For Honeycomb and Sandwich Panels

Decades ago Delron™ Inserts began giving honeycomb and sandwich panels real functionality by providing engineers with a method of attachment. Since then Delron Inserts have spawned a score of imitators, but none offer the variety presented here, nor the meticulous attention to quality design and manufacture on which Rosán has built its reputation.

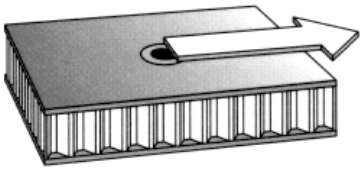
In addition to introducing you to the primary series of Delron Inserts, and explaining the function, design criteria, installation procedure and tooling for each, this catalog also provides the detailed engineering and selection data needed to specify the particular part number required for your application.

Rosán's Delron Insert Series offers you the widest available choice of types, styles, materials and finishes for sandwich panel fastening. This catalog depicts only a portion of honeycomb and sandwich panel fasteners that have been developed over the years. In addition, Rosán is geared to provide custom solutions to all types of special fastener problems. If you don't see a design in this catalog that will suit your application, consult Rosán or one of our field sales engineers for a solution to meet your specific needs.

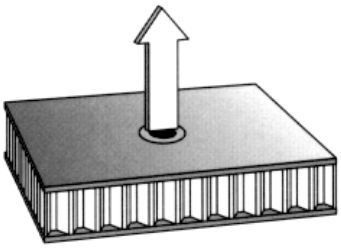
Capabilities

Delron Inserts provide the capability to attach sub-assemblies to sandwich structures. They transmit loads to and from the structure (see below).

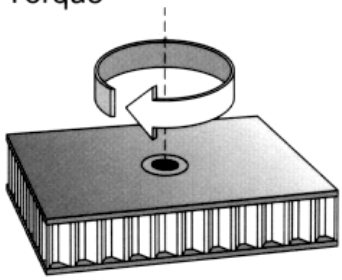
Shear



Tension



Torque



Form 94-676 Rev. A. 96-08-01

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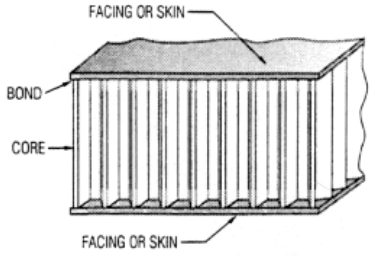


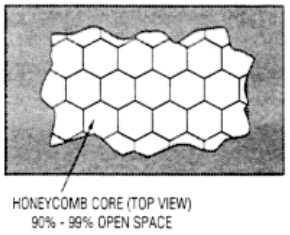
A strctural sandwich consists of 3 elements, the core, the facing (skins or cover sheets) and most important, the bond. Sandwich panels, therefore, can be made from practically any material available. The most common examples are listed below.

Face Sheet Materials:

- Aluminum
- Steel
- Titanium
- Plastic
- Fiberglass - Fiberglass Reinforced Plastic (FRP)
- Composite - Graphite/Boron/Fibers
- Wood Veneer
- Plywood

Core Materials:

- Honeycomb
  - Aluminum
  - CRES Steel
  - Titanium
  - Nomex(r)
  - Kraft Paper
  - FRP with various resins
- Closed Cell Foam - Polyvinyl Chloride (PVC)
- End Grain Balsa Wood
- Wood

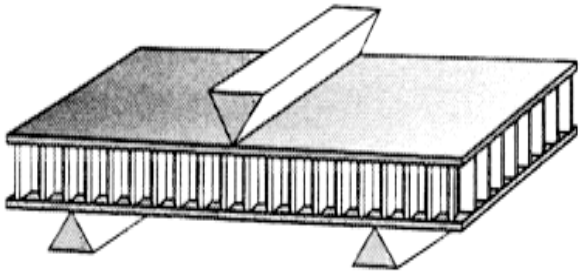


The highest strength-to-weight ratio is produced in honeycomb sandwich panel, where the core is 90% to 99% open space.

The core both supports and links the top and bottom facings of the panel. Because the components are bonded together, compression on one facing produces tension on the other facing. The sandwich construction supports loads by taking the bending moment in the facing sheets and the shear load in the core.

Sub-Panel Structure Comparison

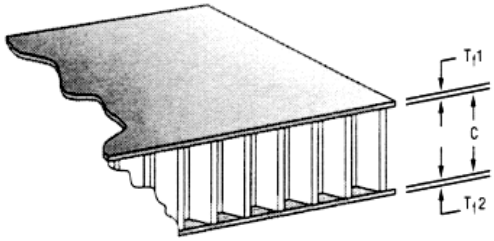
The comparison below shows the relative strength and weight attributes of the most common types of sandwich panels.



	Relative Strength	Relative Stiffness	Relative Weight
Honeycomb	100%	100%	3%
Foam Sandwich	26%	68%	
Structural Extrusion	62%	99%	
Sheet & Stringer	64%	86%	
Plywood	3%	17%	100%

Typical Panel Description

T = Overall Thickness (O.A. is also used)
T_f1 = Thickness of Top Face Sheet
T_f2 = Thickness of Bottom Face Sheet
C = Complete Description of Core



Example:

T = .560"
T_f1 = 020" Aluminum 6061-T6
T_f2 = .020" Aluminum 6061-T6
C (Core) = .518"; 3.2 lbs. Density; 3/16 Hex; .0015" Foil, 5052 Aluminum

Note: T (Overall Thickness) is important to note, and does not always equal the core height plus facing thickness; the thickness of the bonding material must be considered.

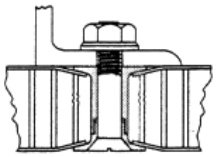
Alcoa Fastening Systems

ALCOA

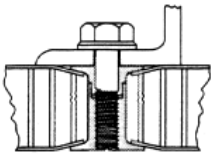
Series Selector Guide

Delron Series	Description	Capabilities	Styles	Installation
100	Traditional “two-piece” grommet type inserts with “interference interlock”. For use as attachment points in honeycomb or sandwich panels. Requires access to both sides of the panel.	Shear and compression loading. Minimum tension capabilities.	Flush or Non-Flush Head Styles: · Thru-Rivet · Thru-Bolt · Threaded · Threaded with Non-Metallic Thread Lock · Threaded with Helical Coil	· One Diameter Thru-Hole · Flat Pressing Anvils with Alignment Ram Type Equipment, or · Arbor Press, or · Hydraulic Press, or Squeezer Equipment
400	Structural capability insert potted or molded into place, requires access to one side of the panel only.	High pull-out strength. Positive sealing.	· Threaded · Floating Thread · Threaded with Non-Metallic Thread Lock · Threaded with All Metal Thread Lock	· One Diameter Blind Hole · Molded in with Semco or Similar Equipment · Tab Installation · Snap-In Installation · Adjustable
600 Regular	Structural capability insert. Pre-assembled two-piece design allows for high installation rates and lower installed costs. Requires access to both sides of the panel.	Excellent shear, tension, compression and torque-out capabilities.	Flush or No-Flush Head Styles: · Thru-Rivet · Thru-Bolt · Threaded · Threaded with Non-Metallic Thread Lock · Threaded with Helical Coil	· Two Diameter Hole (Drilll and Counterbore) · Flat Pressing Anvils with Alignment Ram Type Equipment, or · Arbor Press, or · Hydraulic Press, or Squeezer Equipment
600 Flared	Structural capability insert. Pre-assembled, two-piece design allows for high installation rates and lower installed costs. Requires access to both sides of the panel.	Excellent shear, tension, compression and torque-out capabilities. High fatigue resistance.	Flush or Non-Flush Head Styles: · Thru-Rivet · Thru Bolt · Threaded · Threaded with Non-Metallic Thread Lock · Threaded with Helical Coil	· Two Diameter Hole (Drilll and Counterbore) · Flat Pressing Anvils with Alignment Ram Type Equipment, or · Arbor Press, or · Hydraulic Press, or Squeezer Equipment

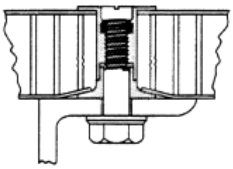
Typical Assemblies



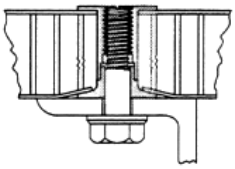
101 & 102 Rivet & Thru-Bolt Series



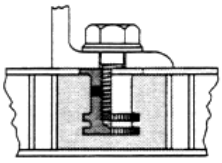
103 Threaded Series



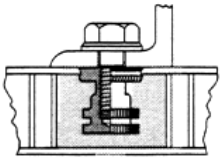
104 Self-Locking Series



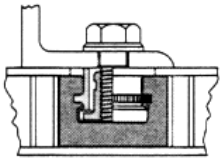
106 All Metal Self-Locking Series



400 H HE Flush Head Series

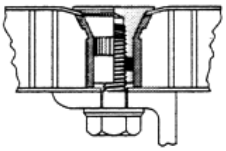


400 S SE Snap-In Series

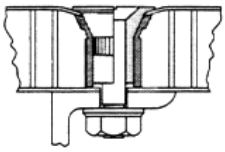


400 HF Floating Series

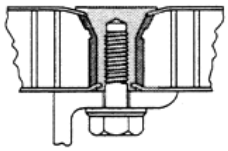
NAS 1832 through NAS 1836 are Available



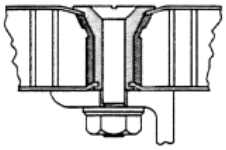
603 & 604 Threaded Series



601 & 602 Rivets Thru-Bolt Series



603 Flared Threaded Series



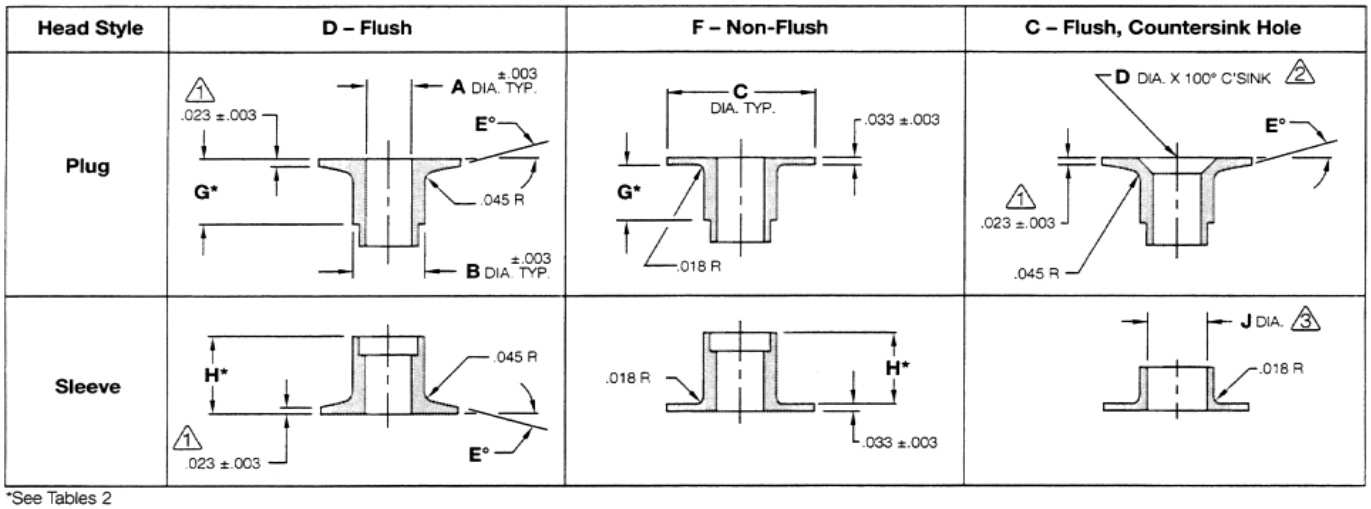
601 & 602 Flared Rivet & Thru-Bolt Series

Alcoa Fastening Systems

Delron Inserts
101 Series – Thru-Rivet

Style Selection

Head styles may be combined between Plugs and Sleeves within the same size.



*See Tables 2

Table 1

Size	Hole Dia.	B Body Dia.	C Head Dia.	D C'Sink Dia.	Head Angle
12	.136	.278	.500	.233	13°
15	.169	.278	.500	.295	13°
18	.194	.309	.625	.362	13°
25	.257	.372	.750	.486	14°
28	.290	.403	.812	.501	14°
31	.318	.466	.875	.574	14°

Notes:

<1> Head Thickness = .033 for 31 size.

<2> "C" style head available in Plugs only.

<3> "J" diameter is thru (no counterbore) for -03 through -04 length Sleeves for 25 and 28 sizes only.

4. - Tolerances, unless otherwise specified: .xxx ± .010; Angles ±2°.

Part Number Selection

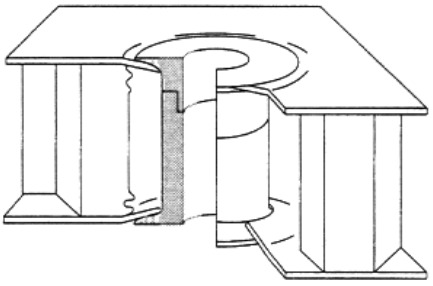
Two part number-Sleeve and Plug-are required for a complete assembly. Consult Rosán for availability of optional materials, finishes, sizes and lengths.

Example:

S 1 0 1 F 15 - 08
P 1 0 1 C 15 - 1

- Add Suffix "NF" to Part Number if No Finish is Required
- Length Dash Number: See Tables 2
- Optional Finish (Alum. Parts Only): AL = Alodine per MIL-C-5541, Class 3; AA = Iridite per MIL-C-5541
- Size: See Table 1
- Head Style: C = Flush Head, Countersink Hole; D = Flush Head; F = Non-Flush Head
- Type: Thru-Rivet
- Material: 0 = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Anodize per MIL-A-8625; 6 = CRES Steel per ASTM-A-581/ASTM-A-582, AMS5640, Passivate per QQ-P-35; 9 = Carbon Steel per ASTM-A-108/FED-STD-66, Cadmium Plate per QQ-P-416, Type II, Class 2
- Series 100: Grommet Type Panel Insert
- Part Type: P = Plug S = Sleeve

Typical Assembly



Typical Series 101, Thru-Rivet Plug and Sleeve assembly, installed in honeycomb sandwich panel. Sleeve and Plug form a telescopic press fit.

Note: For installation and tooling information, see pages 24 and 25.

Alcoa Fastening Systems

101 Series - continued

Plug and Sleeve Dash Number Selection

Select Sleeve and Plug Dash Number from Tables 2 by determining the thickness closest to, but not greater than, the panel being used. Longer lengths available using factory installed sleeve extensions.

= Panel Thickness

Examples: 1. Requirements: #15 Size Thru-Rivet, Aluminum Alloy, Non-Flush Head for a .375 overall panel.
From table select:
-0 Plug = P101F15-0
-06 Sleeve = S101F15-06

2. Requirements: #15 Size Countersink Hole, CRES Steel, Flush Head for a .400 overall panel.
From table select:
-01 Plug = P161C15-01
-06 Sleeve = S161D15-06

Tables 2

12, 15 and 18 Sizes

Plug Dash Number		-X	-0	-01	-1	-11	-2	-21	-3	-31
Sleeve Dash Number	H G	.085	.085	.100	.116	.131	.147	.162	.179	.194
-03	.103	.188	—	—	—	—	—	—	—	—
-04	.165	—	.250	.265	.281	.296	.312	.327	.344	.359
-06	.290	—	.375	.390	.406	.421	.437	.452	.469	.485
-08	.415	—	.500	.515	.531	.546	.562	.577	.594	.609
-10	.540	—	.625	.640	.656	.671	.687	.702	.719	.734
-12	.665	—	.750	.765	.781	.796	.812	.827	.844	.859
-14	.790	—	.875	.890	.906	.921	.937	.952	.969	.984
-16	.915	—	1.000	1.015	1.031	1.046	1.062	1.077	1.094	1.109
-18	1.040	—	1.125	1.140	1.156	1.171	1.187	1.202	1.219	1.234

25 and 28 Sizes

Plug Dash Number		-X	-0	-01	-1	-11	-2	-21	-3	-31
Sleeve Dash Number	H G	.120	.120	.135	.151	.167	.183	.198	.214	.230
-03*	.067	.187	—	—	—	—	—	—	—	—
-04*	.130	—	.250	.265	.281	.297	.313	.328	.344	.360
-06	.255	—	.375	.390	.406	.422	.438	.453	.469	.485
-08	.380	—	.500	.515	.531	.547	.563	.578	.594	.610
-10	.505	—	.625	.640	.656	.672	.688	.703	.719	.735
-12	.630	—	.750	.765	.781	.797	.813	.828	.844	.860
-14	.755	—	.875	.890	.906	.922	.938	.953	.969	.985
-16	.880	—	1.000	1.015	1.031	1.047	1.063	1.078	1.094	1.110
-18	1.005	—	1.125	1.140	1.156	1.172	1.188	1.203	1.219	1.235

*"J" diameter is thru (no counterbore) for theses lengths.

31 Size

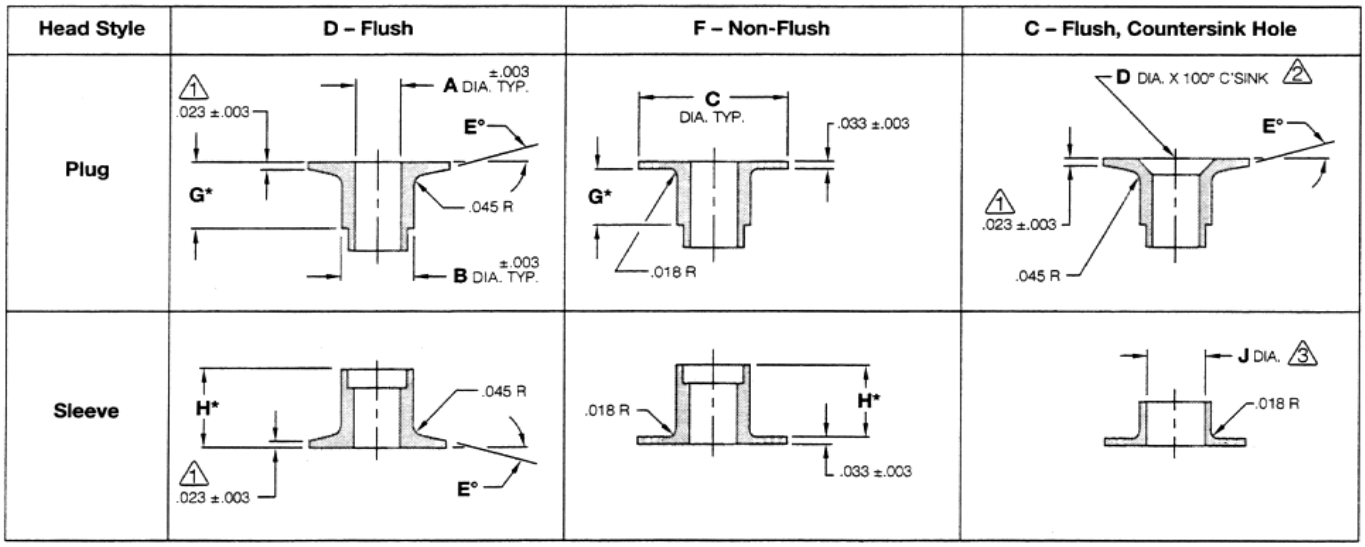
Plug Dash Number		-0	-01	-1	-11	-2	-21	-3	-31
Sleeve Dash Number	H G	.190	.206	.221	.237	.252	.268	.283	.299
-06	.185	.375	.391	.406	.422	.437	.453	.468	.484
-08	.310	.500	.516	.531	.547	.562	.578	.593	.609
-10	.435	.625	.640	.656	.672	.687	.703	.718	.734
-12	.560	.750	.766	.781	.797	.812	.828	.843	.859
-14	.685	.875	.891	.906	.922	.937	.953	.968	.984
-16	.810	1.000	1.016	1.031	1.047	1.062	1.078	1.093	1.109
-18	.935	1.125	1.141	1.156	1.172	1.187	1.203	1.218	1.234

Alcoa Fastening Systems

Delron Inserts
102 Series – Thru-Bolt

Style Selection

Head styles may be combined between Plugs and Sleeves within the same size.



*See Tables 2

Table 1

Size	A Hole Dia.	B Body Dia.	C Head Dia.	D C'Sink Dia.	E° Head Angle
4	.116	.216	.375	.220	13°
6	.144	.278	.500	.274	13°
8	.169	.278	.500	.332	13°
10	.194	.309	.325	.382	13°
25	.257	.372	.750	.505	14°
31	.318	.466	.875	.632	14°

Notes:

<1> Head Thickness = .033 for 31 size.

<2> "C" style head available in Plugs only.

<3> "J" diameter is thru (no counterbore) for -03 through -04 length Sleeves for 25 sizes only.

4. Tolerances, unless otherwise specified: .xxx ± .010; Angles ±2°.

Part Number Selection

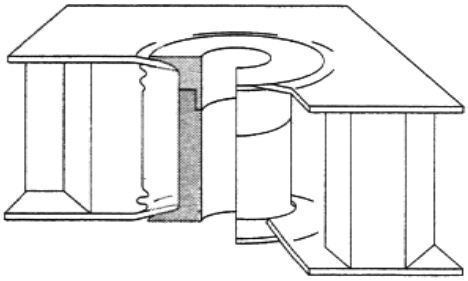
Two part number-Sleeve and Plug-are required for a complete assembly. Consult Rosán for availability of optional materials, finishes, sizes and lengths.

Example:

S 1 0 2 F 10 - 08
P 1 0 2 C 10 - 1

- Add Suffix "NF" to Part Number if No Finish is Required
- Length Dash Number: See Tables 2
- Optional Finish (Alum. Parts Only): AL = Alodine per MIL-C-5541, Class 3; AA = Iridite per MIL-C-5541
- Size: See Table 1
- Head Style: C = Flush Head, Countersink Hole; D = Flush Head; F = Non-Flush Head
- Type: = Thru-Bolt
- Material: 0 = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Anodize per MIL-A-8625; 6 = CRES Steel per ASTM-A-581/ASTM-A-582, AMS5640, Passivate per QQ-P-35; 9 = Carbon Steel per ASTM-A-108/FED-STD-66, Cadmium Plate per QQ-P-416, Type II, Class 2
- Series 100: Grommet Type Panel Insert
- Part Type: P = Plug S = Sleeve

Typical Assembly



Typical Series 102, Thru-Bolt Plug and Sleeve assembly, installed in honeycomb sandwich panel. Sleeve and Plug form a telescopic press fit.

Note: For installation and tooling information, see pages 24 and 25.

Alcoa Fastening Systems

102 Series - continued

Plug and Sleeve Dash Number Selection

Select Sleeve and Plug Dash Number from Tables 2 by determining the thickness closest to, but not greater than, the panel being used. Longer lengths available using factory installed sleeve extensions.

= Panel Thickness

Examples: 1. Requirements: #10 Size Thru-Bolt, Aluminum Alloy, Non-Flush Head for a .375 overall panel.
From table select:
-0 Plug = P102F10-0
-06 Sleeve = S102F10-06

2. Requirements: #10 Size Countersink Hole, CRES Steel, Flush Head for a .400 overall panel.
From table select:
-01 Plug = P162C10-01
-06 Sleeve = S162D10-06

Tables 2

4, 6, and 8 Sizes

Plug Dash Number		-X	-0	-01	-1	-11	-2	-21	-3	-31
Sleeve Dash Number	H G	.085	.085	.100	.116	.131	.147	.162	.179	.194
-03	.103	.188	—	—	—	—	—	—	—	—
-04	.165	—	.250	.265	.281	.296	.312	.327	.344	.359
-06	.290	—	.375	.390	.406	.421	.437	.452	.469	.485
-08	.415	—	.500	.515	.531	.546	.562	.577	.594	.609
-10	.540	—	.625	.640	.656	.671	.687	.702	.719	.734
-12	.665	—	.750	.765	.781	.796	.812	.827	.844	.859
-14	.790	—	.875	.890	.906	.921	.937	.952	.969	.984
-16	.915	—	1.000	1.015	1.031	1.046	1.062	1.077	1.094	1.109
-18	1.040	—	1.125	1.140	1.156	1.171	1.187	1.202	1.219	1.234

25 Size

Plug Dash Number		-X	-0	-01	-1	-11	-2	-21	-3	-31
Sleeve Dash Number	H G	.120	.120	.135	.151	.167	.183	.198	.214	.230
-03*	.067	.187	—	—	—	—	—	—	—	—
-04*	.130	—	.250	.265	.281	.297	.313	.328	.344	.360
-06	.255	—	.375	.390	.406	.422	.438	.453	.469	.485
-08	.380	—	.500	.515	.531	.547	.563	.578	.594	.610
-10	.505	—	.625	.640	.656	.672	.688	.703	.719	.735
-12	.630	—	.750	.765	.781	.797	.813	.828	.844	.860
-14	.755	—	.875	.890	.906	.922	.938	.953	.969	.985
-16	.880	—	1.000	1.015	1.031	1.047	1.063	1.078	1.094	1.110
-18	1.005	—	1.125	1.140	1.156	1.172	1.188	1.203	1.219	1.235

*"J" diameter is thru (no counterbore) for theses lengths.

31 Size

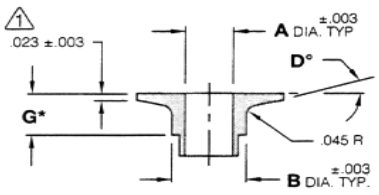
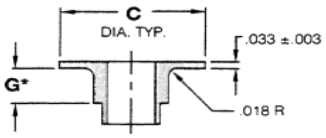
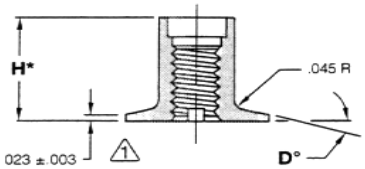
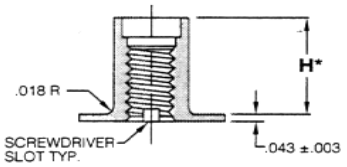
Plug Dash Number		-0	-01	-1	-11	-2	-21	-3	-31
Sleeve Dash Number	H G	.190	.206	.221	.237	.252	.268	.283	.299
-06	.185	.375	.391	.406	.422	.437	.453	.468	.484
-08	.310	.500	.515	.531	.547	.562	.578	.593	.609
-10	.435	.625	.640	.656	.672	.687	.703	.718	.734
-12	.560	.750	.766	.781	.797	.812	.828	.843	.859
-14	.685	.875	.891	.906	.922	.937	.953	.968	.984
-16	.810	1.000	1.016	1.031	1.047	1.062	1.078	1.093	1.109
-18	.935	1.125	1.141	1.156	1.172	1.187	1.203	1.218	1.234

Alcoa Fastening Systems

Delron Inserts
103 Series – Threaded

Style Selection

Head styles may be combined between Plugs and Sleeves within the same size.

Head Style	D – Flush	F – Non-Flush
Plug		
Sleeve		

*See Tables 2

Notes:

<1> Head Thickness = .033 on 524 size Sleeves and 31 size Plugs.

2. Tolerances, unless otherwise specified: .xxx ± .010; Angles ±2°.

Table 1

Size		Thread Per MIL-S-8879	A Hole Dia.	B Body Dia.	C Head Dia.	D° Head Angle
Sleeve	Plug					
440	4	.1120-40 UNJC-3B	.116	.216	.375	13°
632	6	.1380-32 UNJC-3B	.144	.278	.500	13°
832	8	.1640-32 UNJC-3B	.169	.278	.500	13°
1032	10	.1900-32 UNJF-3B	.194	.309	.625	13°
428	25	.2500-28 UNJF-3B	.257	.372	.750	14°
524	31	.3125-24 UNJF-3B	.318	.466	.875	14°

Part Number Selection

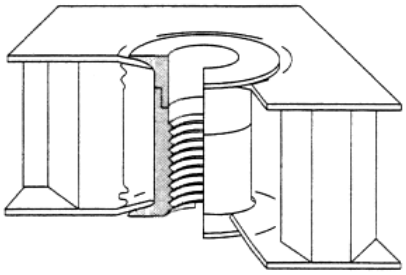
Two part number-Sleeve and Plug-are required for a complete assembly. Consult Rosán for availability of optional materials, finishes, sizes and lengths.

Example:

S 1 0 3 F 428 - 08
P 1 0 3 D 25 - 0

- Add Suffix "NF" to Part Number if No Finish is Required
- Length Dash Number: See Tables 2
- Optional Finish (Alum. Parts Only): AL = Alodine per MIL-C-5541, Class 3; AA = Iridite per MIL-C-5541
- Size: See Table 1
- Head Style: D = Flush Head; F = Non-Flush Head
- Type: Threaded
- Material: 0 = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Anodize per MIL-A-8625
  6 = CRES Steel per ASTM-A-581/ASTM-A-582, AMS5640, Passivate per QQ-P-35
  9 = Carbon Steel per ASTM-A-108/FED-STD-66, Cadmium Plate per QQ-P-416, Type II, Class 2
- Series 100: Grommet Type Panel Insert
- Part Type: P = Plug S = Sleeve

Typical Assembly



Typical Series 103, Threaded Plug and Sleeve assembly, installed in honeycomb sandwich panel. Sleeve and Plug form a telescopic press fit.

Note: For installation and tooling information, see pages 24 and 25.

103 Series - continued

Plug and Sleeve Dash Number Selection

Select Sleeve and Plug Dash Number from Tables 2 by determining the thickness closest to, but not greater than, the panel being used. Longer lengths available using factory installed sleeve extensions. For panel thicknesses less than the minimums listed below , see 103 series, Thin Panel versions.

= Panel Thickness

Examples: 1. Requirements: 1032 Thread size, CRES Steel,
Flush Head for a .500 overall panel.
From table select:
-0 Plug = P163D10-0
-06 Sleeve = S163D1032-08

2. Requirements: 428 Thread size, Aluminum Alloy
Non-Flush Head for a .625 overall panel.
From table select:
-0 Plug = P103F25-0
-10 Sleeve = S103F428-10

Tables 2

440, 632, 832, 1032 Sizes

Plug Dash Number / Sleeve Dash Number (H / G)	-0	-01	-1	-11	-2	-21	-3	-31
H / G	.085	.100	.116	.131	.147	.162	.179	.194
-08 / .415	.500	.515	.531	.546	.562	.577	.594	.609
-10 / .540	.625	.640	.656	.671	.687	.702	.719	.734
-12 / .665	.750	.765	.781	.796	.812	.827	.844	.859
-14 / .790	.875	.890	.906	.921	.937	.952	.969	.984
-16 / .915	1.000	1.015	1.031	1.046	1.062	1.077	1.094	1.109
-18 / 1.040	1.125	1.140	1.156	1.171	1.187	1.202	1.219	1.234

428 Size

Plug Dash Number / Sleeve Dash Number (H / G)	-0	-01	-1	-11	-2	-21	-3	-31
H / G	.120	.135	.151	.167	.183	.198	.214	.230
-08 / .380	.500	.515	.531	.547	.563	.578	.594	.610
-10 / .505	.625	.640	.656	.672	.688	.703	.719	.735
-12 / .630	.750	.765	.781	.797	.813	.828	.844	.860
-14 / .755	.875	.890	.906	.922	.938	.953	.969	.985
-16 / .880	1.000	1.015	1.031	1.047	1.063	1.078	1.094	1.110
-18 / 1.005	1.125	1.140	1.156	1.172	1.188	1.203	1.219	1.235

524 Size

Plug Dash Number / Sleeve Dash Number (H / G)	-0	-01	-1	-11	-2	-21	-3	-31
H / G	.190	.206	.221	.237	.252	.268	.283	.299
-10 / .435	.625	.640	.656	.672	.687	.703	.718	.734
-12 / .560	.750	.766	.781	.797	.812	.828	.843	.859
-14 / .685	.875	.891	.906	.922	.937	.953	.968	.984
-16 / .810	1.000	1.016	1.031	1.047	1.062	1.078	1.093	1.109
-18 / .935	1.125	1.141	1.156	1.172	1.187	1.203	1.218	1.234

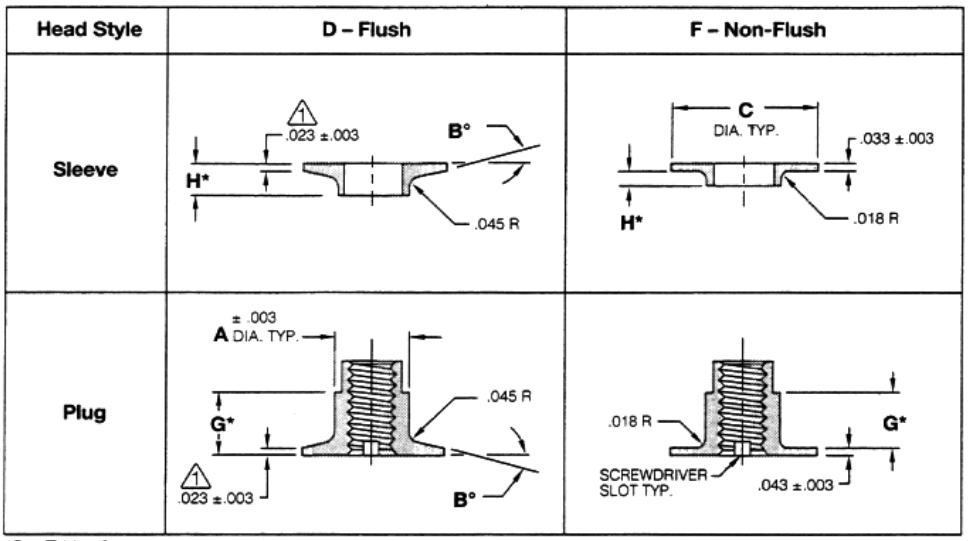
Alcoa Fastening Systems

Delron Inserts

103 Series – Thin Panel Threaded

Style Selection

Head styles may be combined between Plugs and Sleeves within the same size.



*See Tables 2

Notes:

<1> Head Thickness = .033 on 524 size Plugs and 31 size Sleeves.

2. Tolerances, unless otherwise specified: .xxx ± .010; Angles ±2°.

Table 1

Size		Thread Per MIL-S-8879	A Body Dia.	B° Head Angle	C Head Dia
Sleeve	Plug				
4	440	.1120-40 UNJC-3B	.216	13°	.375
6	632	.1380-32 UNJC-3B	.278	13°	.500
8	832	.1640-32 UNJC-3B	.278	13°	.500
10	1032	.1900-32 UNJF-3B	.309	13°	.625
25	428	.2500-28 UNJF-3B	.372	14°	.750
31	524	3125-24 UNJF-3B	.466	14°	.875

Part Number Selection

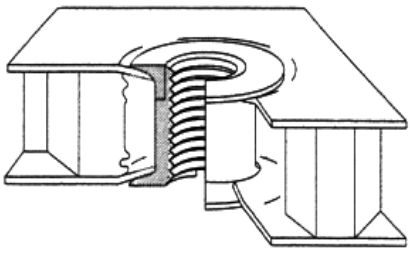
Two part number-Sleeve and Plug-are required for a complete assembly. Consult Rosán for availability of optional materials, finishes, sizes and lengths.

Example:

P 1 0 3 F 832-06
S 1 0 3 D 8 - 0

- Add Suffix "NF" to Part Number if No Finish is Required
- Length Dash Number: See Tables 2
- Optional Finish (Alum. Parts Only): AL = Alodine per MIL-C-5541, Class 3; AA = Iridite per MIL-C-5541
- Size: See Table 1
- Head Style: D = Flush Head; F = Non-Flush Head
- Type: Threaded
- Material: 0 = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Anodize per MIL-A-8625; 6 = CRES Steel per ASTM-A-581/ASTM-A-582, AMS5640, Passivate per QQ-P-35; 9 = Carbon Steel per ASTM-A-108/FED-STD-66, Cadmium Plate per QQ-P-416, Type II, Class 2
- Series 100: Grommet Type Panel Insert
- Part Type: P = Plug S = Sleeve

Typical Assembly



Typical Series 103, Thin Panel, Threaded Plug and Sleeve assembly, installed in honeycomb sandwich panel. Sleeve and Plug form a telescopic press fit.

Note: For installation and tooling information, see pages 24 and 25.

Alcoa Fastening Systems

103 Thin Series - continued

Plug and Sleeve Dash Number Selection

Select Sleeve and Plug Dash Number from Tables 2 by determining the thickness closest to, but not greater than, the panel being used.

= Panel Thickness

Examples: 1. Requirements: 1032 Thread size, CRES Steel,
Flush Head for a .280 overall panel.
From table select:
-04 Plug = P163D1032-04
-1 Sleeve = S163D10-1

2. Requirements: 428 Thread size, Aluminum Alloy
Non-Flush Head for a .390 overall panel.
From table select:
-06 Plug = P103F428-06
-0 Sleeve = S103F25-0

Tables 2

440, 632, 832, 1032 and 428 Sizes

Plug Dash Number / Sleeve Dash Number	G / H	-0	-01	-1	-11	-2	-21	-3	-31
		.094	.109	.125	.140	.156	.171	.187	.202
-04	.151	.245	.261	.276	.292	.307	.323	.338	.354
-06	.281	.375	.391	.406	.422	.437	.453	.468	.484

524 Size

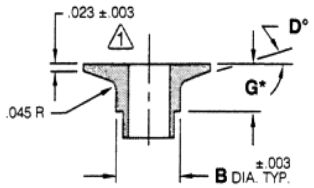
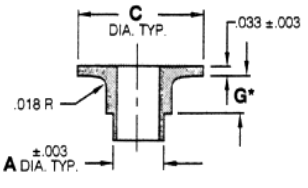
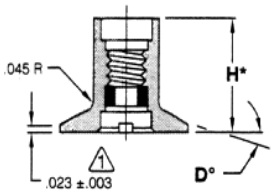
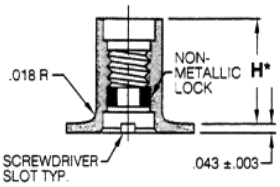
Plug Dash Number / Sleeve Dash Number	G / H	-0	-01	-1	-11	-2	-21	-3	-31
		.094	.109	.125	.140	.156	.171	.187	.202
-06	.281	.375	.390	.406	.422	.437	.453	.468	.484
-08	.401	.500	.510	.526	.542	.557	.573	.588	.604
-10	.526	.625	.636	.651	.667	.682	.698	.713	.729
-12	.651	.745	.761	.776	.792	.807	.823	.838	.854

Alcoa Fastening Systems

Delron Inserts
104 Series - Threaded with Non-Metallic Lock

Style Selection

Head styles may be combined between Plugs and Sleeves within the same size.

Head Style	D – Flush	F – Non-Flush
Plug		
Sleeve		

*See Tables 2

Notes:

[1] Head Thickness = .033 on 524 size Sleeves and 31 size Plugs.

2. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Table 1

Size		Thread Per MIL-S-8879	A Hole Dia.	B Body Dia.	C Head Dia.	D° Head Angle
Plug	Sleeve					
4	440	.1120-40 UNJC-3B	.116	.216	.375	13°
6	632	.1380-32 UNJC-3B	.144	.309	.500	13°
8	832	.1640-32 UNJC-3B	.169	.309	.500	13°
10	1032	.1900-32 UNJF-3B	.194	.341	.625	13°
25	428	.2500-28 UNJF-3B	.257	.403	.750	14°
31	524	.3125-24 UNJF-3B	.318	.497	.875	14°

Part Number Selection

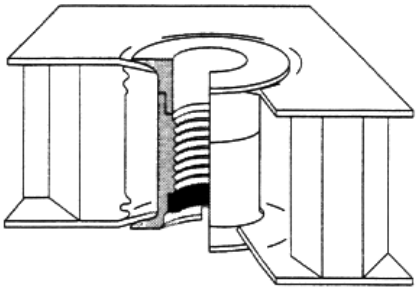
Two part numbers-Sleeve and Plug-are required for a complete assembly. Consult Rosán for availability of optional materials, finishes, sizes and lengths.

Example:

S 1 0 4 F 428 - 08
P 1 0 4 D 25 AL 0

- Add Suffix "NF" to Part Number if No Finish is Required
- Length Dash Number: See Tables 2
- Optional Finish (Alum. Parts Only): AL = Alodine per MIL-C-5541, Class 3; AA = Iridite per MIL-C-5541
- Size: See Table 1
- Head Style: D = Flush Head; F = Non-Flush Head
- Type: Threaded with Non-Metallic Lock, Torque per MIL-N-25027
- Material: 0 = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Anodize per MIL-A-8625; 6 = CRES Steel per ASTM-A-581/ASTM-A-582, AMS5640, Passivate per QQ-P-35; 9 = Carbon Steel per ASTM-A-108/FED-STD-66, Cadmium Plate per QQ-P-416, Type II, Class 2
- Series 100: Grommet Type Panel Insert
- Part Type: P = Plug S = Sleeve

Typical Assembly



Typical Series 104, Threaded Plug and Sleeve assembly, with Non-Metallic Lock installed in honeycomb sandwich panel. Sleeve and Plug form a telescopic press fit.

Note: For installation and tooling information, see pages 24 and 25.

104 Series - continued

Plug and Sleeve Dash Number Selection

Select Sleeve and Plug Dash Number from Tables 2 by determining the thickness closest to, but not greater than, the panel being used. Longer lengths available using factory installed sleeve extensions. For panel thicknesses less than the minimums listed below, see 104 Series, Thin Panel versions.

= Panel Thickness

Examples: 1. Requirements: 632 Thread size, Carbon Steel, Flush Head for a .500 overall panel.
From table select:
-0 Plug = P194D6-0
-08 Sleeve = S194D632-08

2. Requirements: 524 Thread size, Aluminum Alloy, Non-Flush Head for a .890 overall panel.
From table select:
-01 Plug = P104F31-01
-14 Sleeve = S104F524-14

Tables 2

632, 832, 1032 and 428 Sizes

Plug Dash Number / Sleeve Dash Number (H / G)		-0	-01	-1	-11	-2	-21	-3	-31
		.085	.100	.116	.131	.147	.162	.179	.194
-08	.415	.500	.515	.531	.546	.562	.577	.594	.609
-10	.540	.625	.640	.656	.671	.687	.702	.719	.734
-12	.665	.750	.765	.781	.796	.812	.827	.844	.859
-14	.790	.875	.890	.906	.921	.937	.952	.969	.984
-16	.915	1.000	1.015	1.031	1.046	1.062	1.077	1.094	1.109
-18	1.040	1.125	1.140	1.156	1.171	1.187	1.202	1.219	1.234

*-08 available for 428 size.

524 Size

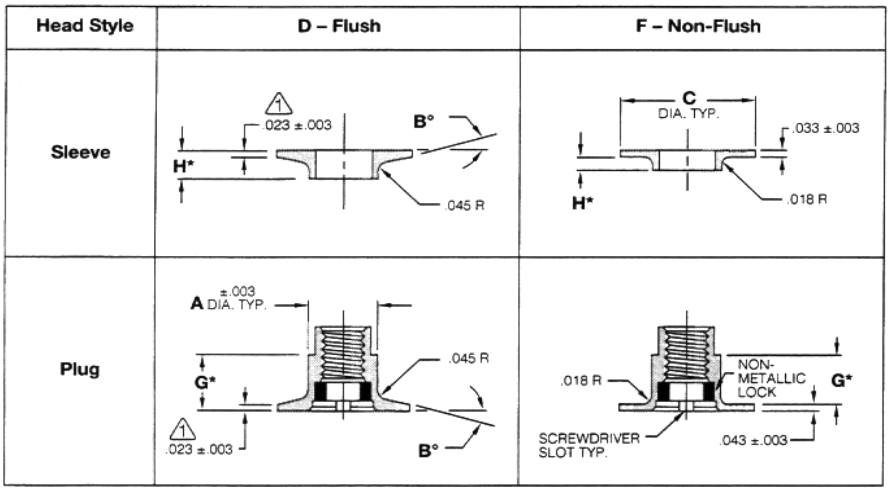
Plug Dash Number / Sleeve Dash Number (H / G)		-0	-01	-1	-11	-2	-21	-3	-31
		.248	.264	.279	.295	.310	.326	.341	.357
-14	.627	.875	.890	.906	.922	.938	.953	.969	.985
-16	.752	1.000	1.015	1.031	1.047	1.063	1.078	1.094	1.110
-18	.877	1.125	1.140	1.156	1.172	1.188	1.203	1.219	1.235

Alcoa Fastening Systems

Delron Inserts104 Series - Thin Panel Threaded with Non-Metallic Lock

Style Selection

Head styles may be combined between Plugs and Sleeves within the same size.



*See Tables 2

Notes:

<1> Head Thickness = .033 on 524 size Plugs and 31 size Sleeves.

2. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Table 1

Size		Thread Per	A	B°	C
Sleeve	Plug	MIS-S-8879	Body Dia	Head Angle	Head Dia.
4	440	.1120-40 UNJC-3B	.216	13°	.375
6	632	.1380-32 UNJC-3B	.309	13°	.500
8	832	.1640-32 UNJC-3B	.309	13°	.500
10	1032	.1900-32 UNJF-3B	.341	13°	.625
25	428	.2500-28 UNJF-3B	.403	14°	.750
31	524	.3125-24 UNJF-3B	.497	14°	.87

Part Number Selection

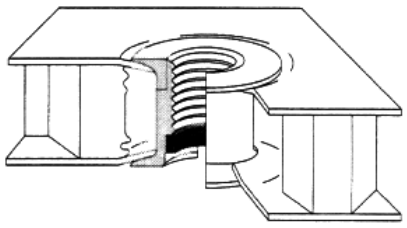
Two part numbers-Sleeve and Plug-are required for a complete assembly. Consult Rosán for availability of optional materials, finishes, sizes and lengths.

Example:

P 1 0 4 F 832 - 06
S 1 0 4 D 8 AL 0

- Add Suffix "NF" to Part Number if No Finish is Required
- Length Dash Number: See Tables 2
- Optional Finish (Alum. Parts Only): AL = Alodine per MIL-C-5541, Class 3; AA = Iridite per MIL-C-5541
- Size: See Table 1
- Head Style: D = Flush Head; F = Non-Flush Head
- Type: Threaded with Non-Metallic-Lock, Torque per MIL-N-25027
- Material: 0 = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Red Anodize per MIL-A-8625; 6 = CRES Steel per ASTM-A-581/ASTM-A-582, AMS5640, Passivate per QQ-P-35; 9 = Carbon Steel per ASTM-A-108/FED-STD-66, Cadmium Plate per QQ-P-416, Type II, Class 2
- Series 100: Grommet Type Panel Insert
- Part Type: P = Plug S = Sleeve

Typical Assembly



Typical Series 104, Thin Panel, Threaded with Non-Metallic-Lock assembly, installed in honeycomb sandwich panel. Sleeve and Plug form a telescopic press fit.

Note: For installation and tooling information, see pages 24 and 25.

Alcoa Fastening Systems

104 Thin Series - continued

Plug and Sleeve Dash Number Selection
Select Sleeve and Plug Dash Number from Tables 2 by determining the thickness closest to, but not greater than, the panel being used.

= Panel Thickness

Examples: 1. Requirements: 832 Thread size, CRES Steel,
Flush Head for a .265 overall panel.
From table select:
-04 Plug = P164D832-04
-01 Sleeve = PS164D8-01

2. Requirements: 524 Thread size, Aluminum Alloy,
Non-Flush Head for a .700 overall panel.
From table select:
-10 Plug = P104F524-10
-21 Sleeve = S10431-21

Tables 2
440, 632, 832, 1032 and 428 Sizes

Sleeve Dash No. / Plug Dash Number (G / H)	-0	-01	-1	-11	-2	-21	-3	-31
	.094	.109	.125	.140	.156	.171	.187	.202
-04 .151	.245	.261	.276	.292	.307	.323	.338	.354
-06 .281	.375	.390	.406	.422	.437	.453	.468	.484

524 Size

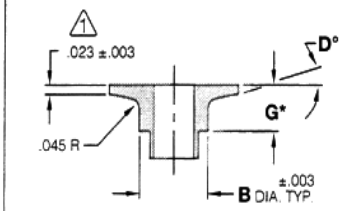
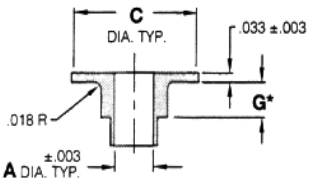
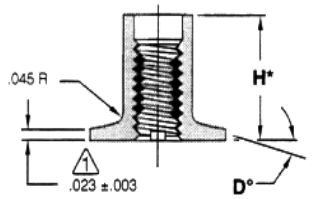
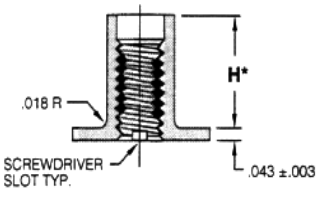
Sleeve Dash No. / Plug Dash Number (G / H)	-0	-01	-1	-11	-2	-21	-3	-31
	.094	.109	.125	.140	.156	.171	.187	.202
-08 .401	.500	.510	.526	.542	.557	.573	.588	.604
-10 .526	.620	.636	.651	.667	.682	.698	.713	.729
-12 .651	.745	.761	.776	.792	.807	.823	.838	.854

Alcoa Fastening Systems

Delron Inserts106 Series - Threaded with Self-Locking Helical Coil Insert

Style Selection

Head styles may be combined between Plugs and Sleeves within the same size.

Head Style	D – Flush	F – Non-Flush
Plug		
Sleeve		

*See Tables 2

Notes:

[1] Head Thickness = .033 on 524 size Sleeves and 31 size Plugs.

2. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Table 1

Size		Thread Per MIL-S-8879	A Hole Dia.	B Body Dia.	C Head Dia.	D° Head Angle
Plug	Sleeve					
6	632	.1380-32 UNJC-3B	.144	.309	.500	13°
8	832	.1640-32 UNJC-3B	.169	.309	.500	13°
10	1032	.1900-32 UNJF-3B	.194	.341	.625	13°
25	428	.2500-28 UNJF-3B	.257	.403	.750	14°
31	524	.3125-24 UNJF-3B	.318	.497	.875	14°

Part Number Selection

Two part numbers-Sleeve and Plug-are required for a complete assembly. Consult Rosán for availability of optional materials, finishes, sizes and lengths.

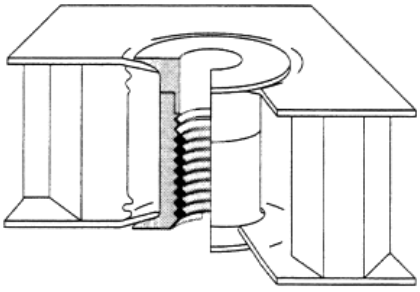
Example:

S 1 0 6 F 428-08

P 1 0 6 D 25 - 0

- Add Suffix "NF" to Part Number if No Finish is Required
- Length Dash Number: See Tables 2
- Size: See Table 1
- Head Style: D = Flush Head, F = Non-Flush Head
- Type: Threaded All-Metal Self-Locking Helical Coil Insert per MS21209
- Material: 0 = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Alodine per MIL-C-5541
  6 = CRES Steel per ASTM-A-581/ASTM-A-582, AMS5640, Passivate per QQ-P-35
  9 = Carbon Steel per ASTM-A-108/FED-STD-66, Cadmium Plate per QQ-P-416, Type II, Class 2
- Series 100: Grommet Type Panel Insert
- Part Type: P = Plug S = Sleeve

Typical Assembly



Typical Series 106, Threaded with Self-Locking Helical Coil Insert; Plug and Sleeve assembly, installed in honeycomb sandwich panel. Sleeve and Plug from a telescopic press fit.

Note: For installation and tooling information, see pages 24 and 25.

Alcoa Fastening Systems

106 Series - continued

Plug and Sleeve Dash Number Selection

Select Sleeve and Plug Dash Number from Tables 2 by determining the thickness closest to, but not greater than, the panel being used. Longer lengths available using factory installed sleeve extensions. For panel thicknesses less than the minimums listed below, see 104 Series, Thin Panel versions.

= Panel Thickness

Examples: 1. Requirements: 632 Thread size, Carbon Steel, Flush Head for a .500 overall panel.
From table select:
-0 Plug = P194D6-0
-08 Sleeve = S194D632-08

2. Requirements: 524 Thread size, Aluminum Alloy, Non-Flush Head for a .890 overall panel.
From table select:
-01 Plug = P104F31-01
-14 Sleeve = S104F524-14

Tables 2
632, 832, 1032 and 428 Sizes

Plug Dash Number		-0	-01	-1	-11	-2	-21	-3	-31
Sleeve Dash Number	H G	.085	.100	.116	.131	.147	.162	.179	.194
-08*	.415	.500	.515	.531	.546	.562	.577	.594	.609
-10	.540	.625	.640	.656	.671	.687	.702	.719	.734
-12	.665	.750	.765	.781	.796	.812	.827	.844	.859
-14	.790	.875	.890	.906	.921	.937	.952	.969	.984
-16	.915	1.000	1.015	1.031	1.046	1.062	1.077	1.094	1.109
-18	1.040	1.125	1.140	1.156	1.171	1.187	1.202	1.219	1.234

*-08 available for 428 size.

524 Size

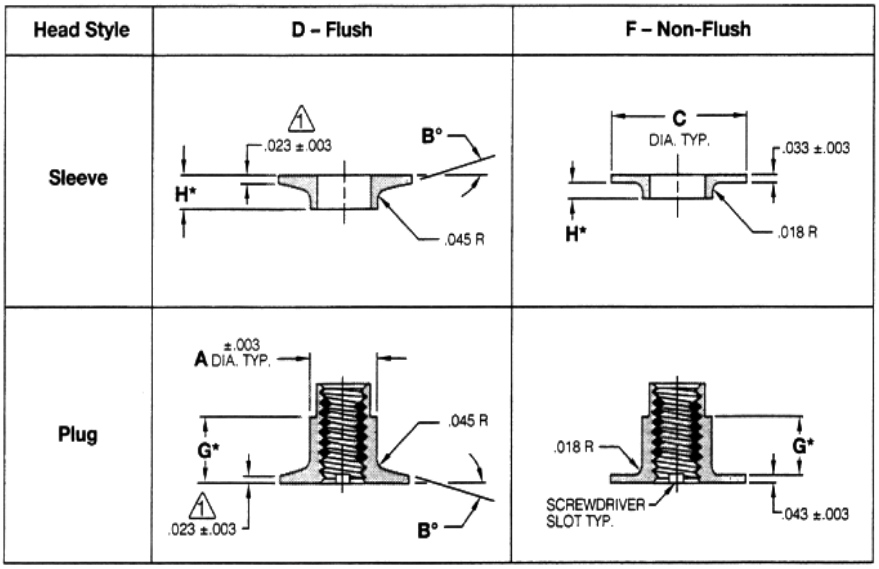
Plug Dash Number		-0	-01	-1	-11	-2	-21	-3	-31
Sleeve Dash Number	H G	.248	.264	.279	.295	.310	.326	.341	.357
-14	.627	.875	.890	.906	.922	.938	.953	.969	.985
-16	.752	1.000	1.015	1.031	1.047	1.063	1.078	1.094	1.110
-18	.877	1.125	1.140	1.156	1.172	1.188	1.203	1.219	1.235

Alcoa Fastening Systems

Delron Inserts106 Series - Thin Panel Threaded with Self-Locking Helical Coil Insert

Style Selection

Head styles may be combined between Plugs and Sleeves within the same size.



*See Tables 2

Notes:

[1] Head Thickness = .033 on 524 size Plugs and 31 size Sleeves.

2. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Table 1

Size		Thread Per MIL-S-8879	A Dia. Tp.	B° Head Angle	C Dia. Typ.
Sleeve	Plug				
6	632	.1380-32 UNJC-3B	.309	13°	.500
8	832	.1640-32 UNJC-3B	.309	13°	.500
10	1032	.1900-32 UNJF-3B	.341	13°	.625
25	428	.2500-28 UNJF-3B	.403	14°	.750
31	524	.3125-24 UNJF-3B	.497	14°	.875

Part Number Selection

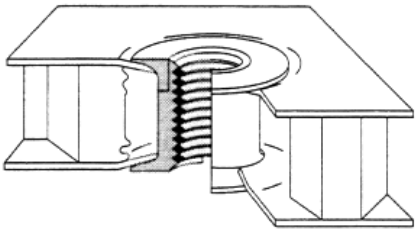
Two part numbers-Sleeve and Plug-are required for a complete assembly. Consult Rosán for availability of optional materials, finishes, sizes and lengths.

Example:

P 1 0 6 F 832-06
S 1 0 6 D 8 - 0

- Add Suffix "NF" to Part Number if No Finish is Required
- Length Dash Number: See Tables 2
- Size: See Table 1
- Head Style: D = Flush Head, F = Non-Flush Head
- Type: Threaded All-Metal Self-Locking Helical Coil Insert per MS21209
- Material: 0 = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Anodize per MIL-A-8625
  6 = CRES Steel per ASTM-A-581 or ASTM-A-582, AMS 5640, Passivate per QQ-P-35
  9 = Carbon Steel per ASTM-A-108/FED-STD-66, Cadmium Plate per QQ-P-416, Type II, Class 2
- Series 100: Grommet Type Panel Insert
- Part Type: P = Plug S = Sleeve

Typical Assembly



Typical Series 106 Thin Panel, Threaded with Self-Locking Helical Coil Insert; Plug and Sleeve assembly, installed in honeycomb sandwich panel. Sleeve and Plug form a telescopic press fit.

Note: For installation and tooling information, see pages 24 and 25.

106 Thin Series - continued

Plug and Sleeve Length Dash Number Selection

Select Sleeve and Plug Length Dash Number from Tables 2 by determining the thickness closest to, but not greater than, the panel being used.

= Panel Thickness

Examples: 1. Requirements: 1032 Thread size, CRES Steel,
Flush Head for a .380 overall panel.
From table select:
-06 Plug = P106D10-06
-0 Sleeve = S106D1032-0

2. Requirements: 428 Thread size, Aluminum Alloy
Non-Flush Head for a .530 overall panel.
From table select:
-08 Plug = P106F25-08
-1 Sleeve = S106F428-1

Tables 2
440, 632, 832, 1032, and 428 Sizes

Sleeve Dash No.		-0	-01	-1	-11	-2	-21	-3	-31
Plug Dash Number	G H	.094	.109	.125	.140	.156	.171	.187	.202
-04*	.151	.245	.261	.276	.292	.307	.323	.338	.354
-06	.281	.375	.390	.406	.422	.437	.453	.468	.484
-08**	.401	.500	.510	.526	.542	.557	.573	.588	.604

524 Size

Sleeve Dash No.		-0	-01	-1	-11	-2	-21	-3	-31
Plug Dash Number	G H	.094	.109	.125	.140	.156	.171	.187	.202
-08	.401	.500	.510	.526	.542	.557	.573	.588	.604
-10	.526	.620	.636	.651	.667	.682	.698	.713	.729
-12	.651	.745	.761	.776	.792	.807	.823	.838	.854

*Not available for 428 size.
**Available in 428 size only.

Installation and Tooling Selection

100 Series, Grommet Type

Permanently installed at sub-assembly, the 100 Series fasteners are self-retained through a telescopic press fit that is a function of the sleeve and plug sections. The use of threaded or threaded self-locking type permits the attachment of components without the use of additional lock nuts.

Panel Preparation

Requires the following:

1. A single diameter thru-hole
2. Standard drill sizes (comparable to body diameter). See table on opposite page
3. Access to both sides of the panel.

Fastener Installation

The most common method of applying the necessary pressure is the use of a hand arbor press, a hydraulic squeezer or any pneumatically operated press.

To assure proper alignment and to direct the pressure to the head of the fastener, the use of a piloted anvil type tool as illustrated is suggested. Alignment tools such as these can be manufactured by your own tooling facilities. Due to the simplicity of this type of tool Ros n does not stock them, but will make them to order for any given type or size.

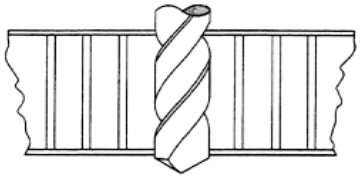
An average of 1800 pounds for installation pressure is recommended. Excessive pressure may force the telescopic section to over-expand and become loose.

Panel facing sheets up to .032" will dimple automatically to obtain a flush head condition. Thicker sheets may require the use of the non-flush head style fastener. If flushness is required in these thicker facings, pre-dimpling or spot-facing is common practice in the industry.

Fasteners that cannot be installed by conventional methods (such as field installations), may be installed by hand operated pull up tools.

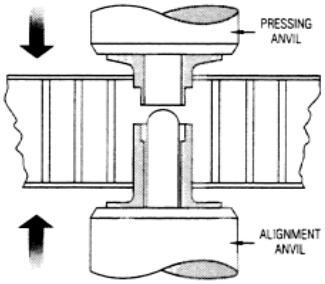
Installation Sequence

1.



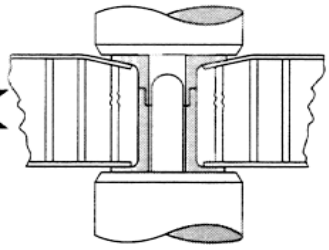
Thru-hole is drilled in panel; drill size is comparable to body diameter of 100 Series insert used.

2.



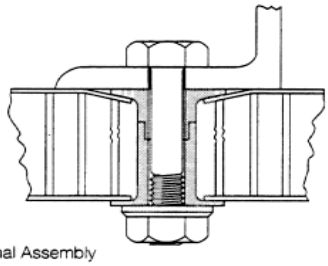
Piloted anvils press sleeve and plug components from opposing sides of panel.

3.



At 300 lbs of installation pressure, facing skins to .032" will dimple automatically.

4.



Typical Final Assembly

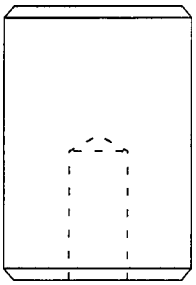
Tooling Part Numbers

Example: Insert Part Number 102C-10-1 requires Tool Kit Number: 1616-3.

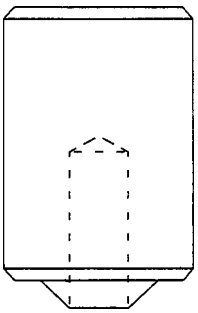
Fastener Series and Sizes	Installation Hole Size	Installation Tooling		
		Tool Kit Number	Pressing Anvil	Alignment Anvil
101(*)12	.290	1612	1612-1	1612-2
101C12		1615-1	1615-1-1	
102(*)4	.228	1613-0	1613-0-1	1613-0-2
102C4		1616-0	1616-0-1	
102(*)6	.290	1613	1613-1	1613-2
102C6		1616-1	1616-1-1	
101(*)15		1614-2	1614-2-1	1614-2-2
102(*)8				
101C15		1615-2	1615-2-1	
102C8		1616-2	1616-2-1	
101(*)18	.323	1614-3	1614-3-1	1614-3-2
102(*)10				
101C18		1615-3	1615-3-1	
102C10		1616-3	1616-3-1	
101(*)25	.390	1614-4	1614-4-1	1614-4-2
102(*)25				
101C25		1615-4	1615-4-1	
102C25		1616-4	1616-4-1	
101(*)28	.421	1674	1674-1	1674-2
101c28		1676	1676-1	1676-2
101(*)31	.484	1614-5	1614-5-1	1614-5-2
102(*)31				
101C31		1615-5	1615-5-1	
102C31		1616-5	1616-5-1	
103(*)440	.228	1617-0	1617-0-1	1617-0-2
104(*)440				
103(*)632	.290	1617-1	1613-1	1617-1-2
104(*)632	.323			
106(*)632				
103(*)832	.290	1617-2	1614-2-1	1617-2-2
104(*)832	.323			
106(*)832				
103(*)1032		1617-3	1614-3-1	1617-3-2
104(*)1032	.358			
106(*)1032				
103(*)428	.390	1617-4	1614-4-1	1617-4-2
104(*)428	.421			
106(*)428				
103(*)524	.484	1617-5	1614-5-1	1617-5-2
104(*)524	.515			
106(*)624				

(*) Fill in 'C', 'D' or 'F' as applicable.

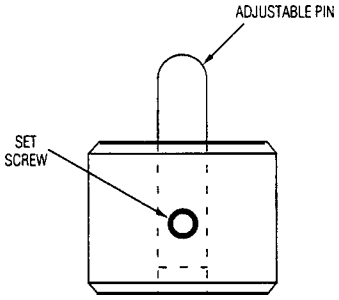
Pressing Anvils For 'D' & 'F' Style Heads



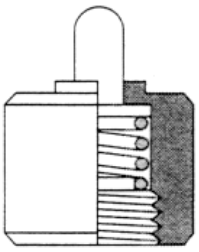
Pressing Anvil For 'C' Style Heads



Alignment Anvils For Thru Hole Type Fasteners



Spring Loaded Alignment Anvils For Threaded Type Fasteners



Alcoa Fastening Systems

Delron Inserts
400 SF Series - Snap-In, Floating Nut

Style Selection

All styles feature a .031 inch minimum radial float.

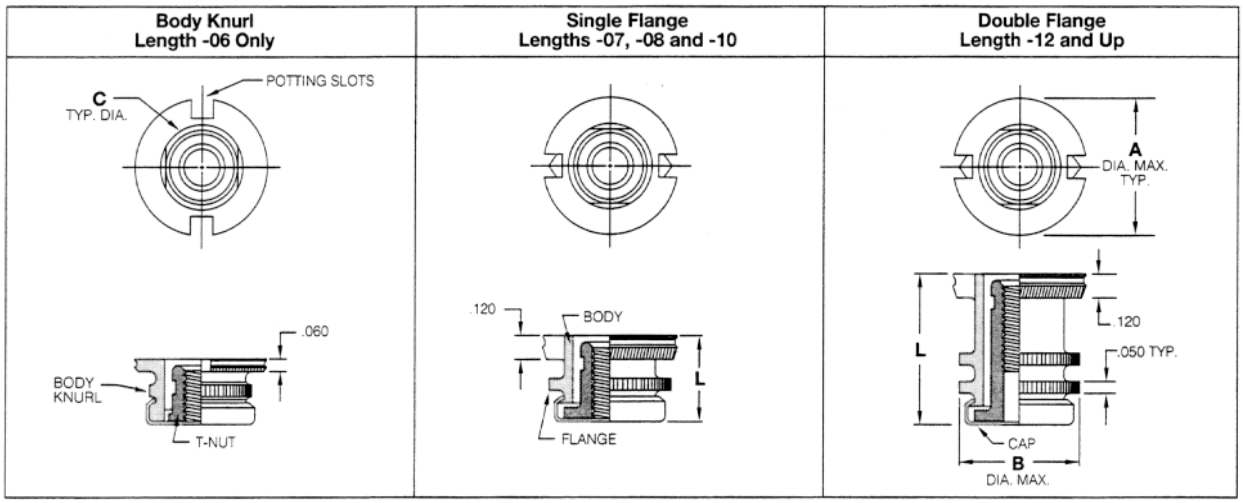


Table 1

Size	Thread Size Per MIL-S-8879	A Head Dia.	B Flange Dia.	C Hole Dia.
440	.1120-40 UNJC-3B	.531	.489	.323
632	.1380-32 UNJC-3B	.531	.489	.323
832	.1640-32 UNJC-3B	.593	.551	.323
1032	.1900-32 UNJF-3B	.593	.511	.323
428	.2500-28 UNJF-3B	.718	.676	.437
524	.3125-24 UNJF-3B	.843	.801	.437
624	.3750-24 UNJF-3B	.968	.926	.515

Materials and Finishes:

Body: 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6; Alodine per MIL-C-5541.
Cap: Brass, Cadmium plated, or Aluminum, Anodized at manufacturer's option.
T-Nut: Options listed in Part Number Selection.

Notes:

1. Burrs permissible at knurled areas and underside of head around potting slots.
2. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Part Number Selection

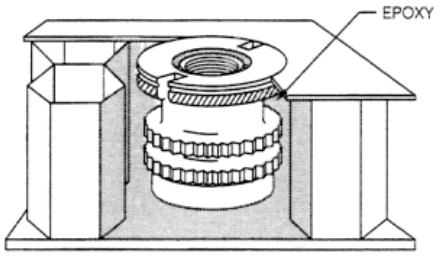
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

4 9 5 SF 832-10 - 4

- 4 — Add Suffix "NS" when Potting Slots are Not Required
- 10 — Skin Thickness Dash Number: See Table 3
- 832 — Length Dash Number: See Table 2
- 9 — Replace with "M" for MoS_2 Solid Film Lubricant On T-Nut Only
- 5 — Thread Size Code: See Table 1
- SF — Flush Head Style, Snap-In, Floating Nut, Potting Slots
- 5 — Thread Type: 3 = Threaded Only; 5 = Crimp Lock per MIL-N-25027
- 4 — Nut Material and Finish: 6 = 303 CRES Steel per ASTM-A-581/ASTM-A-582, AMS5640, Passivate per QQ-P-35, Flash Silver Plate per QQ-S-365 On Self-Locking Nuts Only Unless "M" Finish Required; 9 = Carbon Steel per ASTM-A-108/FED-STD-66, Cadmium Plate per QQ-P-416, Type II, Class 2
- 495 — Series 400: Potted-In Type Panel insert

Typical Assembly



Typical Series 400 SF Snap-In, Floating Nut Insert installed in honeycomb sandwich panel. Insert is held in place by a cured epoxy compound.

Note: For installation and tooling information, see pages 44 and 45.

400 SF Series - continued

Length Dash Number Selection
Select Length Dash Number from Table 2 based on the minimum full thread length required by the application. Insert length "L" must be a minimum of .040" *less* than depth of panel core (See Fig. 1).

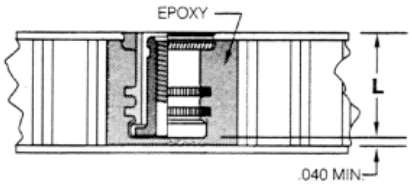
Examples: 1. Requirements: 632 Size Non-Locking Thread, Carbon Steel, Slotted Head, Minimum Full Thread Length of .250 for a panel with a skin thickness of .044, and an overall panel thickness of .650. From table select:

Length	Skin	
-10	-4	P/N = 493 SF 632-10-4

2. Requirements: 428 Size Crimp Lock Thread, 303 CRES, Non-Slotted Head, Minimum Full Thread Length of .475 for a panel with skin thickness of .035, and an overall panel thickness of .765. From table select:

Length	Skin	
-12	-3	P/N = 465 SF 428-12-3NS

Fig. 1



Minimum clearance is required between bottom of insert and inside panel skin for proper epoxy bonding around buttom of insert.

= Minimum Full Thread Length

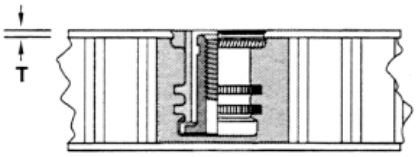
Table 2

Length Dash Number	L	Thread Size						
		440	632	832	1032	428	524	624
-06*	.335	.292	.292	.292	.292	-	-	-
-07	.395	.224	.276	.328	.350	.350	.350	.350
-08	.455	.224	.276	.328	.380	.410	.410	.410
-10	.565	.224	.276	.328	.380	.500	.520	.520
-12	.690	.224	.276	.328	.380	.500	.625	.645
-14	.812	.224	.276	.328	.380	.500	.625	.750
-16	.935	.224	.276	.328	.380	.500	.625	.750

*Available in -1, -2 and -3 skin thicknesses only.

Table 3

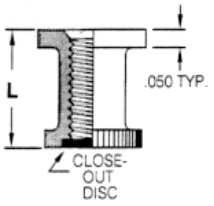
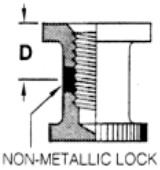
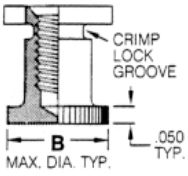
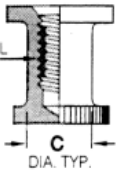
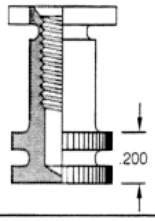
Skin Dash Number	T
-1	.010-.019
-2	.020-.029
-3	.030-.039
-4	.040-.049
-5	.050-.059
-6	.060-.069



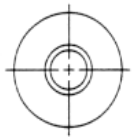
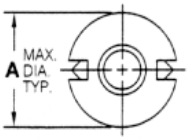
Alcoa Fastening Systems

Delron Inserts 400 H, HE Series - Blind Thread

Style Selection

Thread Type	Threaded Only	Non-Metallic Lock	Crimp Lock per MIL-N-25027	Helical Coil Lock per MS21209	
					
Material*	0, 5, 6 or 9	0, 5, 6 or 9	5, 6 or 9	0, 5, 6 or 9	Double Flange on -07 length and up typical - all styles.

*See "Part Number Selection", below, for description of numerical references.

Head Style	H - Standard Flush	HE - Flush with Potting Slots
		

Notes:

1. Burrs permissible at knurled areas and underside of head around potting slots.
2. Adhesive backed installation tabs are furnished with each slotted part. See Table 3.
3. Plated or lubed bolts are recommended for use with self-locking cres inserts.
4. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Table 1

Size	Thread Size Per MIL-S-8879	A Head Dia.	B Flange Dia.	C Body Dia.	D
440	.1120-40 UNJC-3B	.374	.322	.195	.100
632	.1380-32 UNJC-3B	.436	.385	.230	.120
832	.1640-32 UNJC-3B	.499	.447	.290	.120
1032	.1900-32 UNJF-3B	.499	.447	.290	.120
428	.2500-28 UNJF-3B	.561	.510	.353	.140
524	.3125-24 UNJF-3B	.686	.635	.460	.150
624	.3750-24 UNJF-3B	.811	.697	.550	.150

Part Number Selection

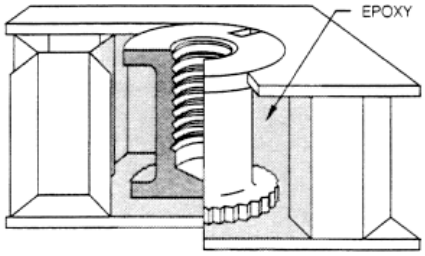
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

4 6 5 HE 428-12

- 12: Length Dash Number: See Tables 2
- 428: Size: See Table 1
- HE: Head Style: H = Standard Flush; HE = Flush With Potting Slots
- 5: Thread Type: 3 = Threaded Only; 4 = Non-Metallic Lock; 5 = Crimp Lock per MIL-N-25027 (Material 5, 6 or 9 Only); 6 = Self-Locking Helical Coil Insert per MS21209
- 6: Material: 0 = 2024-T4 or T351 Aluminum per QQ-A-225/6, Alodine per MIL-C-5541; 5 = A286 CRES per AMS 5731, Passivate per QQ-P-35; 6 = 303 CRES per ASTM-A-581/ASTM-A-582, AMS5640, Passivate per QQ-P-35; 9 = Carbon Steel per ASTM-A-108/FED-STD-66 Cadmium Plate per QQ-P-416, Type II, Class 2
- 4: Series 400: Potted-In Type Panel Insert

Typical Assembly



Typical Series 400 HE, Blind Threaded Insert; installed in honeycomb sandwich panel. Insert is held in place by a cured epoxy compound.

Note: For installation and tooling information, see pages 44 and 45.

Alcoa Fastening Systems

400 H, HE Series - continued

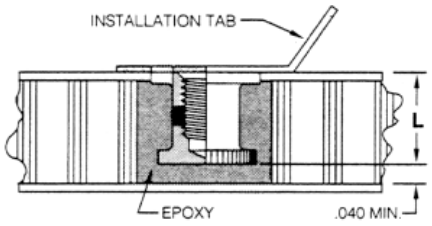
Length Dash Number Selection

Select Length Dash Number from Tables 2 based on the minimum full thread length required by the application. Insert length "L" must be a minimum of .040" *less* than depth of panel core (See Fig. 1).

Example: 1. Requirements: 832 size, Non-Metallic Lock Thread, 303 CRES, Slotted Head with a Minimum Full Thread Length of .295, and an overall panel thickness of .520.
From table select:
-08 P/N = 464HE832-08

2. Requirements: 440 Size Helical Coil Lock, Carbon Steel, Flush Head, with a Minimum Full Thread Length of .150, and an overall panel thickness of .455.
From table select:
-07 P/N = 496H440-07

Fig. 1



Minimum clearance is required between bottom of insert and inside panel skin for proper epoxy bonding around bottom of insert.

= Minimum Full Thread Length

Tables 2

All Thread Types Except Helical Coil Lock

Length Dash Number	L	Thread Size						
		440	632	832	1032	428	524	624
-04*	.220	.170	.170	.170	.170	-	-	-
-05*	.285	.190	.190	.190	.190	.235	-	-
-06*	.335	.225	.235	.235	.235	.250	-	-
-07	.395	.250	.280	.280	.280	.250	-	-
-08	.455	.250	.280	.330	.330	.330	.320	-
-10	.565	.250	.280	.330	.380	.420	.430	.425
-12	.690	.250	.280	.330	.380	.500	.550	.550
-14	.815	.250	.280	.330	.380	.500	.625	.625
-16	.935	.250	.280	.330	.380	.500	.625	.750

*Close out disc required to provide minimum full thread.

Helical Coil Lock Types

Length Dash Number	L	Thread Size						
		440	632	832	1032	428	524	624
-06	.335	.112	-	-	-	-	-	-
-07	.395	.168	.138	-	-	-	-	-
-08	.455	.224	.207	.164	.190	-	-	-
-10	.565	.224	.276	.246	.285	.250	-	-
-12	.690	.224	.276	.328	.380	.375	.312	-
-14	.815	.224	.276	.328	.380	.500	.469	.375
-16	.935	.224	.276	.328	.380	.500	.469	.562

Installation Tabs

Adhesive backed installation tabs are supplied with all 400 HE Series Inserts, unless otherwise specified. The tabs are coded by insert thread size as listed in Table 3.

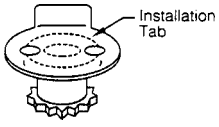


Table 3

Thread Size	Installation Tab Number
440	T16
632	T21
832	T4
1032	T4
428	T6
524	T9
624	T11

Alcoa Fastening Systems

Delron Inserts
400 HF Series - Floating Nut

Style Selection

All styles feature a .031 inch minimum radial float.

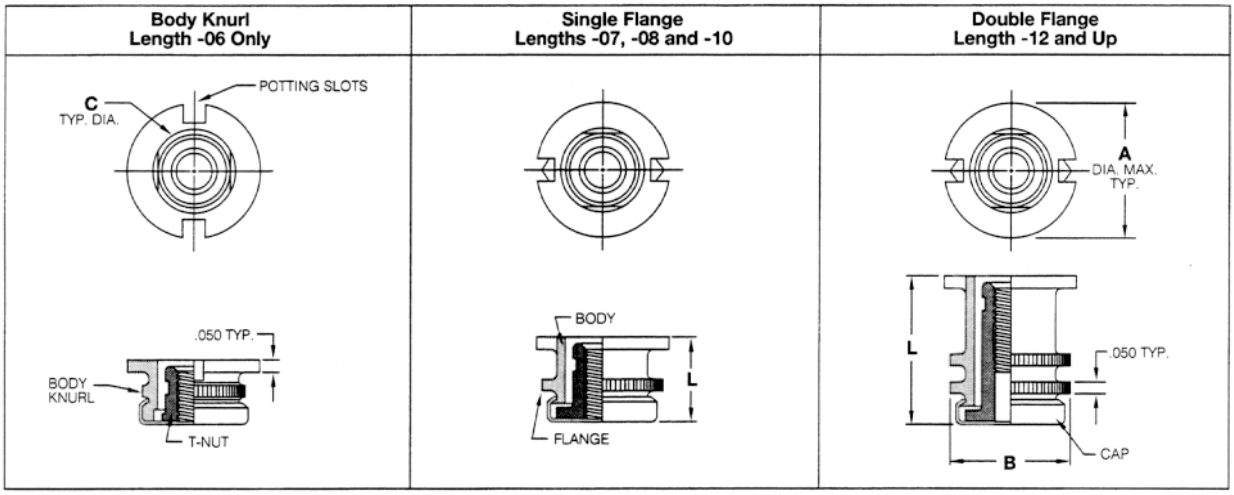


Table 1

Size	Thread Size Per MIL-S-8879	A Head Dia.	B Flange Dia.	C Hole Dia.
440	.1120-40 UNJC-3B	.499	.489	.323
632	.1380-32 UNJC-3B	.499	.489	.323
832	.1640-32 UNJC-3B	.561	.551	.323
1032	.1900-32 UNJF-3B	.561	.551	.323
428	.2500-28 UNJF-3B	.686	.676	.437
524	.3125-24 UNJF-3B	.811	.801	.437
624	.3750-24 UNJF-3B	.936	.926	.515

Materials and Finishes:

Body: 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6; Alodine per MIL-C-5541.

Cap: Brass, Cadmium plated, or Aluminum, Anodized at manufacturer's option.

T-Nut: Options listed in Part Number Selection.

Notes:

1. Burrs permissible at 0knurled areas and underside of head around potting slots.
2. Adhesive backed installation tabs are furnished with each slotted part. See Table 3.
3. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Part Number Selection

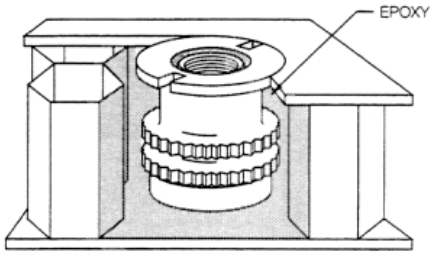
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

4 6 3 HF 1032 - 12

- 12: Add Suffix "NS" when Potting Slots are Not Required
- 12: Length Dash Number: See Table 2
- 1032: Replace With "M" For MoS_2 Solid Film Lubricant On T-Nut Only
- 1032: Size: See Table 1
- HF: Flush Head Style, Floating Nut, Potting Slots
- 3: Thread Type: 3 = Threaded Only; 5 = Crimp Lock per MIL-N-25027
- 6: Nut Material and Finish: 6 = 303 CRES Steel per ASTM-A-581/ASTM-A-582, AMS5640, Passivate per QQ-P-35, Flash Silver Plate per QQ-S-365 On Self-Locking Nuts Only Unless "M" Finish Required; 9 = Carbon Steel per ASTM-A-108/FED-STD-66, Cadmium Plate per QQ-P-416, Type II, Class 2
- 4: Series 400: Potted-In Type Panel Insert

Typical Assembly



Typical Series 400 HF, Floating Nut Insert; installed in honeycomb sandwich panel. Insert is held in place by a cured epoxy compound.

Note: For installation and tooling information, see pages 44 and 45.

Alcoa Fastening Systems

400 HF Series - continued

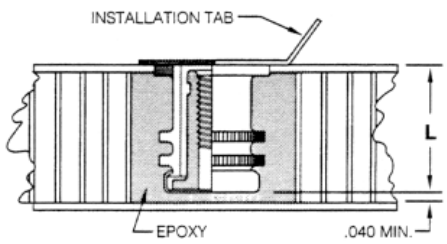
Length Dash Number Selection

Select Length Dash Number from Table 2 based on the minimum full thread length required by the application. Insert length "L" must be a minimum of .040" less than depth of panel core (See Fig. 1).

Examples:

1. Requirements: 428 Size Normal Thread, Carbon Steel Nut, MoS_2 Lubricant, with a Minimum Full Thread Length of .400, and an overall panel thickness of .520.
   From table select:
   -08 P/N = 493HF 428M08
2. Requirements: 1032 Size Crimp Lock Thread, CRES STeel Nut, No Slots, a Minimum Full Thread Length of .380, and an overall panel thickness of .880.
   From table select:
   -14 P/N = 465HF 1032-14NS

Fig. 1



Minimum clearance is required between bottom of insert and inside panel skin for proper epoxy bonding around bottom of insert.

= Minimum Full Thread Length

Table 2

Length Dash Number	L	Thread Size						
		440	632	832	1032	428	524	624
-06	.335	.224	.276	.292	.292	—	—	—
-07	.395	.224	.276	.328	.350	.350	.350	.350
-08	.455	.224	.276	.328	.380	.410	.410	.410
-10	.565	.224	.276	.328	.380	.500	.520	.520
-12	.690	.224	.276	.328	.380	.500	.625	.645
-14	.815	.224	.276	.328	.380	.500	.625	.750
-16	.935	.224	.276	.328	.380	.500	.625	.750

Installation Tabs

Adhesive backed installation tabs are supplied with all 400 HF Series Inserts, unless otherwise specified. The tabs are coded by insert thread size as listed in Table 3.

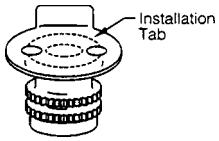


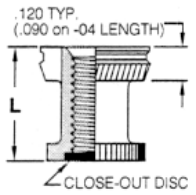
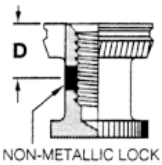
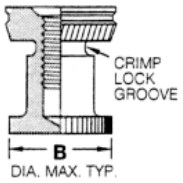
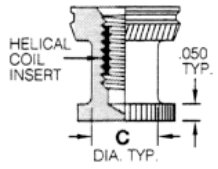
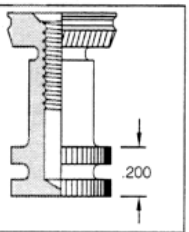
Table 3

Thread Size	Installation Tab Number
440	T13
632	T13
832	T6
1032	T6
428	T9
524	T11
624	T27

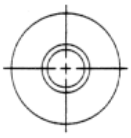
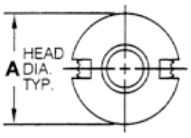
Alcoa Fastening Systems

Delron Inserts
400 S, SE Series - Snap-In

Style Selection

Thread Type	Threaded Only	Non-Metallic Lock	Crimp Lock per MIL-N-25027	Helical Coil Lock per MS21209	
					
Material*	0, 6 or 9	0, 6 or 9	6 or 9 only	0, 6 or 9	Double Flange on -08 and up typical - all styles.

*See "Part Number Selection", below, for description of numerical references.

Head Style	S - Snap-In	SE - Snap-In with Potting Slots
		

Notes:

1. Burrs permissible at knurled areas and on underside of head around potting slots.
2. Plated or lubed bolts are recommended for use with self-locking cres inserts.
3. Tolerances, unless otherwise specified: .xxx ± .010; Angles 1 2°.

Table I

Size	Thread Size Per MIL-S-8879	A Head Dia.	B Flange Dia.	C Body Dia.	D
440	.1120-40 UNJC-3B	.375	.312	.195	.165*
632	.1380-32 UNJC-3B	.437	.375	.230	.175*
832	.1640-32 UNJC-3B	.500	.437	.290	.185*
1032	.1900-32 UNJF-3B	.500	.437	.290	.185*
428	.2500-28 UNJF-3B	.562	.500	.353	.190
524	.3125-24 UNJF-3B	.687	.625	.460	.200
624	.3750-24 UNJF-3B	.812	.687	.550	.200

*Reduce "D" dimension by 0.30 inch when ordering -04 lengths in sizes 440 thru 1032.

Part Number Selection

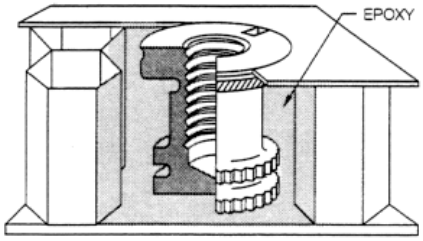
Consult Rosá for availability of optional materials, finishes and sizes.

Example:

4 0 6 SE 832-10-2

- 2 — Top Skin Thickness Dash Number: See Table 3
- 10 — Length Dash Number: See Tables 2
- 832 — Size: See Table I
- SE — Head Style: S = Snap-In; SE = Snap-In with Potting Slots
- 6 — Thread Type: 3 = Threaded Only; 4 = Non-Metallic Lock; 5 = Crimp Lock per MIL-N-25027 (Material 6 or 9 only); 6 = Self-Locking Helical Coil Insert per MS21209
- 0 — Material: 0 = 2024-T4 or T351 Aluminum per QQ-A-225/6, Alodine per MIL-C-5541; 6 = 303 CRES per AMS5640, ASTM-A-581/ASTM-A-582, Passivate per QQ-P-35; 9 = Carbon Steel per ASTM-A-108/FED-STD-66, Cadmium Plate per QQ-P-416, Type II, Class 2
- 4 — Series 400: Potted-In Type

Typical Assembly



Typical Series 400 S, SE Snap-In Insert; installed in honeycomb sandwich panel. Insert is held in place by a cured epoxy compound.

Note: For installation and tooling information, see pages 44 and 45.

Alcoa Fastening Systems

400 S, SE Series – continued

Length and Skin Thickness Dash Number Selection

Select Length Dash Number from Tables 2 based on the minimum full thread length required by the application. Insert length "L" must be a minimum of .040" *less* than depth of panel core (See Fig. 1).

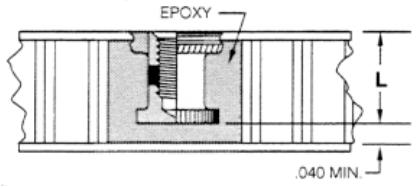
Examples: 1. Requirements: 440 Size Crimp Lock Thread, Carbon Steel, Slotted Head, Minimum Full Thread Length of .200, for a panel with a skin thickness of .035, and an overall panel thickness of .410. From tables select:

Length	Skin	
-06	-3	P/N = 495 SE 440-06-3

2. Requirements: 624 Size Helical Coil Lock, Aluminum Alloy, Non-Slotted Head, Minimum Full Thread Length of .400, for a panel with skin thickness of .060, and an overall panel thickness of 1.035. From tables select:

Length	Skin	
-16	-6	P/N = 406 S 624-16-6

Fig. 1



Minimum clearance is required between bottom of insert and inside panel skin for proper epoxy bonding around bottom of insert.

Tables 2

All Thread Types Except Helical Coil Lock

= Minimum Full Thread Length

Length Dash Number	L	Thread Size						
		440	632	832	1032	428	524	624
-04*†	.220	.170	.170	.170	.170	—	—	—
-05*	.285	.190	.190	.190	.190	.235	—	—
-06*	.335	.225	.235	.235	.235	.250	—	—
-07	.395	.250	.280	.280	.280	.250	—	—
-08	.455	.250	.280	.330	.330	.330	.320	—
-10	.565	.250	.280	.330	.380	.420	.430	.425
-12	.690	.250	.280	.330	.380	.500	.550	.550
-14	.815	.250	.280	.330	.380	.500	.625	.750
-16	.935	.250	.280	.330	.380	.500	.625	.750

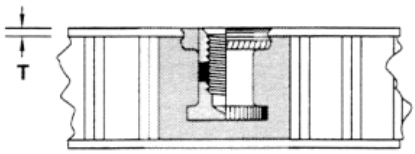
*Close out disc required to provide minimum full thread. † Available in -1, -2 and -3 skin thicknesses only; see Table 3 below.

Helical Coil Lock Types

Length Dash Number	L	Thread Size						
		440	632	832	1032	428	524	624
-06	.335	.112	—	—	—	—	—	—
-07	.395	.168	.138	—	—	—	—	—
-08	.455	.224	.207	.164	.190	—	—	—
-10	.565	.224	.276	.246	.285	.250	—	—
-12	.690	.224	.276	.328	.380	.375	.312	—
-14	.815	.224	.276	.328	.380	.500	.469	.375
-16	.935	.224	.276	.328	.380	.500	.469	.562

Tables 3

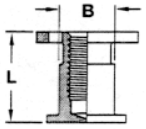
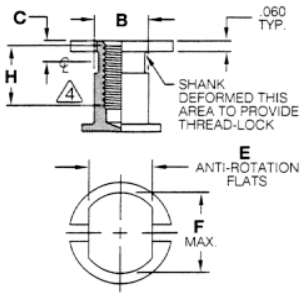
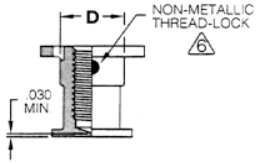
Skin Dash Number	T
-1	.010-.019
-2	.020-.029
-3	.030-.039
-4	.040-.049
-5	.050-.059
-6	.060-.069



Alcoa Fastening Systems

Delron Inserts
D1832 Series - NAS 1832 Equivalent

Style Selection

Thread Type	Nonself-Locking – Threaded Only	Self-Locking per MIL-N-25027 <5>	
		Crimp Lock	Non-Metallic Lock
			
Material*	(-), A, or C	(-) or C	A

*See "Part Number Selection", opposite, for description of Material codes.

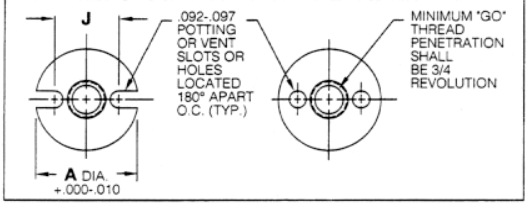
Head Style	Potting Vent Slots or Holes — Manufacturer's Option
	

Table 1

Size	Thread Size Per MIL-S-8879	A Head Dia.	B Body Dia.	C	D Body Dia.	E Flat	F Flange Dia.	H Min.	J	L Min.
06	.1380-32 UNJC-3B	.560	.300	.12	.375	.400	.560	.250	.367	.37
08	.1640-32 UNJC-3B	.560	.300	.12	.375	.400	.560	.250	.367	.37
3	.1900-32 UNJF-3B	.560	.300	.12	.375	.400	.560	.250	.367	.37
4	.2500-28 UNJF-3B	.685	.375	.14	.440	.520	.685	.312	.467	.50
5	.3125-24 UNJF-3B	.685	.475	.16	.500	.520	.685	.312	.467	.50
6	3750-24 UNJF-3B	.841	.500	.22	.550	.560	.841	.375	.591	.50

Notes:

1. Burrs caused by machining of potting holes of slots permissible under flange.
2. Adhesive backed installation tab, D1837, shall be furnished with each insert. See page 44.
3. Plated or solid film lubricant is recommended on self-locking CRES inserts.

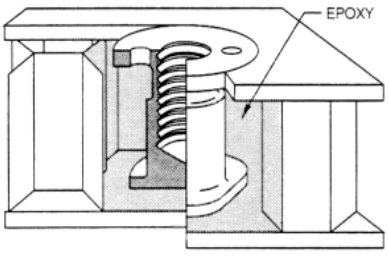
<4> Minimum thread "H", where length permits, shall be 2 diameters.

<5> Self-locking, 303 CRES inserts without plating or lubricant will be tested using a silver plated bolt or screw.

<6> Locate locking pellet no closer than 10° from edge of either potting holes or slots.

7. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Typical Assembly



Typical Series D1832 Blind Threaded Insert (NAS 1832 equivalent); installed in honeycomb sandwich panel. Insert is held in place by a cured epoxy compound.

Note: For installation and tooling information, see pages 44 and 45.

Alcoa Fastening Systems

D1832 Series - continued

Insert Length Determination

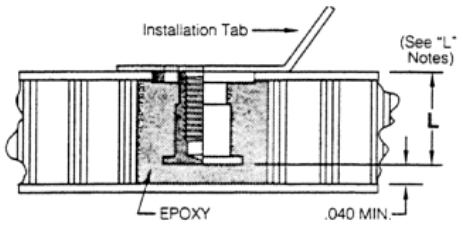
The length of the insert is specified by a dash number which defines .125 inch increments. Insert length must be a minimum of .040 inch less than depth of panel core (See Fig. 1).

Example: -6 = .750
-11 = 1.375 inch

"L" Notes:

1. Specified in .125 inch increments.
2. Minimum "L" values are listed in Table 1, opposite.
3. Maximum bolt engagement should not exceed "L" minus .060 inch.

Fig. 1



Minimum clearance is required between bottom of insert and inside panel skin for proper epoxy bonding around bottom of insert.

Part Number Selection

Consult Rosán for availability of optional materials, finishes and sizes.

Example:

D1832 - 3 - 5

- 5 — Optional Finish: M = Solid-Film Lubricant per MIL-L-46010, Type I; Applied to Threads Only (CRES and Carbon Steel Only)
  - P = Cadmium Plate per QQ-P-416, Type II, Class 2 (CRES only)
  - S = Sliver Plate per AMS2410 (CRES only)
- Length of Insert in .125 inch Increments
- Thread Type: (-) = Self-Locking; N = Nonself-Locking
- Size: See Table 1
- 3 — Material: (-) = Carbon Steel per ASTM-A-108 or FED STD 66, Ultimate Tensile Strength of 85 KSI, Minimum. Cadmium Plate per QQ-P-416, Type II, Class 2
  - A = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Anodize per MIL-A-8625, Type I
  - C = 303 CRES per ASTM-A-582, Passivate per QQ-P-35, Type II
- D1832 — Series D1832: NAS 1832 Equivalent, Potted-In Type Panel Inserts

Part Number Example:

1. Requirements:

.1900-32 Thread size, Self-Locking, Aluminum Screw Engagement of .50 inch, and an overall panel thickness of .750.

Part Number:

D1832 A 3 - 5

- 5 — Insert Length of .625 inch
- Self-Locking Thread
- 3 — .1900-32 UNJF-3B Thread size (See Table 1)
- A — Aluminum Alloy Material
- D1832 — Series

2. Requirements:

.1640-32 Thread size, Nonself-Locking, Carbon Steel with Solid Film Lubricant, Thread Engagement of .25 inch and an overall panel thickness of .50 inch.

Part Number:

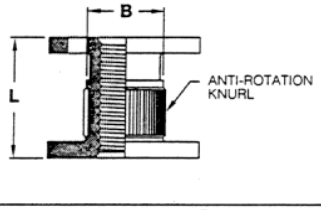
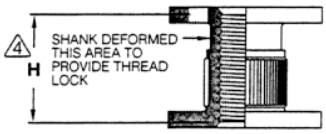
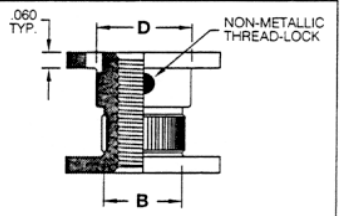
D1832 - 08 N 3 M

- M — Solid-Film Lubricant
- 08 — Insert Length of .375 inch
- N — Nonself-Locking Thread
- 3 — .1640-32UNJC-3B Thread Size (See Table 1)
- Carbon Steel Material
- D1832 — Series

Alcoa Fastening Systems

Delron Inserts
D1833 Series - NAS 1833 Equivalent

Style Selection

Thread Type	Nonself-Locking – Threaded Only	Self-Locking per MIL-N-25027 <5>	
		Crimp Lock	Non-Metallic Lock
			
Material*	(-), A, or C	(-) or C	A

*See "Part Number Selection", opposite, for description of Material codes.

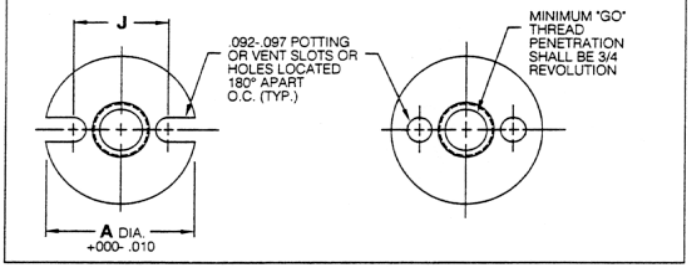
Head Style	Potting Vent Slots or Holes — Manufacturer's Option
	

Table 1

Size	Thread Size Per MIL-S-8879	A Head Dia.	B Dia.	C	D Dia.	J	L Min.
06	.1380-32 UNJC	.560	.300	.12	.375	.367	.250
08	.1640-32 UNJC	.560	.300	.12	.375	.367	.250
3	.1900-32 UNJF	.560	.300	.12	.375	.367	.250
4	.2500-28 UNJF	.685	.375	.14	.440	.467	.312
5	.3125-24 UNJF	.685	.475	.16	.500	.467	.312
6	.3750-24 UNJF	.841	.500	.22	.550	.591	.375

Notes:

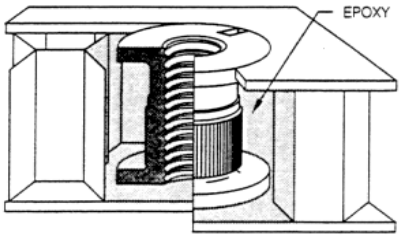
1. Burrs caused by machining of potting holes or slots permissible under flange.
2. Adhesive backed installation tab, D1837, shall be furnished with each insert. See page 44.
3. Plated or solid film lubricant is recommended on self-locking CRES inserts.

<4> Minimum thread "H", where length permits, shall be 2 diameters. Lengths shorter than 2 diameters will be threaded the entire length.

<5> Self-locking, 303 CRES inserts without plating or lubricant will be tested using a silver plated bolt or screw.

6. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Typical Assembly



Typical Series D1833 Blind Thru-Threaded Insert (NAS 1833 equivalent); installed in honeycomb sandwich panel. Insert is held in place by a cured epoxy compound.

Note: For installation and tooling information, see pages 44 and 45.

Alcoa Fastening Systems

D1833 Series - continued

Part Number Selection

Consult Rosán for availability of optional materials, finishes and sizes.

Example:

D1833 - 08 - 625 M

- Optional Finish: M = Solid-Film Lubricant per MIL-L-46010, Type I; Applied to Threads Only (CRES and Carbon Steel Only)
  - P = Cadmium Plate per QQ-P-416, Type II, Class 2 (CRES only)
  - S = Sliver Plate per AMS2410 (CRES only)
- Length of Insert in Thousandths of an inch (Minimums Specified in Table 1)
- Thread Type: (-) = Self-Locking
  - N = Nonself-Locking
  - T = Self-Locking Thru-Threaded
  - TN = Nonself-Locking Thru-Threaded (4)
- Size: See Table 1
- Material: (-) = Carbon Steel per ASTM-A-108 or FED STD 66, Ultimate Tensile Strength of 85 KSI, Minimum. Cadmium Plate per QQ-P-416, Type II, Class 2
  - A = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Anodize per MIL-A-8625, Type I
  - C = 303 CRES per ASTM-A-582, Passivate per QQ-P-35, Type II
- Series D1833: NAS 1833 Equivalent, Potted-In Type Panel Inserts

Part Number Example:

1. Requirements:

.2500-28 Thread size, Nonself-Locking, Thru-Thread 303 CRES with Silver Plating, and an overall panel thickness of .450 inch.

Part Number:

D1833 C 4 N 450 S

- Silver Plating
- Insert Length of .450 inch.
- Nonself-Locking Thru-Threaded
- .2500-28 UNJF Thread size (SeeTable 1)
- 303 CRES Material
- Series

2. Requirements:

.3750-24 Thread size, Self-Locking, Thru-Thread, Carbon Steel, and an overall panel thickness of .825 inch.

Part Number:

D1833 - 6 T 825

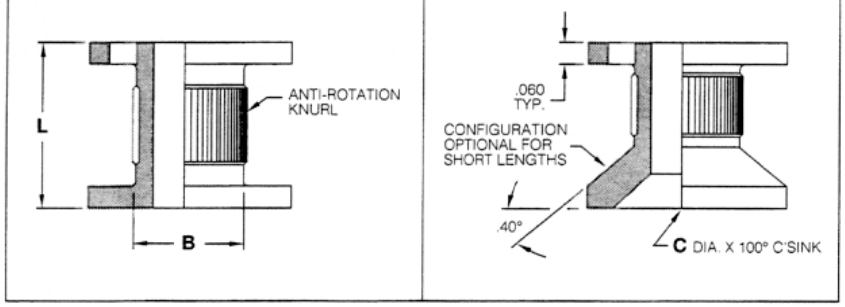
- Insert Length of .825 inch
- Self-Locking Thru-Thread
- .3750-24UNJF Thread Size (See Table 1)
- Carbon Steel Material
- Series

Alcoa Fastening Systems

Delron Inserts
D1834 Series — NAS 1834 Equivalent

Style Selection

Hole Style	Thru Clearance	Countersink Clearance



Head Style	Potting Vent Slots or Holes — Manufacturer's Option

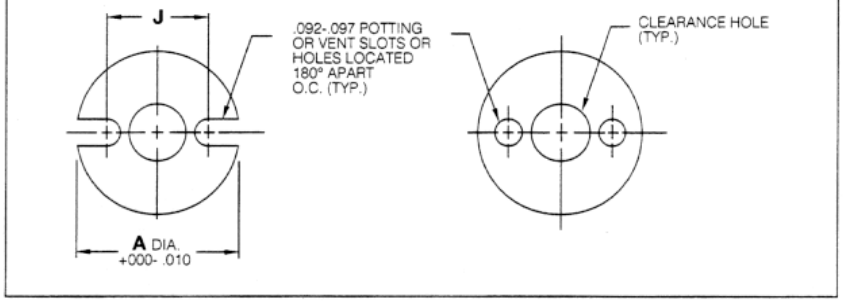


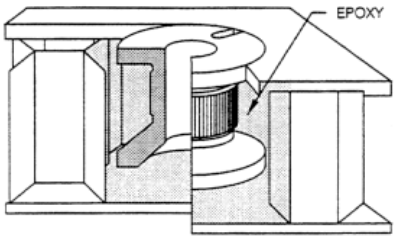
Table 1

Size	Clearance Hole Per AND10387	A Head Dia.	B Dia.	C Dia.	J	L Min.
06	.140	.560	.300	.280	.367	.250
08	.169	.560	.300	.332	.367	.250
3	.196	.560	.300	.385	.367	.250
4	.257	.685	.375	.507	.467	.312
5	.316	.685	.475	.625	.467	.312
6	.377	.841	.500	.750	.591	.375

Notes:

1. Burrs caused by machining of potting holes or slots permissible under flange.
2. Adhesive backed installation tab, D1837, shall be furnished with each insert. See page 44.
3. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Typical Assembly



Typical Series D1834 Clearance Hole Insert (NAS 1834 equivalent); installed in honeycomb sandwich panel. Insert is held in place by a cured epoxy compound.

Note: For installation and tooling information, see pages 44 and 45.

D1834 Series — continued

Part Number Selection

Consult Rosán for availability of optional materials, finishes and sizes.

Example:

D1834 - 06 - 500

- Length of Insert in Thousandths of an inch (Minimums Specified in Table 1)
- Thru-Bolt Type: (-) = Thru-Hole; K = Countersunk Thru-Hole
- Size: See Table 1
- Material: (-) = Carbon Steel per ASTM-A-108 or FED STD 66, Ultimate Tensile Strength of 85 KSI, Minimum. Cadmium Plate per QQ-P-416, Type II, Class 2
- A = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Anodize per MIL-A-8625, Type I
- C = 303 CRES per ASTM-A-582, Passivate per QQ-P-35, Type II
- Series D1834: NAS 1834 Equivalent, Potted-In Type Panel Inserts

Part Number Example:

1. **Requirements:**
   .250 Diameter Clearance Hole, Countersunk, Aluminum Alloy, and an overall panel thickness of .375 inch.

Part Number:

D1834 A 4 K 375

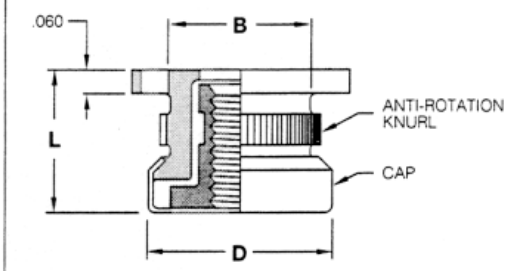
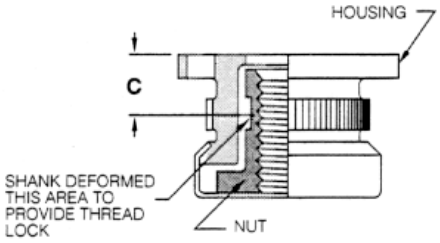
- Insert Length of .375 inch.
- Countersunk Hole Type
- .25 Dia. Clearance Hole
- Aluminum Alloy Material
- Series

Alcoa Fastening Systems

Delron Inserts
D1835 Series — NAS 1835 Equivalent

Style Selection

All styles feature .032 inch minimum radial float.

Thread Type	Nonself-Locking – Threaded Only	Self-Locking per MIL-N-25027 ⚠5 Crimp Lock
		

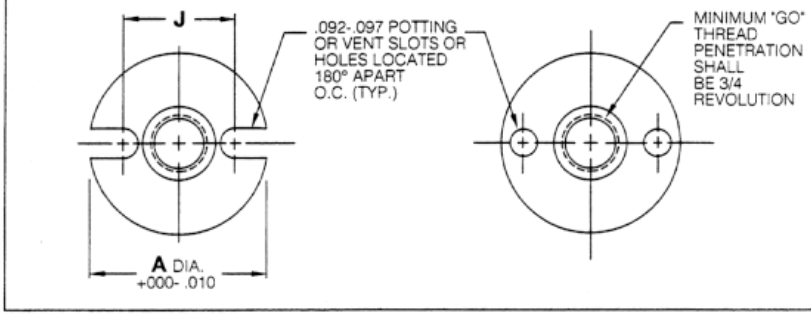
Head Style	Potting Vent Slots or Holes — Manufacturer's Option
	

Table 1

Size	Thread Size Per MIL-S-8879	A Head Dia.	B Dia.	C	D Dia.	J	L <4> Min.
08	.1640-32 UNJC	.685	.403	.16	.535	.500	.37
3	.1900-32 UNJF	.685	.403	.16	.535	.500	.43
4	.2500-28 UNJF	.748	.570	.18	.725	.591	.56
5	.3125-24 UNJF	.810	.617	.20	.790	.655	.75
6	.3750-24 UNJF	.873	.700	.22	.855	.718	.81

Notes:

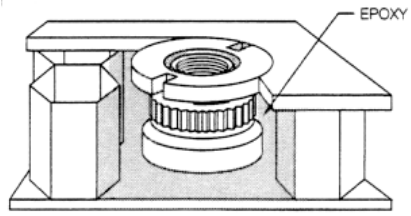
1. Burrs caused by machining of potting holes or slots permissible under flange.
2. Adhesive backed installation tab, D1837, shall be furnished with each insert. See page 44.
3. Plated or solid film lubricant is recommended on self-locking CRES inserts.

<4> Maximum bolt engagement should not exceed "L" minus .060. See Table 1.

<5> Self-locking, 303 CRES inserts without plating or lubricant will be tested using a silver plated bolt or screw.

6. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Typical Assembly



Typical Series D1835 Floating Nut Insert (NAS 1835 equivalent); installed in honeycomb sandwich panel. Insert is held in place by a cured epoxy compound

Note: For installation and tooling information, see pages 44 and 45.

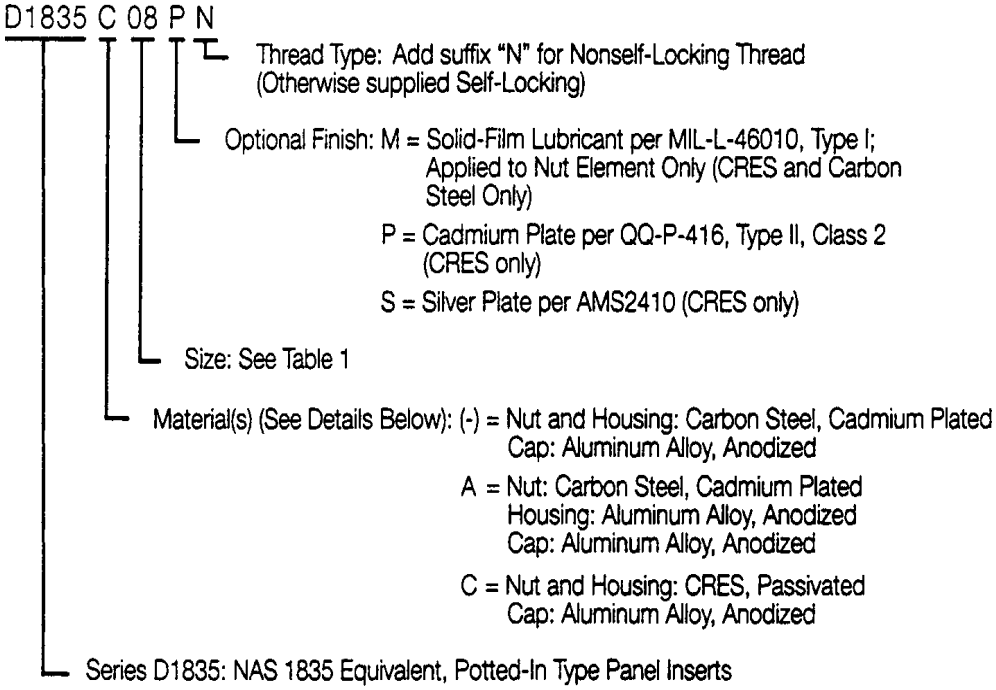
Alcoa Fastening Systems

D1835 Series — continued

Part Number Selection

Consult Rosán for availability of optional materials, finishes and sizes.

Example:



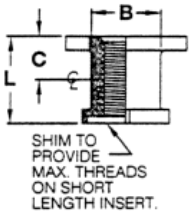
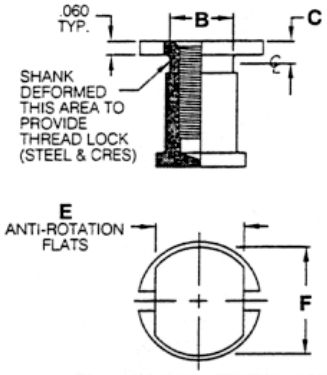
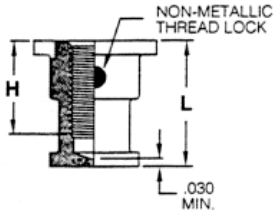
Materials and Finishes

Carbon Steel	Per ASTM-A-108 or FED STD 66, Ultimate Tensile Strength of 85 KSI, Minimum. Cadmium Plate per QQ-P-416, Type II, Class 2.
Aluminum	Housing: 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Anodize per MIL-A-8625, Type I. Cap: 3003H14 Aluminum Alloy per QQ-A-250/2, Anodize per MIL-A-8625 Type I.
CRES	303 CRES per ASTM-A-582, Passivate per QQ-P-35, Type II.

Alcoa Fastening Systems

Delron Inserts
D1836 Series — NAS 1836 Equivalent

Style Selection

Thread Type	Nonself-Locking – Threaded Only	Self-Locking per MIL-N-25027 [5]	
		Crimp Lock	Non-Metallic Lock
			
Material*	(-), A, or C	(-) or C	A

*See "Part Number Selection", opposite, for description of Material codes.

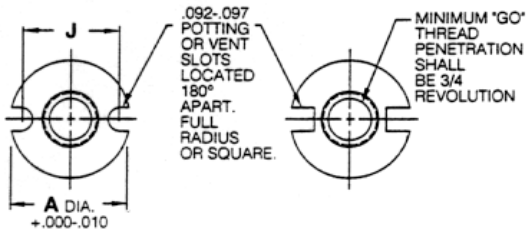
Head Style	Potting Vent Slots or Holes — Manufacturer's Option
	

Table 1

Size	Thread Size Per MIL-S-8879	A Head Dia.	B Dia.	C	E	F Max.	H	J Min.	L
06	.1380-32 UNJC	.451	.250	.12	.260	.45	.187	.358	.218
08	.1640-32 UNJC	.451	.250	.12	.260	.45	.187	.358	.218
3	.1900-32 UNJF	.451	.250	.12	.260	.45	.187	.358	.218
4	.2500-28 UNJF	.498	.300	.14	.312	.49	.250	.405	.281

Notes:

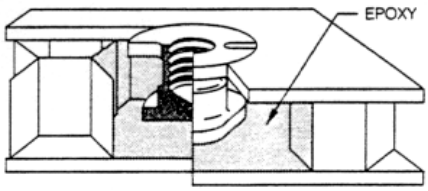
1. Burrs caused by machining of potting slots permissible under flange.
2. Adhesive backed installation tab, D1837, shall be furnished with each insert. See page 44.
3. Plated or solid film lubricant is recommended on self-locking CRES inserts.

<4> Minimum thread "H", where length permits, shall be 2 diameters.

<5> Self-locking, 303 CRES inserts without plating or lubricant will be tested using a silver plated bolt or screw.

6. Tolerances, unless otherwise specified: .xxx ±.010; Angles ± 2°.

Typical Assembly



Typical Series D1834 Clearance Hole Insert (NAS 1834 equivalent); installed in honeycomb sandwich panel. Insert is held in place by a cured epoxy compound.

Note: For installation and tooling information, see pages 44 and 45.

Alcoa Fastening Systems

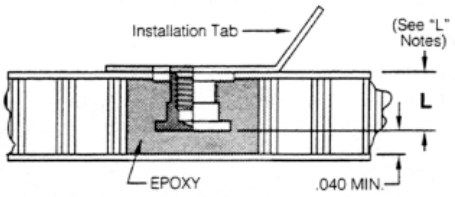
D1836 Series — continued

Insert Length Determination

The length of the insert is specified by a 2-digit dash number which defines .031 inch increments. Insert length must be a minimum of .040 inch *less* than depth of panel core (See Fig. 1).

Example: -07 = .218 inch
-14 = .437 inch

Fig. 1



Minimum clearance is required between bottom of insert and inside panel skin for proper epoxy bonding around bottom of insert.

"L" Notes:

1. Specified in .031 inch increments.
2. Minimum "L" values are listed in Table 1, opposite.
3. Maximum bolt engagement should not exceed "L" minus .060 inch.

Part Number Selection

Consult Rosán for availability of optional materials, finishes and sizes.

Example:

D1836 - 3 - 5

- 5 — Optional Finish: M = Solid-Film Lubricant per MIL-L-46010, Type I; Applied to Threads Only (CRES and Carbon Steel Only)
  - P = Cadmium Plate per QQ-P-416, Type II, Class 2 (CRES only)
  - S = Sliver Plate per AMS2410 (CRES only)
- 5 — Length of Insert in .031 inch increments
- - — Thread Type: (-) = Self-Locking, N = Nonself-Locking
- 3 — Size: See Table 1
- A — Material: (-) = Carbon Steel per ASTM-A-108 or FED STD 66, Ultimate Tensile Strength of 85 KSI, Minimum. Cadmium Plate per QQ-P-416, Type II, Class 2
  - A = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Anodize per MIL-A-8625, Type I
  - C = 303 CRES per ASTM-A-582, Passivate per QQ-P-35, Type II
- D1836 — Series D1836: NAS 1836 Equivalent, Potted-In Type Panel Inserts

Part Number Example:

1. Requirements:

.1900-32 Thread size, Self-Locking, Aluminum Alloy, Screw Engagement of .50 inch, and an overall panel thickness of .750.

Part Number:

D1836 A 3 - 20

- 20 — Insert Length of 0.62 inch
- - — Self-Locking Thread
- 3 — .1900-32 UNJF-3B Thread size (See Table 1)
- A — Aluminum Alloy Material
- D1836 — Series

2. Requirements:

.1640-32 Thread size, Nonself-Locking, Carbon Steel with Solid Film Lubricant, Thread Engagement of .25 inch and an overall panel thickness of .50 inch.

Part Number:

D1836 - 08 N 12 M

- 12 M — Solid-Film Lubricant, Insert Length of .37 inch
- N — Nonself-Locking Thread
- 08 — .1640-32UNJC-3B Thread Size
- - — Carbon Steel Material
- D1836 — Series

Alcoa Fastening Systems

Delron Inserts
D1837 Series — NAS 1837 Equivalent

Style Selection

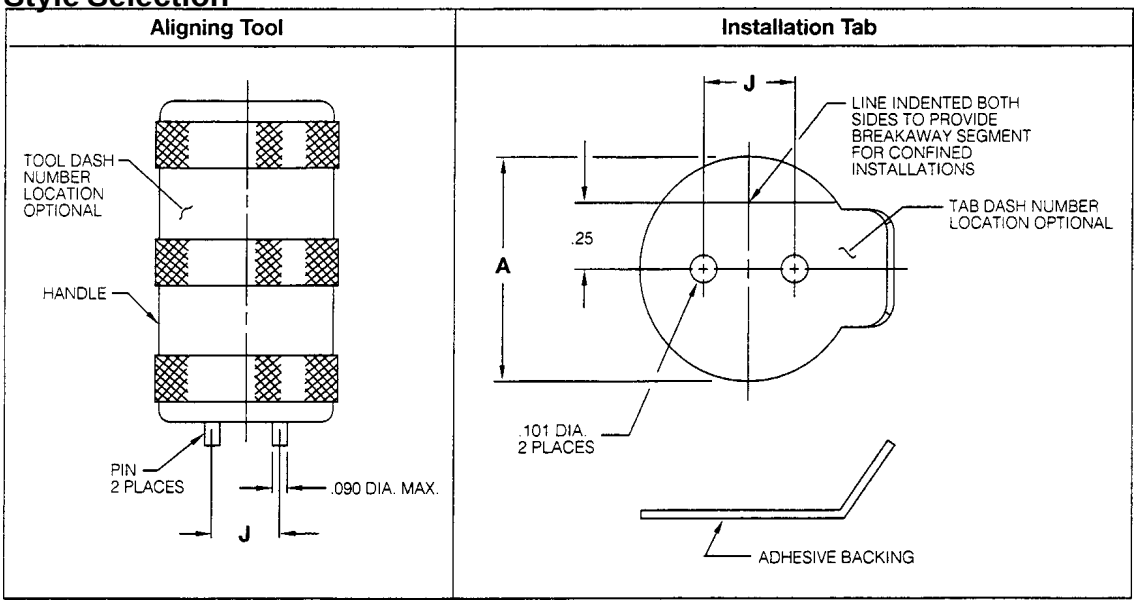


Table 1 — For D1832, D1833 and D1834

Insert First Dash Number	Aligning Tool	Installation Tab	J Ref.	A Ref.
-06	G3	T3	.367	.90
-08	G3	T3	.367	.90
-3	G3	T3	.367	.90
-4	G6	T6	.467	.90
-5	G6	T6	.467	.90
-6	G9	T9	.591	1.13

Table 2 — For D1835

Insert First Dash Number	Aligning Tool	Installation Tab	J Ref.	A Ref.
-08	G7	T7	.500	.90
-3	G7	T7	.500	.90
-4	G9	T9	.591	1.13
-5	G10	T10	.655	1.13
-6	G11	T11	.718	1.13

Table 3 — For D1836

Insert First Dash Number	Aligning Tool	Installation Tab	J Ref.	A Ref.
-06	G2	T2	.358	.90
-08	G2	T2	.358	.90
-3	G2	T2	.358	.90
-4	G4	T4	.405	.90

Notes:

1. Material and Finish:
   Aligning Tool Handle: Aluminum Alloy, Anodized per MIL-A-8625
   Aligning Tool Pins: CRES, Passivated per QQ-P-35
   Installation Tab: Adhesive-Backed Aluminum Alloy or Plastic
2. Example of Part Numbers:
   D1837G3: Aligning tool for D1832, D1833 and D1834 insert in sizes -06, -08 and -3.
   D1837T7: Installation tab for D1835 inserts in sizes -08 and -3
3. (1) Installation tabs are furnished with inserts as specified on the applicable standard. Use this standard to order additional tabs only.

Alcoa Fastening Systems

Installation and Tooling Selection

400 Series and D1800 (NAS 1800) Types

Panel Preparation

The following installation procedure pertains to most Delron potted-in type fasteners. Panels are prepared as illustrated in figures 1 and 2. Drill diameters for various types are shown in the tables below.

Installation Drill Diameters
400 Series

Size	Type H-HE	S-SE	SF-HF
440	.375	.344	-
632	.437	.406	.500
832	.500	.469	.562
1032	.500	.469	.562
428	.562	.531	.687
524	.687	.656	.812
624	.812	.781	.937

D1800 (NAS 1800) Series

Size	D1832, D1833, D1834	D1835	D1836
06	.561-.566	-	.452-.457
08	.561-.566	.686-.691	.452-.457
3	.561-.566	.686-.691	.452-.457
4	.686-.691	.749-.755	.499-.504
5	.686-.691	.811-.817	-
6	.842-.847	.874-.880	-

Bonding Procedure

Most blind applications for potted-in fasteners can use the "Pre-pot" technique. This involves filling the cavity nearly full, giving consideration to the displacement factor of an installed fastener. Sufficient potting material must be used to bond securely yet avoid overflow (Figure 3).

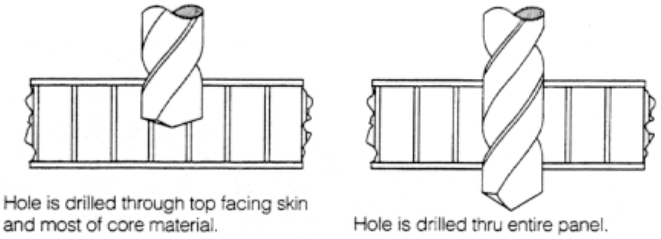
Fastener insertion is very simple using the Series 400 SF and 400S-SE which provide self-retention (Figure 4). Other head styles use tabs to position and hold the fastener in a flush, perpendicular position. Slots or holes in the tabs and insert head, allow additional potting material to be injected into the panel cavity (Figures 5 and 6).

Potting Material

Potting materials suitable for sandwich panel inserts are manufactured by companies such as American Cyanamid, Hexcel, HysolTM™, BASF, Ciba-Geigy, etc. Information on type, setting time, and usage may be secure from them.

Installation Sequence

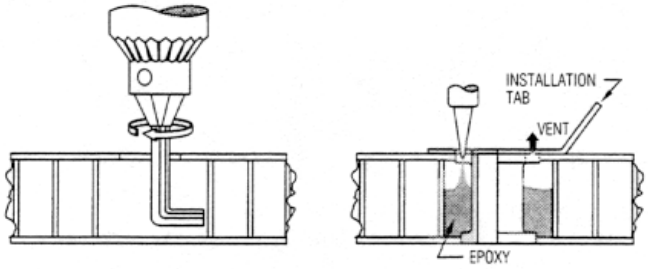
1.



Hole is drilled through top facing skin and most of core material.

Hole is drilled thru entire panel.

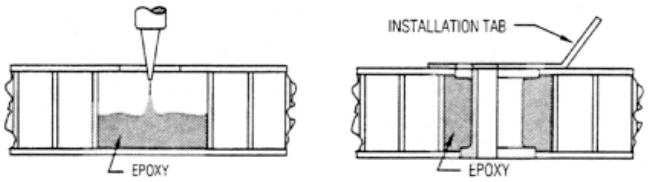
2.



Core material is undercut below top facing skin and down to the bottom skin (as close as possible without risking skin damage).

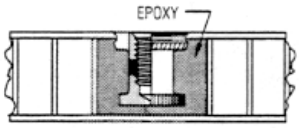
Install insert and fill cavity with potting material.

3.



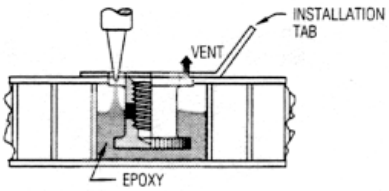
Partially fill cavity with potting material. Leave displacement space for insert.

4.



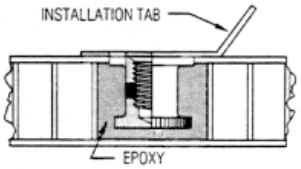
Delron 400 'S','SE' and 'SF' styles snap into the top facing skin, for a completed installation.

5.



Non–snap-in versions, using installation tabs can be "topped-off" with potting material.

6.



Installation tab is left in place until potting material is cured.

Alcoa Fastening Systems

Delron Inserts
601 Series – Thru-Rivet

Style Selection

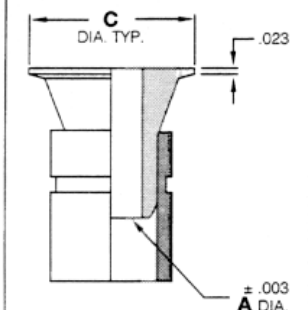
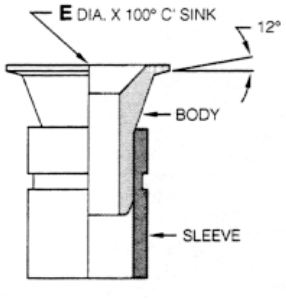
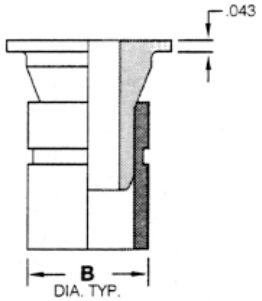
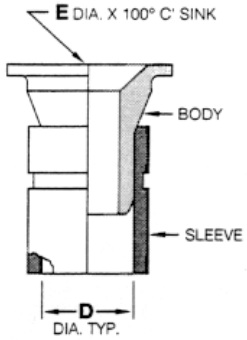
For Top Skin Thicknesses...	Less than .030"		.030" Minimum	
Head Style	D – Flush	C – Flush, Countersink	F – Non-Flush	FC – Non-Flush, Countersink Hole
				

Table 1

Size	Rivet Size	A Hole Dia.	B Sleeve Dia.	C Head Dia.	D Dia	E C'Sink Dia.
1	12 (1/8)	.133	.312	.500	.24	.233
2	15 (5/32)	.168	.375	.562	.27	.295
3	18 (3/16)	.194	.375	.562	.27	.362
4	25 (1/4)	.256	.500	.687	.40	.486
5	31 (5/16)	.318	.562	.750	.46	.574

Note:

1. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Part Number Selection

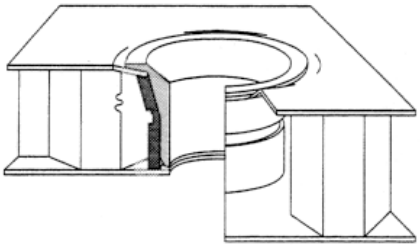
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

6 0 1 D 2-48- 50

- 50 — Body Dash Number: Determined by Formula, (See Example on Sheet 2)
- 48 — Sleeve Dash Number = Core Thickness Rounded to the Nearest Hundredth of an Inch, (See Example on Sheet 2)
- 2 — Size: See Table 1
- D — Head Style: C = Flush, Countersink Hole; D = Flush Head; F = Non-Flush Head; FC = Non-Flush, Countersink Hole
- 1 — Type: Thru-Rivet
- 0 — Material: 0 = Aluminum Alloy: Body = 2024-T4 or T351 per QQ-A225/6 Sleeve = 6061-T6 per WW-T-700/6. Finish = Alodine per MIL-C-5541; 6 = CRES Steel per ASTM-A-581/ASTM-A-582, AMS5640, AMS5639 Passivate per QQ-P-35; 9 = Carbon Steel per ASTM-A-108/FED-STD-66, ASTM-A-519, Cadmium Plate per QQ-P-416, Type II, Class 2
- 6 — Series 600: Structural Type

Typical Assembly



Typical Series 601, Thru-Rivet; Body and Sleeve assembly installed in honeycomb sandwich panel. Top panel skin is gripped between body and flared sleeve of insert for outstanding structural strength.

Note: For installation and tooling information, see pages 56 and 57.

601 Series – continued

Body and Sleeve Dash Number Selection

Sleeve Dash Number

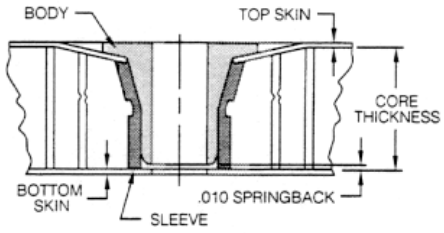
Round *down* to the nearest hundredth of an inch of the panel core thickness (See Figs. 1).

Example: .489 Core Thickness, drop last digit to read -48.

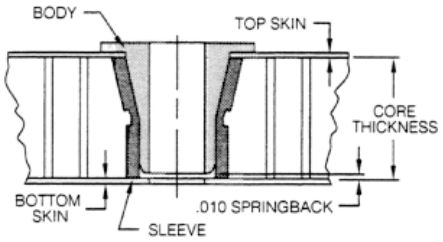
Flush Head Styles	Non-Flush Head Styles
Note: For inspection, the actual sleeve length will be .010 to .015 shorter than the dash number called out. Example: -48 = .480, Actual Length = .465 to .470.	Note: For inspection, the actual sleeve length will be .020 longer than the dash number called out. Example: -48 = .480, Actual Length = .500.

Fig. 1

Flush Head Style



Non-Flush Head Style



Body Dash Number

1. Determine the Maximum Body Length (See Figs. 2) using the appropriate formula, below, based on Head Style.

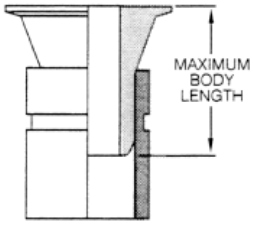
Flush Head Styles	Non-Flush Head Styles
Overall Panel Thickness minus Bottom Skin Thickness minus .010 Springback Factor. Example: .750 - Overall Panel Thickness - .020 - Bottom Skin Thickness .730 - .010 - Springback Factor =.720 - Maximum Body Length	Core Thickness plus Top Skin Thickness minus .010 Springback Factor. Example: .690 - Core Thickness +.040 - Top Skin Thickness .730 - .010 - Springback Factor =.720 - Maximum Body Length

2. Select Body Dash Number from the table below based on Maximum Body Length determined in Step 1; round down to next lowest value.
   Example: .720 Maximum Body Length = -70 Body Dash Number.

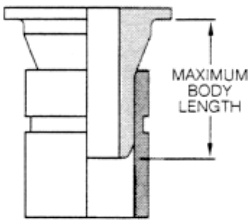
Body Dash Number	Maximum Body Length
-30	.335
-40	.350
-50	.450
-60	.550
-70	.650
-80	.750
-90	.850
-100	.950
-110	1.050
-120	1.150
-130	1.250
-140	1.350
-150	1.450

Fig. 2

Flush Head Style



Non-Flush Head Style



Alcoa Fastening Systems

Delron Inserts
602 Series – Thru-Bolt

Style Selection

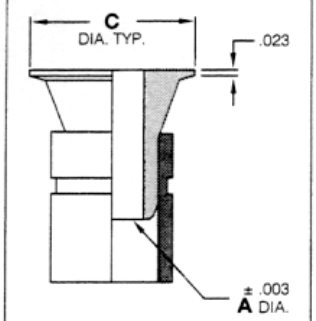
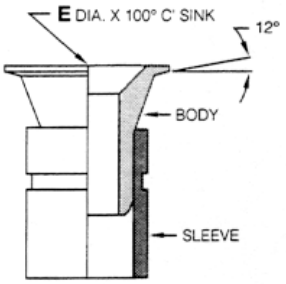
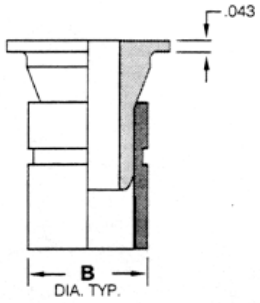
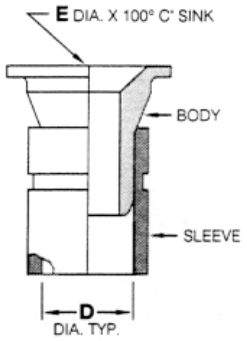
For Top Skin Thicknesses...	Less than .030"		.030" Minimum	
Head Style	D – Flush	C – Flush, Countersink	F – Non-Flush	FC – Non-Flush, Countersink Hole
				

Table 1

Size	Bolt Size	A Hole Dia.	B Sleeve Dia.	C Head Dia.	D Dia.	E C'Sink Dia.
1	6	.144	.312	.500	.24	.274
2	8	.168	.375	.562	.27	.332
3	10	.194	.375	.562	.27	.382
4	25	.256	.500	.687	.40	.505
5	31	.318	.562	.750	.46	.600
C5*	31	.318	.625	.875	.49	.635

*Dimensions apply to Flush style, countersink head versions only.

Note:

1. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Part Number Selection

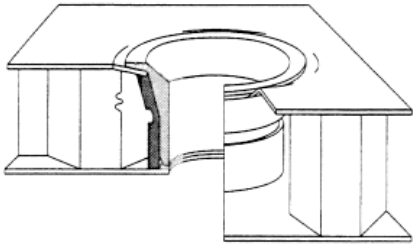
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

6 0 2 D 2-48- 50

- Body Dash Number: Determined by Formula, (See Example on Sheet 2)
- Sleeve Dash Number = Core Thickness Rounded to the Nearest Hundredth of an Inch, (See Example on Sheet 2)
- Size: See Table 1
- Head Style: C = Flush, Countersink Hole; D = Flush Head; F = Non-Flush Head; FC = Non-Flush, Countersink Hole
- Type: Thru-Bolt
- Material: 0 = Aluminum Alloy: Body = 2024-T4 or T351 per QQ-A225/6 Sleeve = 6061-T6 per WW-T-700/6. Finish = Alodine per MIL-C-5541; 6 = CRES Steel per ASTM-A-581/ASTM-A-582, AMS5640, AMS5639 Passivate per QQ-P-35; 9 = Carbon Steel per ASTM-A-108/FED-STD-66, ASTM-A-519, Cadmium Plate per QQ-P-416, Type II, Class 2
- Series 600: Structural Type

Typical Assembly



Typical Series 602, Thru-Bolt; Body and Sleeve assembly installed in honeycomb sandwich panel. Top panel skin is gripped between body and flared sleeve of insert for outstanding structural strength.

Note: **For installation and tooling information, see pages 56 and 57.**

Alcoa Fastening Systems

602 Series – continued

Body and Sleeve Dash Number Selection

Sleeve Dash Number

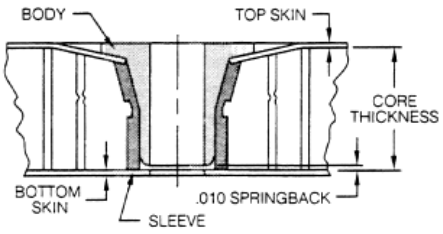
Round *down* to the nearest hundredth of an inch of the panel core thickness (See Figs. 1).

Example: .489 Core Thickness, drop last digit to read -48.

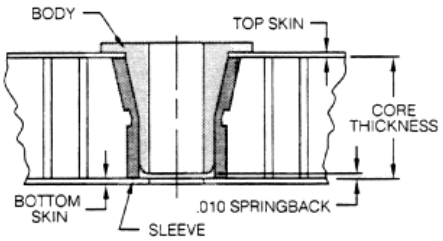
Flush Head Styles	Non-Flush Head Styles
Note: For inspection, the actual sleeve length will be .010 to .015 shorter than the dash number called out. Example: -48 = .480, Actual Length = .465 to .470.	Note: For inspection, the actual sleeve length will be .020 longer than the dash number called out. Example: -48 = .480, Actual Length = .500.

Fig. 1

Flush Head Style



Non-Flush Head Style



Body Dash Number

1. Determine the Maximum Body Length (See Figs. 2) using the appropriate formula, below, based on Head Style.

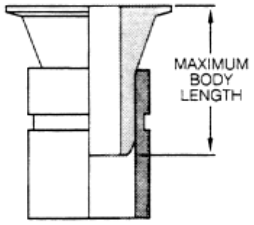
Flush Head Styles	Non-Flush Head Styles
Overall Panel Thickness *minus* Bottom Skin Thickness *minus* .010 Springback Factor. **Example:** .750 - Overall Panel Thickness - .020 - Bottom Skin Thickness .730 - .010 - Springback Factor =.720 - Maximum Body Length	Core Thickness *plus* Top Skin Thickness *minus* .010 Springback Factor. **Example:** .690 - Core Thickness +.040 - Top Skin Thickness .730 - .010 - Springback Factor =.720 - Maximum Body Length

2. Select Body Dash Number from the table below based on Maximum Body Length determined in Step 1; round down to next lowest value.
   Example: .720 Maximum Body Length = -70 Body Dash Number.

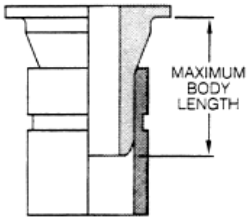
Body Dash Number	Maximum Body Length
-30	.335
-40	.350
-50	.450
-60	.550
-70	.650
-80	.750
-90	.850
-100	.950
-110	1.050
-120	1.150
-130	1.250
-140	1.350
-150	1.450

Fig. 2

Flush Head Style



Non-Flush Head Style



Alcoa Fastening Systems

Delron Inserts
603 Series – Threaded

Stvle Selection

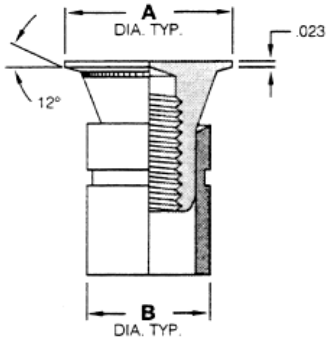
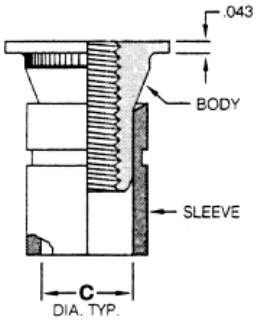
For Top Skin Thicknesses...	Less than .030"	.030" Minimum
Head Style	D-Flush	F-Non-Flush
	 Shown with Blind-Thread	 Shown with Thru-Thread

Table 1

Size	Thread Per MIL-S-8879	A Head Dia.	B Sleeve Dia.	C Dia.
1	.1380-32 UNJC-3B	.500	.312	.24
2	.1640-32 UNJC-3B	.562	.375	.27
3	.1900-32 UNJF-3B	.562	.375	.27
4	.2500-28 UNJF-3B	.687	.500	.40
5	.3125-24 UNJF-3B	.750	.562	.46
6	.3750-24 UNJF-3B	.875	.625	.49

Note:

1. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Part Number Selection

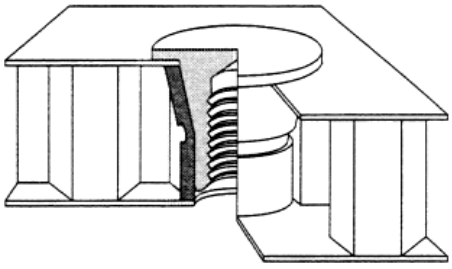
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

6 0 3 D 3-48- 50

- Body Dash Number: Determined by Formula, (See Example on Sheet 2)
- Add "T" When Thru-Thread is Required But is Not Standard, (See Table on Sheet 2)
- Sleeve Dash Number = Core Thickness Rounded to the Nearest Hundredth of an Inch, (See Example on Sheet 2)
- Size: See Table 1
- Head Style: D = Flush Head; F = Non-Flush Head
- Type: Threaded
- Material: 0 = Aluminum Alloy: Body = 2024-T4 or T351 per QQ-A225/6; Sleeve = 6061-T6 per WW-T-700/6. Finish = Alodine per MIL-C-5541
  6 = 303 CRES Steel per AMS5640, ASTM-A-581/ASTM-A-582, AMS5639 Passivate per QQ-P-35
  9 = Carbon Steel per ASTM-A-108/FED-STD-66, ASTM-A-519, Cadmium Plate per QQ-P-416, Type II, Class 2
- Series 600: Structural Type

Typical Assembly



Typical Series 603, Threaded; Body and Sleeve assembly installed in honeycomb sandwich panel. Top panel skin is gripped between body and flared sleeve of insert for outstanding structural strength.

Note: **For installation and tooling information, see pages 56 and 57.**

Alcoa Fastening Systems

603 Series – continued

Body and Sleeve Dash Number Selection

Sleeve Dash Number

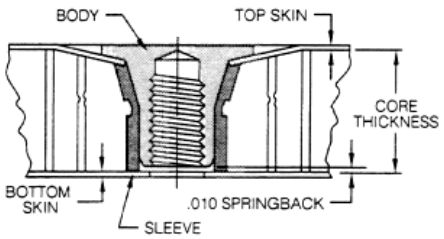
Round *down* to the nearest hundredth of an inch of the panel core thickness (See Figs. 1).

Example: .489 Core Thickness, drop last digit to read -48.

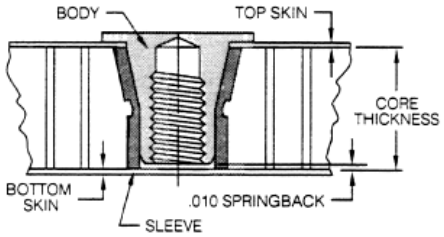
D-Flush Head	F-Non-Flush Head
Note: For inspection, the actual sleeve length will be .010 to .015 shorter than the dash number called out. Example: -48 = .480, Actual Length = .465 to .470.	Note: For inspection, the actual sleeve length will be .020 longer than the dash number called out. Example: -48 = .480, Actual Length = .500.

Fig. 1

D Head Style



F Head Style



Body Dash Number

1. Determine the Maximum Body Length (See Figs. 2) using the appropriate formula, below, based on Head Style.

D-Flush Head	F-Non-Flush Head
Overall Panel Thickness minus Bottom Skin Thickness minus .010 Springback Factor. Example: .750 - Overall Panel Thickness - .020 - Bottom Skin Thickness .730 - .010 - Springback Factor =.720 - Maximum Body Length	Core Thickness plus Top Skin Thickness minus .010 Springback Factor. Example: .690 - Core Thickness +.040 - Top Skin Thickness .730 - .010 - Springback Factor =.720 - Maximum Body Length

2. Select Body Dash Number from the table below based on Maximum Body Length determined in Step 1; round down to next lowest value.
Example: .720 Maximum Body Length = -70 Body Dash Number.

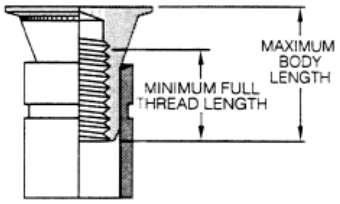
= Minimum Full Thread Length

= Indicates Thru-Thread On Standard Parts

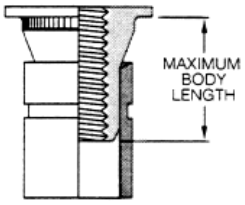
Body Dash Number	Maximum Body Length	Threaded Size					
		1	2	3	4	5	6
-30	.335	.165	.165				
-40	.350	.180	.180	.190			
-50	.450	.280	.280	.280	.270		
-60	.550	.280	.330	.380	.370	.350	
-70	.650	.280	.330	.380	.470	.450	.450
-80	.750	.280	.330	.380	.500	.550	.550
-90	.850	.280	.330	.380	.500	.625	.650
-100	.950	.280	.330	.380	.500	.625	.750
-110	1.050	.280	.330	.380	.500	.625	.750
-120	1.150	.280	.330	.380	.500	.625	.750
-130	1.250	.280	.330	.380	.500	.625	.750
-140	1.350	.280	.330	.380	.500	.625	.750
-150	1.450	.280	.330	.380	.500	.625	.750

Fig. 2

D Head Style



F Head Style



Alcoa Fastening Systems

Delron Inserts
604 Series – Threaded with Non-Metallic Lock

Style Selection

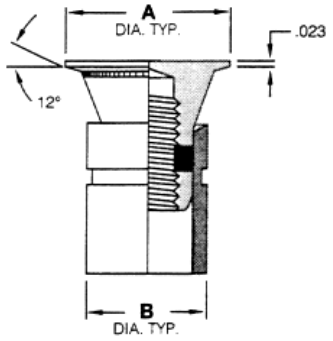
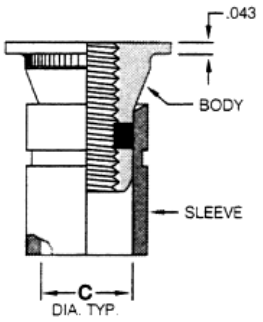
For Top Skin Thicknesses...	Less than .030"	.030" Minimum
Head Style	D-Flush	F-Non-Flush
	 Shown with Blind-Thread	 Shown with Thru-Thread

Table 1

Size	Thread Per MIL-S-8879	A Head Dia.	B Sleeve Dia.	C Dia.
1	.1380-32 UNJC-3B	.500	.312	.24
2	.1640-32 UNJC-3B	.562	.375	.27
3	.1900-32 UNJF-3B	.562	.375	.27
4	.2500-28 UNJF-3B	.687	.500	.40
5	.3125-24 UNJF-3B	.750	.562	.46
6	.3750-24 UNJF-3B	.875	.625	.49

Note:

1. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Part Number Selection

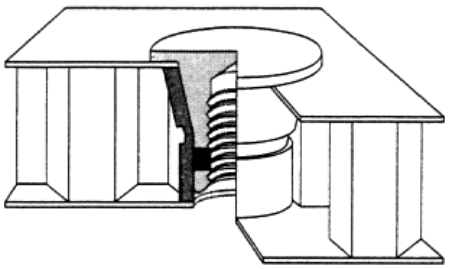
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

6 0 4 D 3-48-50

- Body Dash Number: Determined by Formula, (See Example on Sheet 2)
- Add "T" When Thru-Thread is Required But is Not Standard, (See Table on Sheet 2)
- Sleeve Dash Number = Core Thickness Rounded to the Nearest Hundredth of an Inch, (See Example on Sheet 2)
- Size: See Table 1
- Head Style: D = Flush Head, F = Non-Flush Head
- Type: Threaded with Non-Metallic Lock, Torque per MIL-N-25027
- Material: 0 = Aluminum Alloy: Body = 2024-T4 or T351 per QQ-A225/6 Sleeve = 6061-T6 per WW-T-700/6. Finish = Alodine per MIL-C-5541
  6 = CRES Steel per AMS5640, ASTM-A-581/ASTM-A-582, AMS5639 Passivate per QQ-P-35
  9 = Carbon Steel per ASTM-A-108/FED-STD-66, ASTM-A-519, Cadmium Plate per QQ-P-416, Type II, Class 2
- Series 600: Structural Type

Typical Assembly



Typical Series 604, Threaded with Non-Metallic Lock; Body and Sleeve assembly installed in honeycomb sandwich panel. Top panel skin is gripped between body and flared sleeve of insert for outstanding structural strength.

Note: For installation and tooling information, see pages 56 and 57.

Alcoa Fastening Systems

604 Series – continued

Body and Sleeve Dash Number Selection

Sleeve Dash Number

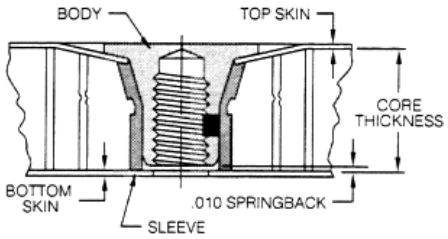
Round *down* to the nearest hundredth of an inch of the panel core thickness (See Figs. 1).

Example: .489 Core Thickness, drop last digit to read -48.

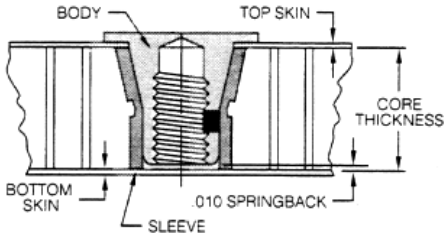
D - Flush Head	F - Non-Flush Head
Note: For inspection, the actual sleeve length will be .010 to .015 shorter than the dash number called out. Example: -48 = .480, Actual Length = .465 to .470.	Note: For inspection, the actual sleeve length will be .020 longer than the dash number called out. Example: -48 = .480, Actual Length = .500.

Fig. 1

D Head Style



F Head Style



Body Dash Number

1. Determine the Maximum Body Length (See Figs. 2) using the appropriate formula, below, based on Head Style.

D - Flush Head	F - Non-Flush Head
Overall Panel Thickness minus Bottom Skin Thickness minus .010 Springback Factor. Example: .750 - Overall Panel Thickness - .020 - Bottom Skin Thickness .730 - .010 - Springback Factor =.720 - Maximum Body Length	Core Thickness plus Top Skin Thickness minus .010 Springback Factor. Example: .690 - Core Thickness +.040 - Top Skin Thickness .730 - .010 - Springback Factor =.720 - Maximum Body Length

2. Select Body Dash Number from the table below based on Maximum Body Length determined in Step 1; round down to next lowest value.
Example: .720 Maximum Body Length = -70 Body Dash Number.

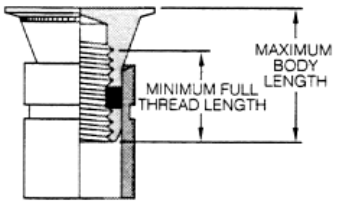
= Minimum Full Thread Length

= Indicates Thru-Thread On Standard Parts

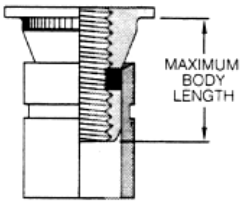
Body Dash Number	Maximum Body Length	Threaded Size					
		1	2	3	4	5	6
-30	.335	.165	.165				
-40	.350	.180	.180	.190			
-50	.450	.280	.280	.280	.270		
-60	.550	.280	.330	.380	.370	.350	
-70	.650	.280	.330	.380	.470	.450	.450
-80	.750	.280	.330	.380	.500	.550	.550
-90	.850	.280	.330	.380	.500	.625	.650
-100	.950	.280	.330	.380	.500	.625	.750
-110	1.050	.280	.330	.380	.500	.625	.750
-120	1.150	.280	.330	.380	.500	.625	.750
-130	1.250	.280	.330	.380	.500	.625	.750
-140	1.350	.280	.330	.380	.500	.625	.750
-150	1.450	.280	.330	.380	.500	.625	.750

Fig. 2

D Head Style



F Head Style



Alcoa Fastening Systems

Delron Inserts
606 Series – Threaded with Self-Locking Helical Coil Insert

Style Selection

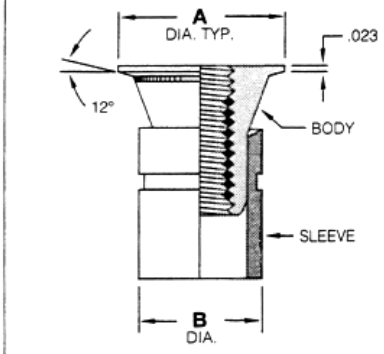
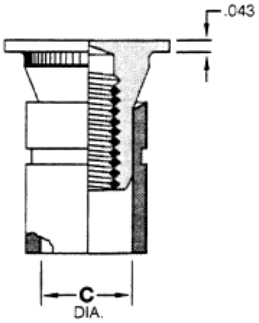
For Top Skin Thicknesses...	Less than .030"	.030" Minimum
Head Style	D-Flush	F-Non-Flush
	 Shown with Thru-Thread	 Shown with Blind-Thread

Table 1

Size	Thread Per MIL-S-8879	A Head Dia.	B Sleeve Dia.	C Dia.
1	.1380-32 UNJC-3B	.500	.312	.24
2	.1640-32 UNJC-3B	.562	.375	.27
3	.1900-32 UNJF-3B	.625	.437	.33
4	.2500-28 UNJF-3B	.687	.500	.40
5	.3125-24 UNJF-3B	.750	.562	.46
6	.3750-24 UNJF-3B	.875	.625	.49

Note:

1. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Part Number Selection

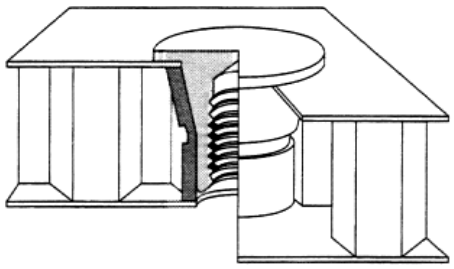
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

6 0 6 D 3-48-50

- Body Dash Number: Determined by Formula, (See Example on Sheet 2)
- Add "T" When Thru-Thread is Required But is Not Standard, (See Table on Sheet 2)
- Sleeve Dash Number = Core Thickness Rounded to the Nearest Hundredth of an Inch, (See Example on Sheet 2)
- Size: See Table 1
- Head Style: D = Flush, Head; F = Non-Flush Head
- Type: Threaded, All-Metal, with Self-Locking Helical Coil Insert Per MS21209
- Material: 0 = Aluminum Alloy: Body = 2024T4 or T351 per QQ-A225/6. Sleeve = 6061-T6 per WW-T-700/6. Finish: = Alodine per MIL-C-5541.
  6 = CRES per ASTM-A-581, ASTM-A-582, AMS5640, AMS5639. Passivate per QQ-P-35.
  9 = Carbon Steel per ASTM-A-108, FED-STD-66,ASTM-A-519, Cadmium Plate per QQ-P-416, Type II, Class 2.
- Series 600: Structural Type

Typical Assembly



Typical Series 606, Threaded with Self-Locking Helical Coil Insert; Body and Sleeve assembly installed in honeycomb sandwich panel. Panel skin is gripped between body and flared sleeve of insert for outstanding structural strength.

Note: For installation and tooling information, see pages 56 and 57.

Alcoa Fastening Systems

606 Series – continued

Body and Sleeve Dash Number Selection

Sleeve Dash Number

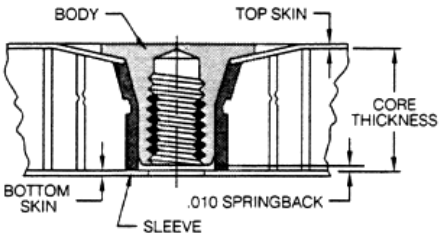
Round *down* to the nearest hundredth of an inch of the panel core thickness (See Figs. 1).

Example: .489 Core Thickness, drop last digit to read -48.

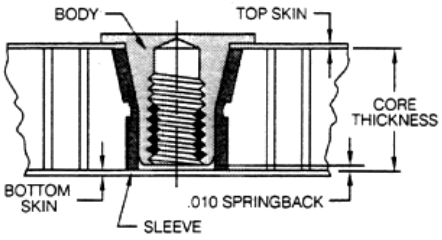
D - Flush Head	F - Non-Flush Head
Note: For inspection, the actual sleeve length will be .010 to .015 shorter than the dash number called out. Example: -48 = .480, Actual Length = .465 to .470.	Note: For inspection, the actual sleeve length will be .020 longer than the dash number called out. Example: -48 = .480, Actual Length = .500.

Fig. 1

D Head Style



F Head Style



Body Dash Number

1. Determine the Maximum Body Length (See Figs. 2) using the appropriate formula, below, based on Head Style.

D - Flush Head	F - Non-Flush Head
Overall Panel Thickness minus Bottom Skin Thickness minus .010 Springback Factor. Example: .750 - Overall Panel Thickness - .020 - Bottom Skin Thickness .730 - .010 - Springback Factor =.720 - Maximum Body Length	Core Thickness plus Top Skin Thickness minus .010 Springback Factor. Example: .690 - Core Thickness +.040 - Top Skin Thickness .730 - .010 - Springback Factor =.720 - Maximum Body Length

2. Select Body Dash Number from the table below based on Maximum Body Length determined in Step 1; round down to next lowest value.
Example: .720 Maximum Body Length = -70 Body Dash Number.

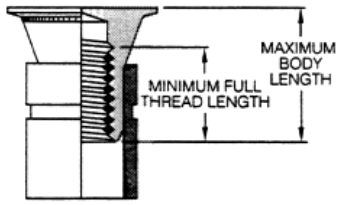
= Minimum Full Thread Length

= Indicates Thru-Thread On Standard Parts

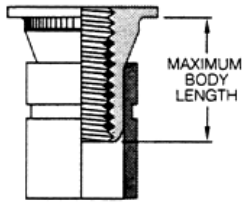
Body Dash Number	Maximum Body Length	Thread Size							
		1	2	3	4	5		6	
						D HEAD	F HEAD	D HEAD	F HEAD
-30	.335							N.A.	N.A.
-40	.350								
-50	.450	.276	.246	.285	.250				
-60	.550	.276	.328	.380	.250	.312	.312		
-70	.650	.276	.328	.380	.500	.312	.312		.375
-80	.750	.276	.328	.380	.500	.468	.468	.375	.375
-90	.850	.276	.328	.380	.500	.468	.625	.562	.562
-100	.950	.276	.328	.380	.500	.625	.625	.562	.750
-110	1.050	.276	.328	.380	.500	.625	.625	.750	.750
-120	1.150	.276	.328	.380	.500	.625	.625	.750	.750
-130	1.250	.276	.328	.380	.500	.625	.625	.750	.750
-140	1.350	.276	.328	.380	.500	.625	.625	.750	.750
-150	1.450	.276	.328	.380	.500	.625	.625	.750	.750

Fig. 2

D Head Style



F Head Style



Alcoa Fastening Systems

Installation and Tooling Selection

600 Series, Structural Type

The characteristic design of this series will retain the fastener in the panel until time of assembly. Knurls under the head of the body of these internally threaded fasteners, grip the cover sheet and act as an anti-rotation feature.

Panel Preparation

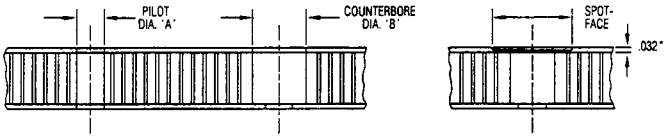
Requires the following:

1. A two diameter hole through the panel.
2. A drill-counterbore combination or singly, or a step drill to standard diameters. See table below.
3. Access to both sides of the panel.
4. Residual core and bondline material must be removed to allow the sleeve to seat on the bottom skin.

Installation Drill Diameters

Fastener Size	1	2	3	4	5	6
"A" Pilot Drill Fig.1 $^{+.005}_{-.000}$	.140	.166	.190	.257	.316	.377
"B" C'BORE Fig.2 $^{+.010}_{-.000}$	.312	.375	.375	.500	.562	.625

Skin Thickness to .032: **Skin Thickness Greater Than .032:**



Panel cover sheets up to .032" will dimple automatically to obtain a flush head condition. Thicker sheets may either require the use of the non-flush head style fastener, or if flushness is required, predimpling or spotfacing is common practice in the industry.

Fastener Installation

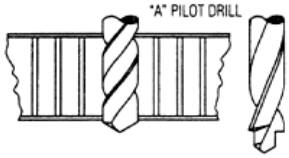
The most commonly used method, and that which is recommended, is the use of ram type equipment, such as an arbor press or hydraulic press.

1. Position fastener in prepared hole.
2. Select tools from Installation Tool Chart (Opposite).
3. With tools in place, apply pressure to head of fastener. Press body of insert into sleeve until head is flush with panel surface ('C' or 'D' head style) or until head is down against panel surface ('F' head style).
4. Release pressure and fastener is now completely installed. Since the head diameter of the fastener has the greatest area of contact, it may cause a slight spring back condition. However, when the component is bolted to the panel, the fastener will again become flush.

   One time setting of insert is critical to a good installation. Do not 'bump' to set flush. Spring back is inherent in the panel and multiple resets of the insert results in a loose body. If within .015 or flush pull the head to flush by attaching the component part.

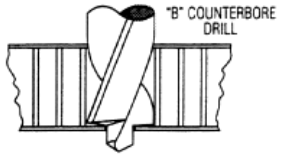
Installation Sequence

1.



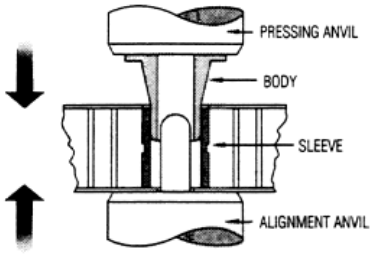
Thru-hole is drilled in panel. Step or piloted counterbore drills can speed this process.

2.



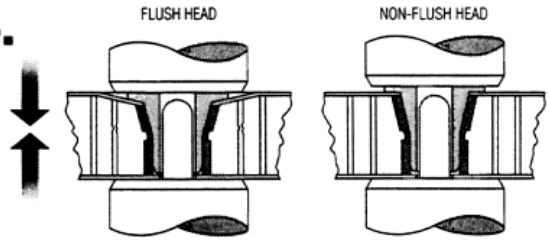
Counterbore is drilled through top skin to inside surface of bottom. Remove core and bond line residual.

3.



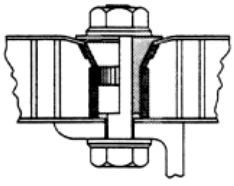
Piloted anvils press together Delron Sleeve and Body components from opposite sides of panel.

4.



At 2200 lbs of installation pressure, facing skins to .032" will dimple automatically.

5.



Typical Final Assembly

Alcoa Fastening Systems

ALCOA

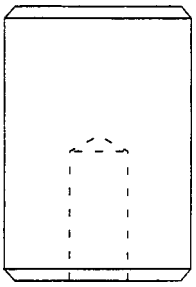
Tooling Part Numbers

Example: Insert Part Number 603D-48-50 requires Tool Kit Part Number: 1617-3

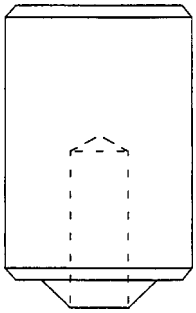
Fastener Series	Tool Kit Number	Consisting of:	
		Pressing Anvil	Alignment Anvil
601(*)1	1612	1612-1	1912-2
602(*)1	1613	1613-1	1613-2
601(*)2 602(*)2	1614-2	1614-2-1	1614-2-2
601(*)3 602(*)3	1614-3	1614-3-1	1614-3-2
601(*)4 602(*)4	1614-4	1614-4-1	1614-4-2
601(*)5 602(*)5	1614-5	1614-5-1	1614-5-2
601(*)6 602(*)6	1614-6	1614-6-1	1614-6-2
601C1	1615-1	1615-1-1	1612-2
601C2	1615-2	1615-2-1	1614-2-2
601C3	1615-3	1615-3-1	1614-3-2
601C4	1615-4	1615-4-1	1614-4-2
601C5	1615-5	1615-5-1	1614-5-2
601C6	1675	1675-1	1614-6-2
602C1	1616-1	1616-1-1	1613-2
602C2	1616-2	1616-2-1	1614-2-2
602C3	1616-3	1616-3-1	1614-3-2
602C4	1616-4	1616-4-1	1614-4-2
602C5	1616-5	1616-5-1	1614-5-2
602C6	1616-6	1616-6-1	1614-6-2
603(*)1 604(*)1	1617-1	1613-1	1617-1-2
603-2 604(*)2	1617-2	1614-2-1	1617-2-2
603(*)3 604(*)3	1617-3	1614-3-1	1617-3-2
603(*)4 604(*)4	1617-4	1614-4-1	1617-4-2
603(*)5 604(*)5	1617-5	1614-5-1	1617-5-2
603(*)6 604(*)6	1617-6	1614-6-1	1617-6-2

(*) Fill in “D” or “F”

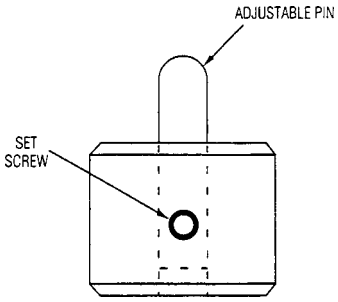
Pressing Anvils For ‘D’ & ‘F’ Style Heads



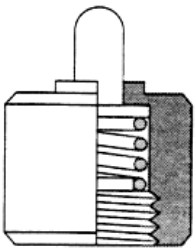
Pressing Anvil For ‘C’ Style Heads



Alignment Anvils For Thru Hole Type Fasteners



Spring Loaded Alignment Anvils For Threaded Type Fasteners



Alcoa Fastening Systems

Delron Inserts
601 Series – Flared Thru-Rivet

Style Selection

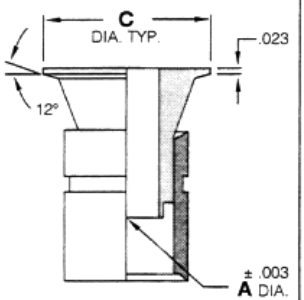
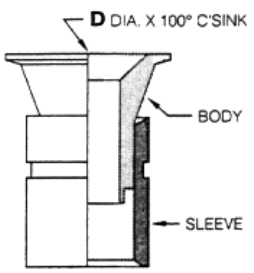
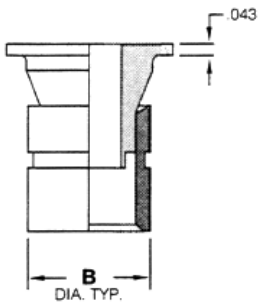
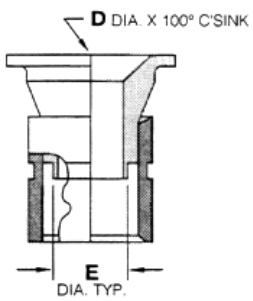
For Panel Skin Thicknesses...	Less than .030"		.030" Minimum	
Head Style	D – Flush	C – Flush, Countersink	F – Non-Flush	FC – Non-Flush, Countersink Hole
				

Table 1

Size	Rivet Size	A Hole Dia.	B Sleeve Dia.	C Head Dia.	D C'Sink Dia	E Flare Dia.
0	8 (3/32)	.103	.250	.375	.192	.148
1	12 (1/8)	.133	.312	.500	.233	.174
2	15 (5/32)	.168	.375	.562	.295	.225
3	18 (3/16)	.194	.375	.562	.362	.225
4	25 (1/4)	.256	.500	.687	.486	.290
5	31 (5/16)	.318	.562	.750	.574	.356
6	37 (3/8)	.381	.625	.875	*	.418

*Available upon request.

Note:

1. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Part Number Selection

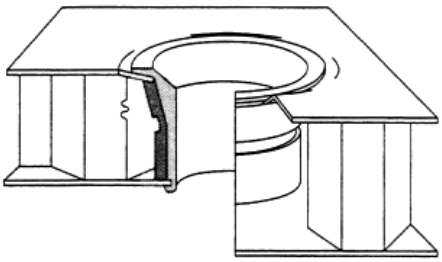
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

6 0 1 D 2-49 F52

- F52 — Body Number: See Table 2
- 49 — Sleeve Dash Number = Core Thickness Rounded to the Nearest Hundredth of an Inch, (See Example on Sheet 2)
- 2 — Size: See Table 1
- D — Head Style: C = Flush, Countersink Hole; D = Flush Head; F = Non-Flush Head; FC = Non-Flush, Countersink Hole
- 1 — Type: Thru-Rivet
- 0 — Material: 0 = Aluminum Alloy: Body = 2024T4 or T351 per QQ-A225/6. Sleeve = 6061-T6 per WW-T-700/6. Finish: = Alodine per MIL-C-5541.
  6 = CRES per ASTM-A-581, ASTM-A-582, AMS5640, AMS5639 Passivate per QQ-P-35.
  9 = Carbon Steel per ASTM-A-108, FED-STD-66, ASTM-A-519, Cadmium Plate per QQ-P-416, Type II, Class 2.
- 6 — Series 600: Flared Structural Type

Typical Assembly



Typical Series 601, Flared Thru-Rivet; Body and Sleeve assembly installed in honeycomb sandwich panel. Both top and bottom panel skins are gripped between body and flared sleeve of insert for maximum structural strength.

Note: For installation and tooling information, see pages 68 and 69.

Alcoa Fastening Systems

601 Flared Series - continued

Body and Sleeve Dash Number Selection

Sleeve Dash Number

Round *down* to the nearest hundredth of an inch of the panel core thickness (See Fig. 1).

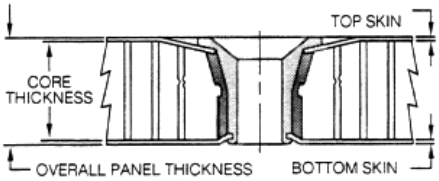
Example: .489 Core Thickness, drop last digit to read -48.

Body Dash Number

Select Body Number from Table 2 according to Overall Panel Thickness.

Example: Overall Panel Thickness of .524 = F52 Body Number.

Fig. 1



Notes:

1. Flush Head styles are not recommended for panel skin thicknesses greater than .030.
2. Non-Flush Head styles are to be used only with minimum panel skin thickness of .030.

Table 2

Body	Panel Thickness
F25	.250-2.50
F26	.260-.269
F27	.270-.279
F28	.280-.289
F29	.290-.299
F30	.300-.309
F31	.310-.319
F32	.320-.329
F33	.330-.339
F34	.340-.349
F35	.350-.359
F36	.360-.369
F37	.370-.379
F38	.380-.389
F39	.390-.399
F40	.400-.409
F41	.410-.419
F42	.420-.429
F43	.430-.439
F44	.440-.449
F45	.450-.459
F46	.460-.469
F47	.470-.479
F48	.480-.489
F49	.490-.499
F50	.500-.509

Body	Panel Thickness
F51	.510-.519
F52	.520-.529
F53	.530-.539
F54	.540-.549
F55	.550-.559
F56	.560-.569
F57	.570-.579
F58	.580-.589
F59	.590-.599
F60	.600-.609
F61	.610-.619
F62	.620-.629
F63	.630-.639
F64	.640-.649
F65	.650-.659
F66	.660-.669
F67	.670-.679
F68	.680-.689
F69	.690-.699
F70	.700-.709
F71	.710-.719
F72	.720-.729
F73	.730-.739
F74	.740-.749
F75	.750-.759
F76	.760-.769

Body	Panel Thickness
F77	.770-.779
F78	.780-.789
F79	.790-.799
F80	.800-.809
F81	.810-.819
F82	.820-.829
F83	.830-.839
F84	.840-.849
F85	.850-.859
F86	.860-.869
F87	.870-.879
F88	.880-.889
F89	.890-.899
F90	.900-.909
F91	.910-.919
F92	.920-.929
F93	.930-.939
F94	.940-.949
F95	.950-.959
F96	.960-.969
F97	.970-.979
F98	.980-.989
F99	.990-.999
F100	1.000-1.009
F101	1.010-1.019
F102	1.020-1.029

Alcoa Fastening Systems

Delron Inserts
602 Series – Flared Thru-Bolt

Style Selection

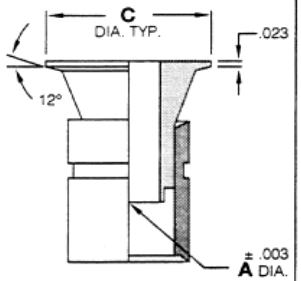
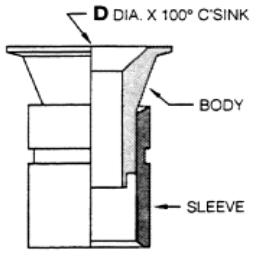
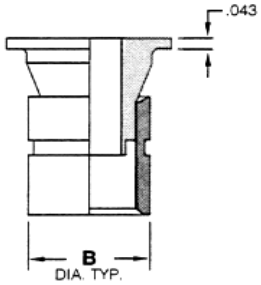
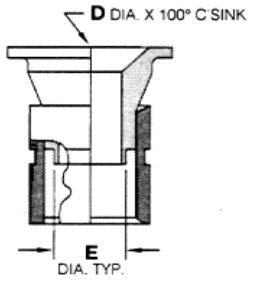
For Panel Skin Thicknesses...	Less than .030"		.030" Minimum	
Head Style	D – Flush	C – Flush, Countersink	F – Non-Flush	FC – Non-Flush, Countersink Hole
				

Table 1

Size	Bolt Size	A Hole Dia.	B Sleeve Dia.	C Head Dia.	D C'Sink Dia.	E Flare Dia.
0	4	.117	.250	.375	.220	.148
1	6	.144	.312	.500	.274	.174
2	8	.168	.375	.562	.332	.225
3	10	.194	.375	.562	.382	.225
4	25	.256	.500	.687	.505	.290
5	31	.318	.562	.750	*	.356
6	37	.381	.625	.875	*	.418

*Available upon request.

Note:

1. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Part Number Selection

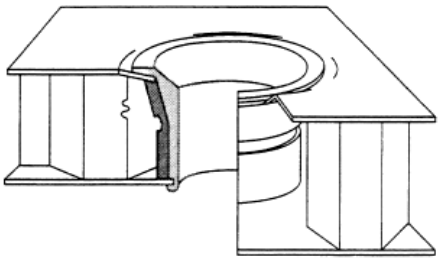
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

6 0 2 D 2-49 F52

- F52 — Body Number: See Table 2
- 2-49 — Sleeve Dash Number = Core Thickness Rounded to the Nearest Hundredth of an Inch, (See Example on Sheet 2)
- D — Size: See Table 1
- Head Style: C = Flush,Countersink Hole; D = Flush Head; F = Non-Flush Head; FC = Non-Flush, Countersink Hole
- 2 — Type: Thru-Bolt
- 0 — Material: 0 = Aluminum Alloy: Body = 2024T4 or T351 per QQ-A225/6. Sleeve = 6061-T6 per WW-T-700/6. Finish: = Alodine per MIL-C-5541.
  6 = CRES per ASTM-A-581, ASTM-A-582, AMS5640, AMS5639. Passivate per QQ-P-35.
  9 = Carbon Steel per ASTM-A-108, FED-STD-66, ASTM-A-519, Cadmium Plate per QQ-P-416, Type II, Class 2.
- 6 — Series 600: Flared Structural Type

Typical Assembly



Typical Series 602, Flared Thru-Bolt; Body and Sleeve assembly installed in honeycomb sandwich panel. Both top and bottom panel skins are gripped between body and flared sleeve of insert for maximum structural strength.

Note: For installation and tooling information, see pages 68 and 69.

Alcoa Fastening Systems

602 Flared Series - continued

Body and Sleeve Dash Number Selection

Sleeve Dash Number

Round *down* to the nearest hundredth of an inch of the panel core thickness (See Fig. 1).

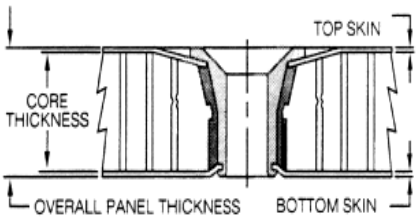
Example: .489 Core Thickness, drop last digit to read -48.

Body Dash Number

Select Body Number from Table 2 according to Overall Panel Thickness.

Example: Overall Panel Thickness of .524 = F52 Body Number.

Fig.1



Notes:

1. Flush Head styles are not recommended for panel skin thicknesses greater than 030.
2. Non-Flush Head styles are to be used only with minimum panel skin thickness of .030.

Table 2

Body	Panel Thickness
F25	.250-.259
F26	.260-.269
F27	.270-.279
F28	.280-.289
F29	.290-.299
F30	.300-.309
F31	.310-.319
F32	.320-.329
F33	.330-.339
F34	.340-.349
F35	.350-.359
F36	.360-.369
F37	.370-.379
F38	.380-.389
F39	.390-.399
F40	.400-.409
F41	.410-.419
F42	.420-.429
F43	.430-.439
F44	.440-.449
F45	.450-.459
F46	.460-.469
F47	.470-.749
F48	.480-.489
F49	.490-.499
F50	.500-509

Body	Panel Thickness
F51	.510-.519
F52	.520-.529
F53	.530-.539
F54	.540-.549
F55	.550-.559
F56	.560-.569
F57	.570-.579
F58	.580-.589
F59	.590-.599
F60	.600-.609
F61	.610-.619
F62	.620-.629
F63	.630-.639
F64	.640-.649
F65	.650-.659
F66	.660-.669
F67	.670-.679
F68	.680-.689
F69	.690-.699
F70	.700-.709
F71	.710-.719
F72	.720-.729
F73	.730-.739
F74	.740-.749
F75	.750-.759
F76	.760-769

Body	Panel Thickness
F77	.770-.779
F78	.780-.789
F79	.790-.799
F80	.800-.809
F81	.810-.819
F82	.820-.829
F83	.830-.839
F84	.840-.849
F85	.850-.859
F86	.860-.869
F87	.870-.879
F88	.880-.889
F89	.890-.899
F90	.900-.909
F91	.910-.919
F92	.920-.929
F93	.930-.939
F94	.940-.949
F95	.950-.959
F96	.960-.969
F97	.970-.979
F98	.980-.989
F99	.990-.999
F100	1.000-1.009
F101	1.010-1.019
F102	1.020-1.029

Alcoa Fastening Systems

Delron Inserts
603 Series - Flared Threaded

Style Selection

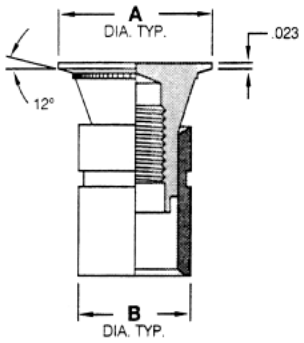
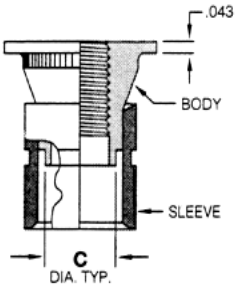
For Top Skin Thicknesses...	Less than .030"	.030" Minimum
Head Style	D-Flush	F-Non-Flush
	 Shown with Blind-Thread	 Shown with Thru-Thread

Table 1

Size	Thread Per MIL-S-8879	A HeadDia.	B SleeveDia.	C FlareDia.
0	.1120-40 UNJC-3B	.375	.250	.148
1	.1380-32 UNJC-3B	.500	.312	.174
2	.1640-32 UNJC-3B	.562	.375	.225
3	.1900-32 UNJF-3B	.562	.375	.225
4	.2500-28 UNJF-3B	.687	.500	.290
5	.325-24 UNJF-3B	.750	.562	.356
6	.3750-24 UNJF-3B	.875	.625	.418

Note:

1. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

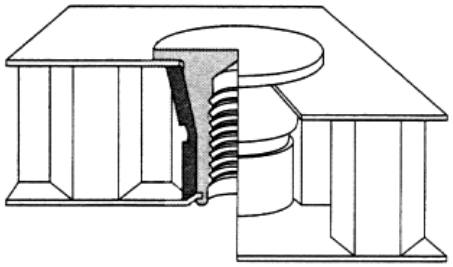
Part Number Selection

Consult Rosán for availability of optional materials, finishes and sizes.
Example:

6 0 3 D 3-49 FT52

- Body Number (See Table 2. Add "T" as Shown When Thru-Thread is Required but is Not Standard)
- Sleeve Dash Number = Core Thickness Rounded to the Nearest Hundredth of an Inch (See Example on Sheet 2)
- Size: See Table 1
- Head Style: D = Flush Head, F = Non-Flush Head
- Type: Threaded
- Material: 0 =Aluminum Alloy: Body = 2024T4 or T351 per QQ-A225/6. Sleeve = 6061-T6 per WW-T-700/6. Finish: = Alodine per MIL-C-5541.
  6 =CRES per ASTM-A-581, ASTM-A-582, AMS5640, AMS5639. Passivate per QQ-P-35.
  9 =Carbon Steel per ASTM-A-108, FED-STD-66, ASTM-A-519, Cadmium Plate per QQ-P-416, Type II, Class 2.
- Series 600: Flared Structural Type

Typical Assembly



Typical Series 603, Flared Threaded; Body and Sleeve; assembly installed in honeycomb sandwich panel. Both top and bottom skins are gripped between body and flared sleeve of insert for maximum structural strength.

Note: For installation and tooling information, see pages 68 and 69.

Alcoa Fastening Systems

603 Flared Series - continued

Body and Sleeve Dash Number Selection

Sleeve Dash Number

Round *down* to the nearest hundredth of an inch of the panel core thickness (See Fig. 1).

Example: .489 Core Thickness, drop last digit to read -48.

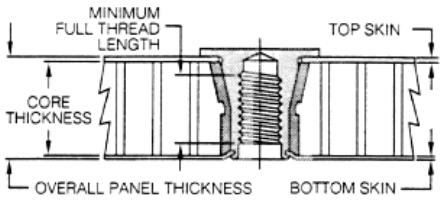
Body Dash Number

Select Body Number from Table 2 according to Overall Panel Thickness.

Example: Overall Panel Thickness of .524 = F52 Body Number.

= Thru-Hole Thread = Minimum Full Thread Length = Not Available

Fig. 1



Notes:

1. Flush Head styles are not recommended for panel skin thicknesses greater than .030.
2. Non-Flush Head styles are to be used only with minimum panel skin thickness of .030.

Table 2

Body Dash No.	Panel Thickness	(Thread Size (See Table 1) 0	1	2	3	4	5	6
F25	.250-.259						–	–
F26	.260-.269						–	–
F27	.270-.279						–	–
F28	.280-.289						–	–
F29	.290-.299						–	–
F30	.300-.309						–	–
F31	.310-.319						–	–
F32	.320-.329						–	–
F33	.330-.339						–	–
F34	.340-.349						–	–
F35	.350-.359						–	–
F36	.360-.369						–	–
F37	.370-.379	.164					–	–
F38	.380-.389	.174					–	–
F39	.390-.399	.184					–	–
F40	.400-.409	.194					–	–
F41	.410-.419	.204						–
F42	.420-.429	.214	.206					–
F43	.430-.439	.224	.216					
F44	.440-.449	↑	.226					
F45	.450-.459		.236					
F46	.460-.469		.246					
F47	.470-.479		.256	.248				
F48	.480-.489		.266	.258				
F49	.490-.499		.276	.268				
F50	.500-.509		↑	.278	.270			
F51	.510-.519			.288	.280			
F52	.520-.529			.298	.290			
F53	.530-.539			.308	.300			
F54	.540-.549			.318	.310			
F55	.550-.559			.328	.320			
F56	.560-.569			↑	.330			
F57	.570-.579				.340			
F58	.580-.589				.350			
F59	.590-.599				.360			
F60	.600-.609				.370			
F61	.610-.619				.380			
F62	.620-.629				↑	.380		
F63	.630-.639					.390		
F64	.640-.649					.400		
F65	.650-.659	↓	↓	↓	↓	.410	–	–

Body Dash No.	Panel Thickness	(Thread Size (See Table 1) 0	1	2	3	4	5	6
F66	.660-.669	↑	↑	↑	↑	.420	–	–
F67	.670-.679					.430	–	–
F68	.680-.689					.440	–	–
F69	.690-.699					.450	–	–
F70	.700-.709					.460	–	–
F71	.710-.719					.470	–	–
F72	.720-.729					.480	–	–
F73	.730-.739					.490	.464	–
F74	.740-.749					.500	.474	–
F75	.750-.759					↑	.484	–
F76	.760-.769						.494	–
F77	.770-.779						.504	–
F78	.780-.789						.514	–
F79	.790-.799						.524	–
F80	.800-.809						.534	–
F81	.810-.819						.544	–
F82	.820-.829						.554	–
F83	.830-.839						.564	–
F84	.840-.849						.574	–
F85	.850-.859						.584	.560
F86	.860-.869						.594	.570
F87	.870-.879						.604	.580
F88	.880-.889						.614	.590
F89	.890-.899						.624	.600
F90	.900-.909						↑	.610
F91	.910-.919							.620
F92	.920-.929							.630
F93	.930-.939							.640
F94	.940-.949							.650
F95	.950-.959							.660
F96	.960-.969							.670
F97	.970-.979							.680
F98	.980-.989							.690
F99	.990-.999							.700
F100	1.000-1.009							.710
F101	1.010-1.019							.720
F102	1.020-1.029							.730
F103	1.030-1.039							.740
F104	1.040-1.049	↓	↓	↓	↓	↓	↓	.750
& UP	1.050-1.059	.224	.276	.328	.380	.500	.624	.750

Alcoa Fastening Systems

Delron Inserts
604 Series - Flared Threaded with Non-Metallic Lock

Style Selection

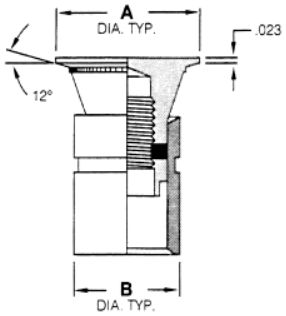
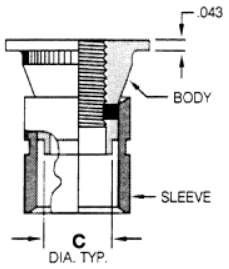
For Top Skin Thicknesses...	Less than .030"	.030" Minimum
Head Style	D-Flush	F-Non-Flush
		
	Shown with Blind-Thread	Shown with Thru-Thread

Table 1

Size	Thread Per MIL-S-8879	A Head Dia.	B Sleeve Dia.	C Flare Dia.
0	.1120-40 UNJC-3B	.375	.250	.148
1	.1380-32 UNJC-3B	.500	.312	.174
2	.1640-32 UNJC-3B	.562	.375	.225
3	.1900-32 UNJF-3B	.562	.375	.225
4	.2500-28 UNJF-3B	.687	.500	.290
5	.3125-24 UNJF-3B	.750	.562	.356
6	.3750-24 UNJF-3B	.875	.625	.418

Note:

1. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Part Number Selection

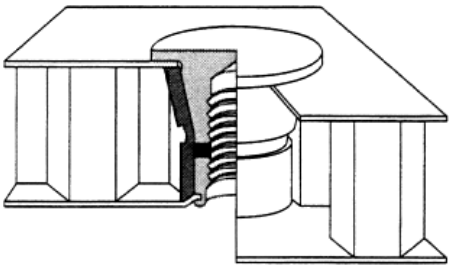
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

6 0 4 D 3-49 FT52

- Body Number (See Table 2. Add "T" as Shown When Thru-Thread is Required but is Not Standard)
- Sleeve Dash Number = Core Thickness Rounded to the Nearest Hundredth of an Inch (See Example on Sheet 2)
- Size: See Table 1
- Head Style: D = Flush Head, F = Non-Flush Head
- Type: Threaded With Non-Metallic Lock
- Material: 0 = Aluminum Alloy: Body = 2024T4 or T351 per QQ-A225/6. Sleeve = 6061-T6 per WW-T-700/6. Finish: = Alodine per MIL-C-5541.
  6 = CRES per ASTM-A-581, ASTM-A-582, AMS5640, AMS5639. Passivate per QQ-P-35.
  9 = Carbon Steel per ASTM-A-108, FED-STD-66, ASTM-A-519, Cadmium Plate per QQ-P-416, Type II, Class 2.
- Series 600: Flared Structural Type

Typical Assembly



Typical Series 604, Flared Threaded with Non-Metallic Lock; Body and Sleeve; assembly installed in honeycomb sandwich panel. Both top and bottom skins are gripped between body and flared sleeve of insert for maximum structural strength.

Note: **For installation and tooling information, see pages 68 and 69.**

Alcoa Fastening Systems

604 Flared Series - continued

Body and Sleeve Dash Number Selection

Sleeve Dash Number

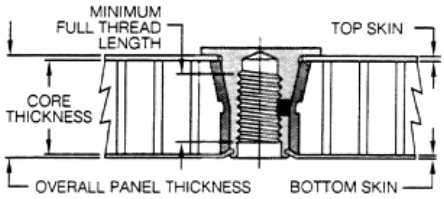
Round *down* to the nearest hundredth of an inch of the panel core thickness (See Fig. 1).
Example: .489 Core Thickness, drop last digit to read -48.

Body Dash Number

Select Body Number from Table 2 according to Overall Panel Thickness.
Example: Overall Panel Thickness of .524 = F52 Body Number.

= Thru-Hole Thread = Minimum Full Thread Length = Not Available

Fig. 1



Notes:

1. Flush Head styles are not recommended for panel skin thicknesses greater than .030.
2. Non-Flush Head styles are to be used only with minimum panel skin thickness of .030.

Table 2

Body Dash No.	Panel Thickness	(Thread Size (See Table 1) 0	1	2	3	4	5	6
F25	.250-.259						–	–
F26	.260-.269						–	–
F27	.270-.279						–	–
F28	.280-.289						–	–
F29	.290-.299						–	–
F30	.300-.309						–	–
F31	.310-.319						–	–
F32	.320-.329						–	–
F33	.330-.339						–	–
F34	.340-.349						–	–
F35	.350-.359						–	–
F36	.360-.369						–	–
F37	.370-.379	.164					–	–
F38	.380-.389	.174					–	–
F39	.390-.399	.184					–	–
F40	.400-.409	.194					–	–
F41	.410-.419	.204						–
F42	.420-.429	.214	.206					–
F43	.430-.439	.224	.216					
F44	.440-.449	↑	.226					
F45	.450-.459		.236					
F46	.460-.469		.246					
F47	.470-.479		.256	.248				
F48	.480-.489		.266	.258				
F49	.490-.499		.276	.268				
F50	.500-.509		↑	.278	.270			
F51	.510-.519			.288	.280			
F52	.520-.529			.298	.290			
F53	.530-.539			.308	.300			
F54	.540-.549			.318	.310			
F55	.550-.559			.328	.320			
F56	.560-.569			↑	.330			
F57	.570-.579				.340			
F58	.580-.589				.350			
F59	.590-.599				.360			
F60	.600-.609				.370			
F61	.610-.619				.380			
F62	.620-.629				↑	.380		
F63	.630-.639					.390		
F64	.640-.649					.400		
F65	.650-.659	↓	↓	↓	↓	.410	–	–

Body Dash No.	Panel Thickness	(Thread Size (See Table 1) 0	1	2	3	4	5	6
F66	.660-.669	↑	↑	↑	↑	.420	–	–
F67	.670-.679					.430	–	–
F68	.680-.689					.440	–	–
F69	.690-.699					.450	–	–
F70	.700-.709					.460	–	–
F71	.710-.719					.470	–	–
F72	.720-.729					.480	–	–
F73	.730-.739					.490	.464	–
F74	.740-.749					.500	.474	–
F75	.750-.759					↑	.484	–
F76	.760-.769						.494	–
F77	.770-.779						.504	–
F78	.780-.789						.514	–
F79	.790-.799						.524	–
F80	.800-.809						.534	–
F81	.810-.819						.544	–
F82	.820-.829						.554	–
F83	.830-.839						.564	–
F84	.840-.849						.574	–
F85	.850-.859						.584	.560
F86	.860-.869						.594	.570
F87	.870-.879						.604	.580
F88	.880-.889						.614	.590
F89	.890-.899						.624	.600
F90	.900-.909						↑	.610
F91	.910-.919							.620
F92	.920-.929							.630
F93	.930-.939							.640
F94	.940-.949							.650
F95	.950-.959							.660
F96	.960-.969							.670
F97	.970-.979							.680
F98	.980-.989							.690
F99	.990-.999							.700
F100	1.000-1.009							.710
F101	1.010-1.019							.720
F102	1.020-1.029							.730
F103	1.030-1.039							.740
F104	1.040-1.049	↓	↓	↓	↓	↓	↓	.750
& UP	1.050-1.059	.224	.276	.328	.380	.500	.624	.750

Alcoa Fastening Systems

Delron Inserts
606 Series - Flared Threaded with Self-Locking Helical Coil Insert

Style Selection

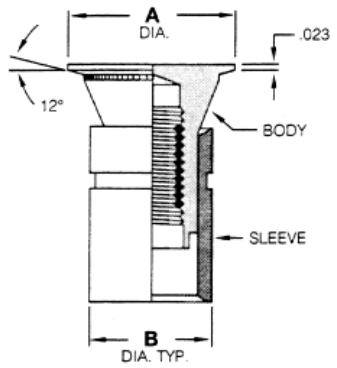
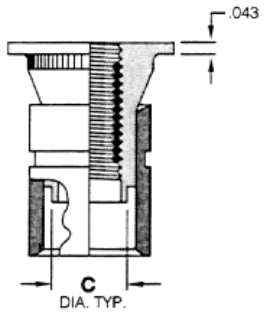
For Top Skin Thicknesses...	Less than .030"	.030" Minimum
Head Style	D – Flush	F – Non-Flush
	 Shown with Blind-Thread	 Shown with Thru-Thread

Table 1

Size	Thread Per MIL-S-8879	A Head Dia.	B Sleeve Dia.	C Dia
1	.1380-32 UNJC-3B	.562	.375	.225
2	.1640-32 UNJC-3B	.625	.437	.290
3	.1900-32 UNJF-3B	.625	.437	.290
4	.2500-28 UNJF-3B	.687	.500	.356
5	.3125-24 UNJF-3B	.750	.562	.418

Note:

1. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Part Number Selection

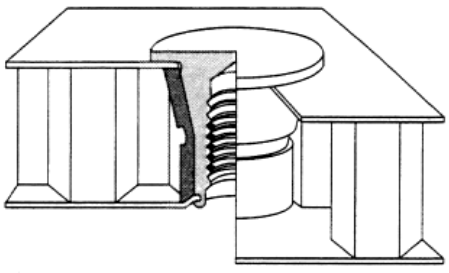
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

6 0 6 D 3-49 FT52

- Body Number (See Table 2. Add "T" as Shown When Thru-Thread is Required but is Not Standard)
- Sleeve Dash Number = Core Thickness Rounded to the Nearest Hundredth of an Inch (See Example on Sheet 2)
- Size: See Table 1
- Head Style: D = Flush Head, F = Non-Flush Head
- Type: Threaded, All Metal, With Self-Locking Helical Coil Insert per MS21209
- Material: 0 = Aluminum Alloy: Body = 2024T4 or T351 per QQ-A225/6. Sleeve = 6061-T6 per WW-T-700/6. Finish: = Alodine per MIL-C-5541.
  6 = CRES per ASTM-A-581, ASTM-A-582, AMS5640, AMS5639. Passivate per QQ-P-35.
  9 = Carbon Steel per ASTM-A-108, FED-STD-66,.ASTM-A-519, Cadmium Plate per QQ-P-416, Type II, Class 2.
- Series 600: Flared Structural Type

Typical Assembly



Typical Series 606 Flared, Threaded with Self-Locking Helical Coil Insert; Body and Sleeve assembly installed in honeycomb sandwich panel. Both top and bottom skins are gripped between body and flared sleeve of insert for maximum structural strength.

Note: For installation and tooling information, see pages 68 and 69.

Alcoa Fastening Systems

ALCOA

606 Flared Series - continued

Body and Sleeve Dash Number Selection

Sleeve Dash Number

Round *down* to the nearest hundredth of an inch of the panel core thickness (See Fig. 1).

Example: .489 Core Thickness, drop last digit to read -48.

Note: For inspection, the actual Sleeve length will be .010-.015 shorter than the converted dash number.

Example: -48 = .480; actual length = .465-.470.

Body Dash Number

Select Body Number from Table 2 according to Overall Panel Thickness.

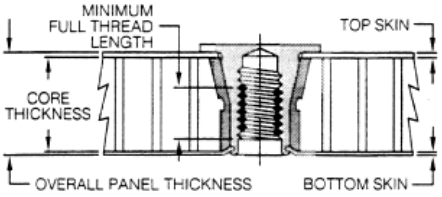
Example: Overall Panel Thickness of .524 = F52 Body Number.

= Thru-Hole Thread

= Minimum Full Thread Length

= Not Available

Fig. 1



Notes:

1. Flush Head styles are not recommended for panel skin thicknesses greater than .030.
2. Non-Flush Head styles are to be used only with minimum panel skin thickness of .030.

Table 2

Body Dash No.	Panel Thickness	(Thread Size (See Table 1) 1	2	3	4	5
F31	.310-.319		–	–	–	–
F32	.320-.329		–	–	–	–
F33	.330-.339		–	–	–	–
F34	.340-.349			–	–	–
F35	.350-.359			–	–	–
F36	.360-.369				–	–
F37	.370-.379				–	–
F38	.380-.389				–	–
F39	.390-.399	.138			–	–
F40	.400-.409	↑			–	–
F41	.410-.419				–	–
F42	.420-.429				–	–
F43	.430-.439					–
F44	.440-.449		.164			–
F45	.450-.459	↓	↑	.190		–
F46	.460-.469	.138		↑		–
F47	.470-.479	.207				–
F48	.480-.489	↑	↓			–
F49	.490-.499					
F50	.500-.509		.164			
F51	.510-.519		.246			
F52	.520-.529	↓	↑			
F53	.530-.539	.207				
F54	.540-.549	.276		↓		
F55	.550-.559	↑		.190		
F56	.560-.569		↓	.285	.250	
F57	.570-.579			↑	↑	
F58	.580-.589		.246			
F59	.590-.599		.328			
F60	.600-.609		↑			
F61	.610-.619					
F62	.620-.629					
F63	.630-.639					
F64	.640-.649			↓		
F65	.650-.659			.285		
F66	.660-.669	↓	↓	.380	↓	.312
F67	.670-.679	.276	.328	.380	.250	.312

Body Dash No.	Panel Thickness	(Thread Size (See Table 1) 1	2	3	4	5
F68	.680-.689	.276	.328	.380	.375	.312
F69	.690-.699	↑	↑	↑	↑	↑
F70	.700-.709					
F71	.710-.719					
F72	.720-.729					
F73	.730-.739					
F74	.740-.749					
F75	.750-.759					
F76	.760-.769					
F77	.770-.779					
F78	.780-.789					
F79	.790-.799				↓	
F80	.800-.809				.375	↓
F81	.810-.819				.500	.312
F82	.820-.829				↑	.469
F83	.830-.839					↑
F84	.840-.849					
F85	.850-.859					
F86	.860-.869					
F87	.870-.879					
F88	.880-.889					
F89	.890-.899					
F90	.900-.909					
F91	.910-.919					
F92	.920-.929					
F93	.930-.939					
F94	.940-.949					
F95	.950-.959					
F96	.960-.969					↓
F97	.970-.979					.469
F98	.980-.989					.625
F99	.990-.999					↑
F100	1.000-1.009					
F101	1.010-1.019					
F102	1.020-1.029					
F103	1.030-1.039	↓	↓	↓	↓	↓
F104	1.040-1.049	.276	.328	.380	.500	.625

Alcoa Fastening Systems

Installation and Tooling Selection

600 Series, Flared Structural Type

The characteristic design of this series will retain the fastener in the panel until time of assembly. Knurls under the head of the body of these internally threaded fasteners, grip the cover sheet and act as an anti-rotation feature.

Panel Preparation

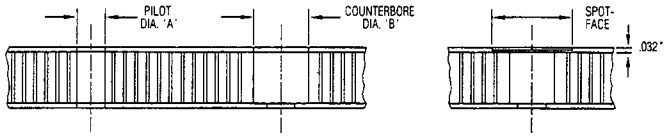
Requires the following:

1. A two diameter hole through the panel.
2. A drill-counterbore combination or singly, or a step drill to standard diameters. See table below.
3. Access to both sides of the panel.
4. Residual core and bondline material must be removed to allow the sleeve to seat on the bottom skin.

Installation Drill Diameters

Fastener Size	0	1	2	3	4	5	6
"A" Pilot Drill Fig. 1, +.005/-.000	.152	.177	.228	.228	.295	.358	.421
"B" C'bore Fig. 2, +.010/-.000	.250	.312	.375	.375	.500	.562	.625

Skin Thickness to .032: **Skin Thickness Greater Than .032**



Panel cover sheets up to .032" will dimple automatically to obtain a flush head condition. Thicker sheets may either require the use of the non-flush head style fastener, or if flushness is required, predimpling or spotfacing is common practice in the industry.

Fastener Installation

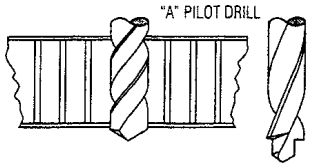
The most commonly used method, and that which is recommended, is the use of ram type equipment, such as an arbor press or hydraulic press.

1. Position fastener in prepared hole.
2. Select tools from Installation Tool Chart (Opposite).
3. Position panel over alignment tool with the guide anvil projecting through the pilot hole. See figure 3.
4. Position fastener in prepared hole and apply pressure with the pressing anvil until the fastener head becomes flush with the top skin. See figure 4.
5. Replace alignment tool with flaring anvil and again apply pressure with pressing anvil until flaring anvil becomes flush with the bottom skin. See figure 5.
6. Release pressure and fastener is now completely installed. Since the head diameter of the fastener has the greatest area of contact, it may cause a slight spring back condition. However, when the component is bolted to the panel, the fastener will again become flush.

   One time setting of insert is critical to a good installation. Do not 'bump' to set flush. Spring back is inherent in the panel and multiple resets of the insert results in a loose body. If within .015 or flush pull the head to flush by attatching the component part.

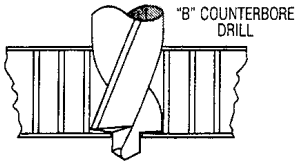
Installation Sequence

1.



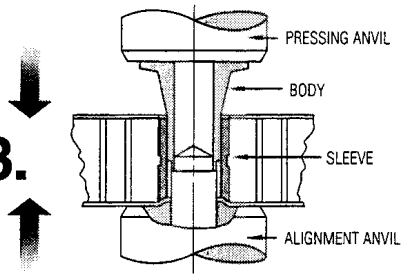
Thru-hole is drilled in panel. Step or piloted counterbore drills can speed this process.

2.

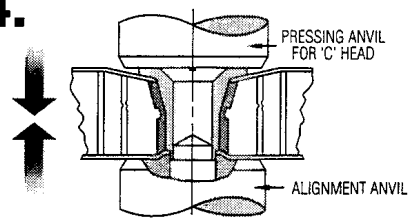


Counterbore is drilled through top skin to inside surface of bottom. Remove core and bond line residual.

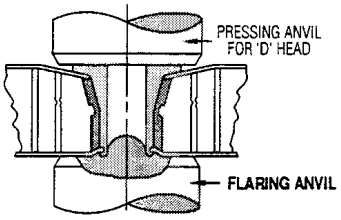
3.



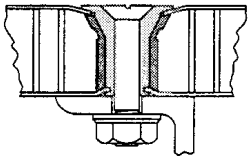
4.



5.



6.



Alcoa Fastening Systems

ALCOA

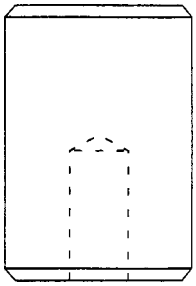
Tooling Part Numbers

Example: Insert Part Number 603D3-47F50 requires Tool Kit Part Number: 1632K3

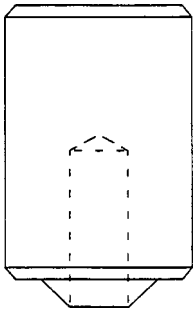
Fastener Series	Tool Kit Number	Consisting of:			
		Alignment Anvil	Pressing Anvil Countersink	Pressing Anvil Flat	Flaring Anvil
601(*)0	1632K0	1632-001	1632-002	1632-003	1632-004
602(*)0					
603(*)0					
604(*)0					
601(*)1	1632K1	1632-11	1632-12	1632-13	1632-14
602(*)1					
603(*)1					
604(*)1					
601(*)2	1632K2	1632-21	1632-22	1632-23	1632-24
602(*)2					
603(*)2					
604(*)2					
606(*)1					
601(*)3	1632K3	1632-21	1632-32	1632-23	1632-24
602(*)3					
603(*)3					
604(*)3					
601(*)4	1632K4	1632-41	1632-42	1632-43	
602(*)4					1632-44
603(*)4					
604(*)4					
606(*)2					
606(*)3					
601(*)5	1632K5	1632-51	1632-52	1632-53	1632-54
602(*)5					
603(*)5					
604(*)5					
606(*)4					
601(*)6	1632K6	1632-61	1632-62	1632-63	1632-64
602(*)6					
603(*)6					
604(*)6					
606(*)5					

(*) Fill in 'C', 'D' or 'F' as applicable.

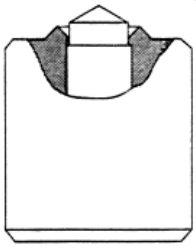
Pressing Anvils For 'D' and 'F' Style Heads



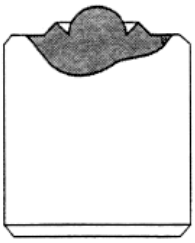
Pressing Anvils For 'C' Style Heads



Alignment Anvil



Flaring Anvil



Alcoa Fastening Systems

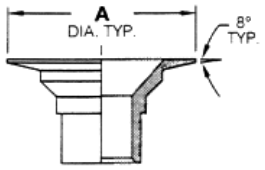
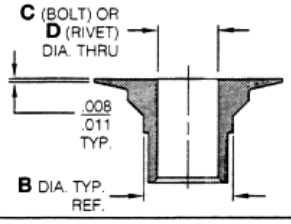
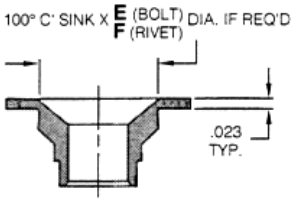
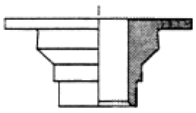
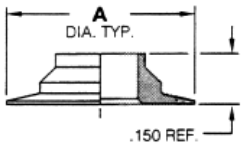
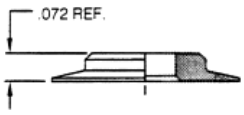
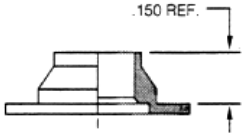
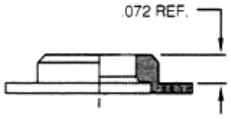
Delron Inserts

A106 Series - Thru-Bolt/Thru-Rivet

A106 Series inserts are designed specifically for lightweight Thru-Hole applications where core crush to the panel is very critical and should be minimized. Recommended in graphite skin applications.

Style Selection

Any sleeve style may be used in combination with any Plug style of the same size.

Head Style	C – Flush, Countersink	D – Flush, Thru-Hole	FC – Non-Flush, Countersink Hole	F – Non-Flush, Thru-Hole
Plug				
Head Style	**D – Flush, -1 Length**	**D – Flush, -0 Length**	**F – Non-Flush, -1 Length**	**F – Non-Flush, -0 Length**
Sleeve				

Note: "B" Diameter may be omitted on short lengths.

Table 1

Size	A Dia.	B Dia. (Ref)	C Dia. Thru (Bolt)	D Dia. Thru (Rivet)	E Dia. C'Sink (Bolt)	F Dia. C'Sink (Rivet)	Installation Hole Diameter +.005-.000
1	.50	.27	.141/.147	.133/.139	.274	.233	.375
2	.50	.27	.166/.172		.332	.293	.375
3	.62	.29	.190/.196		.382	.365	.406
4	.75	.35	.254/.260		.505	.483	.500
5	.81	.41	.315/.321		.633	.574	.640

Note:

Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

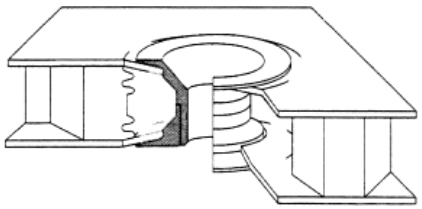
Table 2

	Sleeve Dash Number	
Size	-0	-1
1	.180 thru .249	.250 and Up
2		
3		
4	.180 thru .309	.310 and Up
5	.200 thru .369	.370 and Up

= Panel Thickness

See Sheet 2 for Part Number Selection

Typical Assembly



Typical Series A106 Thru-Hole Plug and Sleeve assembly, installed in honeycomb sandwich panel.

Note: For installation and tooling information, contact the Rosán Engineering Department.

Alcoa Fastening Systems

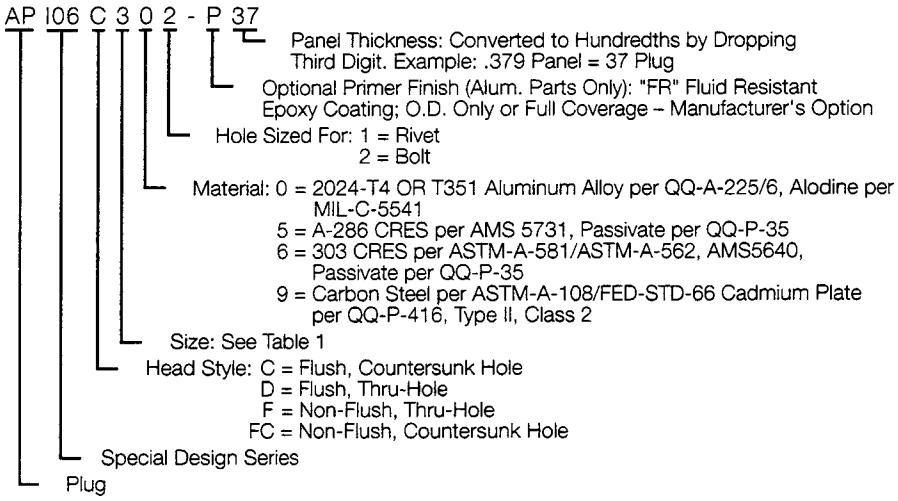
A106 Series - continued

Part Number Selection

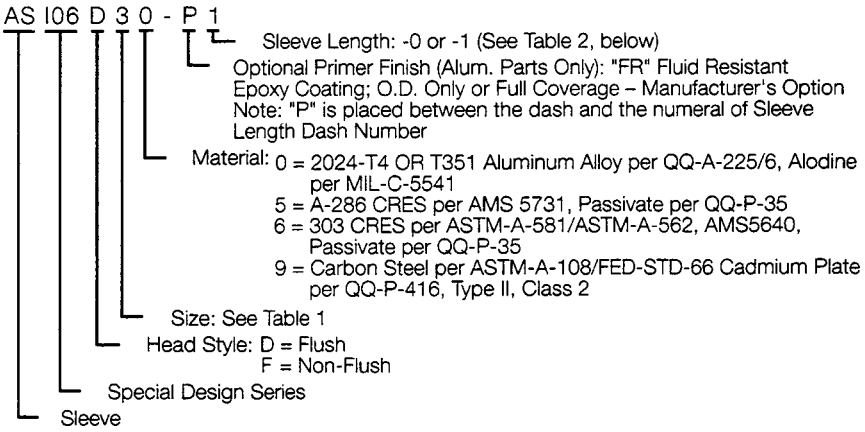
Two part numbers—Sleeve and Plug—are required for a complete assembly. Consult Rosán for availability of optional materials, finishes, sizes and length.

Examples:

Plug:



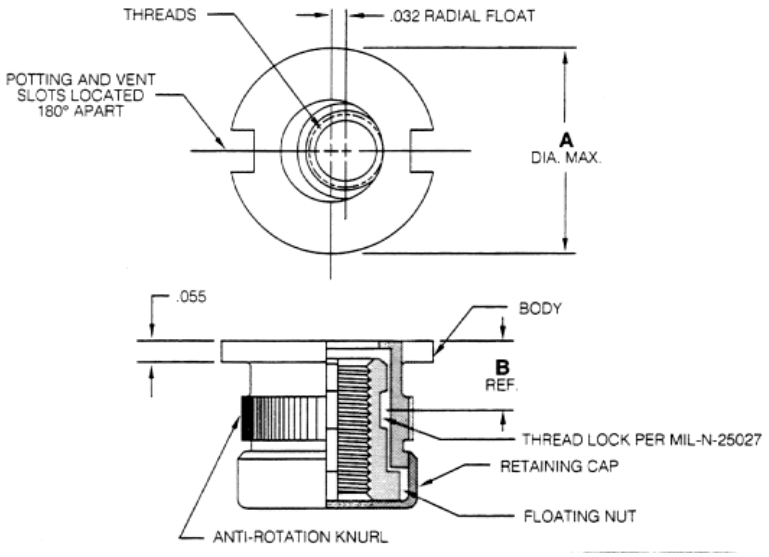
Sleeve:

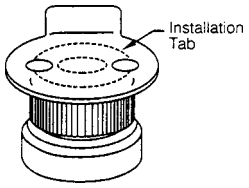


Alcoa Fastening Systems

Delron Inserts
D147HF Series - Floating Nut with Self-Locking, Blind Thread

D147HF Series inserts are designed for applications where potential hole misalignment requires a floating nut element. This series features an extensive variety of material and finish combinations.





Adhesive backed installation tabs are supplied with each Insert. See codes listed in Table 1.

Notes:

1. Burrs caused by slotting are permissable under flange.
2. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Table 1

Size	Thread Per MIL-S-8879	A Head Dia.	Installation Tab	Installation Hole Dia.	B Ref.
04	.1120-40 UNJC-3B	.561	T7	.562-.565	.14
06	.1380-32 UNJC-3B	.561	T7	.562-.565	.14
08	.1640-32 UNJC-3B	.561	T7	.562-.565	.16
3	.1900-32 UNJF-3B	.561	T7	.562-.565	.16
4	.2500-28 UNJF-3B	.686	T9	.687-.690	.18
5	.3125-24 UNJF-3B	.811	T11	.812-.815	.20
6	.3750-24 UNJF-3B	.937	T27	.938-.941	.22

Part Number Selection

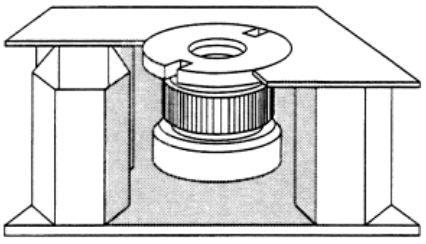
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

D147HF 3 B 4

- 4 — Insert Length Code Number: See Table 2
- B — Material Code: See Table 3
- 3 — Size: See Table 1
- D147HF — Special Design Series

Typical Assembly



Typical Series D147HF, Floating Nut Insert; installed in honeycomb panel. Insert is held in place by a cured epoxy compound.

Note: For general installation information, refer to page 45. For hole preparation see table above.

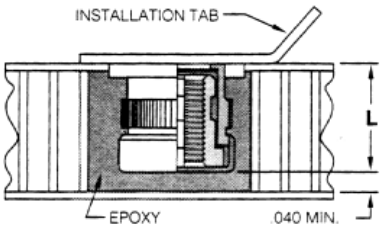
D147HF Series - continued

Length Dash Number Selection

Select Length Code Number from Table 2 based on the minimum full thread length required by the application. Insert length “L” must be a minimum of .040" less than depth of panel core (See Fig. 1).

Example: Requirements: .2500-28 Size Thread, Carbon Steel Nut and Body, with a Minimum Full Thread Length of .495.
From table select:
7 P/N = D147HF4B7.

Fig. 1



Minimum clearance is required between bottom of insert and inside panel skin for proper epoxy bonding.

= Minimum Full Thread

Table 2

Length Code No.	L	Thread Size					
		06	08	3	4	5	6
2	.350	.276	.276	.276	.276	.276	.276
3	.375	.276	.301	.301	.301	.301	.301
4	.455	.276	.328	.380	.386	.386	.386
5	.565	.276	.328	.380	.491	.491	.491
6	.690	.276	.328	.380	.500	.616	.616
7	.815	.276	.328	.380	.500	.625	.742
8	.935	.276	.328	.380	.500	.625	.750
9	1.060	.276	.328	.380	.500	.625	.750
10	1.185	.276	.328	.380	.500	.625	.750

Notes: 1. Maximum bolt engagement should not exceed “Length” minus .060.
2. Minimum full thread shall be 2 diameters where length permits.

Table 3 - Material and Finish Selection

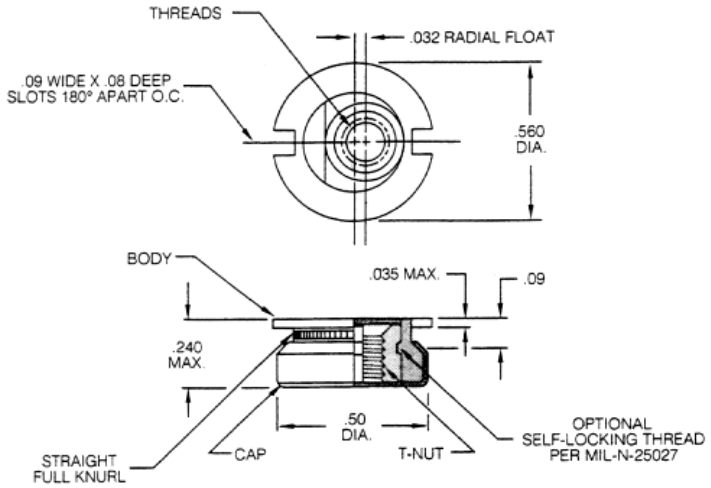
Material Code	Floating Nut	Body
A	Carbon Steel per FED-STD-66 Cadmium Plate per QQ-P-416, TYPE II, CL2	2024-T4 OR T351 Aluminum Alloy QQ-A-225/6 Alodine per MIL-C-5541
B	Carbon Steel per FED-STD-66 Cadmium Plate per QQ-P-416, TYPE II, CL2	Carbon steel per ASTM-A-108/FED-STD-66 Cadmium Plate per QQ-P-416, TYPE II, CL2
C	303 CRES per ASTM-A-581, AMS5640 Passivate per QQ-P-35	303 CRES per ASTM-A-582, AMS5640 Passivate per QQ-P-35
D	303 CRES per ASTM-A-581, AMS5640 Passivate per QQ-P-35	2024-T4 OR T351 Aluminum Alloy QQ-A-225/6 Alodine per MIL-C-5541
E	Carbon Steel per FED-STD-66 Cadmium Plate per QQ-P-416, TYPE II, CL2 Dry Film Lube per MIL-L-46010 TYPE I	2024-T4 OR T351 Aluminum Alloy per QQ-A-225/6 Alodine per MIL-C-5541
F	303 CRES per ASTM-A-581, AMS5640 High Chloride Nickel Strike Cadmium Plate per QQ-P-416, TYPE II, CL2	6061-T6 Aluminum Alloy QQ-A-225/8 Alodine per MIL-C-5541
G	Carbon Steel per FED-STD-66 Cadmium Plate per QQ-P-416, TYPE II, CL2	303 CRES per ASTM-A-582, AMS5640 Passivate per QQ-P-35

Optional Finish for Aluminum Bodies: Anodize per MIL-A-8625, Type I.

Alcoa Fastening Systems

Delron Inserts Flush Head with Floating Nut D137HF Series - Thin Panel

D137HF Series inserts are designed specifically for lightweight applications in .300 minimum thick panels. The inserts provide a flush application with a floating nut element for potential hole misalignments.



Materials and Finishes:

Body: Options listed in Part Number Selection.
Cap: Brass; Cadmium plated, or Aluminum, Anodized at manufacturer's option.
T-Nut: Options listed in Part Number Selection.

Notes:

1. No. T-7 adhesive backed installation tabs are furnished with all parts.
2. Tolerances, unless otherwise specified: .xxx ± .010; Angles ± 2°.

Table 1

Size	Thread Size Per MIL-S-8879	Installation Hole Dia.
1	.1380-32 UNJC-3B	.560 - .567
2	.1649-32 UNJC-3B	
3	.1900-32 UNJF-3	

Part Number Selection

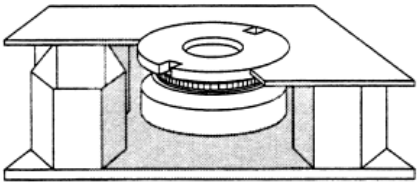
Consult Rosán for availability of optional materials, finishes and sizes.

Example:

D137HF 3 6 5 C M

- M — T-Nut Optional Finish: M = Dry Film Lubricant per MIL-L-46010, Type I
- C — Body Material:
  - ( ) = 2024-T4 or T351 Aluminum Alloy per QQ-A-225/6, Anodize per MIL-A-8625
  - C = 303 CRES Steel per ASTM-A-581,/ASTM-A-582, AMS5640 Passivate per QQ-P-35
  - S = Carbon Steel per ASTM-A-108/FED-STD-66, Cadmium Plate per QQ-P-416, Type II, Class 2
- 5 — Thread Type: 3 = Threaded Only (Non-Locking); 5 = Self-Locking Thread
- 6 — Nut Material: 6 = 303 CRES, Passivated; 9 = Carbon Steel, Cadmium Plated
- 3 — Size: See Table 1
- D137HF — Special Design Series

Typical Assembly



Typical Series D137HF, Floating Nut Insert; installed in honeycomb sandwich panel. Insert is held in place by a cured epoxy compound.

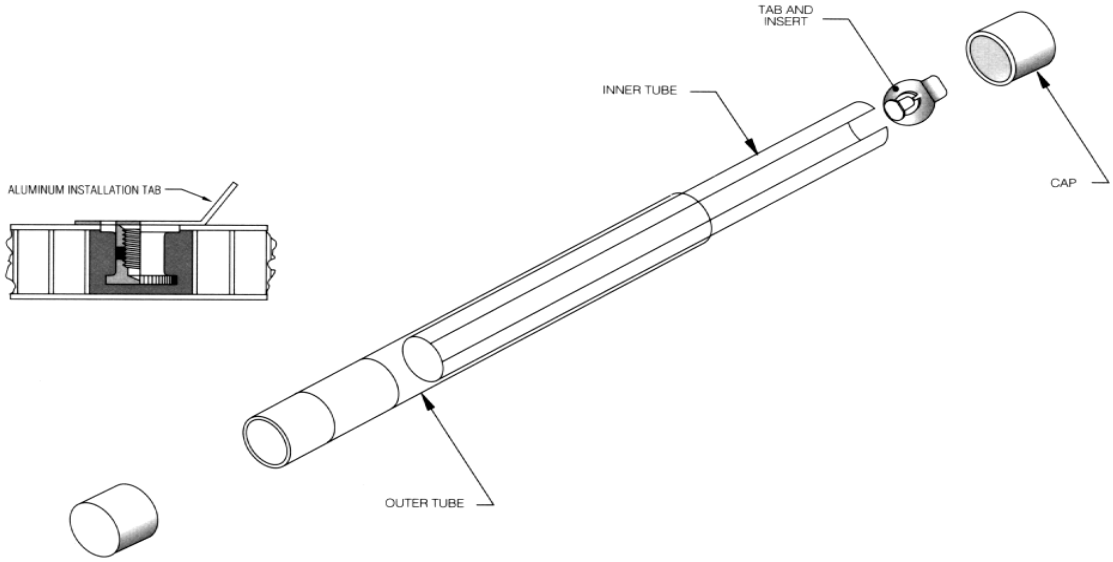
Note: For general installation information, refer to page 45. For hole preparation see table above.

Alcoa Fastening Systems

Optional Tube Packaging for Potted-in Types (400 Series and 1800 Series (NAS) versions)

Molded-in inserts with installation tabs are supplied in convenient tube packaging. Tubes are clear for easy visual identification and inventory inspection.

- Inserts with aluminum installation tabs are packaged in cylindrical tubing.



- Inserts with plastic installation tabs are packaged in form, fitting tubing.