

# Drop-In Internally Threaded Anchor (DIAB)

Mechanical Anchors

## Expansion shell anchors for use in solid base materials

Simpson Strong-Tie introduces a redesigned Drop-In Anchor (DIAB) that provides easier installation into base materials. Improved geometry in the preassembled expansion plug improves setting capability so the anchor installs with 40% fewer hammer strikes than previous versions. These displacement-controlled expansion anchors are easily set by driving the plug toward the bottom of the anchor using either the hand- or power-setting tools. DIAB anchors feature a positive-set marking indicator at the top of the anchor — helping you see more clearly when proper installation has taken place.

Use a Simpson Strong-Tie fixed-depth stop bit to take the guesswork out of drilling to the correct depth. The fluted design of the tip draws debris away from the hole during drilling, allowing for a cleaner installation.

### Key features

- Positive set marking system indicates when anchor is properly set
- Lipped drop-in version available for flush installation
- Hand- and power-setting tools available for fast, easy and economical installation
- Fixed-depth stop bit helps you drill to the correct depth every time
- Available in coil-thread version for 1/2" and 3/4" coil-thread rod

**Codes:** FM 3053987; UL File Ex3605; Multiple DOT listings; Meets the requirements of Federal Specification A-A-55614, Type 1

**Material:** Carbon steel

**Coating:** Zinc plated



Drop-In



Lipped Drop-In



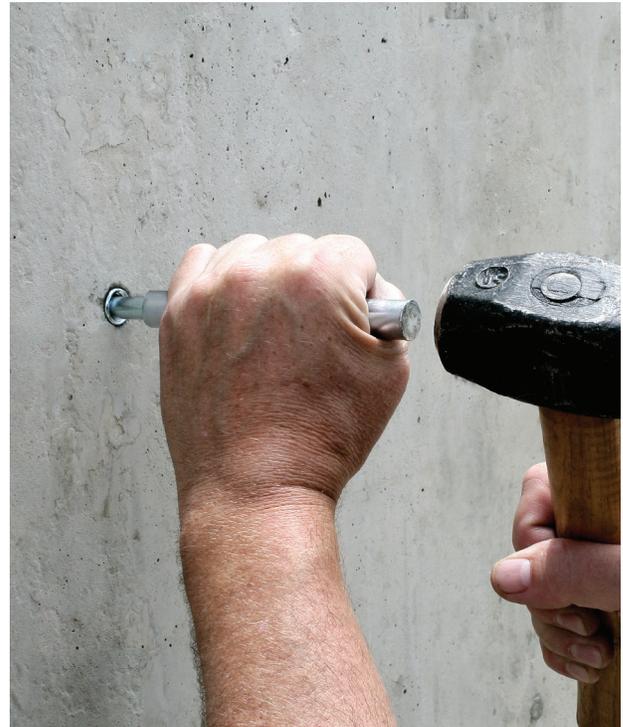
Coil-Thread Drop-In

### Fixed-Depth Drill Bits for DIAB

Model No.	Drill Bit Diameter (in.)	Drill Depth (in.)	Drop-In Anchor (in.)
MDPL037DIA	3/8	1 1/16	1/4
MDPL050DIA	1/2	1 11/16	3/8
MDPL062DIA	5/8	2 1/16	1/2



Fixed-Depth Drill Bit



Anchor being set with hand setting tool.



Anchor being set with SDS setting tool.



Positive set indicator.

# Drop-In Internally Threaded Anchor (DIAB)

## Drop-In Anchor

Rod Size (in.)	Model No.	Drill Bit Dia. (in.)	Bolt Threads (per in.)	Body Length (in.)	Thread Length (in.)	Quantity	
						Box	Carton
¼	DIAB25	⅜	20	1	⅜	100	500
⅜	DIAB37	½	16	1⅞	⅝	50	250
½	DIAB50	⅝	13	2	¾	50	200
⅝	DIAB62	⅞	11	2½	1	25	100
¾	DIAB75	1	10	3⅝	1¼	20	80



Drop-In

## Lipped Drop-In Anchor

Rod Size (in.)	Model No.	Drill Bit Dia. (in.)	Bolt Threads (per in.)	Body Length (in.)	Thread Length (in.)	Quantity	
						Box	Carton
¼	DIABL25	⅜	20	1	⅜	100	500
⅜	DIABL37	½	16	1⅞	⅝	50	250
½	DIABL50	⅝	13	2	¾	50	200



Lipped Drop-In

## Coil-Thread Drop-In Anchor

Rod Size (in.)	Model No.	Drill Bit Dia. (in.)	Bolt Threads (per in.)	Body Length (in.)	Thread Length (in.)	Quantity	
						Box	Carton
½	DIAB50C <sup>1</sup>	⅝	6	2	¾	50	200
¾	DIAB75C <sup>1</sup>	1	4½	3⅝	1¼	20	80



Coil-Thread Drop-In

1. DIAB50C and DIAB75C accept ½" and ¾" coil-thread rod, respectively.

## Drop-In Anchor Hand-Setting Tool

Model No.	Description	Box Quantity	Carton Qty.
DIABST25	Setting tool for use with Drop-In models DIAB25, DIABL25	10	50
DIABST37	Setting tool for use with Drop-In models DIAB37, DIABL37	10	50
DIABST50	Setting tool for use with Drop-In models DIAB50, DIABL50, DIAB50C	10	50
DIABST62	Setting tool for use with Drop-In model DIAB62	5	25
DIABST75	Setting tool for use with Drop-In models DIAB75, DIAB75C	5	20



Hand-Setting Tool

1. Setting tools sold separately. Tools may be ordered by the piece.

## Drop-In Anchor Power-Setting Tool (SDS-plus®)

Model No.	Description	Box Quantity	Carton Qty.
DIABST25-SDS	Power-setting tool for use with Drop-In models DIAB25, DIABL25	10	50
DIABST37-SDS	Power-setting tool for use with Drop-In models DIAB37, DIABL37	10	50
DIABST50-SDS	Power-setting tool for use with Drop-In models DIAB50, DIABL50, DIAB50C	10	50



Power-Setting Tool

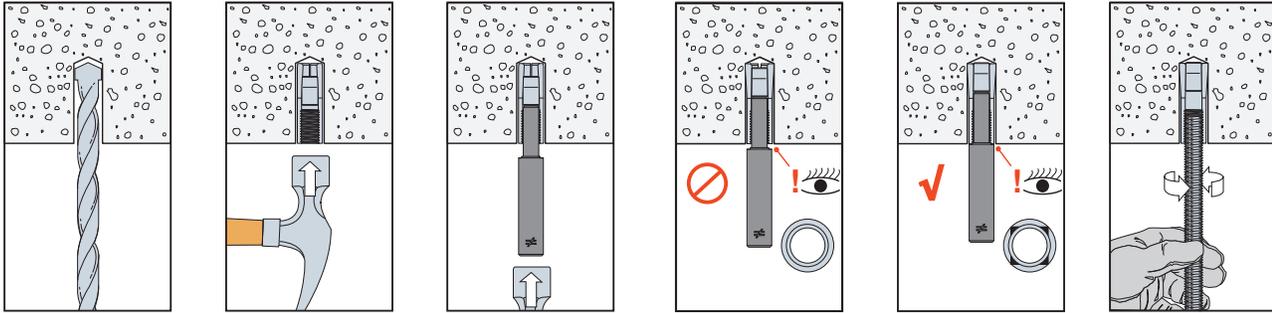
1. Setting tools sold separately. Tools may be ordered by the piece.

# Drop-In Internally Threaded Anchor (DIAB)

## DIAB Manual Installation

**Caution:** Oversized holes will reduce the anchors load capacity

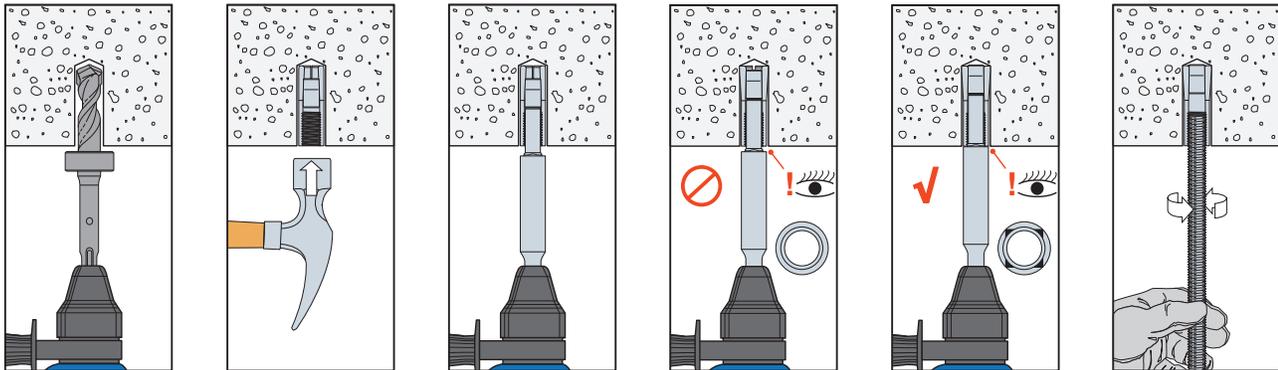
1. Drill a hole in the base material using the appropriate diameter carbide drill bit or fixed-depth bit as specified in the table. Drill the hole to the specified embedment. For fixed-depth bits, drill the hole until the shoulder of the bit contacts the surface of the base material. Then blow the hole clean of dust and debris using compressed air. Overhead installations need not be blown clean.
2. Insert the anchor into the hole. Tap with hammer until flush against the surface.
3. Using the designated Drop-In setting tool, drive expander plug towards the bottom of the anchor until the shoulder of the setting tool makes contact with the top of the anchor. When properly set, four indentations will be visible on the top of the anchor indicating full expansion.
4. Insert bolt or threaded rod. Minimum thread engagement should be equal to the nominal diameter of the threaded insert.



## DIAB SDS Installation

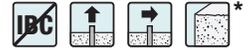
**Caution:** Oversized holes will reduce the anchors load capacity

1. Drill a hole in the base material using the appropriate diameter carbide drill bit or fixed-depth drill bit as specified in the table. Drill the hole to the specified embedment. For fixed-depth bits, drill the hole until the shoulder of the bit contacts the surface of the base material. Then blow the hole clean of dust and debris using compressed air. Overhead installations need not be blown clean.
2. Insert the anchor into the hole. Tap with hammer until flush against the surface.
3. Attach SDS Drop-In setting tool to a drill. Drive expander plug towards the bottom of the anchor using only hammer mode until the shoulder of the setting tool makes contact with the top of the anchor. When properly set, four indentations will be visible on the top of the anchor indicating full expansion.
4. Insert bolt or threaded rod. Minimum thread engagement should be equal to the nominal diameter of the threaded insert.



# Drop-In (DIAB) Design Information — Concrete

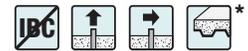
DIAB Allowable Tension and Shear Loads in Normal-Weight Concrete



Model No.	Rod Size in. (mm)	Drill Bit Dia. in.	Embed Depth in. (mm)	Critical Edge Dist. in. (mm)	Critical Spacing in. (mm)	$f'_c \geq 2,500$ psi (17.2 MPa)				$f'_c \geq 4,000$ psi (27.6 MPa)			
						Tension Load		Shear Load		Tension Load		Shear Load	
						Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)
DIAB25 DIABL25	¼ (6.4)	⅜	1 (25)	3 (76)	4 (102)	1,565 (7.0)	390 (1.7)	1,840 (8.2)	460 (2.0)	1,965 (8.7)	490 (2.2)	1,840 (8.2)	460 (2.0)
DIAB37 DIABL37	⅜ (9.5)	½	1⅞ (40)	4½ (114)	6 (152)	2,950 (13.1)	740 (3.3)	4,775 (21.2)	1,195 (5.3)	3,910 (17.4)	980 (4.4)	4,775 (21.2)	1,195 (5.3)
DIAB50 DIABL50 DIAB50C	½ (12.7)	⅝	2 (51)	6 (152)	8 (203)	5,190 (23.1)	1,300 (5.8)	6,760 (30.1)	1,690 (7.5)	6,515 (29.0)	1,630 (7.3)	6,760 (30.1)	1,690 (7.5)
DIAB62	⅝ (15.9)	⅞	2½ (64)	7½ (191)	10 (254)	7,010 (31.2)	1,755 (7.8)	12,190 (54.2)	3,050 (13.6)	9,060 (40.3)	2,265 (10.1)	12,190 (54.2)	3,050 (13.6)
DIAB75 DIAB75C	¾ (19.1)	1	3⅞ (79)	9 (229)	12½ (318)	9,485 (42.2)	2,370 (10.5)	15,960 (71.0)	3,990 (17.7)	11,660 (51.9)	2,915 (13.0)	15,960 (71.0)	3,990 (17.7)

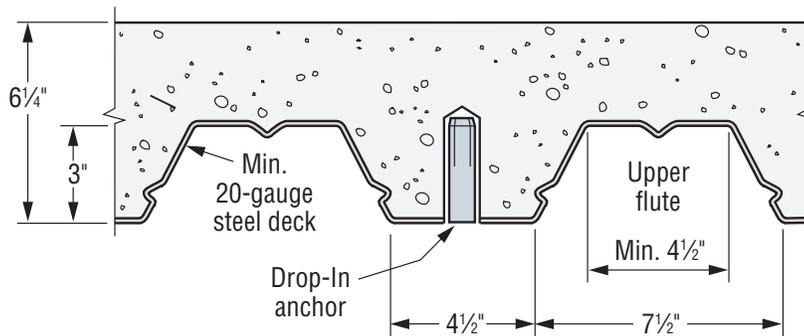
1. The allowable loads listed are based on a safety factor of 4.0.
2. Refer to allowable load-adjustment factors for edge distance and spacing on p. 148.
3. Allowable loads may be linearly interpolated between concrete strength listed.
4. The minimum concrete thickness is 1½ times the embedment depth.
5. Allowable loads may not be increased for short-term loading due to wind or seismic forces.

DIAB Allowable Tension and Shear Loads in Soffit of Sand-Lightweight Concrete over Steel Deck



Model No.	Rod Size in. (mm)	Drill Bit Dia. in.	Embed Depth in. (mm)	Critical End Dist. <sup>6</sup> in. (mm)	Critical Spacing in. (mm)	$f'_c \geq 3,000$ psi (20.7 MPa)			
						Tension Load		Shear Load	
						Ultimate lb. (kN)	Allowable lb. (kN)	Ultimate lb. (kN)	Allowable lb. (kN)
DIAB37 DIABL37	⅜ (9.5)	½	1⅞ (40)	4½ (114)	6 (152)	2,895 (12.9)	725 (3.2)	3,530 (15.7)	885 (3.9)
DIAB50 DIABL50 DIAB50C	½ (12.7)	⅝	2 (51)	6 (152)	8 (203)	4,100 (18.2)	1,025 (4.6)	4,685 (20.8)	1,170 (5.2)

1. The allowable loads listed are based on a safety factor of 4.0.
2. Allowable loads may not be increased for short-term loading due to wind or seismic forces.
3. Refer to allowable load-adjustment factors for edge distance and spacing on p. 148.
4. Anchors were installed in the center of the bottom flute of the steel deck.
5. Steel deck must be minimum 20-gauge thick with minimum yield strength of 33 ksi.
6. Critical end distance is defined as the distance from end of the slab in the direction of the flute.



Lightweight Concrete over Steel Deck

\*See p. 14 for an explanation of the load table icons.

# Drop-In (DIAB) Design Information — Concrete

## Allowable Load-Adjustment Factors for Drop-In Anchor (DIAB) in Normal-Weight Concrete and Sand-Lightweight Concrete over Steel Deck: Edge Distance and Spacing, Tension and Shear Loads

### How to use these charts:

- The following tables are for reduced edge distance and spacing.
- Locate the anchor size to be used for either a tension and/or a shear load application.
- Locate the edge distance ( $c_{act}$ ) or spacing ( $s_{act}$ ) at which the anchor is to be installed.

- The load adjustment factor ( $f_c$  or  $f_s$ ) is the intersection of the row and column.
- Multiply the allowable load by the applicable load adjustment factor.
- Reduction factors for multiple edges or spacing are multiplied together.

### Edge Distance Tension ( $f_c$ )

Edge Dist. $c_{act}$ (in.)	Size	1/4	3/8	1/2	5/8	3/4
	$C_{cr}$	3	4 1/2	6	7 1/2	9
	$C_{min}$	1 3/4	2 5/8	3 1/2	4 3/8	5 1/4
	$f_{cmin}$	0.77	0.77	0.77	0.77	0.77
1 3/4		0.77				
2		0.82				
2 1/2		0.91				
2 5/8		0.93	0.77			
3		1.00	0.82			
3 1/2			0.88	0.77		
4			0.94	0.82		
4 3/8			0.98	0.85	0.77	
4 1/2			1.00	0.86	0.78	
5				0.91	0.82	
5 1/4				0.93	0.83	0.77
5 1/2				0.95	0.85	0.79
6				1.00	0.89	0.82
6 1/2					0.93	0.85
7					0.96	0.88
7 1/2					1.00	0.91
8						0.94
8 1/2						0.97
9						1.00



- $c_{act}$  = actual edge distance at which anchor is installed (inches).
- $C_{cr}$  = critical edge distance for 100% load (inches).
- $C_{min}$  = minimum edge distance for reduced load (inches).
- $f_c$  = adjustment factor for allowable load at actual edge distance.
- $f_{ocr}$  = adjustment factor for allowable load at critical edge distance.  $f_{ocr}$  is always = 1.00.
- $f_{cmin}$  = adjustment factor for allowable load at minimum edge distance.
- $f_c = f_{cmin} + [(1 - f_{cmin})(C_{act} - C_{min}) / (C_{cr} - C_{min})]$ .

### Spacing Tension ( $f_s$ )

Spacing $s_{act}$ (in.)	Size	1/4	3/8	1/2	5/8	3/4
	$S_{cr}$	4	6	8	10	12 1/2
	$S_{min}$	1 1/2	2 1/4	3	3 3/4	4 3/4
	$f_{smin}$	0.72	0.72	0.80	0.80	0.80
1 1/2		0.72				
2		0.78				
2 1/4		0.80	0.72			
2 1/2		0.83	0.74			
3		0.89	0.78	0.80		
3 1/2		0.94	0.81	0.82		
3 3/4		0.97	0.83	0.83	0.80	
4		1.00	0.85	0.84	0.81	
4 1/2			0.89	0.86	0.82	
4 3/4			0.91	0.87	0.83	0.80
5			0.93	0.88	0.84	0.81
5 1/2			0.96	0.90	0.86	0.82
6			1.00	0.92	0.87	0.83
6 1/2				0.94	0.89	0.85
7				0.96	0.90	0.86
7 1/2				0.98	0.92	0.87
8				1.00	0.94	0.88
8 1/2					0.95	0.90
9					0.97	0.91
9 1/2					0.98	0.92
10					1.00	0.94
10 1/2						0.95
11						0.96
11 1/2						0.97
12						0.99
12 1/2						1.00



- $s_{act}$  = actual spacing distance at which anchor is installed (inches).
- $S_{cr}$  = critical spacing distance for 100% load (inches).
- $S_{min}$  = minimum spacing distance for reduced load (inches).
- $f_s$  = adjustment factor for allowable load at actual spacing distance.
- $f_{ocr}$  = adjustment factor for allowable load at critical spacing distance.  $f_{ocr}$  is always = 1.00.
- $f_{smin}$  = adjustment factor for allowable load at minimum spacing distance.
- $f_s = f_{smin} + [(1 - f_{smin})(s_{act} - s_{min}) / (S_{cr} - s_{min})]$ .

### Edge Distance Shear ( $f_c$ )

Edge Dist. $c_{act}$ (in.)	Size	1/4	3/8	1/2	5/8	3/4
	$C_{cr}$	3	4 1/2	6	7 1/2	9
	$C_{min}$	1 3/4	2 5/8	3 1/2	4 3/8	5 1/4
	$f_{cmin}$	0.54	0.54	0.64	0.64	0.64
1 3/4		0.54				
2		0.63				
2 1/2		0.82				
2 5/8		0.86	0.54			
3		1.00	0.63			
3 1/2			0.75	0.64		
4			0.88	0.71		
4 3/8			0.97	0.77	0.64	
4 1/2			1.00	0.78	0.65	
5				0.86	0.71	
5 1/4				0.89	0.74	0.64
5 1/2				0.93	0.77	0.66
6				1.00	0.83	0.71
6 1/2					0.88	0.76
7					0.94	0.81
7 1/2					1.00	0.86
8						0.90
8 1/2						0.95
9						1.00



- $c_{act}$  = actual edge distance at which anchor is installed (inches).
- $C_{cr}$  = critical edge distance for 100% load (inches).
- $C_{min}$  = minimum edge distance for reduced load (inches).
- $f_c$  = adjustment factor for allowable load at actual edge distance.
- $f_{ocr}$  = adjustment factor for allowable load at critical edge distance.  $f_{ocr}$  is always = 1.00.
- $f_{cmin}$  = adjustment factor for allowable load at minimum edge distance.
- $f_c = f_{cmin} + [(1 - f_{cmin})(C_{act} - C_{min}) / (C_{cr} - C_{min})]$ .

### Spacing Shear ( $f_s$ )

Spacing $s_{act}$ (in.)	Size	1/4	3/8	1/2	5/8	3/4
	$S_{cr}$	4	6	8	10	12 1/2
	$S_{min}$	1 1/2	2 1/4	3	3 3/4	4 3/4
	$f_{smin}$	1.00	1.00	1.00	1.00	1.00
1 1/2		1.00				
2		1.00				
2 1/4		1.00	1.00			
2 1/2		1.00	1.00			
3		1.00	1.00	1.00		
3 1/2		1.00	1.00	1.00		
3 3/4		1.00	1.00	1.00	1.00	
4		1.00	1.00	1.00	1.00	
4 1/2			1.00	1.00	1.00	
4 3/4			1.00	1.00	1.00	1.00
5			1.00	1.00	1.00	1.00
5 1/2			1.00	1.00	1.00	1.00
6			1.00	1.00	1.00	1.00
6 1/2				1.00	1.00	1.00
7				1.00	1.00	1.00
7 1/2				1.00	1.00	1.00
8				1.00	1.00	1.00
8 1/2					1.00	1.00
9					1.00	1.00
9 1/2					1.00	1.00
10					1.00	1.00
10 1/2						1.00
11						1.00
11 1/2						1.00
12						1.00
12 1/2						1.00



- $s_{act}$  = actual spacing distance at which anchor is installed (inches).
- $S_{cr}$  = critical spacing distance for 100% load (inches).
- $S_{min}$  = minimum spacing distance for reduced load (inches).
- $f_s$  = adjustment factor for allowable load at actual spacing distance.
- $f_{ocr}$  = adjustment factor for allowable load at critical spacing distance.  $f_{ocr}$  is always = 1.00.
- $f_{smin}$  = adjustment factor for allowable load at minimum spacing distance.
- $f_s = f_{smin} + [(1 - f_{smin})(s_{act} - s_{min}) / (S_{cr} - s_{min})]$ .