

IAPMO UES ER-2018

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**BADGER INDUSTRIES**

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0625

**APPROVALS & LISTINGS**



BADGER NUSIG CONNECTORS <sup>1,2,8</sup>										
Model	Deck Family-Slab Type <sup>10</sup>	Applicable Load Type <sup>3</sup>	Min. Spacing and/or Max. Load Angle for Full Capacity <sup>8,9</sup>	Strength <sup>4,5</sup>					Max. Fire Sprinkler Pipe <sup>6</sup>	
				P <sub>n</sub> (lbs)	P <sub>n</sub> /Ω (lbs)	φP <sub>n</sub> (lbs)	Ω	φ	Rod Size (in.)	Pipe Size (in.)
NDH3812 or MDH3812	W2	Vertical	27 1/2 in.	2119	588	953	3.60	0.45	3/8 1/2	4 5
	W3	Vertical	12 3/4 in.	1266	477	759	2.65	0.60	3/8 1/2	4 3 1/2
NDH1258 or MDH1258	W3	Vertical	19 3/8 in.	1845	658	1107	2.80	0.60	1/2 5/8	4 5
NDH4S-W3	W3	Vertical and Bracing	9 1/2 in. 40°	2946	1052	1620	2.80	0.55	3/8 1/2 5/8	4 6 6
NDH38FV-W3	W3	Vertical	-	556	182	305	3.05	0.55	3/8	1 1/2

### Notes:

<sup>1</sup> Badger NUSIG Connectors shall be installed and inspected per the manufacturer instructions.

<sup>2</sup> Composite Deck-Slab with minimum  $f'_c = 3000$  psi, 110 pcf minimum LWC or NWC.

<sup>3</sup> Vertical load assumes deck in a horizontal plane  $\pm 5^\circ$ . The bracing load may be applied in any horizontal direction.

<sup>4</sup> The allowable strength,  $P_n/\Omega$ , shall be equal to or greater than the governing nominal load or load combination for Allowable Stress Design (ASD) as stipulated in the IBC or ASCE/SEI 7.

<sup>5</sup> The factored strength,  $\phi P_n$ , shall be equal to or greater than the governing factored load or factored load combination for Load and Resistance Factor Design as stipulated in the IBC or ASCE/SEI 7.

<sup>6</sup> Maximum fire sprinkler pipe size in accordance with NFPA 13 assuming minimum connector spacing for full capacity.

<sup>7</sup> Applicable to all threaded rod sizes that can be used with Badger NUSIG Connector. The load shall not exceed the strength of the threaded rod provided by others.

<sup>8</sup> For Badger NUSIG Connectors at spacings less than the minimum spacing required for full capacity, the nominal strength shall be calculated using equations BN-1 through BN-3

$$\text{For NDH3812 or MDH3812 in W2 deck-slabs} \quad P_n = 2119 \cdot \alpha_s \quad \alpha_s = 0.014 \cdot S + 0.601 \leq 1 \quad \Omega = 3.60 \quad \phi = 0.45 \quad [\text{BN-1}]$$

$$\text{For NDH3812 or MDH3812 in W3 deck-slabs} \quad P_n = 1266 \cdot \alpha_s \quad \alpha_s = 0.013 \cdot S + 0.833 \leq 1 \quad \Omega = 2.65 \quad \phi = 0.60 \quad [\text{BN-2}]$$

$$\text{For NDH1258 or MDH1258 in W3 deck-slabs} \quad P_n = 1845 \cdot \alpha_s \quad \alpha_s = 0.016 \cdot S + 0.690 \leq 1 \quad \Omega = 2.80 \quad \phi = 0.60 \quad [\text{BN-3}]$$

<sup>9</sup> For Badger NUSIG Connectors at spacings less than the minimum spacing required and/or the maximum load application angle from vertical for full capacity, the nominal strength shall be calculated using equation BN-4

$$\text{For NDH4S-W3 installed in W3 deck-slabs} \quad P_n = 2946 \cdot \alpha_s \cdot \alpha_\theta \quad \alpha_s = 0.030 \cdot S + 0.714 \leq 1 \quad \Omega = 2.80 \quad \phi = 0.55 \quad [\text{BN-4}]$$

Where:

$$\alpha_\theta = 0.506 \cdot \cos\theta + 0.612 \leq 1$$

$P_n$  = Nominal Strength of Badger NUSIG Connector

$S$  = Badger NUSIG Connector spacing (in.)

$\theta$  = load application angle from the axis of the threaded rod (deg),  $\leq 60^\circ$

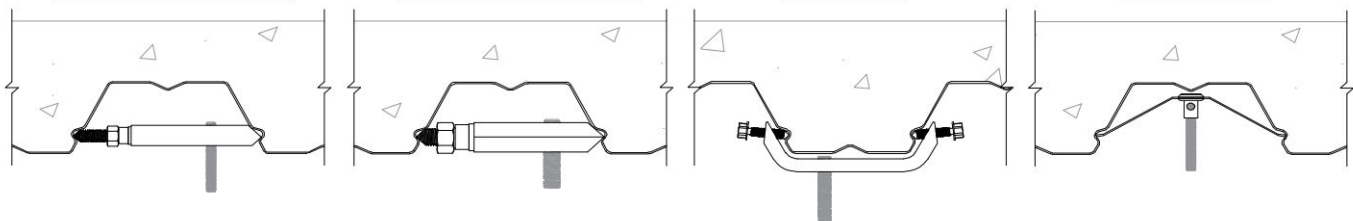
<sup>10</sup> Applicable to deck manufactured after 06/21/2022

NDH3812 or MDH3812

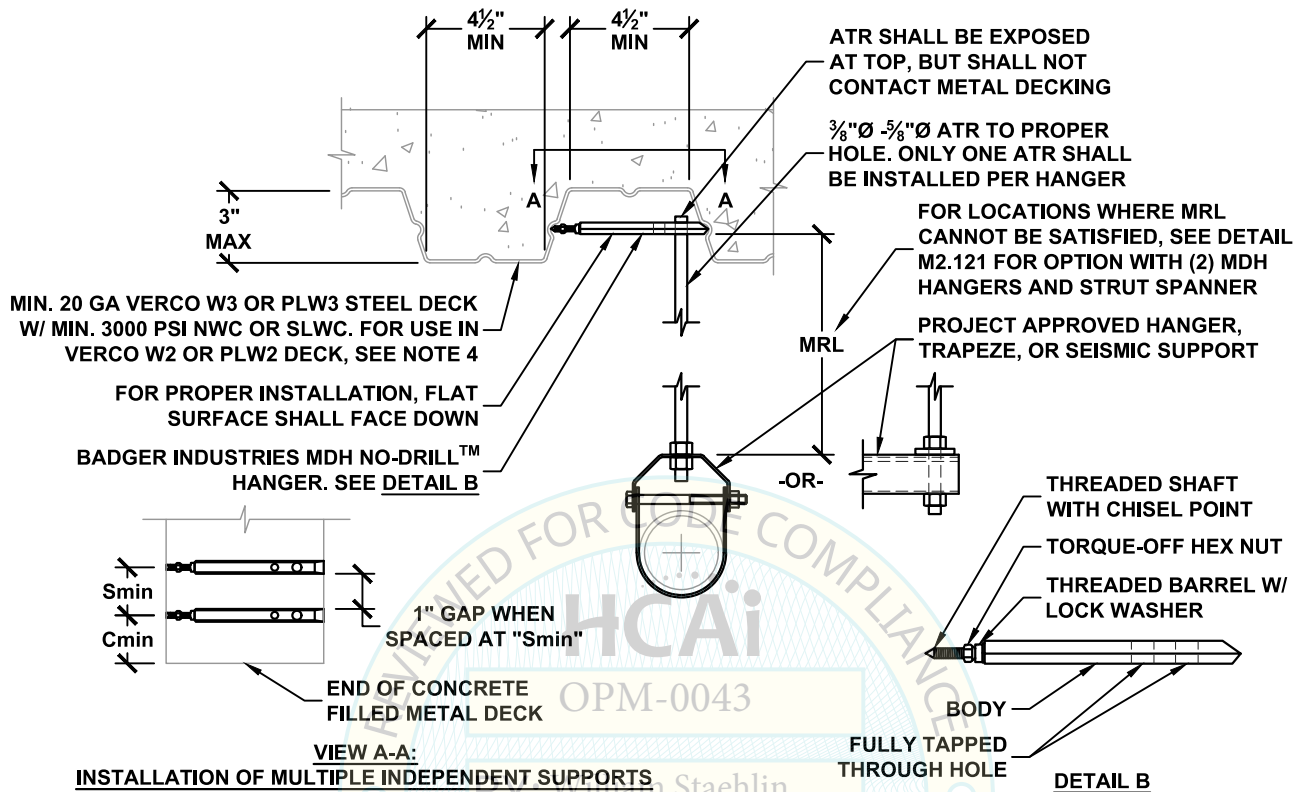
NDH1258 or MDH1258

NDH4S-W3

NDH38FV-W3



# HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) BADGER INDUSTRIES MDH NO-DRILL™ HANGER



GRAVITY ONLY		GRAVITY & SEISMIC		ATR HANGER DIA. INCH	MIN ROD LENGTH MRL INCH	MDH SIZE	MIN SPACING Smin INCH	MIN END DIST. Cmin INCH
HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS					
38A TO 38C	200	38A TO 38E	400	3/8	8	MDH3812	2	6
50A TO 50C	200	50A TO 50E	400	1/2	18			
50A TO 50D	300	50A TO 50G	600	1/2	8	MDH1258	3	6
63A TO 63D	300	63A TO 63G	600	5/8	18			

- 1 SEE DETAIL M0.00 FOR SECTION NOTES
- 2 WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
- 3 PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE MDH DOES NOT IMPACT THE LISTED MDH CAPACITIES.
- 4 ONLY THE MDH3812 MAY BE USED IN VERO W2 OR PLW2 DECK AND SHALL BE USED FOR GRAVITY ONLY LOADS.
- 5 INSTALLATION: CLEAN METAL DECKING GROOVES TO EXPOSE PLATED DECKING METAL PRIOR TO PLACEMENT OF THE MDH HANGER. ACCURATELY PLACE MDH HANGER CHISEL POINT ENDS INTO METAL DECKING GROOVES WITH FLAT SURFACE FACING DOWNWARDS AND WITH THE LENGTH OF THE MDH BODY BEING PERPENDICULAR TO THE DECKING GROOVES. WHILE HOLDING THE BODY CHISEL POINT END TIGHT INTO METAL DECKING GROOVE, TIGHTEN TORQUE-OFF HEX NUT UNTIL BOTH CHISEL POINT ENDS ARE TIGHT AND SECURELY WEDGED INTO THE OPPOSING METAL DECKING GROOVES. WHILE HOLDING THE MDH HANGER BODY IN PLACE, TIGHTEN THE TORQUE-OFF HEX NUT WITH AN OPEN END WRENCH UNTIL THE HEX NUT HAS BROKEN AWAY FROM THE THREADED BARREL, LEAVING THE LOCK WASHER COMPRESSED AND THE HEX NUT LOOSE ON THE THREADED SHAFT. FOR REFERENCE, A MINIMUM OF 15 FT-LBS OF TORQUE IS REQUIRED FOR THE MDH3812 AND A MINIMUM OF 20 FT-LBS OF TORQUE IS REQUIRED FOR THE MDH1258.



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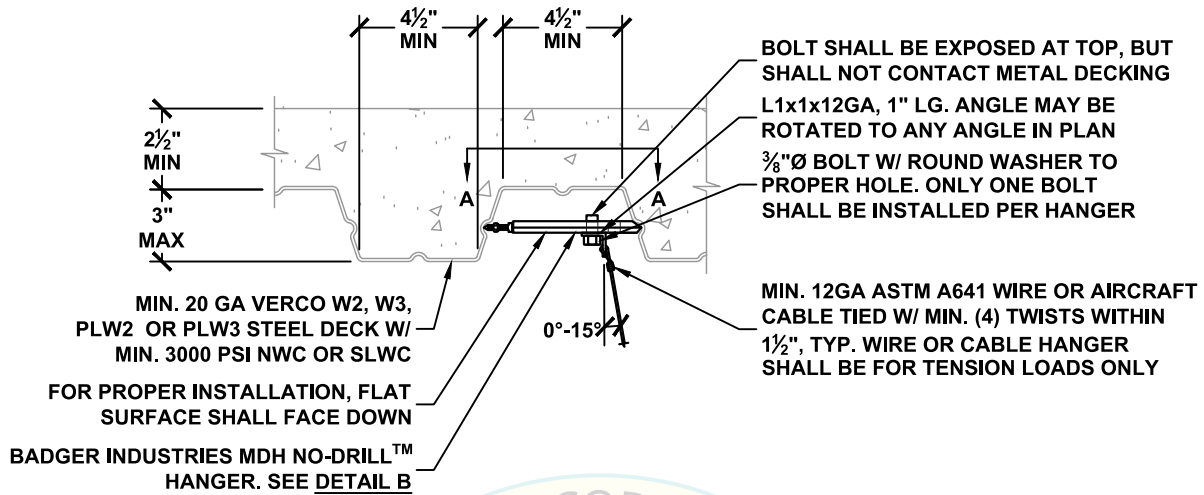
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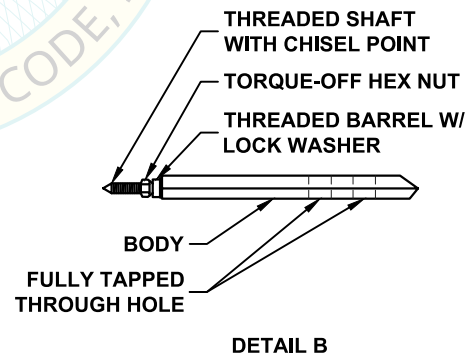
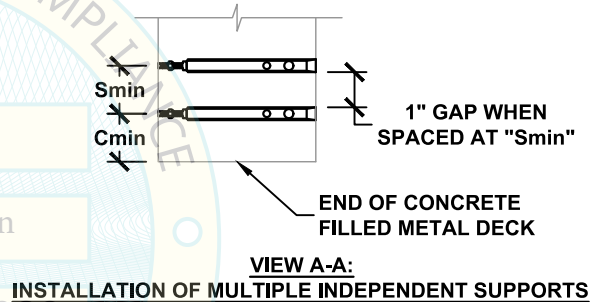
**M2.120**

# HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) BADGER INDUSTRIES MDH NO-DRILL™ HANGER



GRAVITY ONLY		MDH SIZE	MIN SPACING Smin INCH	MIN END DIST. Cmin INCH
HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS			
38A TO 38C	180	MDH3812	2	6

- <sup>1</sup> SEE DETAIL M0.00 FOR SECTION NOTES
- <sup>2</sup> PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE MDH DOES NOT IMPACT THE LISTED MDH CAPACITIES.
- <sup>3</sup> INSTALLATION: CLEAN METAL DECKING GROOVES TO EXPOSE PLATED DECKING METAL PRIOR TO PLACEMENT OF THE MDH HANGER. ACCURATELY PLACE MDH HANGER CHISEL POINT ENDS INTO METAL DECKING GROOVES WITH FLAT SURFACE FACING DOWNWARDS AND WITH THE LENGTH OF THE MDH BODY BEING PERPENDICULAR TO THE DECKING GROOVES. WHILE HOLDING THE BODY CHISEL POINT END TIGHT INTO METAL DECKING GROOVE, TIGHTEN TORQUE-OFF HEX NUT UNTIL BOTH CHISEL POINT ENDS ARE TIGHT AND SECURELY WEDGED INTO THE OPPOSING METAL DECKING GROOVES. WHILE HOLDING THE MDH HANGER BODY IN PLACE, TIGHTEN THE TORQUE-OFF HEX NUT WITH AN OPEN END WRENCH UNTIL THE HEX NUT HAS BROKEN AWAY FROM THE THREADED BARREL, LEAVING THE LOCK WASHER COMPRESSED AND THE HEX NUT LOOSE ON THE THREADED SHAFT. FOR REFERENCE, A MINIMUM OF 15 FT-LBS OF TORQUE IS REQUIRED FOR THE MDH3812.



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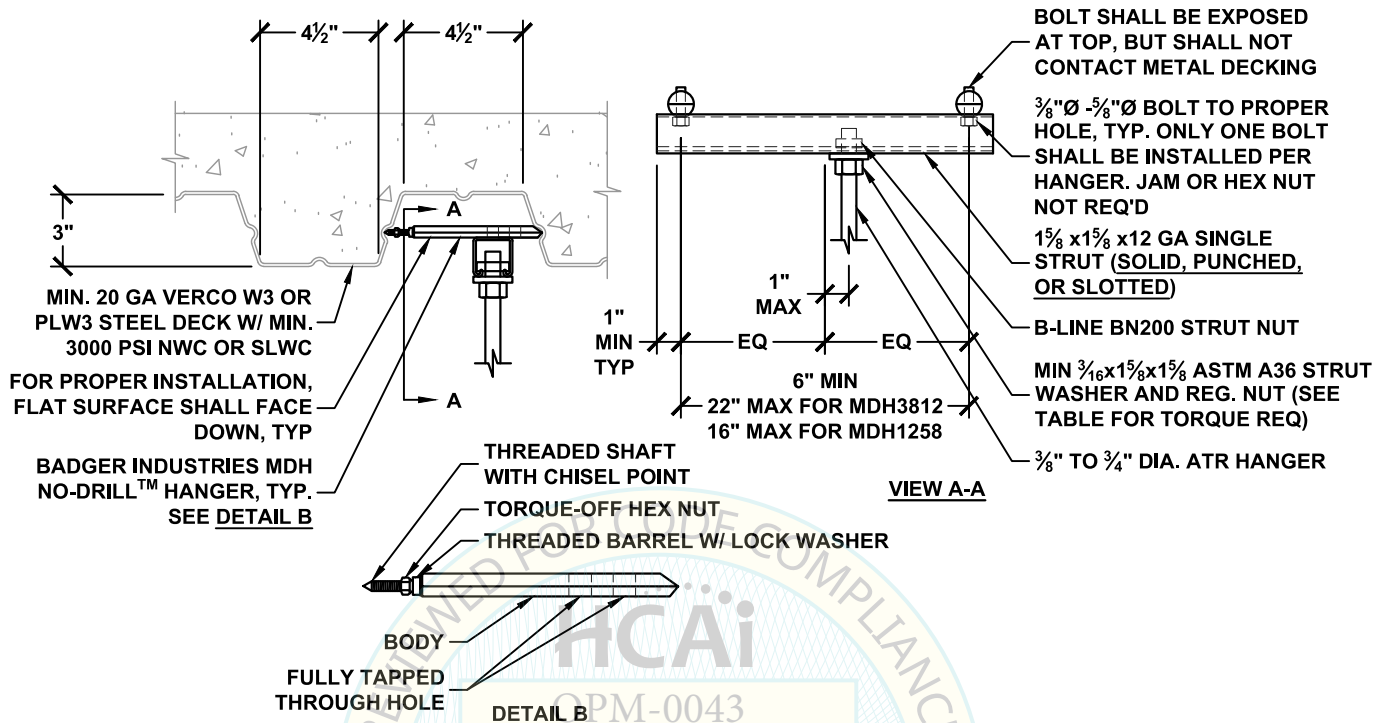
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**M2.120.1**



# HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) BADGER INDUSTRIES MDH NO-DRILL™ HANGERS



GRAVITY ONLY		GRAVITY & SEISMIC		HANGER DIA. INCH	MDH SIZE	MIN SPACING Smin INCH	MIN END DIST. Cmin INCH
HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS				
38A TO 38D	300	38A TO 38G	600	3/8	MDH3812	2	6
50A TO 50D	300	50A TO 50G	600	1/2			
63A TO 63D	300	63A TO 63G	600	5/8			
38A TO 38F	450	38A TO 38H	900	3/8	MDH1258	3	6
50A TO 50F	450	50A TO 50H	900	1/2			
63A TO 63F	450	63A TO 63H	900	5/8			
75A TO 75F	450	75A TO 75H	900	3/4			

FASTENER WITH STRUT NUT	
DIA. INCH	TORQUE REQ'D FT-LBS
3/8	19
1/2 - 3/4	50

- SEE DETAIL M0.00 FOR SECTION NOTES
- WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
- PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE MDH DOES NOT IMPACT THE LISTED MDH CAPACITIES.
- INSTALLATION: CLEAN METAL DECKING GROOVES TO EXPOSE PLATED DECKING METAL PRIOR TO PLACEMENT OF THE MDH HANGER. ACCURATELY PLACE MDH HANGER CHISEL POINT ENDS INTO METAL DECKING GROOVES WITH FLAT SURFACE FACING DOWNWARDS AND WITH THE LENGTH OF THE MDH BODY BEING PERPENDICULAR TO THE DECKING GROOVES. WHILE HOLDING THE BODY CHISEL POINT END TIGHT INTO METAL DECKING GROOVE, TIGHTEN TORQUE-OFF HEX NUT UNTIL BOTH CHISEL POINT ENDS ARE TIGHT AND SECURELY WEDGED INTO THE OPPOSING METAL DECKING GROOVES. WHILE HOLDING THE MDH HANGER BODY IN PLACE, TIGHTEN THE TORQUE-OFF HEX NUT WITH AN OPEN END WRENCH UNTIL THE HEX NUT HAS BROKEN AWAY FROM THE THREADED BARREL, LEAVING THE LOCK WASHER COMPRESSED AND THE HEX NUT LOOSE ON THE THREADED SHAFT. FOR REFERENCE, A MINIMUM OF 15 FT-LBS OF TORQUE IS REQUIRED FOR THE MDH3812 AND A MINIMUM OF 20 FT-LBS OF TORQUE IS REQUIRED FOR THE MDH1258.



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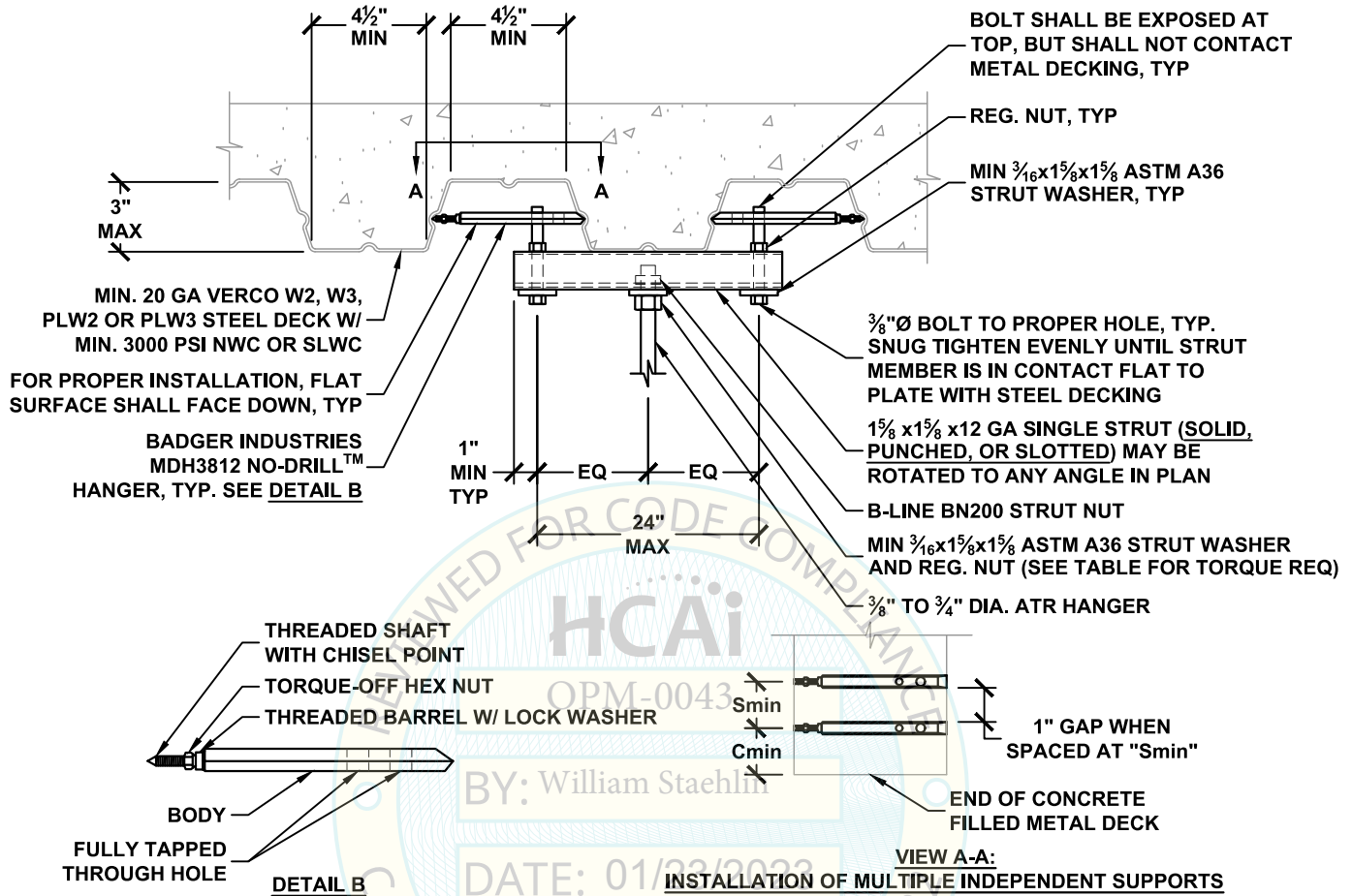
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**M2.121**

# HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) BADGER INDUSTRIES MDH NO-DRILL™ HANGERS



GRAVITY ONLY		GRAVITY & SEISMIC		ATR HANGER DIA. INCH	MDH SIZE	MIN SPACING Smin INCH	MIN END DIST. Cmin INCH	FASTENER WITH STRUT NUT	
HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS					DIA. INCH	TORQUE REQ'D FT-LBS
38A TO 38E	400	38A TO 38G	690	3/8	MDH3812	2	6	3/8	19
50A TO 50E	400	50A TO 50G	690	1/2				1/2 - 3/4	50
63A TO 63E	400	63A TO 63G	690	5/8					

- 1 SEE DETAIL M0.00 FOR SECTION NOTES
- 2 WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
- 3 PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE MDH DOES NOT IMPACT THE LISTED MDH CAPACITIES.
- 4 INSTALLATION: CLEAN METAL DECKING GROOVES TO EXPOSE PLATED DECKING METAL PRIOR TO PLACEMENT OF THE MDH HANGER. ACCURATELY PLACE MDH HANGER CHISEL POINT ENDS INTO METAL DECKING GROOVES WITH FLAT SURFACE FACING DOWNWARDS AND WITH THE LENGTH OF THE MDH BODY BEING PERPENDICULAR TO THE DECKING GROOVES. WHILE HOLDING THE BODY CHISEL POINT END TIGHT INTO METAL DECKING GROOVE, TIGHTEN TORQUE-OFF HEX NUT UNTIL BOTH CHISEL POINT ENDS ARE TIGHT AND SECURELY WEDGED INTO THE OPPOSING METAL DECKING GROOVES. WHILE HOLDING THE MDH HANGER BODY IN PLACE, TIGHTEN THE TORQUE-OFF HEX NUT WITH AN OPEN END WRENCH UNTIL THE HEX NUT HAS BROKEN AWAY FROM THE THREADED BARREL, LEAVING THE LOCK WASHER COMPRESSED AND THE HEX NUT LOOSE ON THE THREADED SHAFT. FOR REFERENCE, A MINIMUM OF 15 FT-LBS OF TORQUE IS REQUIRED FOR THE MDH3812.



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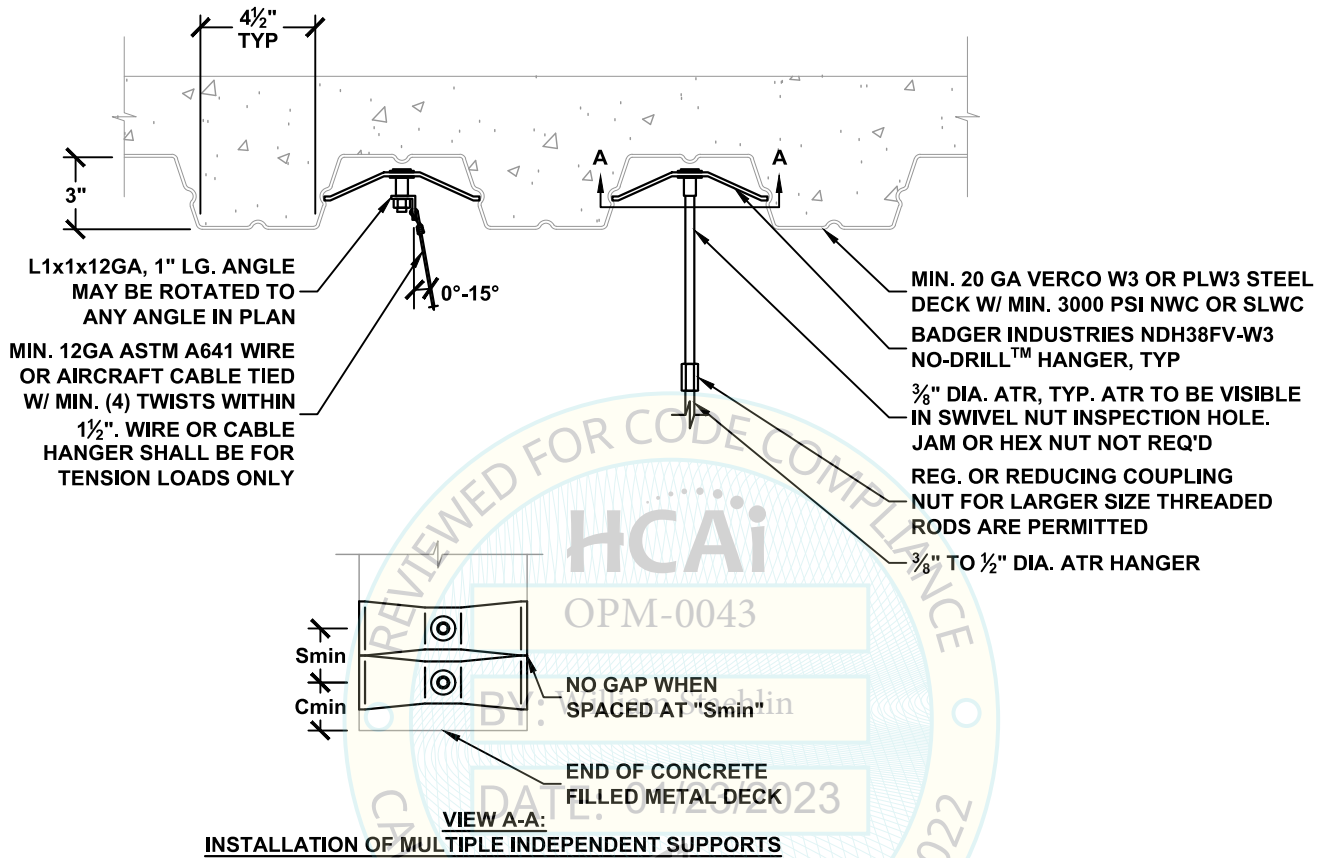
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**M2.122**

# ATR HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) BADGER INDUSTRIES NDH38FV-W3 NO-DRILL™ HANGER



GRAVITY ONLY		GRAVITY & SEISMIC		ATR HANGER DIA. INCH	MIN SPACING Smin INCH	MIN END DIST. Cmin INCH
HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS			
38A TO 38A	70	38A TO 38D	170	3/8	2 1/2	1 1/2
50A TO 50A	70	50A TO 50D	170	1/2	2 1/2	1 1/2

- <sup>1</sup> SEE DETAIL M0.00 FOR SECTION NOTES
- <sup>2</sup> WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
- <sup>3</sup> PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.



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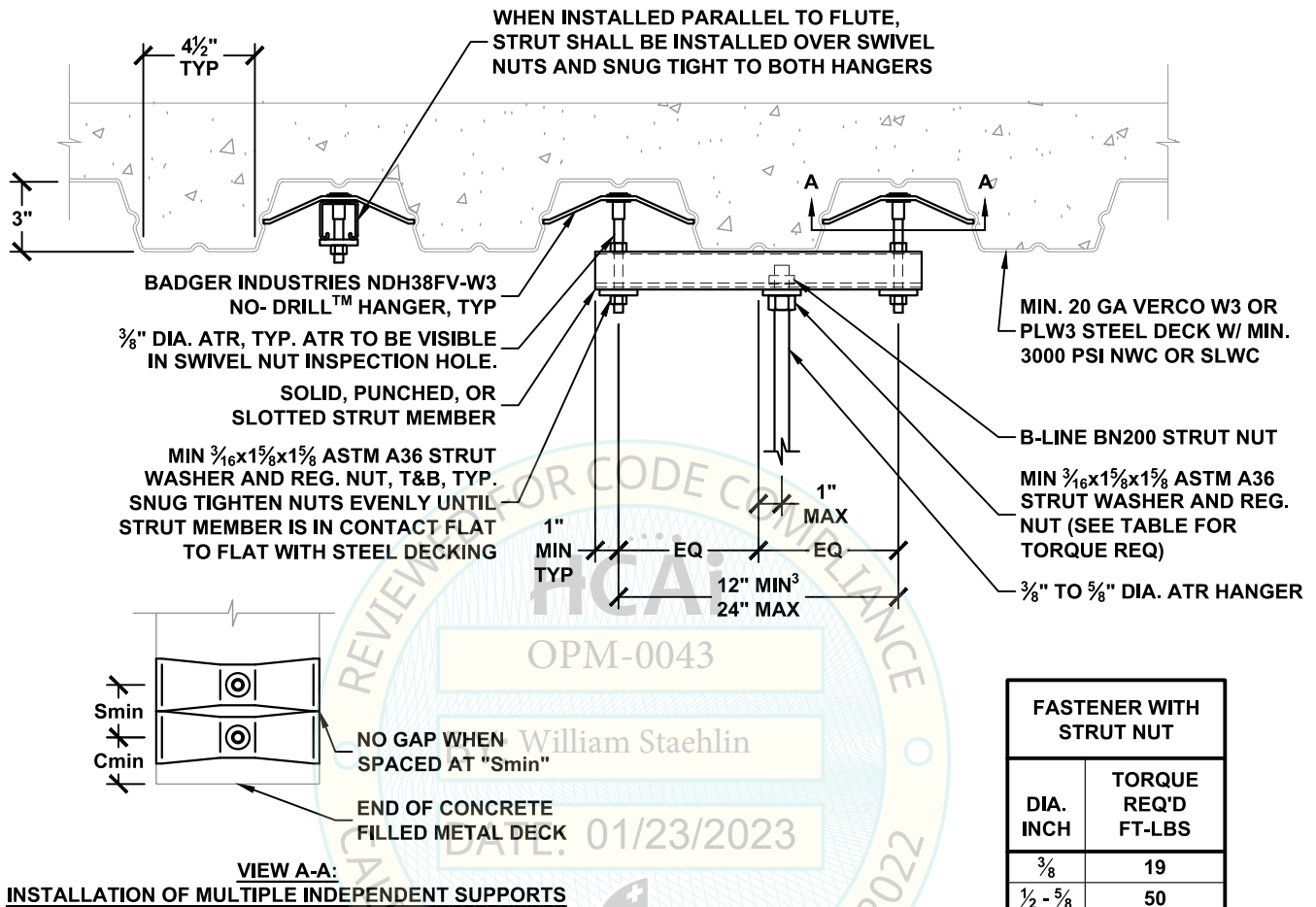
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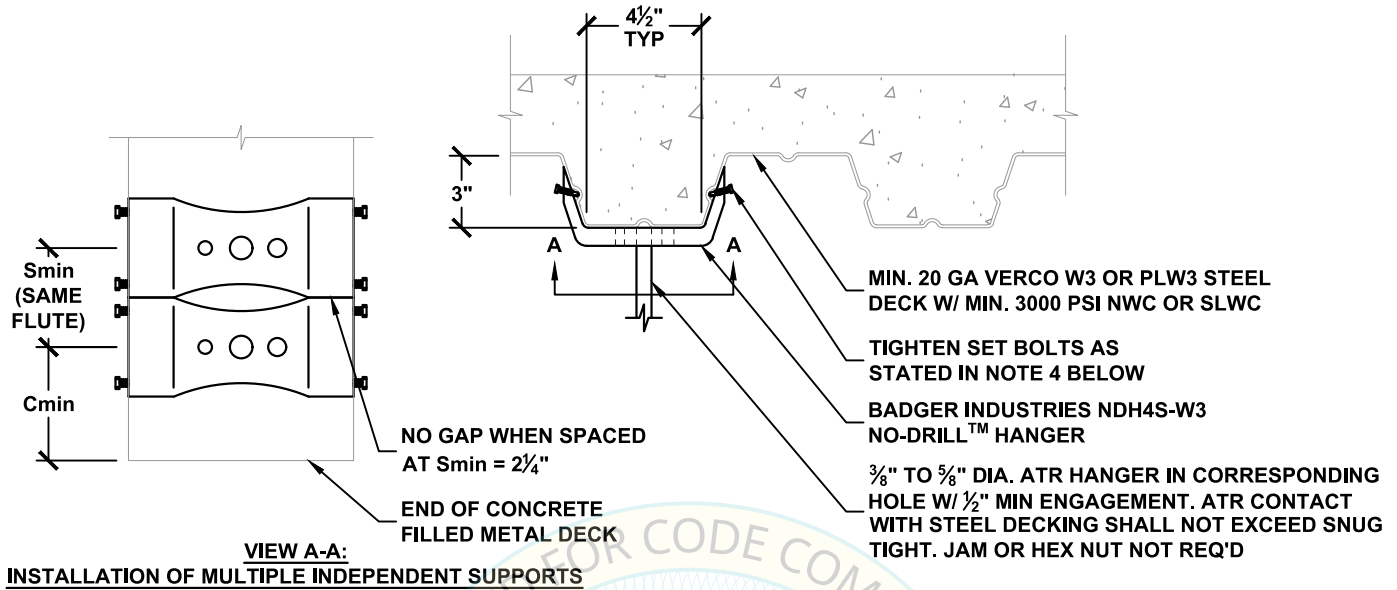
**M3.20**

# ATR HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) BADGER INDUSTRIES NDH38FV-W3 NO-DRILL™ HANGERS





# ATR HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGER



GRAVITY ONLY		GRAVITY & SEISMIC		ATR HANGER DIA. INCH	MIN SPACING Smin INCH	MIN END DIST. Cmin INCH
HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS			
38A TO 38F	470	38A TO 38J	940	3/8	2 1/4	6
50A TO 50F	470	50A TO 50J	940	1/2		
63A TO 63F	470	63A TO 63J	940	5/8		
38A TO 38F	570	38A TO 38K	1140	3/8	6	6
50A TO 50F	570	50A TO 50K	1140	1/2		
63A TO 63F	570	63A TO 63K	1140	5/8		
38A TO 38G	630	38A TO 38L	1260	3/8	10	6
50A TO 50G	630	50A TO 50L	1260	1/2		
63A TO 63G	630	63A TO 63L	1260	5/8		
38A TO 38H	730	38A TO 38L	1460	3/8	14 1/2	6
50A TO 50H	730	50A TO 50L	1460	1/2		
63A TO 63H	730	63A TO 63L	1460	5/8		

- <sup>1</sup> SEE DETAIL M0.00 FOR SECTION NOTES
- <sup>2</sup> WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
- <sup>3</sup> PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.
- <sup>4</sup> INSTALLATION: ALIGN THE LENGTH OF THE NDH4S-W3 TO BE PERPENDICULAR TO THE LENGTH OF THE STEEL DECKING GROOVES. WHILE HOLDING THE NDH4S-W3 IN PLACE, HAND TIGHTEN EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY MAKING SURE THAT THE POINTED END OF EACH SET BOLT IS ENGAGED INTO THE STEEL DECKING GROOVE. ONCE EACH OF THE (4) SET BOLTS ARE HAND TIGHT AND PROPER PLACEMENT OF THE NDH4S-W3 HAS BEEN CHECKED, CONTINUE TIGHTENING (USING A BOX END WRENCH) EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY UNTIL THE HEX HEAD OF EACH SET BOLT BREAKS AWAY. PROPER INSTALLATION REQUIRES THE HEX HEADS OF ALL SET BOLTS TO HAVE BROKEN AWAY. FOR REFERENCE, A MINIMUM OF 10 FT-LBS OF TORQUE IS REQUIRED.



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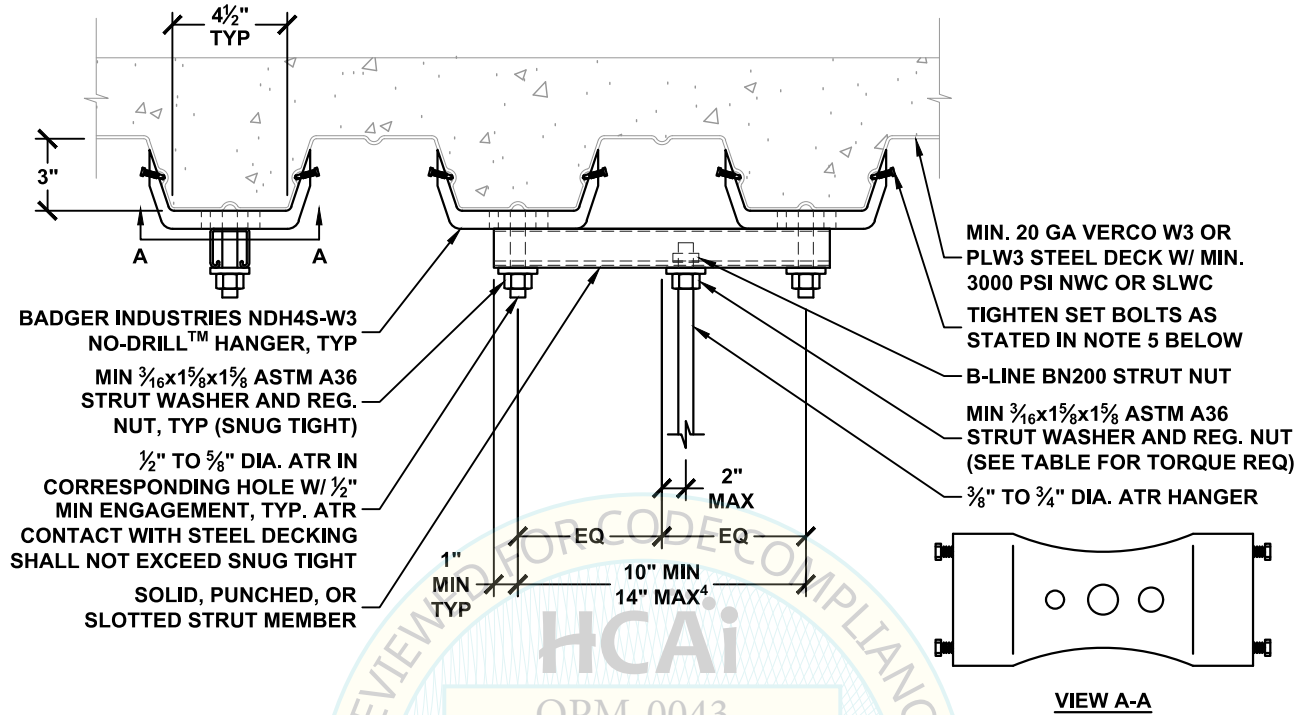
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**M3.30**

# ATR HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGERS



STRUT MEMBER SIZE	GRAVITY ONLY		GRAVITY & SEISMIC		ATR HANGER DIA. INCH	MIN END DIST. Cmin INCH
	HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS		
1 3/16"x1 5/8"x12GA SINGLE STRUT	38A TO 38E	380	38A TO 38E	380	3/8	6
	50A TO 50E	380	50A TO 50E	380	1/2	6
	63A TO 63E	380	63A TO 63E	380	5/8	6
1 5/8"x1 5/8"x12GA SINGLE STRUT	38A TO 38H	730	38A TO 38K	1180	3/8	6
	50A TO 50J	900	50A TO 50K	1180	1/2	6
	63A TO 63J	900	63A TO 63K	1180	5/8	6
1 5/8"x1 5/8"x12GA SOLID DOUBLE STRUT	63A TO 63J	900	63A TO 63N	2400	5/8	6
	75A TO 75J	900	75A TO 75N	2400	3/4	6

FASTENER WITH STRUT NUT	
DIA. INCH	TORQUE REQ'D FT-LBS
3/8	19
1/2 - 3/4	50

- SEE DETAIL M0.00 FOR SECTION NOTES
- WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
- PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.
- NDH HANGER ASSEMBLY SHALL BE SPACED 10" MIN. FROM ANY ADJACENT NDH HANGERS. REFER TO DETAIL M3.30 FOR SPACING DETAIL.
- INSTALLATION: ALIGN THE LENGTH OF THE NDH4S-W3 TO BE PERPENDICULAR TO THE LENGTH OF THE STEEL DECKING GROOVES. WHILE HOLDING THE NDH4S-W3 IN PLACE, HAND TIGHTEN EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY MAKING SURE THAT THE POINTED END OF EACH SET BOLT IS ENGAGED INTO THE STEEL DECKING GROOVE. ONCE EACH OF THE (4) SET BOLTS ARE HAND TIGHT AND PROPER PLACEMENT OF THE NDH4S-W3 HAS BEEN CHECKED, CONTINUE TIGHTENING (USING A BOX END WRENCH) EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY UNTIL THE HEX HEAD OF EACH SET BOLT BREAKS AWAY. PROPER INSTALLATION REQUIRES THE HEX HEADS OF ALL SET BOLTS TO HAVE BROKEN AWAY. FOR REFERENCE, A MINIMUM OF 10 FT-LBS OF TORQUE IS REQUIRED.



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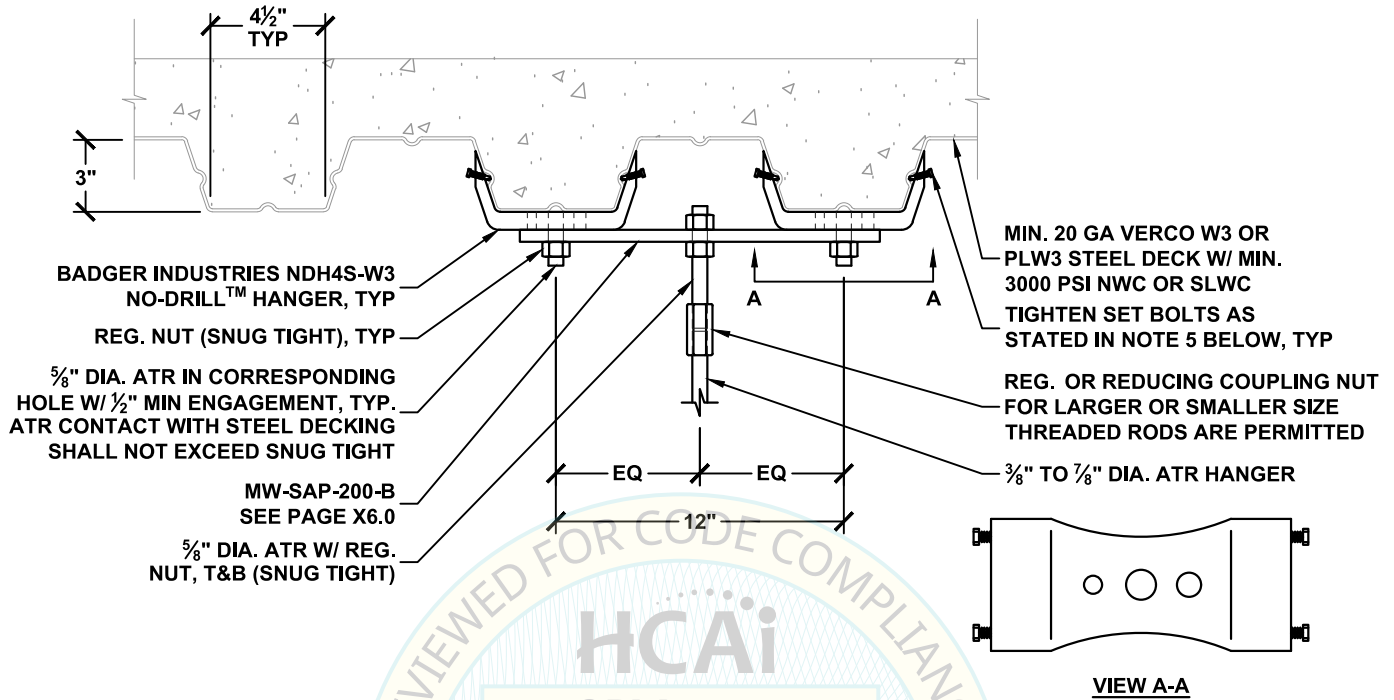
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**M3.31**

# ATR HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGERS



GRAVITY ONLY		GRAVITY & SEISMIC		ATR HANGER DIA. INCH	MIN END DIST. Cmin INCH
HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS		
38A TO 38H	730	38A TO 38M	1930	3/8	6
50A TO 50L	1260	50A TO 50M	1930	1/2	6
63A TO 63L	1260	63A TO 63M	1930	5/8	6
75A TO 75L	1260	75A TO 75M	1930	3/4	6
88A TO 88A	1260	88A TO 88M	1930	7/8	6

- 1 SEE DETAIL M0.00 FOR SECTION NOTES
- 2 WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
- 3 PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.
- 4 NDH HANGER ASSEMBLY SHALL BE SPACED 10" MIN. FROM ANY ADJACENT NDH HANGERS. REFER TO DETAIL M3.30 FOR SPACING DETAIL.
- 5 INSTALLATION: ALIGN THE LENGTH OF THE NDH4S-W3 TO BE PERPENDICULAR TO THE LENGTH OF THE STEEL DECKING GROOVES. WHILE HOLDING THE NDH4S-W3 IN PLACE, HAND TIGHTEN EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY MAKING SURE THAT THE POINTED END OF EACH SET BOLT IS ENGAGED INTO THE STEEL DECKING GROOVE. ONCE EACH OF THE (4) SET BOLTS ARE HAND TIGHT AND PROPER PLACEMENT OF THE NDH4S-W3 HAS BEEN CHECKED, CONTINUE TIGHTENING (USING A BOX END WRENCH) EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY UNTIL THE HEX HEAD OF EACH SET BOLT BREAKS AWAY. PROPER INSTALLATION REQUIRES THE HEX HEADS OF ALL SET BOLTS TO HAVE BROKEN AWAY. FOR REFERENCE, A MINIMUM OF 10 FT-LBS OF TORQUE IS REQUIRED.



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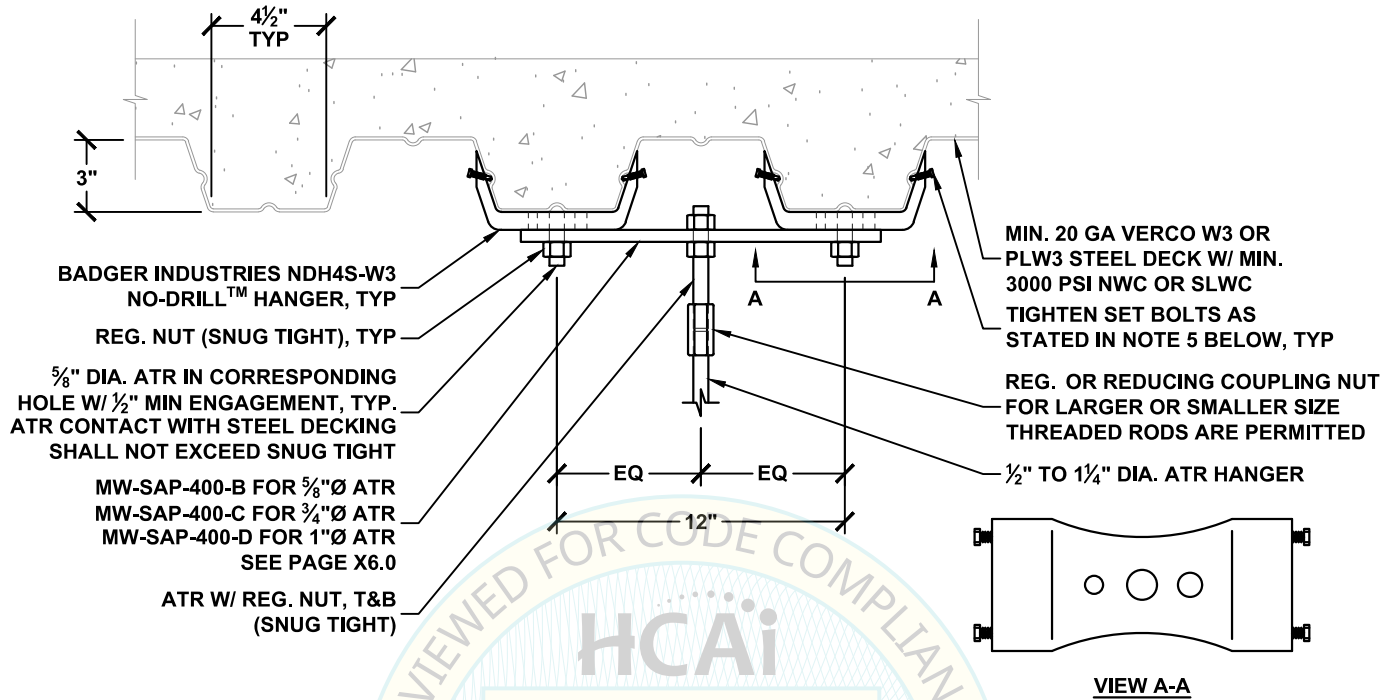
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**M3.32**

# ATR HANGER ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (4) BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGERS



GRAVITY ONLY		GRAVITY & SEISMIC		ATR HANGER DIA. INCH	MIN END DIST. Cmin INCH
HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS		
50A TO 50L	1350	50A TO 50Q	3600	1/2	6
63A TO 63N	2160	63A TO 63Q	3600	5/8	6
75A TO 75P	2520	75A TO 75Q	3500	3/4	6
88A TO 88P	2520	88A TO 88Q	3500	7/8	6
100A TO 100P	2520	100A TO 100Q	3500	1	6
125A TO 125P	2520	125A TO 125Q	3500	1 1/4	6

- 1 SEE DETAIL M0.00 FOR SECTION NOTES
- 2 WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
- 3 PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.
- 4 NDH HANGER ASSEMBLY SHALL BE SPACED 10" MIN. FROM ANY ADJACENT NDH HANGERS. REFER TO DETAIL M3.30 FOR SPACING DETAIL.
- 5 INSTALLATION: ALIGN THE LENGTH OF THE NDH4S-W3 TO BE PERPENDICULAR TO THE LENGTH OF THE STEEL DECKING GROOVES. WHILE HOLDING THE NDH4S-W3 IN PLACE, HAND TIGHTEN EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY MAKING SURE THAT THE POINTED END OF EACH SET BOLT IS ENGAGED INTO THE STEEL DECKING GROOVE. ONCE EACH OF THE (4) SET BOLTS ARE HAND TIGHT AND PROPER PLACEMENT OF THE NDH4S-W3 HAS BEEN CHECKED, CONTINUE TIGHTENING (USING A BOX END WRENCH) EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY UNTIL THE HEX HEAD OF EACH SET BOLT BREAKS AWAY. PROPER INSTALLATION REQUIRES THE HEX HEADS OF ALL SET BOLTS TO HAVE BROKEN AWAY. FOR REFERENCE, A MINIMUM OF 10 FT-LBS OF TORQUE IS REQUIRED.



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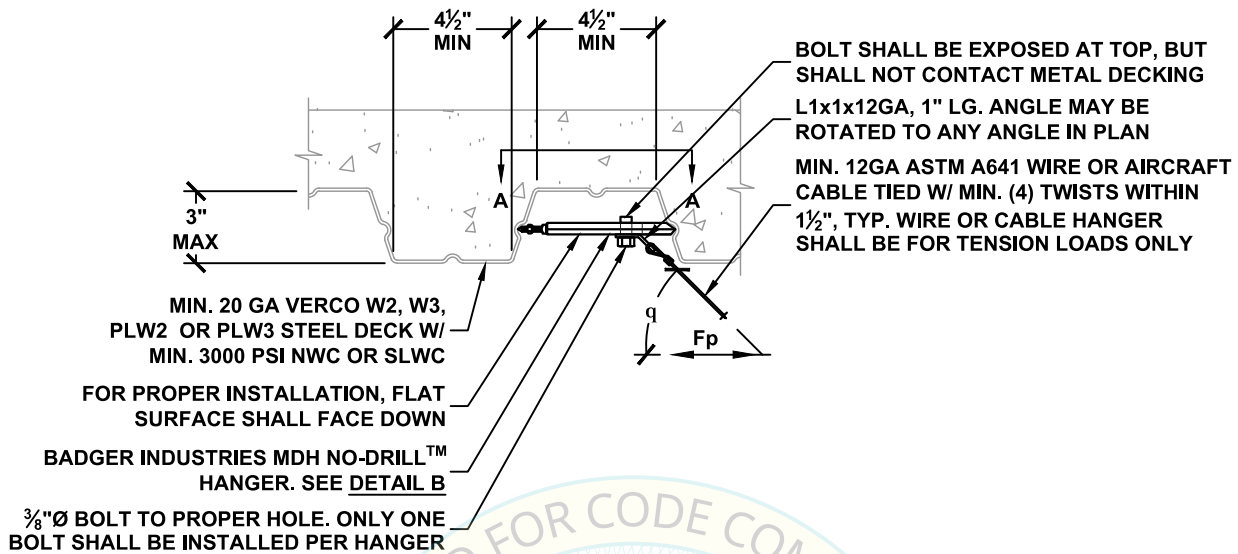
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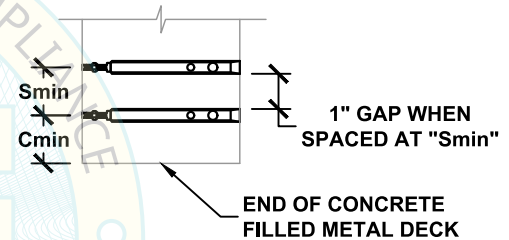
**M3.33**



# WIRE/CABLE BRACE ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) BADGER INDUSTRIES MDH NO-DRILL™ HANGER

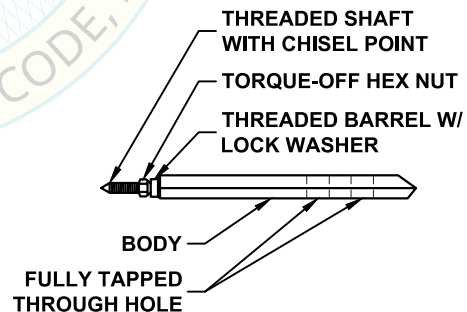


BRACE BRACKET CONNECTION TYPE	ALLOWABLE LATERAL LOAD Fp LBS	MAX BRACE RANGE q	MDH SIZE	MIN SPACING Smin INCH	MIN END DIST. Cmin INCH
38A TO 38B	130	30°- 45°	MDH3812	2	6
38A TO 38A	90	46°- 60°			



VIEW A-A

- <sup>1</sup> SEE DETAIL N0.00 FOR SECTION NOTES
- <sup>2</sup> PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE MDH DOES NOT IMPACT THE LISTED MDH CAPACITIES.
- <sup>3</sup> INSTALLATION: CLEAN METAL DECKING GROOVES TO EXPOSE PLATED DECKING METAL PRIOR TO PLACEMENT OF THE MDH HANGER. ACCURATELY PLACE MDH HANGER CHISEL POINT ENDS INTO METAL DECKING GROOVES WITH FLAT SURFACE FACING DOWNWARDS AND WITH THE LENGTH OF THE MDH BODY BEING PERPENDICULAR TO THE DECKING GROOVES. WHILE HOLDING THE BODY CHISEL POINT END TIGHT INTO METAL DECKING GROOVE, TIGHTEN TORQUE-OFF HEX NUT UNTIL BOTH CHISEL POINT ENDS ARE TIGHT AND SECURELY WEDGED INTO THE OPPOSING METAL DECKING GROOVES. WHILE HOLDING THE MDH HANGER BODY IN PLACE, TIGHTEN THE TORQUE-OFF HEX NUT WITH AN OPEN END WRENCH UNTIL THE HEX NUT HAS BROKEN AWAY FROM THE THREADED BARREL, LEAVING THE LOCK WASHER COMPRESSED AND THE HEX NUT LOOSE ON THE THREADED SHAFT. FOR REFERENCE, A MINIMUM OF 15 FT-LBS OF TORQUE IS REQUIRED FOR THE MDH3812.



DETAIL B



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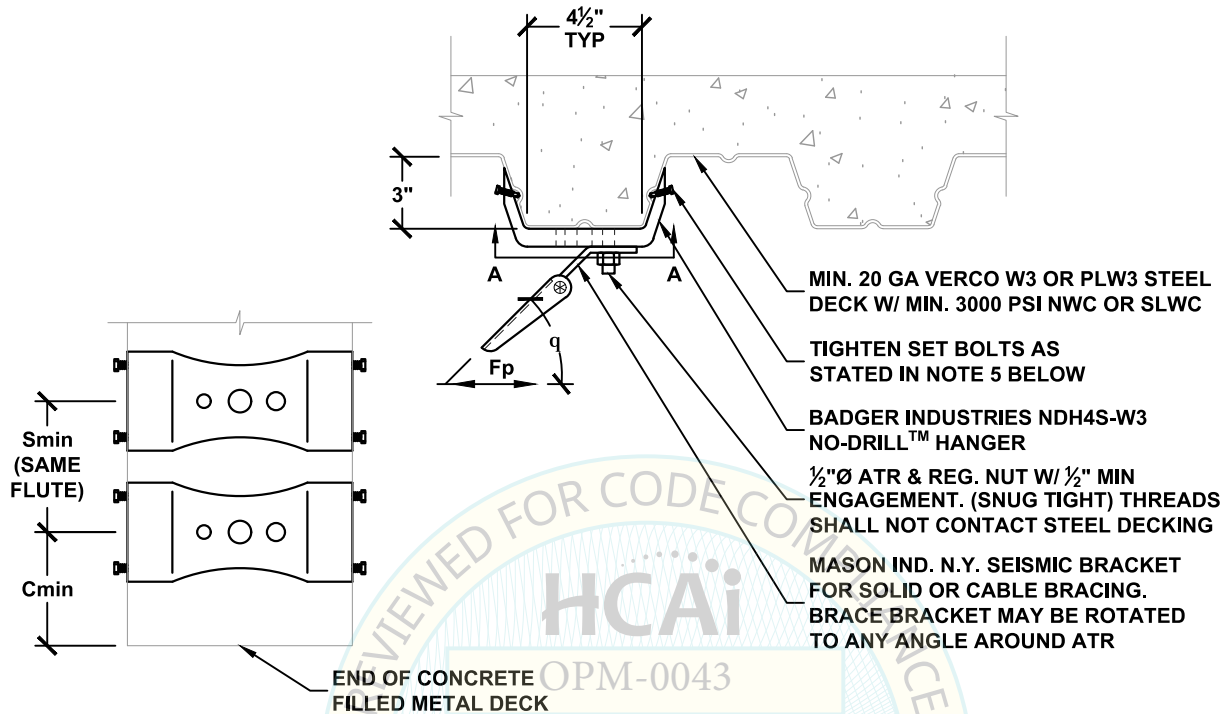
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**N2.120.1**

# SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (1) BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGER



VIEW A-A:

INSTALLATION OF MULTIPLE INDEPENDENT SUPPORTS

BRACE BRACKET CONNECTION TYPE	ALLOWABLE LATERAL LOAD Fp LBS	$\Omega_0 = 2.0^2$		MAX BRACE RANGE q	MIN SPACING Smin INCH	MIN END DIST. Cmin INCH
		BRACE BRACKET CONNECTION TYPE	ALLOWABLE LATERAL LOAD Fp LBS			
50A TO 50J	910	50A TO 50F	550	30° - 45°	24	12
50A TO 50J	910	50A TO 50F	550	46° - 60°		

1 SEE DETAIL N0.00 FOR SECTION NOTES

2 OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE

3 PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.

4 FOR NDH HANGERS WITH SPACING LESS THAN Smin, THE COMBINED DEMAND OF MULTIPLE NDH HANGERS SHALL NOT EXCEED THE CAPACITY OF A SINGLE NDH HANGER.

5 INSTALLATION: ALIGN THE LENGTH OF THE NDH4S-W3 TO BE PERPENDICULAR TO THE LENGTH OF THE STEEL DECKING GROOVES. WHILE HOLDING THE NDH4S-W3 IN PLACE, HAND TIGHTEN EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY MAKING SURE THAT THE POINTED END OF EACH SET BOLT IS ENGAGED INTO THE STEEL DECKING GROOVE. ONCE EACH OF THE (4) SET BOLTS ARE HAND TIGHT AND PROPER PLACEMENT OF THE NDH4S-W3 HAS BEEN CHECKED, CONTINUE TIGHTENING (USING A BOX END WRENCH) EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY UNTIL THE HEX HEAD OF EACH SET BOLT BREAKS AWAY. PROPER INSTALLATION REQUIRES THE HEX HEADS OF ALL SET BOLTS TO HAVE BROKEN AWAY. FOR REFERENCE, A MINIMUM OF 10 FT-LBS OF TORQUE IS REQUIRED.



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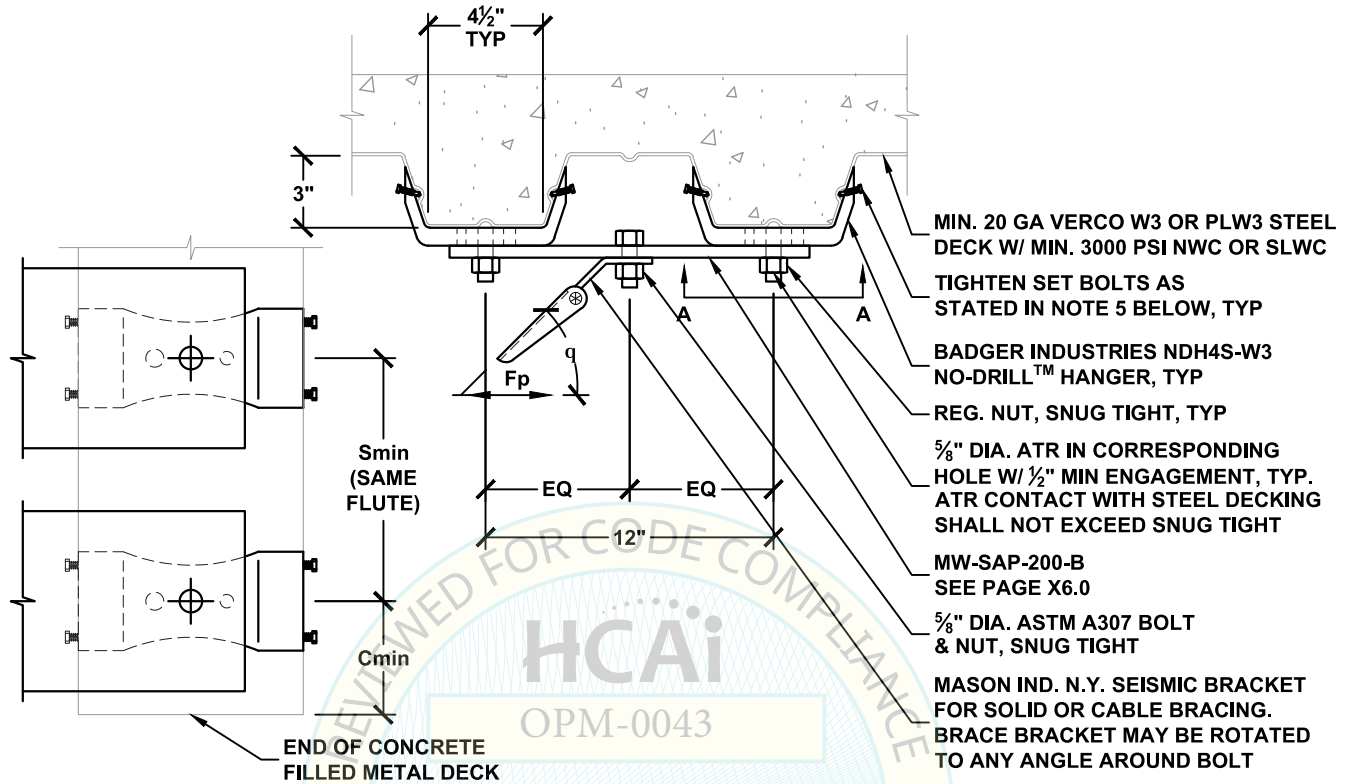
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**N3.30**

# SEISMIC BRACKET ATTACHMENT TO CONCRETE FILLED METAL DECK WITH (2) BADGER INDUSTRIES NDH4S-W3 NO-DRILL™ HANGER



**VIEW A-A:**  
**INSTALLATION OF MULTIPLE INDEPENDENT SUPPORTS**

BRACE BRACKET CONNECTION TYPE	ALLOWABLE LATERAL LOAD Fp LBS	$\Omega_0 = 2.0^2$		MAX BRACE RANGE q	MIN SPACING Smin INCH	MIN END DIST. Cmin INCH
		BRACE BRACKET CONNECTION TYPE	ALLOWABLE LATERAL LOAD Fp LBS			
63A TO 63M	1830	63A TO 63K	1100	30° - 45°	24	12
63A TO 63K	1110	63A TO 63K	1100	46° - 60°		

- SEE DETAIL N0.00 FOR SECTION NOTES
- OVERSTRENGTH FACTOR AS REQUIRED FOR ANCHORAGE TO CONCRETE
- PROXIMITY OR SPACING OF NEW OR EXISTING CONCRETE INSERTS OR DRILLED HOLE ANCHORS TO THE NDH DOES NOT IMPACT THE LISTED NDH CAPACITIES.
- FOR NDH HANGERS WITH SPACING LESS THAN Smin, THE COMBINED DEMAND OF MULTIPLE NDH HANGERS SHALL NOT EXCEED THE CAPACITY OF A SINGLE NDH HANGER.
- INSTALLATION: ALIGN THE LENGTH OF THE NDH4S-W3 TO BE PERPENDICULAR TO THE LENGTH OF THE STEEL DECKING GROOVES. WHILE HOLDING THE NDH4S-W3 IN PLACE, HAND TIGHTEN EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY MAKING SURE THAT THE POINTED END OF EACH SET BOLT IS ENGAGED INTO THE STEEL DECKING GROOVE. ONCE EACH OF THE (4) SET BOLTS ARE HAND TIGHT AND PROPER PLACEMENT OF THE NDH4S-W3 HAS BEEN CHECKED, CONTINUE TIGHTENING (USING A BOX END WRENCH) EACH OF THE (4) SET BOLTS EQUALLY AND ALTERNATIVELY UNTIL THE HEX HEAD OF EACH SET BOLT BREAKS AWAY. PROPER INSTALLATION REQUIRES THE HEX HEADS OF ALL SET BOLTS TO HAVE BROKEN AWAY. FOR REFERENCE, A MINIMUM OF 10 FT-LBS OF TORQUE IS REQUIRED.



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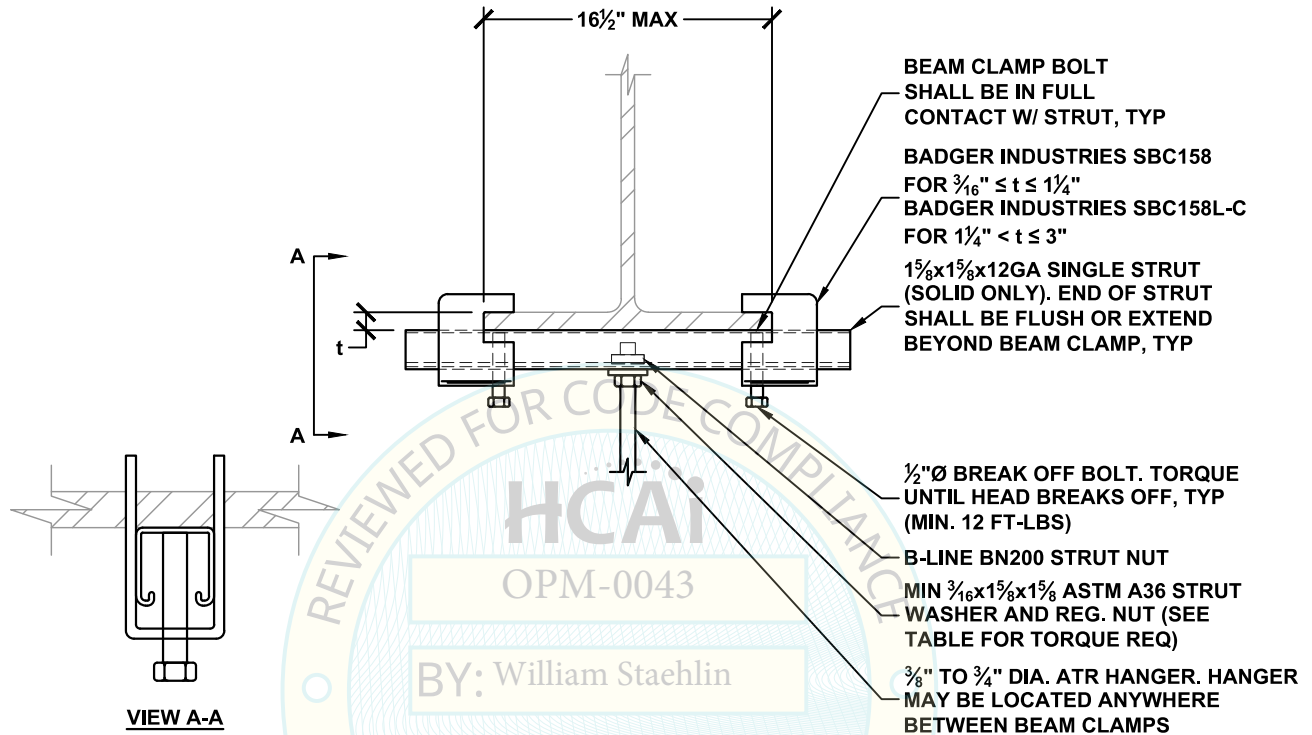
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**N3.31**

# ATR HANGER ATTACHMENT TO STEEL BEAM WITH (2) BADGER INDUSTRIES SBC158 SERIES STEEL BEAM CLAMPS



FASTENER WITH STRUT NUT	
DIA. INCH	TORQUE REQ'D FT-LBS
3/8	19
1/2 - 3/4	50

GRAVITY ONLY		GRAVITY & SEISMIC		ATR HANGER DIA. INCH
HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	
38A TO 38H	730	38A TO 38M	1840	3/8
50A TO 50J	920	50A TO 50M	1840	1/2
63A TO 63J	920	63A TO 63M	1840	5/8
75A TO 75J	920	75A TO 75M	1840	3/4

- <sup>1</sup> SEE DETAIL M0.00 FOR SECTION NOTES
- <sup>2</sup> ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
- <sup>3</sup> WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
- <sup>4</sup> BEAM CLAMPS SHALL NOT BE USED ON SHAPES WITH SLOPED FLANGES.



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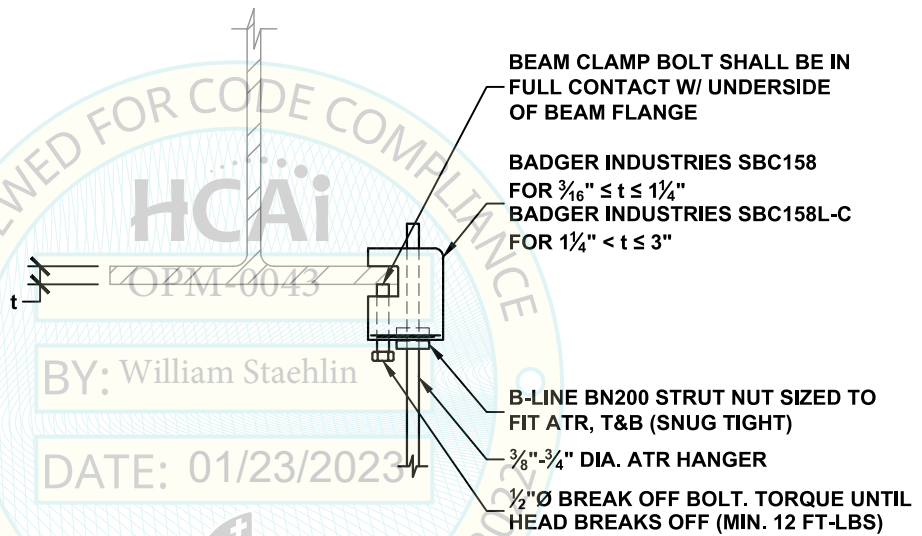
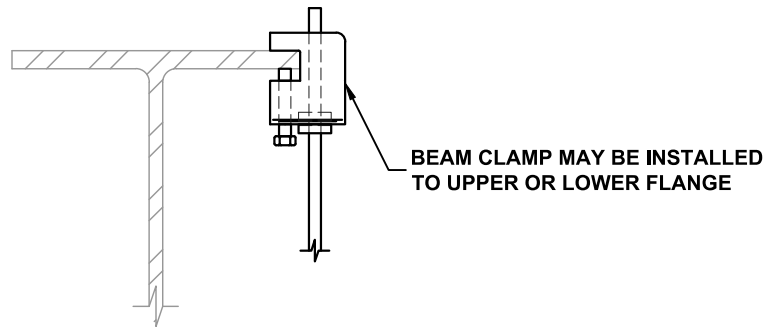
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**M3.14.1**



# ATR HANGER ATTACHMENT TO STEEL BEAM WITH (1) BADGER INDUSTRIES SBC158 SERIES STEEL BEAM CLAMP



GRAVITY ONLY		GRAVITY & SEISMIC		ATR HANGER DIA. INCH
HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	
38A TO 38H	730	38A TO 38M	1940	$\frac{3}{8}$
50A TO 50J	970	50A TO 50M	1940	$\frac{1}{2}$
63A TO 63J	970	63A TO 63M	1940	$\frac{5}{8}$
75A TO 75J	970	75A TO 75M	1940	$\frac{3}{4}$

- <sup>1</sup> SEE DETAIL M0.00 FOR SECTION NOTES
- <sup>2</sup> ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
- <sup>3</sup> WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
- <sup>4</sup> BEAM CLAMPS SHALL NOT BE USED ON SHAPES WITH SLOPED FLANGES.



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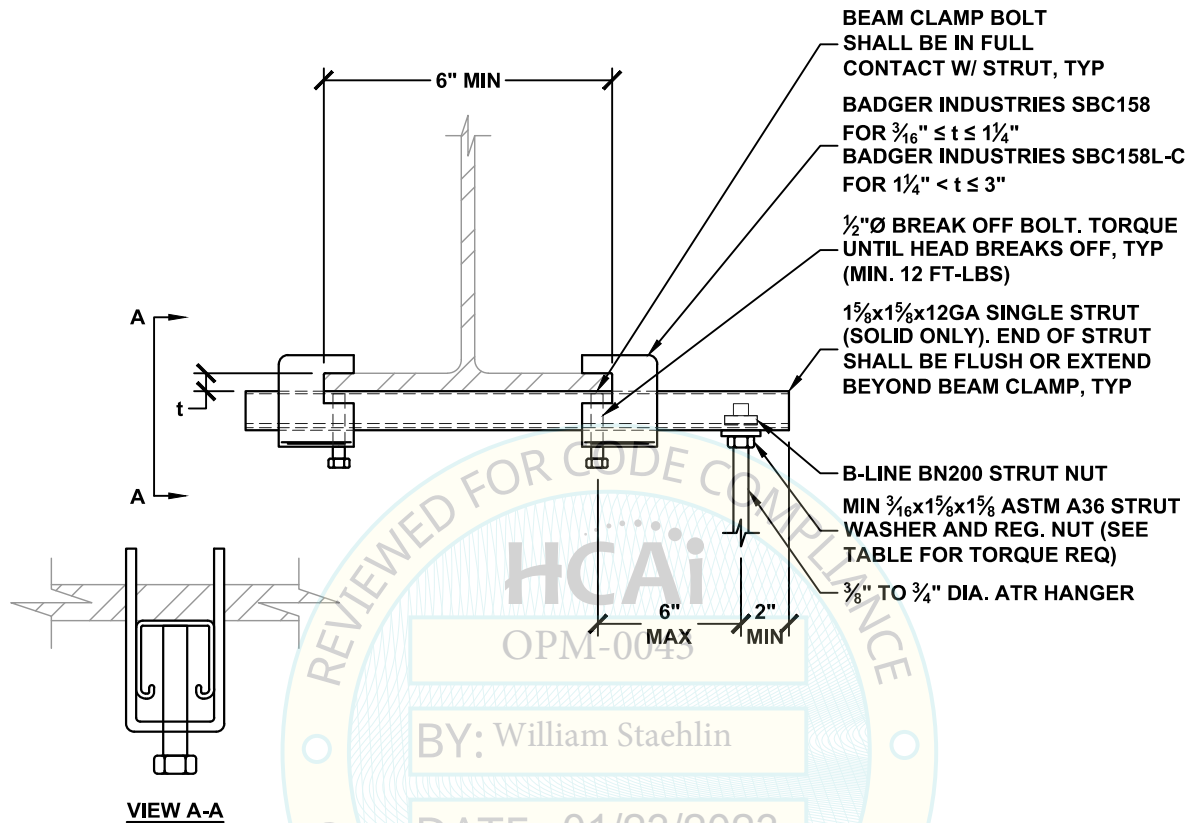
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**M3.15**

# ATR HANGER ATTACHMENT TO STEEL BEAM WITH (2) BADGER INDUSTRIES SBC158 SERIES STEEL BEAM CLAMPS



FASTENER WITH STRUT NUT	
DIA. INCH	TORQUE REQ'D FT-LBS
$\frac{3}{8}$	19
$\frac{1}{2} - \frac{3}{4}$	50

GRAVITY ONLY		GRAVITY & SEISMIC		ATR HANGER DIA. INCH
HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	HANGER CONNECTION TYPE	ALLOWABLE VERTICAL LOAD LBS	
38A TO 38G	680	38A TO 38L	1350	$\frac{3}{8}$
50A TO 50G	680	50A TO 50L	1350	$\frac{1}{2}$
63A TO 63G	680	63A TO 63L	1350	$\frac{5}{8}$
75A TO 75G	680	75A TO 75L	1350	$\frac{3}{4}$

- <sup>1</sup> SEE DETAIL M0.00 FOR SECTION NOTES
- <sup>2</sup> ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
- <sup>3</sup> WHEN USED FOR "GRAVITY & SEISMIC" LOADING, THE GRAVITY DEMAND SHALL NOT EXCEED THE "GRAVITY ONLY" ALLOWABLE LOAD.
- <sup>4</sup> BEAM CLAMPS SHALL NOT BE USED ON SHAPES WITH SLOPED FLANGES.



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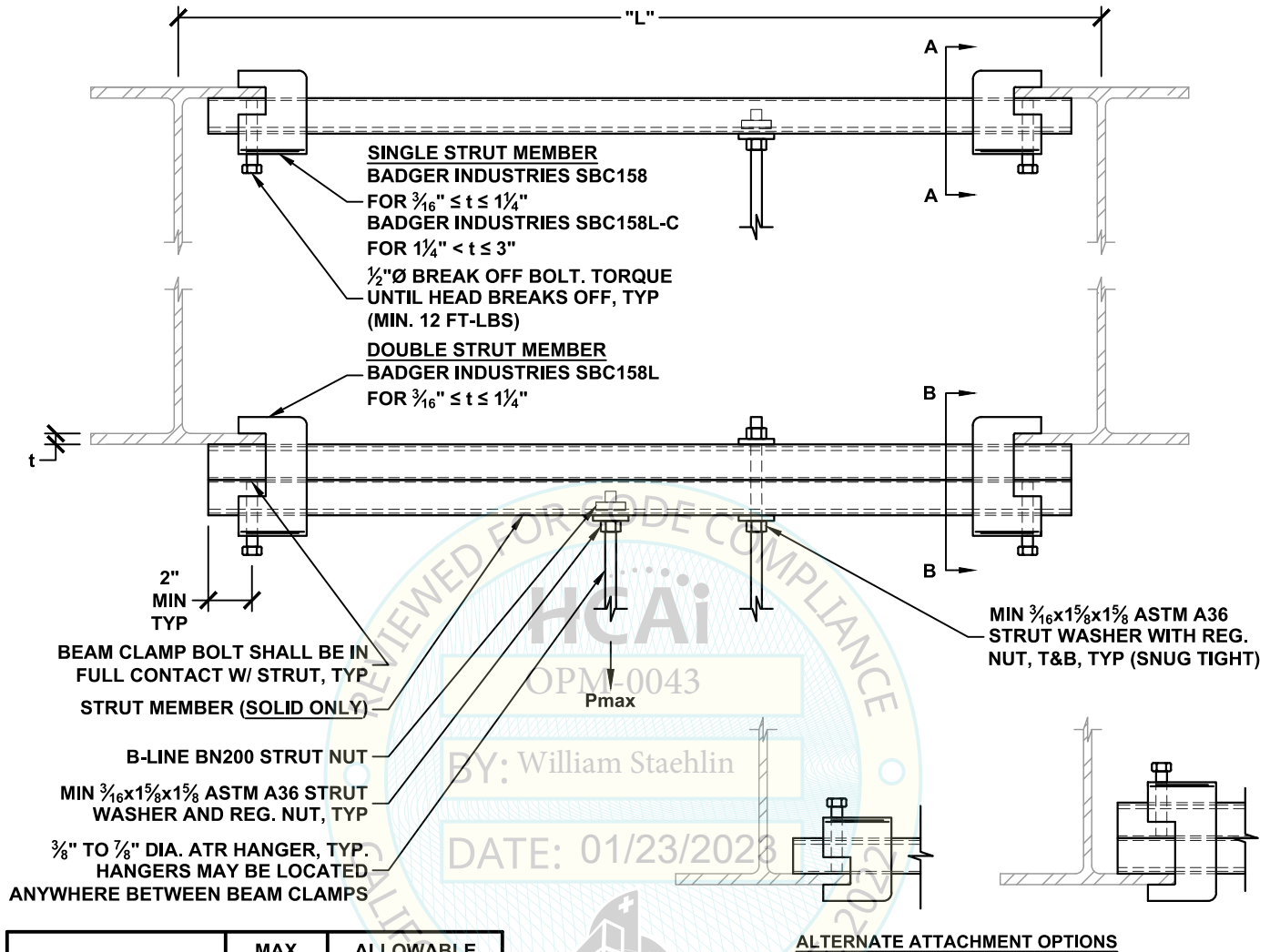
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**M3.16**

# SUPPLEMENTAL STEEL DETAIL WITH (2) BADGER INDUSTRIES SBC158 SERIES STEEL BEAM CLAMPS



SUPPLEMENTAL STEEL MEMBER	MAX BEAM LENGTH "L" FT	ALLOWABLE VERTICAL LOAD Pmax LBS
$1\frac{5}{8}" \times 1\frac{5}{8}" \times 12$ GA SINGLE CHANNEL STRUT	4	350
	6	200
	8	110
	10	70
$1\frac{5}{8}" \times 1\frac{5}{8}" \times 12$ GA DOUBLE CHANNEL STRUT	4	1010
	6	620
	8	500
	10	360

FASTENER WITH STRUT NUT	
DIA. INCH	TORQUE REQ'D FT-LBS
$\frac{3}{8}$	19
$\frac{1}{2} - \frac{3}{4}$	50

## NOTES:

- ATTACHMENT TO STEEL BEAM SHALL NOT BE PLACED WITHIN THE PROTECTED ZONE AS DEFINED IN AISC 341.
- MULTIPLE HANGER RODS MAY BE ATTACHED TO STRUT MEMBER PROVIDED THE MAX ALLOWABLE LOAD (Pmax) IS NOT EXCEEDED.



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