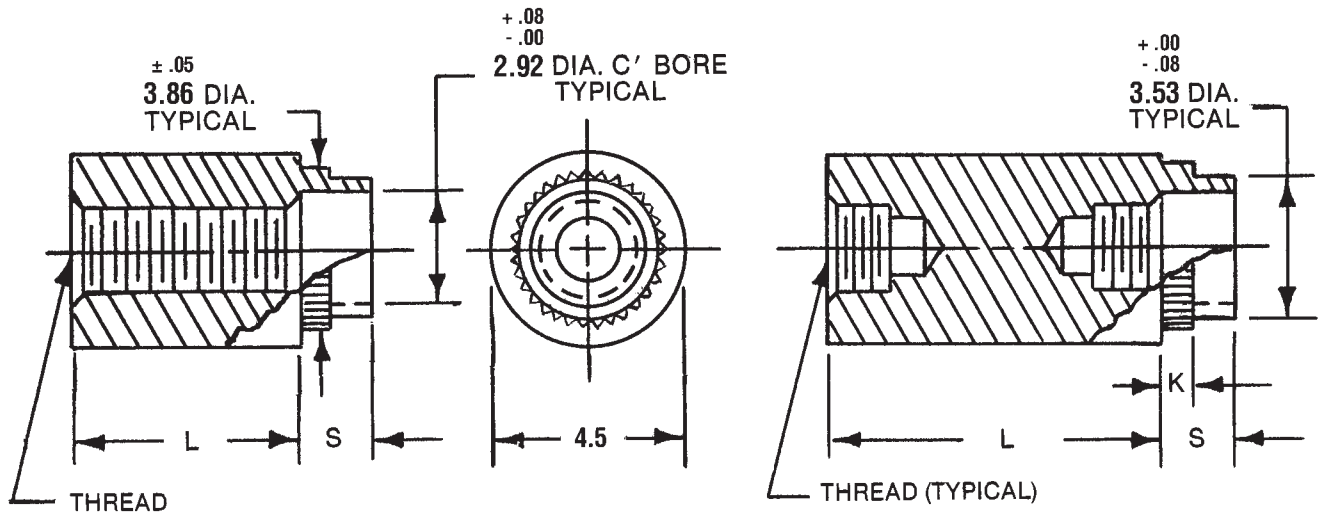


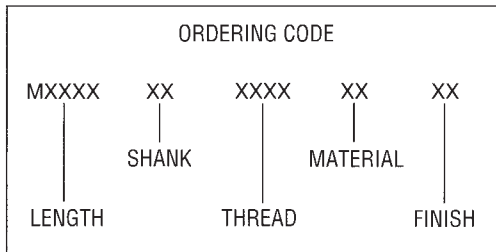
# 4.5mm ROUND PARTIAL KNURLED SWAGE STANDOFFS



L = STANDOFF LENGTH  
 S = SHANK LENGTH  
 P = BOARD THICKNESS

See page iv for installation information

See page 7M for thread depth chart  
 See page 6M for finish codes  
 For non-standard parts contact Sales Office



SWAGE TOOLING		
PUNCH	ANVIL	LENGTH
P3	AR-70	3-5
	AR-71	6-12
	AR-72	13-18
	AR-73	19-25

SWAGE/PANEL CODE			
±.08	S	P	K
1.9	A	.8	.8
2.7	B	1.6	1.6
3.4	C	2.4	2.4
4.2	D	3.2	3.2

LENGTH	PART NO.
3	M1650
4	M1651
5	M1652
6	M1653
7	M1654
8	M1655
9	M1656
10	M1657
11	M1658
12	M1659
13	M1660
14	M1661

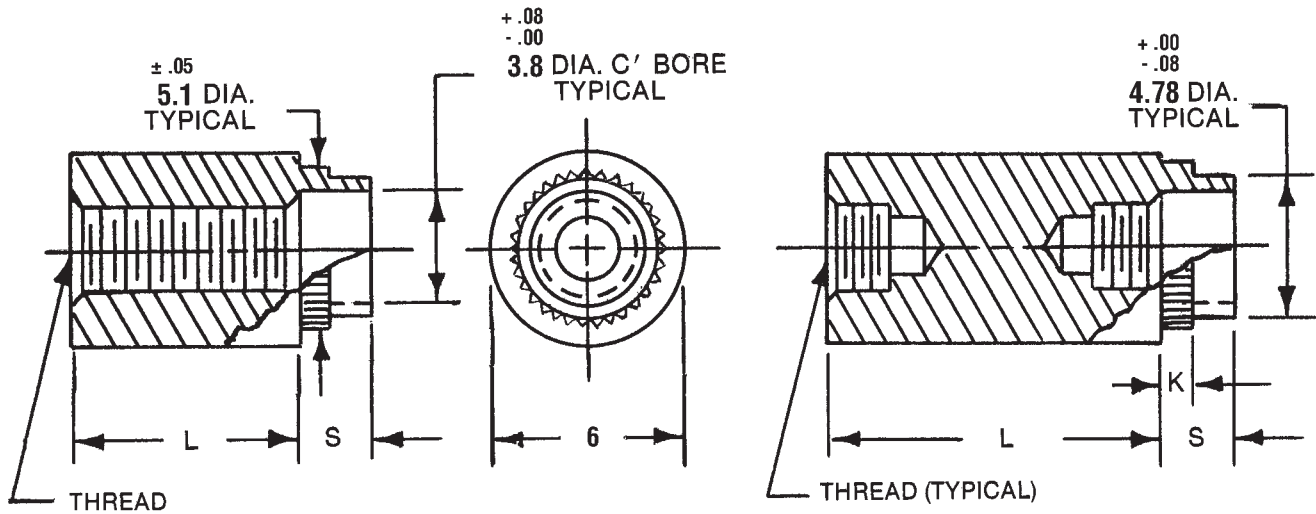
LENGTH	PART NO.
15	M1662
16	M1663
17	M1664
18	M1665
19	M1666
20	M1667
21	M1668
22	M1669
23	M1670
24	M1671
25	M1672

THREAD	CODE
M2.5x0.45	2545
M3x0.5	3005

MATERIAL	CODE	RoHS
Aluminum	AL	YES
Brass	B	YES
Stainless Steel	SS	YES
Steel	S	YES



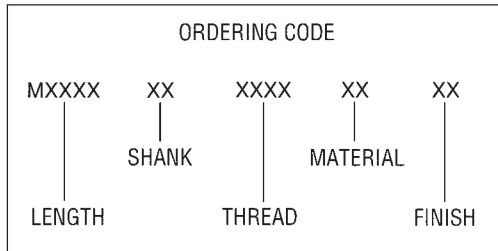
# 6mm ROUND PARTIAL KNURLED SWAGE STANDOFFS



See page iv for installation information

L = STANDOFF LENGTH  
 S = SHANK LENGTH  
 P = BOARD THICKNESS

See page 7M for thread depth chart  
 See page 6M for finish codes  
 For non-standard parts contact Sales Office



SWAGE TOOLING		
PUNCH	ANVIL	LENGTH
P4	AR-74	3-5
	AR-75	6-12
	AR-76	13-18
	AR-77	19-25

SWAGE/PANEL CODE			
± .08	S	P	K
1.9	A	.8	.8
2.7	B	1.6	1.6
3.4	C	2.4	2.4
4.2	D	3.2	3.2

LENGTH	PART NO.
3	M1685
4	M1686
5	M1687
6	M1688
7	M1689
8	M1690
9	M1691
10	M1692
11	M1693
12	M1694
13	M1695
14	M1696

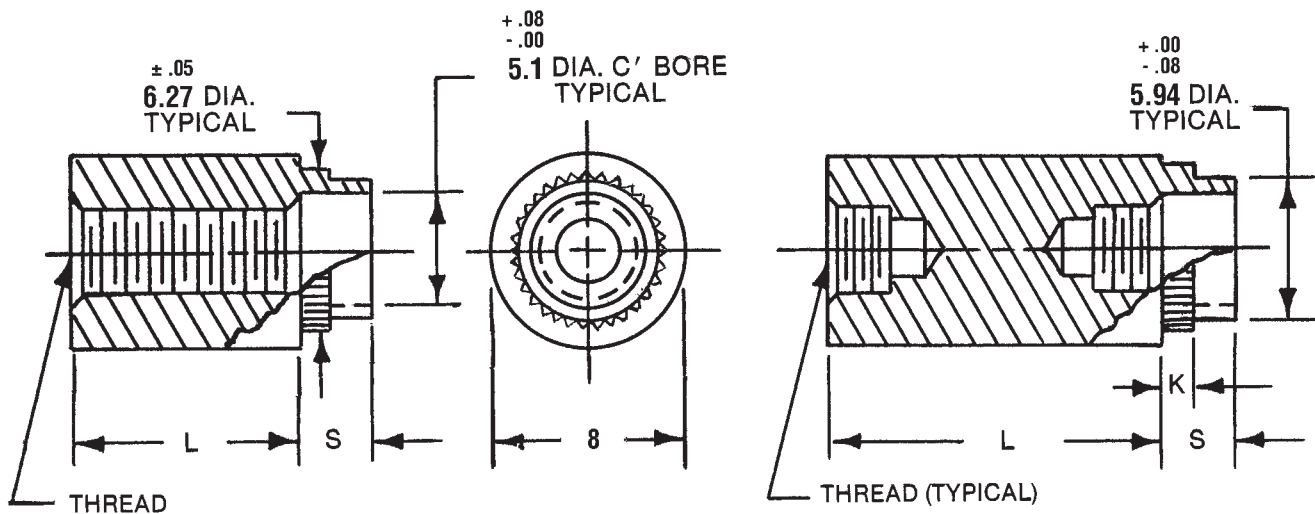
LENGTH	PART NO.
15	M1697
16	M1698
17	M1699
18	M1700
19	M1701
20	M1702
21	M1703
22	M1704
23	M1705
24	M1706
25	M1707

THREAD	CODE
M3x0.5	3005
M3.5x0.6	3506

MATERIAL	CODE	RoHS
Aluminum	AL	YES
Brass	B	YES
Stainless Steel	SS	YES
Steel	S	YES



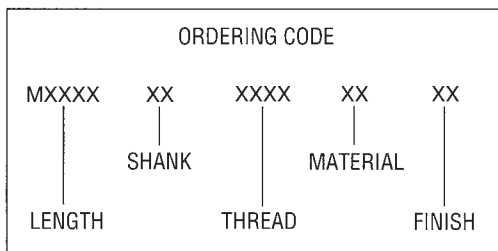
# 8mm ROUND PARTIAL KNURLED SWAGE STANDOFFS



L = STANDOFF LENGTH  
 S = SHANK LENGTH  
 P = BOARD THICKNESS

See page iv for installation information

See page 7M for thread depth chart  
 See page 6M for finish codes  
 For non-standard parts contact Sales Office



SWAGE TOOLING		
PUNCH	ANVIL	LENGTH
P5	AR-78	3-5
	AR-79	6-12
	AR-80	13-18
	AR-81	19-25

SWAGE/PANEL CODE			
± .08	S	P	K
1.9	A	.8	.8
2.7	B	1.6	1.6
3.4	C	2.4	2.4
4.2	D	3.2	3.2

LENGTH	PART NO.
3	M1720
4	M1721
5	M1722
6	M1723
7	M1724
8	M1725
9	M1726
10	M1727
11	M1728
12	M1729
13	M1730
14	M1731

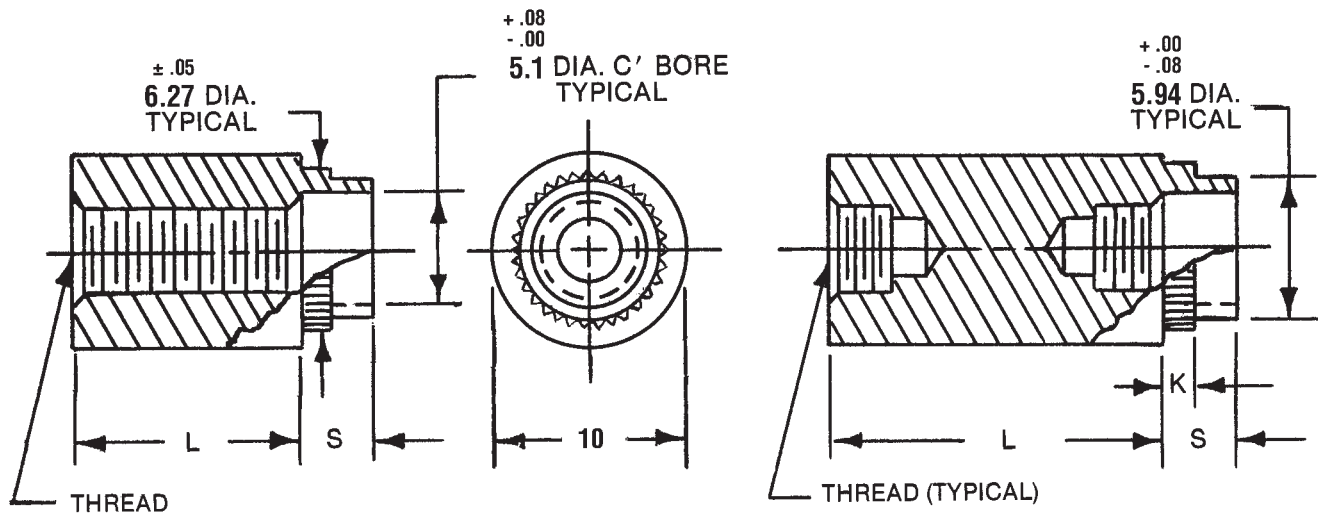
LENGTH	PART NO.
15	M1732
16	M1733
17	M1734
18	M1735
19	M1736
20	M1737
21	M1738
22	M1739
23	M1740
24	M1741
25	M1742

THREAD	CODE
M3.5x0.6	3506
M4x0.7	4007

MATERIAL	CODE	RoHS
Aluminum	AL	YES
Brass	B	YES
Stainless Steel	SS	YES
Steel	S	YES



# 10mm ROUND PARTIAL KNURLED SWAGE STANDOFFS

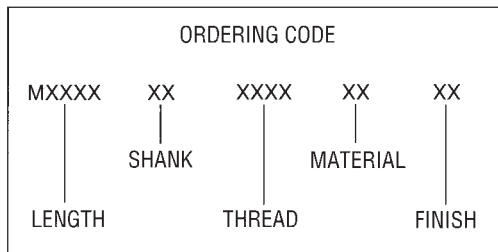


L = STANDOFF LENGTH  
 S = SHANK LENGTH  
 P = BOARD THICKNESS

See page iv for installation information

See page 7M for thread depth chart  
 See page 6M for finish codes  
 For non-standard parts contact Sales Office

SWAGE TOOLING		
PUNCH	ANVIL	LENGTH
P5	AR-82	3-5
	AR-83	6-12
	AR-84	13-18
	AR-85	19-25



SWAGE/PANEL CODE			
±.08	S	P	K
1.9	A	.8	.8
2.7	B	1.6	1.6
3.4	C	2.4	2.4
4.2	D	3.2	3.2

LENGTH	PART NO.
3	M1755
4	M1756
5	M1757
6	M1758
7	M1759
8	M1760
9	M1761
10	M1762
11	M1763
12	M1764
13	M1765
14	M1766

LENGTH	PART NO.
15	M1767
16	M1768
17	M1769
18	M1770
19	M1771
20	M1772
21	M1773
22	M1774
23	M1775
24	M1776
25	M1777

THREAD	CODE
M3.5x0.6	3506
M4x0.7	4007
M5x0.8	5008

MATERIAL	CODE	RoHS
Aluminum	AL	YES
Brass	B	YES
Stainless Steel	SS	YES
Steel	S	YES



# MATERIALS

MATERIAL ROD & BAR	ORDERING CODE	MATERIAL SPECIFICATIONS	RoHS COMPLIANT
Aluminum	AL	QQ-A-225/3D, QQ-A-225/6A, QQ-A-225/8B, QQ-A-200/9D	YES
Aluminum (Handles Only)	A	QQ-A-225/8B - QQ-A-200/9D	YES
Brass	B	ASTM-B-16	YES
Nylon	N	LP-410A	YES
Steel	S	ASTM-A108-07	YES
Stainless Steel	SS	ASTM-A-581, A-582	YES

\* Non RoHS Compliant Finish

## FINISH CODES

*1	Cadmium (Commercial) (Special Order Only)	25	Black Oxide, Brass MIL-F-495E
*2	Cadmium QQ-P-416F-Class 2 Type-1 (Clear Chromate) (Special Order Only)	26	Black Oxide, Stainless Steel, Steel Mil-DTL-13924D, Class 1 and 4
*3	Cadmium QQ-P-416F-Class 2 Type-2 (Yellow Chromate) (Special Order Only)	27	Electro Tin Solder (60/40) per M222-MIL-F-14072D
4	Chrome Over Nickel	28	Zinc Plate .0002 ASTM-B-633 (Yellow Chromate)
5	Nickel QQ-N-290 Class 1 Grade G	29	Brushed Finish – Handles Only
*6	Iridite #14 (Gold) MIL-DTL-5541F	30	Brushed Finish – Clear Lacquer – Handles Only
7	Iridite (Clear) MIL-DTL-5541F	31	Brushed Satin – Handles Only
*9	Alodine 1200	32	Brushed Satin – Clear Anodize – Handles Only
10	Chrome QQ-C-320B Class 1 Type I (Bright Finish)	33	Brushed Satin – Black Anodize – Handles Only
11	Chrome QQ-C-320B Class 1 Type II (Satin Finish)	34	Satin Finish – Clear Anodize
12	Zinc .0002 ASTM-B-633 (Clear Chromate)	35	Satin Finish – Black Anodize
13	Bright Dip – Brass	36	Anodize MIL-A-8625F Black High Luster
14	Bright Tin ASTM B545 over Copper Flash Mil-C-14550	37	Ductile Nickel
15	Hot Tin Dip MIL-T-10727C Type II	38	Polished Nickel – Handles Only
16	Electro Tin ASTM B545 Class A, B or C	39	Caustic Etch and Lacquer
19	Caustic Etch	40	Semi-Frost Anodize (Clear)
20	Passivate MIL-F-14072E	41	Semi-Frost Anodize (Black)
21	Anodize MIL-A-8625F – Type II Class 2 (Sulfuric) Chemical Seal (Dark Grey)	42	Black Zinc
22	Anodize MIL-A-8625F – Type II Class 1 (Sulfuric) Hot Water Seal (Clear)	43	Blue Zinc
23	Anodize MIL-A-8625F – Type II Class 2 (Sulfuric) Chemical Seal (Yellow Green)	44	Electro Tin with Nickel Undercoat Per Mil-T-10727C
24	Anodize MIL-A-8625F – Type II Class 2 (Sulfuric) Chemical Seal (Black)	45	Passivate QQ-P-35C Type VI
		46	Passivate ASTM A 967 Nitric 1
		47	Passivate ASTM A 380-96
		48	Passivate AMS 2700 Type 2

### STANDOFFS & SPACERS MANUFACTURING TOLERANCES

LENGTHS:           ± .13mm up to 100mm  
                           ± .20mm from 100mm to 150mm  
                           ± .25mm over 150mm

## DEPTHS OF THREADS

THREAD	TAPPED THRU		BLIND TAP DEPTH
	ALUMINUM, BRASS STEEL, NYLON	STAINLESS STEEL	ALUMINUM, BRASS ST. ST, STEEL, NYLON
M2x0.4	9	6	4.7
M2.5x0.45	19	16	4.7
M3x0.5	25	19	6.3
M3.5x0.6	25	25	9.5
M4x0.7	25	25	11.1
M5x0.8	28	25	12.7
M6x1	31	31	16
M8x1.25	31	31	16

## PERCENTAGE OF THREAD FOR TAPPED HOLES

THREAD	FORM TAP	CUT TAP
M2	55	65
M3	55	65
M4	55	65
M5	55	65
M6	55	65
M8	60	70

THREADS ARE TO COMMERCIAL 6g6H  
STANDARD PER ANSIB1.13M (IFI-500)

THREADS ARE SUPPLIED CUT OR ROLLED  
AT OUR OPTION UNLESS SPECIFICALLY  
NOTED ON ORDER

THREAD SIZES	
THREAD SIZE	CODE
M2x0.4	2004
M2.5x0.45	2545
M3x0.5	3005
M3.5x0.6	3506
M4x0.7	4007
M5x0.8	5008
M6x1	6010
M8x1.25	8012

THREAD SIZE	CLEARANCE HOLE RANGE	CODE
M2x0.4	2.2 - 2.6	2
M2.5x0.45	2.7 - 3.1	25
M3x0.5	3.2 - 3.6	3
M3.5x0.6	3.7 - 4.2	35
M4x0.7	4.3 - 4.8	4
M5x0.8	5.3 - 5.8	5
M6x1	6.4 - 7	6
M8x1.25	8.4 - 10	8

## ILLUSTRATION OF THE SWAGING PROCESS

Follow these instructions for a superior installation of both plain swage standoffs and knurled swage standoffs. Knurled swage standoffs offer more holding power than plain standoffs, and eliminate electrical connection breaks due to loosening and spinning of the standoff because of high torque stresses.

### HOLE SPECIFICATIONS

#### Plain Swage Standoff

A plain swage standoff (no knurl) requires a *STRAIGHT HOLE*. The hole diameter in the board or panel is the same as the shank (or shoulder) diameter of the standoff with a **tolerance of  $+0.003"/-0.000"$  ( $+0.076\text{ mm}/-0.000\text{ mm}$ )**.

#### Partial Knurl or Full Knurl Swage Standoff

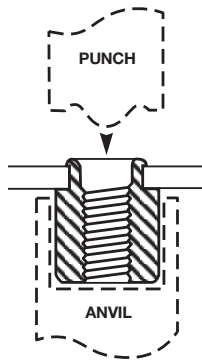
A partial knurl or full knurl swage standoff requires a *STRAIGHT HOLE* in a printed circuit board. The hole diameter in the board is  **$.010"$  to  $.012"$**  smaller than the shank (or shoulder) diameter of the standoff with a **tolerance of  $+0.005"/-0.000"$  ( $+0.13\text{ mm}/-0.000\text{ mm}$ )**.

### METHODS OF INSTALLATION

#### Swage

While some dimensions of the punch and anvil change with the size of the swage standoffs, the following dimensions remain constant:

- The punch is 2.5" in overall length and .5" OD
- The anvil is 1" in overall length and .5" OD with a 1/2-24 external thread
- Punch and anvil part numbers for swaging are listed on the individual pages of plain and partial knurl swage standoffs



#### Flare

- Flare tool is not supplied
- Flare angle should be same as countersink angle
- For flush flaring into countersunk hole use shank length .020" shorter than board thickness

