

## GENERAL INFORMATION

## TAP-FLEX®

Thread-Forming Structural Screws

## PRODUCT DESCRIPTION

Tap-Flex® Thread-Forming Structural Screws are thread-forming, dual heat treated self-tapping fasteners that provide the strength, ductility, and resistance to embrittlement failures required in critical curtain wall and dissimilar metal applications. Tap-Flex fasteners are designed to offer a replacement option for traditional nut and bolt assemblies. These fasteners provide an excellent solution in blind applications. The patented E-Form® segmented thread profile design improves both installation and in-place performance.

## GENERAL APPLICATIONS AND USES

- Steel-to-Steel Connections
- Aluminum-to-Aluminum
- Aluminum-to-Steel Connections
- Steel-to-aluminum Connections

## FEATURES AND BENEFITS

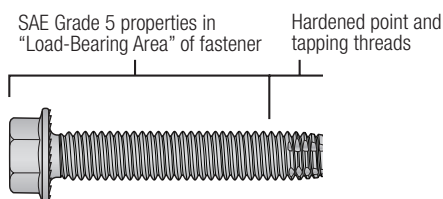
- + Eliminates thread-tapping operations
- + E-Form® thread profile overcomes friction build-up and reduces drive torque
- + Forms work-hardened threads to resist loosening caused by vibration or thermal changes
- + Serrations on underside of hex washer head lock against the fixture
- + High hardness lead threads for tapping
- + In the load-bearing area, a lower hardness heat treatment provides grade 5 bolt properties, resulting in a fastener with increased ductility having no significant susceptibility to Hydrogen-Assisted Stress Corrosion Cracking (HASCC)
- + Stalgard PLUS Coating provides enhanced galvanic compatibility in dissimilar metal applications, including those involving aluminum
- + Fasteners coated with Stalgard PLUS finish typically show no red rust or other base metal corrosion on significant surfaces after 1500 hours of 5% neutral salt spray exposure (per ASTM B117)
- + Fasteners accept standard nuts and washers (if desired and/or required)

## GUIDE SPECIFICATIONS

05 05 23 – Metal Fastenings, 09 22 16.23 – Fasteners. Fasteners shall be Tap-Flex as supplied by DEWALT, Towson, MD. Concrete screw anchors shall be installed in accordance with published instructions and the Authority Having Jurisdiction.

## MATERIAL SPECIFICATIONS

Anchor Component	Specification
Anchor Body	Alloy Steel
Plating/Coating	Stalgard PLUS Coating 1,500 Hour Rating for ASTM B117 Salt Spray Test



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## ANCHOR MATERIALS

- Alloy Steel

## HEAD STYLES

- Hex Washer Head

## ANCHOR SIZE RANGE

- 3/8" diameter x 1-1/2" to 5" lengths
- 1/2" diameter x 1-1/2" to 5" lengths
- 5/8" diameter x 1-1/2" to 5" lengths

## FINISH

- Stalgard PLUS coating

## INSTALLATION SPECIFICATIONS

### Installation Specifications and Supplemental Information for Tap-Flex

Dimension	Unit	Fastener Diameter		
		3/8"	1/2"	5/8"
Thread Size (UNC)	in.	3/8-16	1/2-13	5/8-11
Nominal drill bit diameter	-	8.5 mm	29/64"	37/64"
Impact wrench socket size	in.	9/16	3/4	15/16
Head height <sup>1</sup>	in.	3/8	1/2	19/32
Washer diameter	in.	3/4	1	1-1/4
Maximum steel thickness	in.	5/8	3/4	1
Effective tensile stress area (Threads)	in <sup>2</sup>	0.078	0.142	0.226
Effective tensile stress area (Unthreaded Shank)	in <sup>2</sup>	0.086	0.156	0.249
Minimum specified ultimate strength	ksi	120	120	120
Minimum specified yield strength	ksi	92	92	92

1. Head height includes the thickness of the integral washer.

### Seating Torque of Tap-Flex Anchors in Steel, ft-lbf<sup>1,2,3</sup>

Fastener Diameter	Steel Type / Thickness															
	A653 Grade 33 / A500 Grade A (F <sub>u</sub> = 45 ksi)						A36 / A500 Grade B (F <sub>u</sub> = 58 ksi)						A572 Grade 50 (F <sub>u</sub> = 65 ksi)			
	1/8"	3/16"	1/4"	3/8"	1/2"	5/8"	1/8"	3/16"	1/4"	3/8"	1/2"	5/8"	1/8"	3/16"	1/4"	3/8"
3/8"	13	25	35	36	-	-	16	32	40	40	-	-	18	36	40	40
1/2"	13	26	33	56	95	-	17	34	43	72	95	-	19	38	48	80
5/8"	16	32	47	88	118	185	21	41	60	114	152	185	23	46	67	128

1. Tabulated seating torques are 75% of the tested ultimate failure torque in each material.

2. Tabulated seating torques are based on laboratory testing and are for reference only. If seating torques greater than snug tight are desired, it is suggested to determine the failure torque in the application and base material with a manual torque wrench. Maximum seating torque should not exceed 75% of this failure torque.

3. When using a washer under the head of the fastener, multiply tabulated seating torques by 0.75.

### Maximum Seating Torque of Tap-Flex Anchors in Aluminum, ft-lbf<sup>1,2,3</sup>

Fastener Diameter	Aluminum Type / Thickness								
	6063-T5 (F <sub>u</sub> = 22 ksi)			6063-T6 (F <sub>u</sub> = 30 ksi)			6061-T6 (F <sub>u</sub> = 38 ksi)		
	1/8"	3/16"	1/4"	1/8"	3/16"	1/4"	1/8"	3/16"	1/4"
3/8"	11	23	31	14	30	39	17	36	40
1/2"	11	22	32	15	17	44	18	32	56
5/8"	14	29	49	20	38	59	25	47	70

1. Tabulated seating torques are 75% of the tested ultimate failure torque in each material.

2. Tabulated seating torques are based on laboratory testing and are for reference only. If seating torques greater than snug tight are desired, it is suggested to determine the failure torque in the application and base material with a manual torque wrench. Maximum seating torque should not exceed 75% of this failure torque.

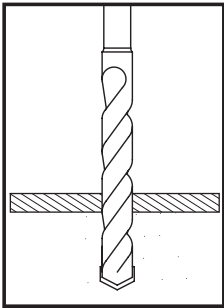
3. When using a washer under the head of the fastener, multiply tabulated seating torques by 0.75.

### Suggested Minimum Spacing and Edge Distance of Tap-Flex Fasteners

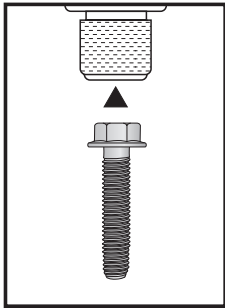
Fastener Diameter d (in.)	Minimum Screw Spacing in Aluminum: 2.5d (in.)	Minimum Screw Spacing in Steel: 3d (in.)	Minimum Edge Distance: 1.5d (in.)
3/8	15/16	1-1/8	9/16
1/2	1-1/4	1-1/2	3/4
5/8	1-9/16	1-7/8	15/16

INSTALLATION INSTRUCTIONS

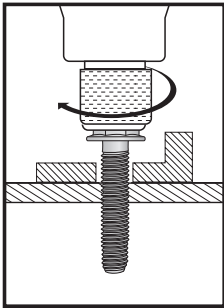
Installation Instruction



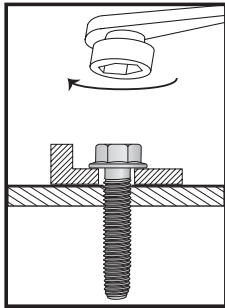
**Step 1**  
Using the proper drill bit or annular cutter size, drill a hole into the base material. Remove any chips or burrs from the hole.



**Step 2**  
Select a powered impact wrench and attach an appropriate sized hex socket/driver to the impact wrench. Mount the screw fastener head into the socket.



**Step 3**  
Drive the anchor into the hole until the head of the anchor comes into contact with the fixture or the material being fastened. The fastener must be snug after installation.



**Step 4 (Optional)**  
Tighten the fastener with a torque wrench to an appropriate seating torque. Do not exceed the maximum torque for the selected anchor diameter.

Note: An appropriate seating torque ranges from snug tight at a minimum to a maximum of the listed maximum seating torque or 75% of the stripping torque in the material.

DEWALT Impact Wrench Selection Guidance

Fastener Diameter	Material Thickness				
	1/8" ≤ t ≤ 3/16"	3/16" < t ≤ 1/4"	1/4" < t ≤ 3/8"	3/8" < t ≤ 1/2"	1/2" < t ≤ 5/8"
3/8"	DCF911/DCF913	DCF911/DCF913	DCF911/DCF913	-	-
1/2"	DCF911/DCF913	DCF911/DCF913	DCF921/DCF922/DCF923	DCF891/DCF892	-
5/8"	DCF911/DCF913	DCF911/DCF913	DCF921/DCF922/DCF923	DCF891/DCF892	DCF891/DCF892

1. Suggestions in this table are based on laboratory testing with listed tools in the maximum power setting and are for reference only.

## PERFORMANCE DATA

### Ultimate Tension Pull-Out Capacity in Steel, lbf<sup>1,2</sup>

Fastener Diameter	Steel Type and Thickness																	
	A653 Grade 33 / A500 Grade A (F <sub>u</sub> = 45 ksi)						A36 / A500 Grade B (F <sub>u</sub> = 58 ksi)						A572 Grade 50 (F <sub>u</sub> = 65 ksi)					
	1/8"	3/16"	1/4"	3/8"	1/2"	5/8"	1/8"	3/16"	1/4"	3/8"	1/2"	5/8"	1/8"	3/16"	1/4"	3/8"	1/2"	5/8"
3/8"	1,565	3,350	5,030	7,915	9,705	9,705	2,020	4,320	6,485	9,705	9,705	9,705	2,260	4,840	7,270	9,705	9,705	9,705
1/2"	2,015	4,015	5,335	9,880	12,665	16,460	2,595	5,175	6,875	12,735	16,460	16,460	2,910	5,795	7,705	13,390	16,460	16,460
5/8"	2,655	4,800	7,495	12,405	16,285	21,220	3,420	6,190	9,660	15,985	20,990	26,795	3,830	6,935	10,825	16,815	20,990	26,795

1. Ultimate strengths are based on laboratory tests.  
 2. Ultimate load capacities must be reduced by a minimum safety factor of 3.0 or greater to determine allowable loads (ASD).

### Allowable Tension Pull-Out Capacity in Steel, lbf<sup>1,2</sup>

Fastener Diameter	Steel Type and Thickness																	
	A653 Grade 33 / A500 Grade A (F <sub>u</sub> = 45 ksi)						A36 / A500 Grade B (F <sub>u</sub> = 58 ksi)						A572 Grade 50 (F <sub>u</sub> = 65 ksi)					
	1/8"	3/16"	1/4"	3/8"	1/2"	5/8"	1/8"	3/16"	1/4"	3/8"	1/2"	5/8"	1/8"	3/16"	1/4"	3/8"	1/2"	5/8"
3/8"	520	1,115	1,675	2,640	3,235	3,235	675	1,440	2,160	3,235	3,235	3,235	755	1,615	2,425	3,235	3,235	3,235
1/2"	670	1,340	1,780	3,295	4,220	5,485	865	1,725	2,290	4,245	5,485	5,485	970	1,930	2,570	4,465	5,485	5,485
5/8"	885	1,600	2,500	4,135	5,430	7,075	1,140	2,065	3,220	5,330	6,995	8,930	1,275	2,310	3,610	5,605	6,995	8,930

1. Allowable (ASD) loads are based on a safety factor,  $\Omega = 3.00$ .  
 2. Allowable (ASD) capacities for other member thicknesses may be determined by interpolating within the table.

### Ultimate Tension Pull-Out Capacity in Aluminum, lbf<sup>1,2</sup>

Fastener Diameter	Material Type and Thickness								
	Aluminum								
	6063-T5 (F <sub>u</sub> = 22 ksi)			6063-T6 (F <sub>u</sub> = 30 ksi)			6061-T6 (F <sub>u</sub> = 38 ksi)		
	1/8"	3/16"	1/4"	1/8"	3/16"	1/4"	1/8"	3/16"	1/4"
3/8"	760	1,630	2,515	1,165	2,375	3,880	1,565	3,120	5,245
1/2"	955	1,820	3,000	1,440	2,895	4,465	1,925	3,965	5,935
5/8"	1,195	2,405	4,325	1,610	3,440	5,600	2,020	4,470	6,875

1. Ultimate strengths are based on laboratory tests.  
 2. Ultimate load capacities must be reduced by a minimum safety factor of 3.0 or greater to determine allowable loads (ASD).

### Allowable Tension Pull-Out Capacity in Aluminum, lbf<sup>1,2</sup>

Fastener Diameter	Aluminum Type and Thickness								
	6063-T5 (F <sub>u</sub> = 22 ksi)			6063-T6 (F <sub>u</sub> = 30 ksi)			6061-T6 (F <sub>u</sub> = 38 ksi)		
	1/8"	3/16"	1/4"	1/8"	3/16"	1/4"	1/8"	3/16"	1/4"
3/8"	255	545	840	390	790	1,295	520	1,040	1,750
1/2"	320	605	1,000	480	965	1,490	640	1,320	1,980
5/8"	400	800	1,440	535	1,145	1,865	675	1,490	2,290

1. Allowable (ASD) loads are based on a safety factor,  $\Omega = 3.00$ .  
 2. Allowable (ASD) capacities for other member thicknesses may be determined by interpolating within the table.

### Ultimate Shear Capacity of Tap-Flex in Aluminum-to-Aluminum Connections, lbf<sup>1,2</sup>

Fastener Diameter	Material Type and Thickness								
	6063-T5 (F <sub>u</sub> = 22 ksi)			6063-T6 (F <sub>u</sub> = 30 ksi)			6061-T6 (F <sub>u</sub> = 38 ksi)		
	1/8"-1/8"	3/16"-3/16"	1/4"-1/4"	1/8"-1/8"	3/16"-3/16"	1/4"-1/4"	1/8"-1/8"	3/16"-3/16"	1/4"-1/4"
3/8"	1,875	3,060	4,660	2,460	3,820	5,200	3,040	4,580	5,575
1/2"	2,250	3,230	4,895	3,040	4,325	5,905	3,825	5,425	6,915
5/8"	2,180	3,320	5,105	2,890	4,640	6,240	3,600	5,955	7,370

1. Ultimate strengths are based on laboratory tests.  
 2. Ultimate load capacities must be reduced by a minimum safety factor of 3.0 or greater to determine allowable loads (ASD).

**Allowable Shear Capacity of Tap-Flex in Aluminum-to-Aluminum Connections, lbf<sup>1,2,3</sup>**

Fastener Diameter	Material Type and Thickness								
	6063-T5 (F <sub>u</sub> = 22 ksi)			6063-T6 (F <sub>u</sub> = 30 ksi)			6061-T6 (F <sub>u</sub> = 38 ksi)		
	1/8"-1/8"	3/16"-3/16"	1/4"-1/4"	1/8"-1/8"	3/16"-3/16"	1/4"-1/4"	1/8"-1/8"	3/16"-3/16"	1/4"-1/4"
3/8"	625	1,020	1,555	820	1,275	1,735	1,015	1,525	1,860
1/2"	750	1,075	1,630	1,015	1,440	1,970	1,275	1,810	2,305
5/8"	725	1,105	1,700	965	1,545	2,080	1,200	1,985	2,455

- Allowable (ASD) loads are based on a safety factor,  $\Omega = 3.00$ .
- Allowable (ASD) capacities for other member thicknesses may be determined by interpolating within the table.
- In testing, the top sheet of aluminum was drilled with a clearance hole so that it acting as a bearing surface only. Thread engagement was only in the bottom sheet. Clearance holes were sized 1/32-inch above the fastener diameter.

**Ultimate Shear Capacity of Tap-Flex in Aluminum-to-Steel Connections, lbf<sup>1,2</sup>**

Fastener Diameter	Material Type and Thickness											
	6063-T5 (F <sub>u</sub> = 22 ksi)				6063-T6 (F <sub>u</sub> = 30 ksi)				6061-T6 (F <sub>u</sub> = 38 ksi)			
	1/8"-1/8"	3/16"-3/16"	1/4"-1/4"	3/8"-3/8"	1/8"-1/8"	3/16"-3/16"	1/4"-1/4"	3/8"-3/8"	1/8"-1/8"	3/16"-3/16"	1/4"-1/4"	3/8"-3/8"
3/8"	4,055	5,575	5,575	5,575	4,465	5,575	5,575	5,575	4,875	5,575	5,575	5,575
1/2"	3,860	5,680	7,860	8,135	4,730	7,135	9,755	9,625	5,595	8,595	10,425	10,425
5/8"	3,685	5,450	7,760	7,545	4,390	6,935	9,085	9,845	5,095	8,415	10,410	12,145

- Ultimate strengths are based on laboratory tests.
- Ultimate load capacities must be reduced by a minimum safety factor of 3.0 or greater to determine allowable loads (ASD).
- Values are based on steel with a minimum ultimate strength of F<sub>u</sub> = 45 ksi.

**Allowable Shear Capacity of Tap-Flex in Aluminum-to-Steel Connections, lbf<sup>1,2,3</sup>**

Fastener Diameter	Material Type and Thickness											
	6063-T5 (F <sub>u</sub> = 22 ksi)				6063-T6 (F <sub>u</sub> = 30 ksi)				6061-T6 (F <sub>u</sub> = 38 ksi)			
	1/8"-1/8"	3/16"-3/16"	1/4"-1/4"	3/8"-3/8"	1/8"-1/8"	3/16"-3/16"	1/4"-1/4"	3/8"-3/8"	1/8"-1/8"	3/16"-3/16"	1/4"-1/4"	3/8"-3/8"
3/8"	1,350	1,860	1,860	1,860	1,490	1,860	1,860	1,860	1,625	1,860	1,860	1,860
1/2"	1,285	1,895	2,620	2,710	1,575	2,380	3,250	3,210	1,865	2,865	3,475	3,475
5/8"	1,230	1,815	2,585	2,515	1,465	2,310	3,030	3,280	1,700	2,805	3,470	4,050

- Allowable (ASD) loads are based on a safety factor,  $\Omega = 3.00$ .
- Allowable (ASD) capacities for other member thicknesses may be determined by interpolating within the table.
- In testing, the top sheet of aluminum was drilled with a clearance hole so that it acting as a bearing surface only. Thread engagement was only in the steel base material. Clearance holes were sized 1/32-inch above the fastener diameter.
- Values are based on steel with a minimum ultimate strength of F<sub>u</sub> = 45 ksi.

**Ultimate Shear Capacity of Tap-Flex in Steel, lbf<sup>1,2</sup>**

Fastener Diameter	Steel Strength Thickness			
	1/4"	3/8"	1/2"	5/8"
3/8"	5,575	5,575	5,575	5,575
1/2"	10,425	10,425	10,425	10,425
5/8"	15,435	15,435	15,435	15,435

- Ultimate strengths are based on laboratory tests.
- Ultimate load capacities must be reduced by a minimum safety factor of 3.0 or greater to determine allowable loads (ASD).
- Values are based on steel with a minimum ultimate strength of F<sub>u</sub> = 45 ksi.

**Allowable Shear Capacity of Tap-Flex in Steel, lbf<sup>1,2,3</sup>**

Fastener Diameter	Steel Strength Thickness			
	1/4"	3/8"	1/2"	5/8"
3/8"	1,860	1,860	1,860	1,860
1/2"	3,475	3,475	3,475	3,475
5/8"	5,145	5,145	5,145	5,145

- Allowable (ASD) loads are based on a safety factor,  $\Omega = 3.00$ .
- Allowable (ASD) capacities for intermediate member thicknesses may be determined by interpolating tabulated data within the table.
- Allowable shear capacities do not consider bearing/tearout failures in the attachment material.
- Values are based on steel with a minimum ultimate strength of F<sub>u</sub> = 45 ksi.

## ORDERING INFORMATION

### Tap-Flex

Cat. No.	Description (Diameter- TPI x Nominal Length)	Minimum Thread Length (in.)	Minimum Usable Thread Length <sup>1</sup> (in.)	Maximum Load-Bearing Length <sup>2</sup> (in.)	Minimum Protrusion Length <sup>3</sup> (in.)	Pack Qty.
<b>3/8" Diameter, 9/16" Hex Washer Head with Serrations</b>						
DFSESU310	3/8"-16 x 1-1/2"	1.500	1.000	1.000	0.500	500
DFSESU320	3/8"-16 x 2"	2.000	1.500	1.500	0.500	500
DFSESU330	3/8"-16 x 2-1/2"	2.500	2.000	2.000	0.500	500
DFSESU340	3/8"-16 x 3"	2.500	2.000	2.500	0.500	250
DFSESU350	3/8"-16 x 4"	2.500	2.000	3.500	0.500	250
DFSESU360	3/8"-16 x 5"	2.500	2.000	4.500	0.500	150
<b>1/2" Diameter, 3/4" Hex Washer Head with Serrations</b>						
DFSESU410	1/2"-13 x 1-1/2"	1.500	0.875	0.875	0.625	250
DFSESU420	1/2"-13 x 2"	2.000	1.375	1.375	0.625	250
DFSESU430	1/2"-13 x 2-1/2"	2.500	1.875	1.875	0.625	250
DFSESU440	1/2"-13 x 3"	2.500	1.875	2.375	0.625	150
DFSESU450	1/2"-13 x 4"	2.500	1.875	3.375	0.625	100
DFSESU460	1/2"-13 x 5"	2.500	1.875	4.375	0.625	100
<b>5/8" Diameter, 15/16" Hex Washer Head with Serrations</b>						
DFSESU510	5/8"-11 x 1-1/2"	1.500	0.625	0.625	0.875	250
DFSESU520	5/8"-11 x 2"	2.000	1.125	1.125	0.875	250
DFSESU530	5/8"-11 x 2-1/2"	2.500	1.625	1.625	0.875	150
DFSESU540	5/8"-11 x 3"	2.500	1.625	2.125	0.875	100
DFSESU550	5/8"-11 x 4"	2.500	1.625	3.125	0.875	50
DFSESU560	5/8"-11 x 5"	2.500	1.625	4.125	0.875	50

1. Minimum Usable Thread Length is the Minimum Thread Length minus the Minimum Protrusion Length (hardened point and lead tapping threads).  
 2. Maximum Load Bearing Length is the length of the lower hardness region below the head of the fastener, not including the hardened point and lead tapping threads.  
 3. The Minimum Protrusion Length is the portion of the fastener that must protrude past the back side of the supporting material.



### Magnetic Drill Press

Impact Rated Socket	
Model #	Description
DWE1622K	2" 2-Speed Magnetic Drill Press



### Impact Wrenches

Impact Rated Socket	
Model #	Description
DCF913	20V MAX* 3/8 in. Cordless Impact Wrench
DCF923	ATOMIC 20V MAX* 3/8 in. Cordless Impact Wrench
DCF911	20V MAX* 1/2 in. Cordless Impact Wrench
DCF921 DCF922	ATOMIC 20V MAX* 1/2 in. Cordless Impact Wrench
DCF891 DCF892	20V MAX* XR® 1/2 in. Mid-Range Impact Wrench



### Impact Sockets

Fastener Size (in.)	Socket Size (in.)	Impact Rated Socket
		1/2" Square Drive
3/8	9/16	DWMT751220SP
1/2	3/4	DWMT751130SP
5/8	15/16	DWMT751040SP

