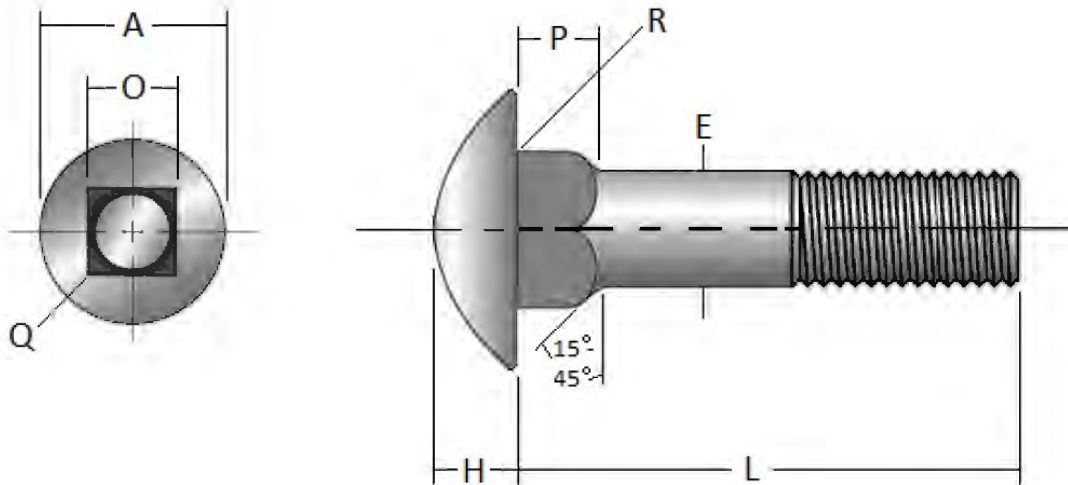
### Specification Requirements:

- Dimensions: ASME B18.3 \*Exception: Fully Threaded
- Material & Mechanical: Alloy Group 1, Condition CW per ASTM F879
- Thread Requirements: ASME B1.1, Class 3A UNRC & UNRF
- Finish: Per ASTM A380/A380M
- Material Test Reports: The MTR must have documented lot traceability, dimensional results, full chemical test results and full mechanical test results to the specification(s) above. In addition, the MTR shall be in full compliance with Fastenal's MTR Requirements.



### Carriage Bolts, Stainless Steel

The information below lists the required dimensional, chemical and physical characteristics of the products in this purchase order. If the order received does not meet these requirements, it may result in a supplier corrective action request, which could jeopardize your status as an approved vendor. Unless otherwise specified, all referenced consensus standards must be adhered to in their entirety.



Nominal Size or Basic Bolt Diameter	E		A		H		O		P		Q	R	
	Body Diameter		Head Diameter		Head Height		Square Width		Square Depth		Corner Radius on Square	Fillet Radius	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Max.	
#10	0.1900	0.199	0.159	0.469	0.436	0.114	0.094	0.199	0.185	0.125	0.094	0.031	0.031
1/4	0.2500	0.260	0.213	0.594	0.563	0.145	0.125	0.260	0.245	0.156	0.125	0.031	0.031
5/16	0.3125	0.324	0.272	0.719	0.688	0.176	0.156	0.324	0.307	0.187	0.156	0.031	0.031
3/8	0.3750	0.388	0.329	0.844	0.782	0.208	0.188	0.388	0.368	0.219	0.188	0.047	0.031
7/16	0.4375	0.452	0.385	0.969	0.907	0.239	0.219	0.452	0.431	0.250	0.219	0.047	0.031
1/2	0.5000	0.515	0.444	1.094	1.032	0.270	0.250	0.515	0.492	0.281	0.250	0.047	0.031
5/8	0.6250	0.642	0.559	1.344	1.219	0.344	0.313	0.642	0.616	0.344	0.313	0.078	0.062
3/4	0.7500	0.768	0.678	1.594	1.469	0.406	0.375	0.768	0.741	0.406	0.375	0.078	0.062

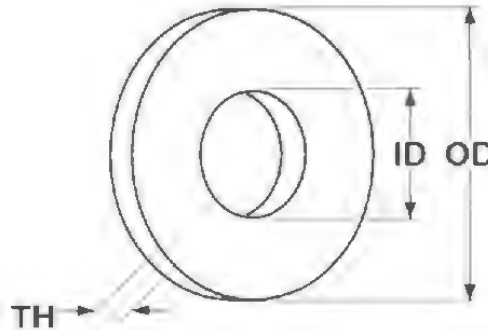
#### Specification Requirements:

- Dimensions:** ASME B18.5:  
 Full Diameter Body on product over 12" in length.  
 Full or Reduced Diameter Body 6" < thru 12" lengths (Reduced body diameter having a limit equal to the minimum pitch diameter)  
 \*\* Exceptions: bolts less than or equal to 6 inches in length shall be fully threaded. Bolts longer than 6" shall have 6" of full form threads.
- Material & Mechanical Properties:** Cold worked ASTM F593 Group 1. \*\*Exception, Size #10 will use the appropriate tensile stress area to determine the required minimum tensile strength in psi when tested in accordance with ASTM F606, for round head bolts
- Thread Requirements:** ASME B1.1, UNC, Class 2A

## Fastenal Product Standard: FNL.FW.SMOD.316

### Flat Washer, Small OD, 316 Stainless Steel

The information below lists the required dimensional, chemical and physical characteristics of the products in this purchase order. If the order received does not meet these requirements, it may result in a supplier corrective action request, which could jeopardize your status as an approved vendor. Unless otherwise specified, all referenced consensus standards must be adhered to in their entirety.



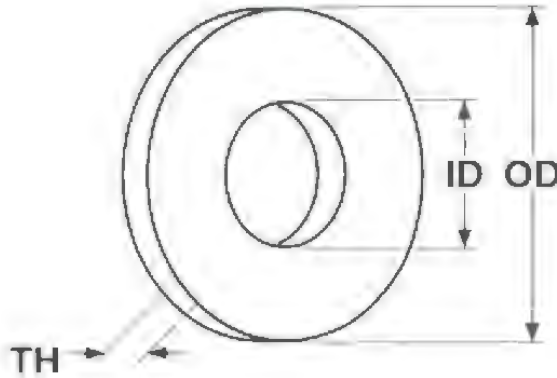
Size	O.D.		I.D.		Thickness	
	Min.	Max.	Min.	Max.	Min.	Max.
2	0.245	0.270	0.083	0.103	0.022	0.042
4	0.275	0.300	0.115	0.135	0.022	0.042
6	0.307	0.320	0.151	0.164	0.022	0.042
8	0.370	0.395	0.164	0.184	0.022	0.042
10	0.433	0.458	0.213	0.223	0.022	0.042
12	0.495	0.505	0.253	0.263	0.033	0.047
1/4	0.620	0.630	0.280	0.290	0.033	0.047
5/16	0.745	0.755	0.339	0.349	0.033	0.047
3/8	0.870	0.880	0.401	0.411	0.043	0.057
7/16	1.120	1.130	0.495	0.505	0.055	0.070
1/2	1.245	1.255	0.555	0.567	0.055	0.070
9/16	1.055	1.067	0.600	0.630	0.068	0.088
5/8	1.495	1.505	0.683	0.692	0.068	0.088
3/4	1.745	1.755	0.810	0.820	0.090	0.113
7/8	1.995	2.005	0.932	0.942	0.090	0.113
1	1.995	2.005	1.057	1.067	0.108	0.123
1 1/8	2.495	2.505	1.178	1.195	0.108	0.123
1 1/4	2.745	2.755	1.307	1.317	0.108	0.123
1 1/2	3.245	3.265	1.550	1.570	0.129	0.149
1 3/4	3.450	3.650	1.750	1.950	0.129	0.149
2	3.900	4.125	2.050	2.185	0.149	0.169

#### Specification Requirements:

- Dimensions: See dimensions above.
- Material: 316 Stainless Steel
- Product Marking: "316" Note, stamping washer sizes #6 and smaller may cause distortion of ID.
- Finish: Per ASTM A380

### Flat Washer, Small OD, 18-8 Stainless Steel

The information below lists the required dimensional, chemical and physical characteristics of the products in this purchase order. If the order received does not meet these requirements, it may result in a supplier corrective action request, which could jeopardize your status as an approved vendor. Unless otherwise specified, all referenced consensus standards must be adhered to in their entirety.



Size	O.D.		I.D.		Thickness	
	Min.	Max.	Min.	Max.	Min.	Max.
0	0.172	0.202	0.063	0.093	0.022	0.028
2	0.245	0.270	0.083	0.103	0.022	0.042
3	0.245	0.270	0.099	0.119	0.022	0.042
4	0.275	0.300	0.115	0.135	0.022	0.042
5	0.430	0.450	0.133	0.151	0.033	0.047
6	0.307	0.320	0.151	0.164	0.022	0.042
8	0.370	0.395	0.164	0.184	0.022	0.042
10	0.433	0.458	0.213	0.223	0.022	0.042
12	0.495	0.505	0.253	0.263	0.033	0.047
1/4	0.620	0.630	0.280	0.290	0.033	0.047
5/16	0.745	0.755	0.339	0.349	0.033	0.047
3/8	0.870	0.880	0.401	0.411	0.043	0.057
7/16	1.120	1.130	0.495	0.505	0.055	0.070
1/2	1.245	1.255	0.555	0.567	0.055	0.070
9/16	1.055	1.067	0.600	0.630	0.068	0.088
5/8	1.495	1.505	0.683	0.692	0.068	0.088
3/4	1.745	1.755	0.810	0.820	0.090	0.113
7/8	1.995	2.005	0.932	0.942	0.090	0.113
1	1.995	2.005	1.057	1.067	0.108	0.123
1 1/8	2.495	2.505	1.178	1.195	0.108	0.123
1 1/4	2.745	2.755	1.307	1.317	0.108	0.123
1 3/8	3.300	3.385	1.500	1.600	0.129	0.149
1 1/2	3.245	3.265	1.550	1.570	0.129	0.149
1 3/4	3.450	3.650	1.750	1.950	0.129	0.149
2	3.900	4.125	2.050	2.185	0.149	0.169

Specification Requirements:

- Dimensions: See dimensions above.
- Material: 18-8 Stainless steel.
- Finish: Per ASTM A380

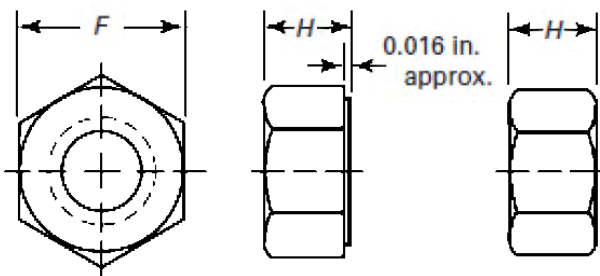


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- Finish: Per ASTM A380
- Material Test Reports: The MTR must have documented lot traceability, dimensional results, full chemical test results and full mechanical test results to the specification(s) above. In addition, the MTR shall be in full compliance with Fastenal's MTR Requirements.

### Finished Hex Nuts, 316 Stainless Steel

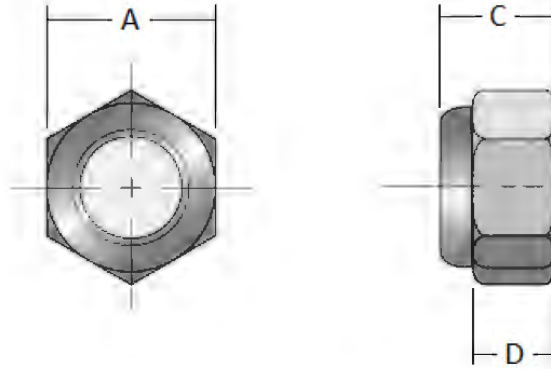
The information below lists the required dimensional, chemical and physical characteristics of the products in this purchase order. If the order received does not meet these requirements, it may result in a supplier corrective action request, which could jeopardize your status as an approved vendor. Unless otherwise specified, all referenced consensus standards must be adhered to in their entirety.



Nominal Size	F		H	
	Width Across Flats		Thickness	
	Max.	Min.	Max.	Min.
1/4	.438	.428	.226	.212
5/16	.500	.489	.273	.258
3/8	.563	.551	.337	.320
7/16	.688	.675	.385	.365
1/2	.750	.736	.448	.427
9/16	.875	.861	.496	.473
5/8	.938	.922	.559	.535
3/4	1.125	1.088	.665	.617
7/8	1.312	1.269	.776	.724
1	1.500	1.450	.887	.831
1 1/8	1.688	1.631	.999	.939
1 1/4	1.875	1.812	1.094	1.030
1 3/8	2.062	1.994	1.206	1.138
1 1/2	2.250	2.175	1.317	1.245
1 5/8	2.43	2.35	1.416	1.364
1 3/4	2.625	2.538	1.540	1.460
1 7/8	2.813	2.722	1.651	1.567
2	3.000	2.900	1.763	1.675
2 1/4	3.375	3.263	1.986	1.890
2 1/2	3.750	3.625	2.209	2.105
2 3/4	4.125	3.988	2.431	2.319
3	4.5	4.350	2.654	2.534

### Hex Nylon Insert Locknuts (NE), 18-8 Stainless Steel

The information below lists the required dimensional, chemical and physical characteristics of the products in this purchase order. If the order received does not meet these requirements, it may result in a supplier corrective action request, which could jeopardize your status as an approved vendor. Unless otherwise specified, all referenced consensus standards must be adhered to in their entirety.



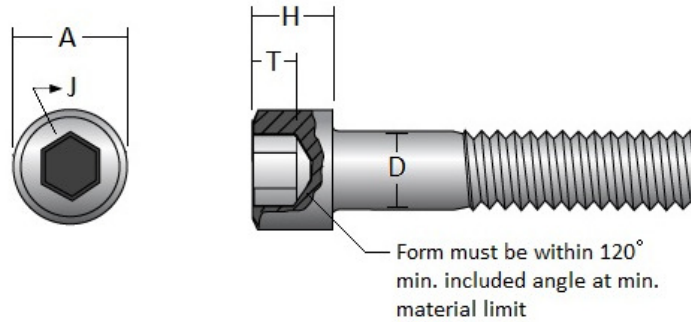
	Size	C		A		D
		Thickness		Width Across Flats		Hex Height
		Max.	Min.	Max.	Min.	Min.
NE	1/4	.328	.298	.439	.430	.225
	5/16	.359	.329	.502	.489	.250
	3/8	.468	.438	.564	.551	.335
	7/16	.468	.438	.627	.616	.324
	1/2	.609	.579	.752	.736	.464
	9/16	.656	.626	.877	.861	.469
	5/8	.765	.735	.940	.922	.593
	3/4	.890	.860	1.064	1.052	.742
	7/8	.999	.969	1.252	1.239	.790
	1	1.078	1.016	1.440	1.427	.825
	1 1/8	1.203	1.141	1.627	1.614	0.930
	1 1/4	1.422	1.360	1.815	1.801	1.125
	1 3/8	1.609	1.547	2.008	1.973	1.282
1 1/2	1.640	1.578	2.197	2.159	1.313	

#### Specification Requirements:

- Dimensions: Per ASME B18.16.6
- Material, Performance & Mechanical Properties: 18-8 Stainless Steel, Group 1 Condition CW per ASTM F594  
Nylon 6/6 material shall be in compliance with current RoHS European Union Directive.  
Prevailing torque per QA7-95
- Thread Requirements: ASME B1.1, UNC & UNF, Class 2B
- Product Marking: Manufacturer's ID
- Finish: Surface condition per ASTM A380, and waxed  
Wax shall contain a tracer element that is visible under black light

### Socket Head Cap Screws, 18-8 Stainless Steel

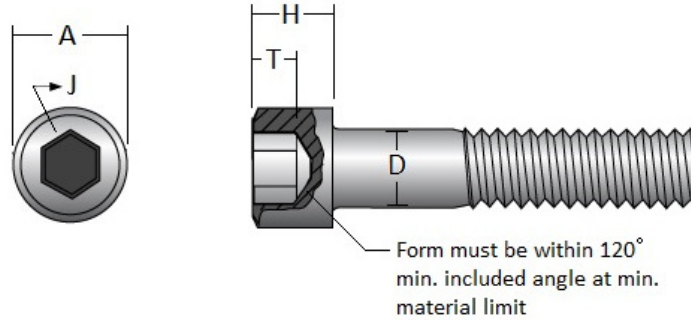
The information below lists the required dimensional, chemical and physical characteristics of the products in this purchase order. If the order received does not meet these requirements, it may result in a supplier corrective action request, which could jeopardize your status as an approved vendor. Unless otherwise specified, all referenced consensus standards must be adhered to in their entirety.



Size	D		A		H		J		T
	Body Diameter		Head Diameter		Head Height		Hex Socket		Key Engagement
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.
#0	.0600	.0568	.096	.091	.060	.057	0.0510	0.0500	.025
#1	.0730	.0695	.118	.112	.073	.070	0.0635	0.0625	.031
#2	.0860	.0822	.140	.134	.086	.083	0.0791	0.0781	.038
#3	.0990	.0949	.161	.154	.099	.095	0.0791	0.0781	.044
#4	.1120	.1075	.183	.176	.112	.108	0.0952	0.0937	.051
#5	.1250	.1202	.205	.198	.125	.121	0.0952	0.0937	.057
#6	.1380	.1329	.226	.216	.138	.134	0.1111	0.1094	.064
#8	.1640	.1585	.270	.257	.164	.159	0.1426	0.1406	.077
#10	.1900	.1840	.312	.298	.190	.185	0.1587	0.1562	.090
#12	.2160	.2095	.324	.314	.216	.210	0.1587	0.1562	.103
1/4	.2500	.2435	.375	.354	.250	.244	0.1900	0.1875	.120
5/16	.3125	.3053	.469	.446	.312	.306	0.2530	0.2500	.151
3/8	.3750	.3678	.562	.540	.375	.368	0.3160	0.3125	.182
7/16	.4375	.4294	.656	.631	.438	.430	0.3790	0.3750	.213
1/2	.5000	.4919	.750	.725	.500	.492	0.3790	0.3750	.245
9/16	.5625	.5538	.843	.827	.562	.554	0.4420	0.4375	.276
5/8	.6250	.6163	.938	.914	.625	.616	0.5050	0.5000	.307
3/4	.7500	.7406	1.125	1.094	.750	.740	0.6310	0.6250	.370
7/8	.8750	.8647	1.312	1.291	.875	.864	0.7570	0.7500	.432
1	1.000	.9886	1.500	1.476	1.000	.988	0.7570	0.7500	.495
1 1/8	1.125	1.1086	1.688	1.665	1.125	1.111	0.8850	0.8750	.557
1 1/4	1.250	1.2336	1.875	1.852	1.250	1.236	0.8850	0.8750	.620
1 3/8	1.375	1.3568	2.062	2.038	1.375	1.360	1.0200	1.0000	.682
1 1/2	1.500	1.4818	2.250	2.224	1.500	1.485	1.0200	1.0000	.745
1 3/4	1.750	1.7295	2.625	2.597	1.750	1.734	1.2750	1.2500	.870
2	2.000	1.9780	3.000	2.970	2.000	1.983	1.5300	1.5000	.995

### Socket Head Cap Screws, 18-8 Stainless Steel

The information below lists the required dimensional, chemical and physical characteristics of the products in this purchase order. If the order received does not meet these requirements, it may result in a supplier corrective action request, which could jeopardize your status as an approved vendor. Unless otherwise specified, all referenced consensus standards must be adhered to in their entirety.

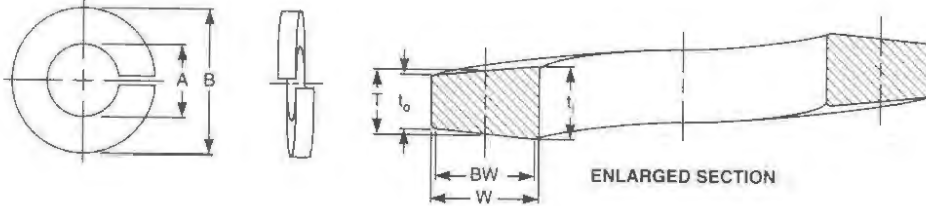


Size	D		A		H		J		T
	Body Diameter		Head Diameter		Head Height		Hex Socket		Key Engagement
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Min.
#0	.0600	.0568	.096	.091	.060	.057	0.0510	0.0500	.025
#1	.0730	.0695	.118	.112	.073	.070	0.0635	0.0625	.031
#2	.0860	.0822	.140	.134	.086	.083	0.0791	0.0781	.038
#3	.0990	.0949	.161	.154	.099	.095	0.0791	0.0781	.044
#4	.1120	.1075	.183	.176	.112	.108	0.0952	0.0937	.051
#5	.1250	.1202	.205	.198	.125	.121	0.0952	0.0937	.057
#6	.1380	.1329	.226	.216	.138	.134	0.1111	0.1094	.064
#8	.1640	.1585	.270	.257	.164	.159	0.1426	0.1406	.077
#10	.1900	.1840	.312	.298	.190	.185	0.1587	0.1562	.090
#12	.2160	.2095	.324	.314	.216	.210	0.1587	0.1562	.103
1/4	.2500	.2435	.375	.354	.250	.244	0.1900	0.1875	.120
5/16	.3125	.3053	.469	.446	.312	.306	0.2530	0.2500	.151
3/8	.3750	.3678	.562	.540	.375	.368	0.3160	0.3125	.182
7/16	.4375	.4294	.656	.631	.438	.430	0.3790	0.3750	.213
1/2	.5000	.4919	.750	.725	.500	.492	0.3790	0.3750	.245
9/16	.5625	.5538	.843	.827	.562	.554	0.4420	0.4375	.276
5/8	.6250	.6163	.938	.914	.625	.616	0.5050	0.5000	.307
3/4	.7500	.7406	1.125	1.094	.750	.740	0.6310	0.6250	.370
7/8	.8750	.8647	1.312	1.291	.875	.864	0.7570	0.7500	.432
1	1.000	.9886	1.500	1.476	1.000	.988	0.7570	0.7500	.495
1 1/8	1.125	1.1086	1.688	1.665	1.125	1.111	0.8850	0.8750	.557
1 1/4	1.250	1.2336	1.875	1.852	1.250	1.236	0.8850	0.8750	.620
1 3/8	1.375	1.3568	2.062	2.038	1.375	1.360	1.0200	1.0000	.682
1 1/2	1.500	1.4818	2.250	2.224	1.500	1.485	1.0200	1.0000	.745
1 3/4	1.750	1.7295	2.625	2.597	1.750	1.734	1.2750	1.2500	.870
2	2.000	1.9780	3.000	2.970	2.000	1.983	1.5300	1.5000	.995



### Lock Washers, Medium-Split, 316 Stainless Steel

The information below lists the required dimensional, chemical and physical characteristics of the fasteners in this purchase order. If the order received does not meet these requirements, it may result in a supplier corrective action request, which could jeopardize your status as an approved vendor. Unless otherwise specified, all referenced consensus standards must be adhered to in their entirety.



Nominal Washer Size	A		B	T	W	BW
	Inside Diameter		Outside Diameter	Mean Section Thickness $(t_1 + T_0)/2$	Section Width	Bearing Width
	Max	Min	Max	Min	Min	Min
No. 2	.094	.088	.172	.020	.035	.024
No. 3	.107	.101	.195	.025	.040	.028
No. 4	.120	.114	.209	.025	.040	.028
No. 5	.133	.127	.236	.031	.047	.033
No. 6	.148	.141	.250	.031	.047	.033
No. 8	.174	.167	.293	.040	.055	.038
No. 10	.200	.193	.334	.047	.062	.043
No. 12	.227	.220	.377	.056	.070	.049
1/4	.260	.252	.487	.062	.109	.076
5/16	.322	.314	.583	.078	.125	.087
3/8	.385	.377	.680	.094	.141	.099
7/16	.450	.440	.776	.109	.156	.109
1/2	.512	.502	.869	.125	.171	.120
9/16	.574	.564	.965	.141	.188	.132
5/8	.641	.628	1.073	.156	.203	.142
3/4	.766	.753	1.265	.188	.234	.164
7/8	.894	.878	1.459	.219	.266	.186
1	1.024	1.003	1.656	.250	.297	.208
1-1/8	1.153	1.129	1.847	.281	.328	.230
1-1/4	1.280	1.254	2.036	.312	.359	.251
1-3/8	1.408	1.379	2.219	.344	.391	.274
1-1/2	1.534	1.504	2.419	.375	.422	.295
1-5/8	1.663	1.633	2.553	.389	.424	.297
1-3/4	1.789	1.758	2.679	.389	.424	.297
1-7/8	1.914	1.883	2.811	.422	.427	.299
2	2.039	2.008	2.936	.422	.427	.299
2-1/4	2.293	2.262	3.221	.440	.442	.309
2-1/2	2.543	2.512	3.471	.440	.442	.309
2-3/4	2.793	2.762	3.824	.458	.491	.344
3	3.043	3.012	4.074	.458	.491	.344

#### Specification Requirements:

- Dimensions: ASME B18.21.1
- Material: 316 Stainless steel
- Mechanical Properties: Hardness HRC 35-43  $\leq 5/8$   
HRC 32-43  $\geq 3/4$
- Finish: Per ASTM A380

### Specification Requirements:

- Dimensions: ASME B18.3
- Material & Mechanical Properties: Alloy Group 1 (18-8 Stainless Steel), Condition CW per ASTM F837  
Sizes larger than 3/4" diameter: Minimum 75 KSI Tensile and Minimum 30 KSI Yield
- Thread Requirements: ASME B1.1, Class 3A, UNRC & UNRF (0.060" to 1" inclusive)  
Class 2A, UNRC & UNRF (Over 1")
- Product Marking: Manufacturer's trademark on sizes 1/4 and larger and Alloy Mechanical Property Marking
- Finish: Per ASTM A380/A380M
- Material Test Reports: The MTR must have documented lot traceability, dimensional results, full chemical test results and full mechanical test results to the specification(s) above. In addition, the MTR shall be in full compliance with Fastenal's MTR Requirements.

### Specification Requirements:

- Dimensions: ASME B18.3
- Material & Mechanical Properties: Alloy Group 1 (18-8 Stainless Steel), Condition CW per ASTM F837  
Sizes larger than 3/4" diameter: Minimum 75 KSI Tensile and Minimum 30 KSI Yield
- Thread Requirements: ASME B1.1, Class 3A, UNRC & UNRF (0.060" to 1" inclusive)  
Class 2A, UNRC & UNRF (Over 1")
- Product Marking: Manufacturer's trademark on sizes 1/4 and larger and Alloy Mechanical Property Marking
- Finish: Per ASTM A380/A380M
- Material Test Reports: The MTR must have documented lot traceability, dimensional results, full chemical test results and full mechanical test results to the specification(s) above. In addition, the MTR shall be in full compliance with Fastenal's MTR Requirements.



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- Material Test Reports: The MTR must have documented lot traceability, dimensional results, full chemical test results and full mechanical test results to the specification(s) above. In addition, the MTR shall be in full compliance with Fastenal's MTR Requirements.



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### Specification Requirements:

- Dimensions: ASME B18.2.2
- Material & Mechanical Properties: AISI 316 or 316L stainless steel, Group 2 Condition CW per ASTM F594
- Thread Requirements: ASME B1.1, UNC & UNF, Class 2B
- Finish: Per ASTM A380
- Product Marking: Alloy Grade per ASTM F594
- Material Test Reports: The MTR must have documented lot traceability, dimensional results, full chemical test results and full mechanical test results to the specification(s) above. In addition, the MTR shall be in full compliance with Fastenal's MTR Requirements.