

SmartBolts®

An Industrial Indicators brand

www.hoh.si

Product Catalog



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Industrial Indicators is a full-service engineering and manufacturing company and a global leader in load indication, control, and monitoring technologies. We design, develop, and sell fasteners, tools, and OEM equipment integrated with load sensors. We specialize in bolting solutions and **are the creators of SmartBolts®**.



I. Getting Started

SmartBolts® Technology

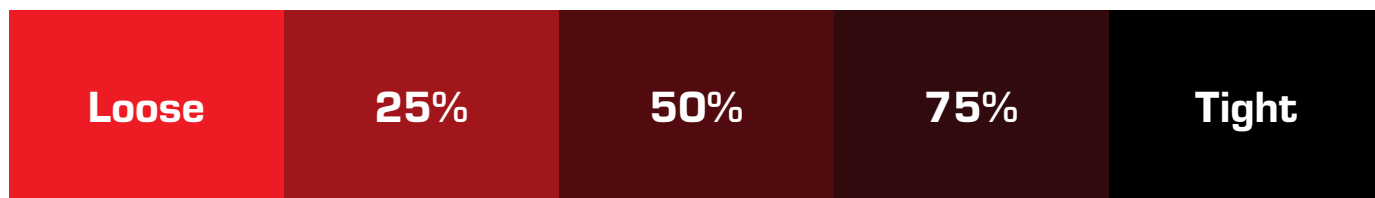
SmartBolts technology enables users to visually check that critical bolts are properly tightened. The technology accurately displays bolt tension (and thereby joint clamp force) by measuring the elongation of the bolt and converting that into a visual indication. SmartBolts show bolt tension in real time, are fully re-usable, and will provide a visual alert in case of loss of tension.

SmartBolts provides a Visual Indication System™ that shows that your critical bolts are properly tensioned and that you are ready to press the START button on your process.



SmartBolts®

SmartBolts are specialty fasteners with a built-in indicator that shows the tension that is developed as the bolt is installed. The indicator gradually darkens from bright red to black as the fastener is tightened.



Specifications

Size Range (Hex Head Cap Screws)	7/16" (M10) to 2-1/2" (M64)
Length Range	1-1/4" (30mm) to 24" (600mm)
Available Grades	Grade 5 (Class 8.8), Grade 8 (Class 10.9) (Other grades available upon request)
Available Finishes	Plain, Clear Zinc, Yellow Zinc (Other finishes available upon request)
Threading	Partial or Full
Grip Lengths	Minimums apply for fully threaded bolts
Design Tension Range	30-90% of Proof Load
Accuracy	+/-10% of Design Tension
Operating Temperature Range	-4°F (-20°C) to 168°F (75°C)

I. Getting Started

SmartBolts have the same form and function as the bolts you are using now. Replacing them is simply a matter of removing the ordinary bolt and installing the matching SmartBolt. Tighten until the indicator turns black and you are ready to go!



SmartBolt at zero tension



SmartBolt at Design Tension

Pre-Engineered Configuration

Pre-Engineered SmartBolts are often available directly from inventory. We offer quick lead times and reduced pricing for all Pre-Engineered products.

FASTENER HEAD TYPE

Pre-Engineered SmartBolts are only available as hex head cap screws.

SHANK DIAMETERS

Shank diameters range from 7/16" (M10) to 1-1/2" (M36).

SHANK LENGTHS

Shank lengths range from 1.25" (30mm) to 12" (300mm). Available lengths will vary based on the diameter.

THREAD TYPE

Threads are coarse (UNC) only.

THREAD LENGTH

Thread lengths are partial unless otherwise noted.

MATERIAL GRADES

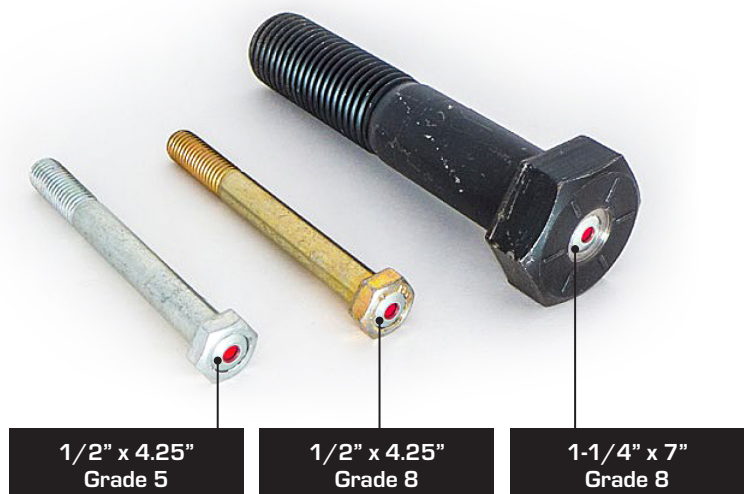
Grade 5 (Class 8.8) and Grade 8 (Class 10.9) are available in all diameters.

MATERIAL FINISHES

Grade 5 (Class 8.8) bolts up to 3/4" (M20) feature a Clear Zinc finish. Grade 8 (Class 10.9) bolts up to 3/4" (M20) feature a Yellow Zinc finish. Larger bolts feature a Plain finish and will be supplied with our Protective Recess.

DESIGN TENSION

All Pre-Engineered SmartBolts are designed to indicate "Tight" at 70% of the bolt's **Modified Proof Strength***. This tension level is appropriate for many applications.



*** Modified Proof Strength** is the proof strength of the bolt after conversion into a SmartBolt. In all but the shortest bolt lengths, Modified Proof Strength is identical to the original bolt proof strength.

I. Getting Started

Custom Engineered Configuration

If you have requirements that fall outside of the Pre-Engineered line offered in this catalog, you may specify your requirements for Custom Engineered SmartBolts by using our form.

The following are examples of Custom Engineered SmartBolt options we can design and manufacture to meet your specific requirements:

BOLT TYPES

Do you need a heavy hex head bolt? A 12-point flange bolt? We convert many bolt types other than hex head cap screws. We can even convert socket head cap screws greater than 1" in diameter (M24).

THREAD TYPES, LENGTHS AND DIAMETERS

Fully threaded, fine threaded, triple-lead, custom thread lengths, we do it all! We can convert bolts of greater length and diameter than are listed in this catalog – contact us with your requirements.

CUSTOM DESIGN TENSIONS

We can create a custom design meeting your application requirements with an indicating tension ranging from 30% to 90% of modified proof strength.



12-Point Flange Bolts



Hex Flange Bolts



Socket Head Cap Screws

These features can be added to your Custom Engineered SmartBolts. Select the features you want in our [Find Your SmartBolt form](#) and we will respond with a custom design and quotation.



PROTECTIVE RECESS

The Protective Recess design counterbores the indicator into the head of the bolt to protect it from impact. While this catalog offers the Protective Recess in bolts 7/8" (M22) and larger, it is also available on many other SmartBolts diameters and models.



CONTAMINATION SEAL

The Contamination Seal is a popular option which can be added with the Protective Recess. It features a clear, flush epoxy seal which encapsulates the indicator and offers a wipe-clean surface beneficial for environments where the bolts will be exposed to grease, mud, fluids or dust.



MADE IN USA BOLT

All SmartBolts are "Made in USA" from US components. In some cases, however, the bolt we start with has been manufactured overseas. If customers require, we can often source a bolt that has been manufactured in the USA. In this case you will get a 100% Made in USA product that starts with a quality US-made bolt.



II. Bolting Terms

Bolting terms for SmartBolts properties, as used in this catalog.

CLAMP FORCE

The compressive force on the joint members that results from the tensile force developed in a tightened bolt. This force, not torque, is what holds your bolted joint together.

TENSION

The tensile force developed by tightening a bolt. It is equal and opposite to the clamp force - the force holding your bolted joint together. Tension is the force that SmartBolts measure and display.

DESIGN TENSION

The tensile force on the bolt, measured in klbf or kN, at which SmartBolts are designed to indicate the "Tight" color. "Tight" shows the bolt has been properly installed and Preload is established. All of the SmartBolts products listed in this catalog have an indicating Design Tension of 70% of fastener Modified Proof Strength.

PROOF STRENGTH

The tensile strength of a bolt beyond which permanent elongation of the bolt may occur. SmartBolts are designed to operate in tensile loads from zero up to proof strength. This is called the elastic region of the bolt.

MODIFIED PROOF STRENGTH

The proof strength of the bolt after conversion into a SmartBolt. In all but the shortest bolt lengths listed in this catalog, this strength is identical to the bolt proof strength before modification.

ULTIMATE STRENGTH

The maximum tensile load that a bolt can withstand before breaking.

GRIP LENGTH

The combined thickness of all components joined together between the bolt head and nut. Given in inches for Inch series SmartBolts and millimeters for Metric series SmartBolts.





II. Bolting Terms

Bolting terms for SmartBolts properties, as used in this catalog.

MINIMUM GRIP LENGTH

With respect to SmartBolts in this catalog, if a Minimum Grip Length is denoted, there is a limit to how far the nut can be run up the shank during installation before it begins to impact the accuracy of the SmartBolts indicator. Customers may contact the factory to learn what the specified minimum grip length is for a particular SmartBolts model, if it applies.

KLBF (KILOPOUNDS-FORCE)

A measure of tensile force or clamp force on a bolt as it is tightened. Design Tension, Proof Strength, and Ultimate Strength are expressed in klbf for Inch series SmartBolts.

KN (KILONEWTONS)

A measure of tensile force or clamp force on a bolt as it is tightened. Design Tension, Proof Strength, and Ultimate Strength are expressed in kN for Metric series SmartBolts.

NUT FACTOR

A constant that attempts to model all of the many variables (such as friction) that affect the torque-tension relationship. Torque charts depend on an assumption of the nut factor, but it is very difficult to predict and measure. SmartBolts eliminate the nut factor from the bolting equation, measuring and displaying Tension directly.

PRELOAD

The tensile force developed during installation (tightening) of a bolt. This load can be directly measured and displayed by the SmartBolts indicator.

STRESS

Force per unit area. For bolts, it is often expressed in PSI (pounds per square inch). The metric equivalent measure is mPa (megapascals).

STRESS AREA

The effective cross sectional area of the threaded region in a bolt.

STRAIN

With respect to bolts under tensile force, Strain is the measure of elongation of the bolt as it is stretched.

TORQUE

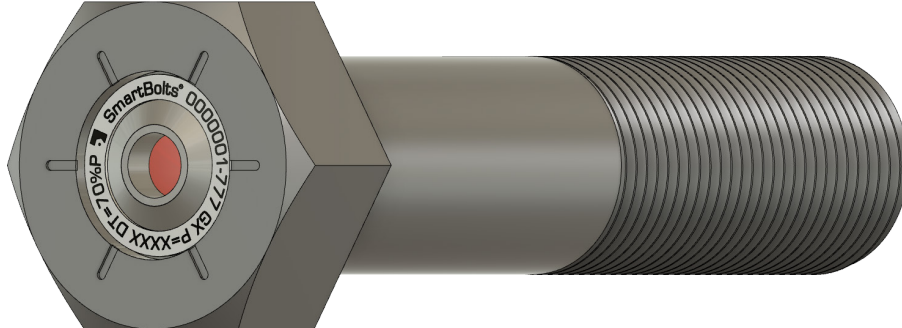
A twisting or rotational force given in units of pound-feet (lb-ft) or Newton-meters (Nm). It is a measure of how much force is required to turn the head or nut of a bolt. Torque is related to bolt tension by the nut factor, which is difficult to predict. SmartBolts allow proper bolted joint installation without concern for torque or nut factor, eliminating the requirement to use a torque wrench.



III. How to Order

Find Your SmartBolt and Request a Quote

Use our interactive forms at [Find Your SmartBolt](#) to request a quote.



Pre-Engineered SmartBolts are hex head cap screws in a large selection of inch and metric sizes, and are appropriate for a wide variety of applications.

Step 1 of 4: Bolt Information

Bolt Head Type

☒ Hex Head Cap Screw ☐ Hex Head Flange Bolt ☐ Heavy Hex Cap Screw

☐ Other - Please Specify

Dimensions

Nominal Diameter - Thread Pitch X Length

Grade

☐ Grade 5/Class 8.8 ☐ Grade 8/Class 10.9 ☐ Undecided

☐ Other - Please Specify

Finish

☐ Plain ☐ Clear Zinc ☐ Yellow Zinc ☐ Undecided

The custom form allows you full latitude to specify any type of available fastener, finish, or design tension and choose custom options.

Need assistance?

Contact us and we'll help get you started.



+1 (240) 631-7246

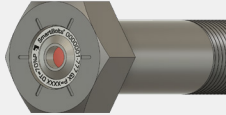


sales@smartbolts.com

Overview

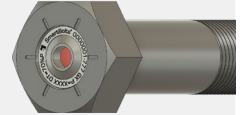
Hex

Minimum Diameter 7/16" (M10)
Maximum Diameter 2.5" (M64)
Product Category Options Pre-Engineered, Custom



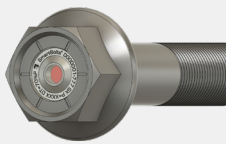
Heavy Hex

Minimum Diameter 1/2" (M12)
Maximum Diameter 2.5" (M64)
Product Category Options Custom



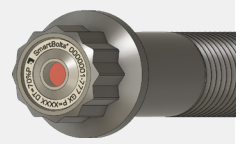
Hex Flange

Minimum Diameter 1/2" (M12)
Maximum Diameter 2.5" (M64)
Product Category Options Custom



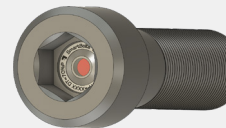
12-point Flange

Minimum Diameter 5/8" (M16)
Maximum Diameter 2.5" (M64)
Product Category Options Custom



Socket

Minimum Diameter 1" (M24)
Maximum Diameter 2.5" (M64)
Product Category Options Custom



Special Custom

Request a special custom product configuration from our full range of options.



Find Your SmartBolts

SmartBolts are available in a wide range of fastener types and sizes. Available options start with minimum diameter of 7/16" (M10) and a maximum diameter of 2.5" (M64). You can review the [SmartBolts Tech Specs](#) for more detailed product information.

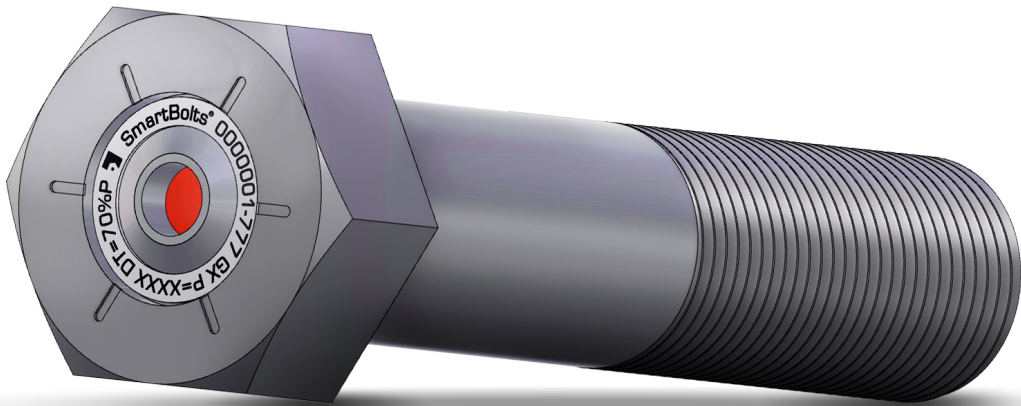
Pre-Engineered products are appropriate for a wide variety of applications and often available directly from inventory. Available options are listed in the SmartBolts Product Catalog.

Custom products are specific product configurations from our full range of options. You may specify your requirements for Custom SmartBolts by using the [Product Request Form](#).





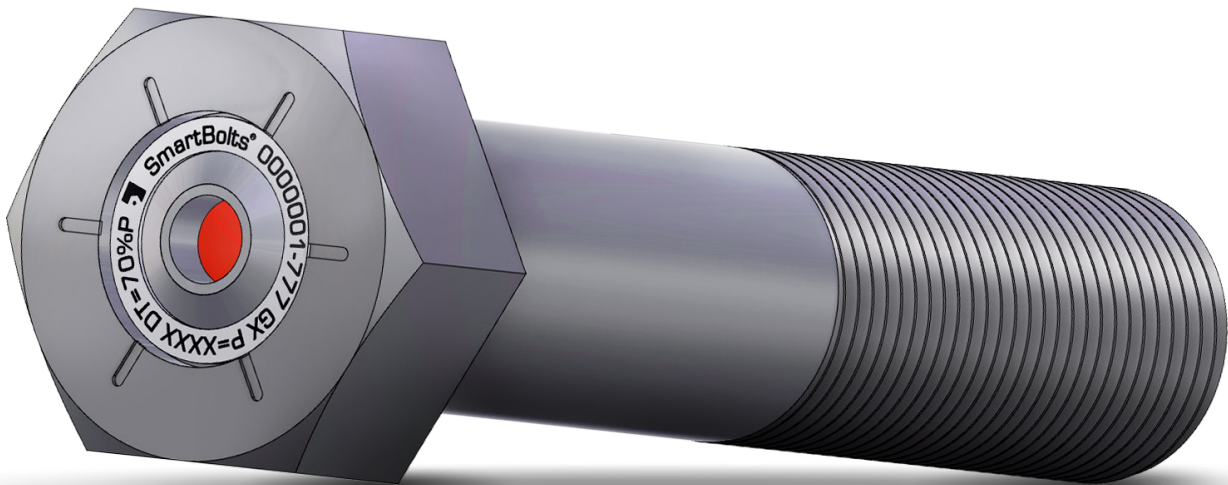
Hex



Minimum Diameter	7/16" M10
Maximum Diameter	2.5" M64
Minimum Length	1.25" / 30mm
Maximum Length	24" / 600mm
Product Category Options	Pre-Engineered, Custom
Design Tension Set Point Range	30% to 90% of Fastener Proof Load
Accuracy	+/- 10%
Operating Temperature Range	- 4°F to 168°F [- 20°C to 75°C]



Heavy Hex



Minimum Diameter	1/2" M12
Maximum Diameter	2.5" M64
Minimum Length	1.25" / 30mm
Maximum Length	24" / 600mm
Product Category Options	Pre-Engineered, Custom
Design Tension Set Point Range	30% to 90% of Fastener Proof Load
Accuracy	+/- 10%
Operating Temperature Range	- 4°F to 168°F [- 20°C to 75°C]



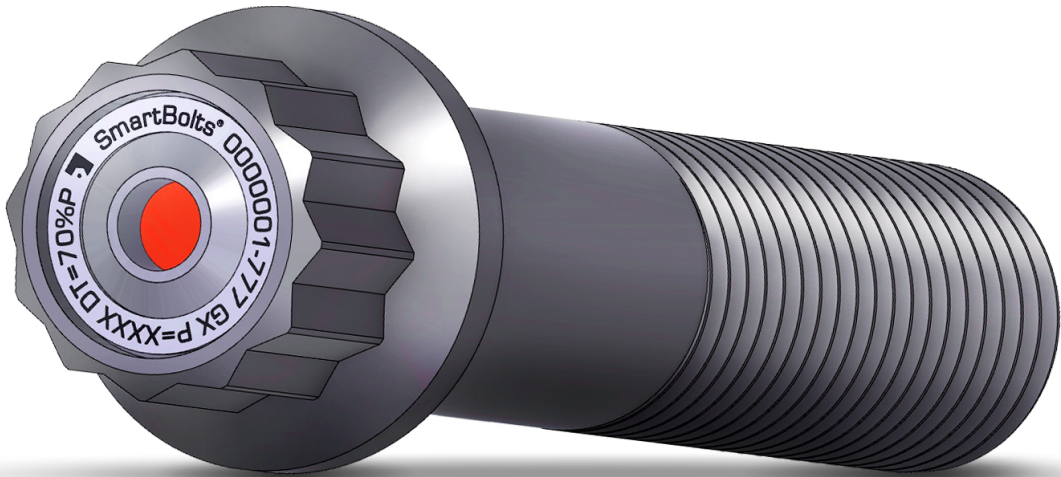
Hex Flange



Minimum Diameter	1/2" M12
Maximum Diameter	2.5" M64
Minimum Length	1.25" / 30mm
Maximum Length	24" / 600mm
Product Category Options	Pre-Engineered, Custom
Design Tension Set Point Range	30% to 90% of Fastener Proof Load
Accuracy	+/- 10%
Operating Temperature Range	- 4°F to 168°F [- 20°C to 75°C]



12-point Flange



Minimum Diameter	5/8" M16
Maximum Diameter	2.5" M64
Minimum Length	1.25" / 30mm
Maximum Length	24" / 600mm
Product Category Options	Pre-Engineered, Custom
Design Tension Set Point Range	30% to 90% of Fastener Proof Load
Accuracy	+/- 10%
Operating Temperature Range	- 4°F to 168°F [- 20°C to 75°C]



Socket



Minimum Diameter	1"
Maximum Diameter	2.5" M64
Minimum Length	1.25" / 30mm
Maximum Length	24" / 600mm
Product Category Options	Pre-Engineered, Custom
Design Tension Set Point Range	30% to 90% of Fastener Proof Load
Accuracy	+/- 10%
Operating Temperature Range	- 4°F to 168°F [- 20°C to 75°C]

After Market Kits by Equipment/Application

SmartBolts are available as complete aftermarket kits (single part number) to suit a range of common OEM equipment applications, including Hydraulic Excavators, Apron Feeders, Vibration Feeders and a range of Mobile-Plant Undercarriage. Custom kits can also be designed based on the equipment/application.



SmartBolts After Market Kit



SmartBolts on Hydraulic Excavators



Slew Bearing



Track Frame



Final Drive



Drive Sprocket

Supported Excavators

Our team is constantly expanding the list of supported excavator models.

OEM	CAT®	HITACHI	KOMATSU
Models	6030 6040 6050 6060 6090	EX1200 EX3600 EX1900 EX5500 EX2500 EX5600 EX2600 EX8000	PC2000 PC5500 PC8000



IV. Products

Pre-Engineered SmartBolts®

The Products section lists the Part Numbers and specifications for Pre-Engineered SmartBolts.

1/2" Grade 5

Type: Hex Head Cap Screw
Diameter: 1/2"
Thread Size: 13
Grade: 5
Finish: Clear Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
1.25 ††	7	10	14.1	C-10001	25
1.5 ††	7	10	14.1	C-10002	25
1.75 ††	7	10	14.1	C-10003	25
2 †	7.5	10.7	15.2	C-10004	25
2.25 †	7.5	10.7	15.2	C-10005	25
2.5 †	8.2	11.9	16.9	C-10006	25
3	8.2	11.9	16.9	C-10007	25
3.5	8.2	11.9	16.9	C-10008	25
4	8.2	11.9	16.9	C-10009	25
4.5	8.2	11.9	16.9	C-10010	25
5	8.2	11.9	16.9	C-10011	25
5.5	8.2	11.9	16.9	C-10012	25
6	8.2	11.9	16.9	C-10013	25

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

CAN'T FIND YOUR SMARTBOLT?

If the SmartBolt you need is not listed in this catalog, use our [Find Your SmartBolt form](#) to submit your requirements.

1/2" Grade 8

Type: Hex Head Cap Screw
Diameter: 1/2"
Thread Size: 13
Grade: 8
Finish: Yellow Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
1.25 ††	9.8	14.1	17.7	C-10014	25
1.5 ††	9.8	14.1	17.7	C-10015	25
1.75 ††	9.8	14.1	17.7	C-10016	25
2 †	10.5	15.2	19	C-10017	25
2.25 †	10.5	15.2	19	C-10018	25
2.5 †	12	16.9	21.1	C-10019	25
3 †	12	16.9	21.1	C-10020	25
3.5	12	16.9	21.1	C-10021	25
4	12	16.9	21.1	C-10022	25
4.5	12	16.9	21.1	C-10023	25
5	12	16.9	21.1	C-10024	25
5.5	12	16.9	21.1	C-10025	25
6	12	16.9	21.1	C-10026	25

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

CAN'T FIND YOUR SMARTBOLT?

If the SmartBolt you need is not listed in this catalog, use our [Find Your SmartBolt form](#) to submit your requirements.

5/8" Grade 5

Type: Hex Head Cap Screw
Diameter: 5/8"
Thread Size: 11
Grade: 5
Finish: Clear Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
1.75 ††	12	17.1	24.2	C-10028	25
2 †	12	17.1	24.2	C-10029	25
2.25 †	12.5	17.9	25.3	C-10030	25
2.5 †	12.5	17.9	25.3	C-10031	25
3 †	13.5	19.1	27	C-10032	25
3.5	13.5	19.1	27	C-10033	25
4	13.5	19.1	27	C-10034	25
4.5	13.5	19.1	27	C-10035	25
5	13.5	19.1	27	C-10036	25
5.5	13.5	19.1	27	C-10037	25
6	13.5	19.1	27	C-10038	25

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

CAN'T FIND YOUR SMARTBOLT?

If the SmartBolt you need is not listed in this catalog, use our [Find Your SmartBolt form](#) to submit your requirements.

5/8" Grade 8

Type: Hex Head Cap Screw
Diameter: 5/8"
Thread Size: 11
Grade: 8
Finish: Yellow Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
1.5 ††	17	24.2	30.3	C-10039	25
1.75 ††	17	24.2	30.3	C-10040	25
2 †	17	24.2	30.3	C-10041	25
2.25 †	17.5	25.3	31.6	C-10042	25
2.5 †	17.5	25.3	31.6	C-10043	25
3 †	19	27	33.7	C-10044	25
3.5	19	27	33.7	C-10045	25
4	19	27	33.7	C-10046	25
4.5	19	27	33.7	C-10047	25
5	19	27	33.7	C-10048	25
5.5	19	27	33.7	C-10049	25
6	19	27	33.7	C-10050	25

NOTE:

† Fully threaded fastener † Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

CAN'T FIND YOUR SMARTBOLT?

If the SmartBolt you need is not listed in this catalog, use our [Find Your SmartBolt form](#) to submit your requirements.

3/4" Grade 5

Type: Hex Head Cap Screw
Diameter: 3/4"
Thread Size: 10
Grade: 5
Finish: Clear Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
2 ‡	18.5	26.4	37.3	C-10051	10
2.25 ‡	18.5	26.4	37.3	C-10052	10
2.5 ‡	18.5	26.4	37.3	C-10053	10
3 ‡	20	28.3	40	C-10054	10
3.5	20	28.3	40	C-10055	10
4	20	28.3	40	C-10056	10
4.5	20	28.3	40	C-10057	10
5	20	28.3	40	C-10058	10
5.5	20	28.3	40	C-10059	10
6	20	28.3	40	C-10060	10
7	20	28.3	40	C-10061	10
8	20	28.3	40	C-10062	10
9	20	28.3	40	C-10063	10
10	20	28.3	40	C-10064	10

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

CAN'T FIND YOUR SMARTBOLT?

If the SmartBolt you need is not listed in this catalog, use our [Find Your SmartBolt form](#) to submit your requirements.

3/4" Grade 8

Type: Hex Head Cap Screw
Diameter: 3/4"
Thread Size: 10
Grade: 8
Finish: Yellow Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
2 ‡	26	37.3	46.6	C-10065	10
2.25 ‡	26	37.3	46.6	C-10066	10
2.5 ‡	26	37.3	46.6	C-10067	10
3 ‡	28	40	50.1	C-10068	10
3.5	28	40	50.1	C-10069	10
4	28	40	50.1	C-10070	10
4.5	28	40	50.1	C-10071	10
5	28	40	50.1	C-10072	10
5.5	28	40	50.1	C-10073	10
6	28	40	50.1	C-10074	10
7	28	40	50.1	C-10075	10
8	28	40	50.1	C-10076	10
9	28	40	50.1	C-10077	10
10	28	40	50.1	C-10078	10

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

CAN'T FIND YOUR SMARTBOLT?

If the SmartBolt you need is not listed in this catalog, use our [Find Your SmartBolt form](#) to submit your requirements.



IV. Products

Pre-Engineered SmartBolts®

1" Grade 5

Type: Hex Head Cap Screw
Diameter: 1"
Thread Size: 8
Grade: 5
Finish: Plain
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
3 ‡	34.5	49.4	69.8	C-10079	10
3.5 ‡	35	50.2	70.9	C-10080	10
4 ‡	36	51.4	72.6	C-10081	10
4.5	36	51.4	72.6	C-10082	10
5	36	51.4	72.6	C-10083	10
5.5	36	51.4	72.6	C-10084	10
6	36	51.4	72.6	C-10085	10
7	36	51.4	72.6	C-10086	10
8	36	51.4	72.6	C-10087	10
9	36	51.4	72.6	C-10088	10
10	36	51.4	72.6	C-10089	10
11	36	51.4	72.6	C-10090	10
12	36	51.4	72.6	C-10091	10

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

CAN'T FIND YOUR SMARTBOLT?

If the SmartBolt you need is not listed in this catalog, use our [Find Your SmartBolt form](#) to submit your requirements.

1" Grade 8

Type: Hex Head Cap Screw
Diameter: 1"
Thread Size: 8
Grade: 8
Finish: Plain
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
3 ‡	49	69.8	87.3	C-10092	10
3.5 ‡	49.5	70.9	88.6	C-10093	10
4 ‡	51	72.6	90.7	C-10094	10
4.5	51	72.6	90.7	C-10095	10
5	51	72.6	90.7	C-10096	10
5.5	51	72.6	90.7	C-10097	10
6	51	72.6	90.7	C-10098	10
7	51	72.6	90.7	C-10099	10
8	51	72.6	90.7	C-10100	10
9	51	72.6	90.7	C-10101	10
10	51	72.6	90.7	C-10102	10
11	51	72.6	90.7	C-10103	10
12	51	72.6	90.7	C-10104	10

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

CAN'T FIND YOUR SMARTBOLT?

If the SmartBolt you need is not listed in this catalog, use our [Find Your SmartBolt form](#) to submit your requirements.



M10 Class 8.8

Type: Hex Head Cap Screw
Diameter: M10
Thread Size: 1.5
Class: 8.8
Finish: Clear Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
30 †‡	17	24	34	C-10105	25
35 ‡	17	24	34	C-10106	25
40 ‡	17	24	34	C-10107	25
45 ‡	20	28	39	C-10108	25
50 ‡	20	28	39	C-10109	25
55	23	33	46	C-10110	25
60	23	33	46	C-10111	25
70	23	33	46	C-10112	25
80	23	33	46	C-10113	25
90	23	33	46	C-10114	25
100	23	33	46	C-10115	25

NOTE:

† Fully threaded fastener

‡ Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

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M10 Class 10.9

Type: Hex Head Cap Screw
Diameter: M10
Thread Size: 1.5
Class: 10.9
Finish: Yellow Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
30 ††	25	35	44	C-10116	25
35 ††	25	35	44	C-10117	25
40 †	25	35	44	C-10118	25
45 †	28	40	50	C-10119	25
50 †	28	40	50	C-10121	25
55	28	40	50	C-10122	25
60	34	48	60	C-10123	25
70	34	48	60	C-10124	25
80	34	48	60	C-10125	25
90	34	48	60	C-10126	25
100	34	48	60	C-10127	25

NOTE:

† Fully threaded fastener † Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

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IV. Products

Pre-Engineered SmartBolts®

M12 Class 8.8

Type: Hex Head Cap Screw
Diameter: M12
Thread Size: 1.75
Class: 8.8
Finish: Clear Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
30 ††	28	40	55	C-10127	25
35 ††	28	40	55	C-10128	25
40 ††	28	40	55	C-10129	25
45 ††	28	40	55	C-10130	25
50 †	30	43	60	C-10131	25
55	34	48	67	C-10132	25
60	34	48	67	C-10133	25
70	34	48	67	C-10134	25
80	34	48	67	C-10135	25
90	34	48	67	C-10136	25
100	34	48	67	C-10137	25
110	34	48	67	C-10138	25
120	34	48	67	C-10139	25
140	34	48	67	C-10140	25
160	34	48	67	C-10141	25

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

CAN'T FIND YOUR SMARTBOLT?

If the SmartBolt you need is not listed in this catalog, use our [Find Your SmartBolt form](#) to submit your requirements.

M12 Class 10.9

Type: Hex Head Cap Screw
Diameter: M12
Thread Size: 1.75
Class: 10.9
Finish: Yellow Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
30 ††	40	57	72	C-10142	25
35 ††	40	57	72	C-10143	25
40 ††	40	57	72	C-10144	25
45 †	43	62	78	C-10145	25
50 †	43	62	78	C-10146	25
55	48	69	87	C-10147	25
60	48	69	87	C-10148	25
70	48	69	87	C-10149	25
80	48	69	87	C-10150	25
90	48	69	87	C-10151	25
100	48	69	87	C-10152	25
110	48	69	87	C-10153	25
120	48	69	87	C-10154	25
140	48	69	87	C-10155	25
160	48	69	87	C-10156	25

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

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If the SmartBolt you need is not listed in this catalog, use our [Find Your SmartBolt form](#) to submit your requirements.

M16 Class 8.8

Type: Hex Head Cap Screw
Diameter: M16
Thread Size: 2.0
Class: 8.8
Finish: Clear Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
40 †‡	58	82	113	C-10157	25
45 †‡	58	82	113	C-10158	25
50 †‡	58	82	113	C-10159	25
55 †‡	58	82	113	C-10160	25
60 †‡	58	82	113	C-10161	25
70	64	90	125	C-10162	25
80	64	90	125	C-10163	25
90	64	90	125	C-10164	25
100	64	90	125	C-10165	25
110	64	90	125	C-10166	25
120	64	90	125	C-10167	25
140	64	90	125	C-10168	25
160	64	90	125	C-10169	25

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

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IV. Products

Pre-Engineered SmartBolts®

M16 Class 10.9

Type: Hex Head Cap Screw
Diameter: M16
Thread Size: 2.0
Class: 10.9
Finish: Yellow Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
40 ††	82	117	147	C-10170	25
45 ††	82	117	147	C-10171	25
50 ††	82	117	147	C-10172	25
55 †	82	117	147	C-10173	25
60	90	129	162	C-10174	25
70	90	129	162	C-10175	25
80	90	129	162	C-10176	25
90	90	129	162	C-10177	25
100	90	129	162	C-10178	25
110	90	129	162	C-10179	25
120	90	129	162	C-10180	25
140	90	129	162	C-10181	25
160	90	129	162	C-10182	25

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

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If the SmartBolt you need is not listed in this catalog, use our [Find Your SmartBolt form](#) to submit your requirements.

M20 Class 8.8

Type: Hex Head Cap Screw
Diameter: M20
Thread Size: 2.5
Class: 8.8
Finish: Clear Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
50 ††	96	137	183	C-10183	10
55 ††	96	137	183	C-10184	10
60 ††	96	137	183	C-10185	10
70 ††	96	137	183	C-10186	10
80 ††	96	137	183	C-10187	10
90	102	146	195	C-10188	10
100	102	146	195	C-10189	10
110	102	146	195	C-10190	10
120	102	146	195	C-10191	10
140	102	146	195	C-10192	10
160	102	146	195	C-10193	10
180	102	146	195	C-10194	10
200	102	146	195	C-10195	10
220	102	146	195	C-10196	10
240	102	146	195	C-10197	10
260	102	146	195	C-10198	10

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

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M20 Class 10.9

Type: Hex Head Cap Screw
Diameter: M20
Thread Size: 2.5
Class: 10.9
Finish: Yellow Zinc
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
50 ††	134	190	239	C-10199	10
55 ††	134	190	239	C-10200	10
60 †	134	190	239	C-10201	10
70 †	134	190	239	C-10202	10
80 ††	134	190	239	C-10203	10
90	142	203	254	C-10204	10
100	142	203	254	C-10205	10
110	142	203	254	C-10206	10
120	142	203	254	C-10207	10
140	142	203	254	C-10208	10
160	142	203	254	C-10209	10
180	142	203	254	C-10210	10
200	142	203	254	C-10211	10
220	142	203	254	C-10212	10
240	142	203	254	C-10213	10

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

All above listed SmartBolts products have an indicating design tension of 70% of fastener modified proof strength.

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M24 Class 8.8

Type: Hex Head Cap Screw
Diameter: M24
Thread Size: 3.0
Class: 8.8
Finish: Plain
Design Tension: 70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
80 ††	142	202	280	C-10214	10
90 ††	142	202	280	C-10215	10
100	148	211	292	C-10216	10
110	148	211	292	C-10217	10
120	148	211	292	C-10218	10
140	148	211	292	C-10219	10
160	148	211	292	C-10220	10
180	148	211	292	C-10221	10
200	148	211	292	C-10222	10
220	148	211	292	C-10223	10
240	148	211	292	C-10224	10
260	148	211	292	C-10225	10
280	148	211	292	C-10226	10
300	148	211	292	C-10227	10

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

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Pre-Engineered SmartBolts®

M24 Class 10.9

Type:	Hex Head Cap Screw
Diameter:	M24
Thread Size:	3.0
Class:	10.9
Finish:	Plain
Design Tension:	70%P



Length (inches)	Design Tension (klbf)	Modified Proof Strength (klbf)	Ultimate Strength (klbf)	Case Part Number	Case Quantity
80 ††	196	280	351	C-10228	10
90 ††	204	292	366	C-10229	10
100	204	292	366	C-10230	10
110	204	292	366	C-10231	10
120	204	292	366	C-10232	10
140	204	292	366	C-10233	10
160	204	292	366	C-10234	10
180	204	292	366	C-10235	10
200	204	292	366	C-10236	10
220	204	292	366	C-10237	10
240	204	292	366	C-10238	10
260	204	292	366	C-10239	10
280	204	292	366	C-10240	10
300	204	292	366	C-10241	10

NOTE:

† Fully threaded fastener ‡ Minimum grip length requirement

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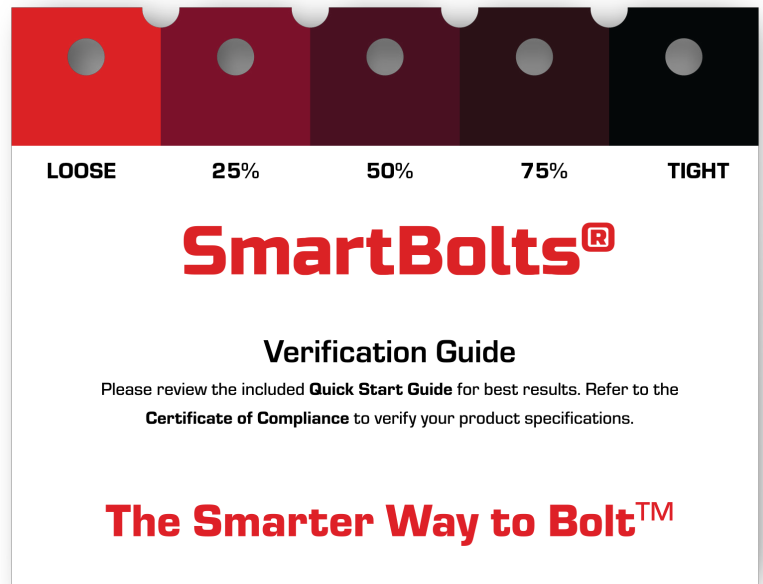
IV. Products

Pre-Engineered SmartBolts®

Verification Guide

The Verification Guide presents the continuous spectrum of the SmartBolts indicator range as five distinct regions of indicator color.

Laminated for rugged use, the guide fits into a pocket and can be quickly deployed to check bolt tension. It is the perfect training and validation tool for both new and experienced users.



Demonstration Unit

The Demonstration Unit is a lightweight, hand-held device designed to show how SmartBolts work without special fixtures or wrenches. Watch the indicator change across the full spectrum from red to black with a simple twist of the handle.

These units are perfect for meetings or training to instantly convey the SmartBolts operation to co-workers whether you are in the conference room, the factory floor or in the field.

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V. Certification

Quality Certification

SmartBolts are 100% inspected and tested to ensure that each one that we produce complies with our demanding quality control standards. Each product is tested under tension until the color of the indicator reaches a prescribed value. A Certificate of Compliance will be included with each shipped order to certify that SmartBolts have undergone and passed all essential tests, inspections and packaging requirements.

One Year Limited Warranty

SmartBolt products are warranted to the original end user for one year from the date of purchase. Within the period of this warranty, we will replace any defective product, on return of the part, prepaid to the factory. This warranty does not extend to damage resulting from abuse, misuse, over-tightening, exceeding specified temperature limits, accident (including shipping damage), or use in hostile environments including, but not limited to, acidic, petroleum, solvents or solvent vapors. In no event shall any liability of Industrial Indicators arising from this warranty exceed the purchase price of the SmartBolt products. Before using, the user shall determine the suitability of the product for their intended use, and the user assumes all risk and liability whatsoever of the product in connection therewith. Industrial Indicators makes no warranty of merchantability or fitness for a particular purpose. In no event shall Industrial Indicators be liable for incidental or consequential damages.

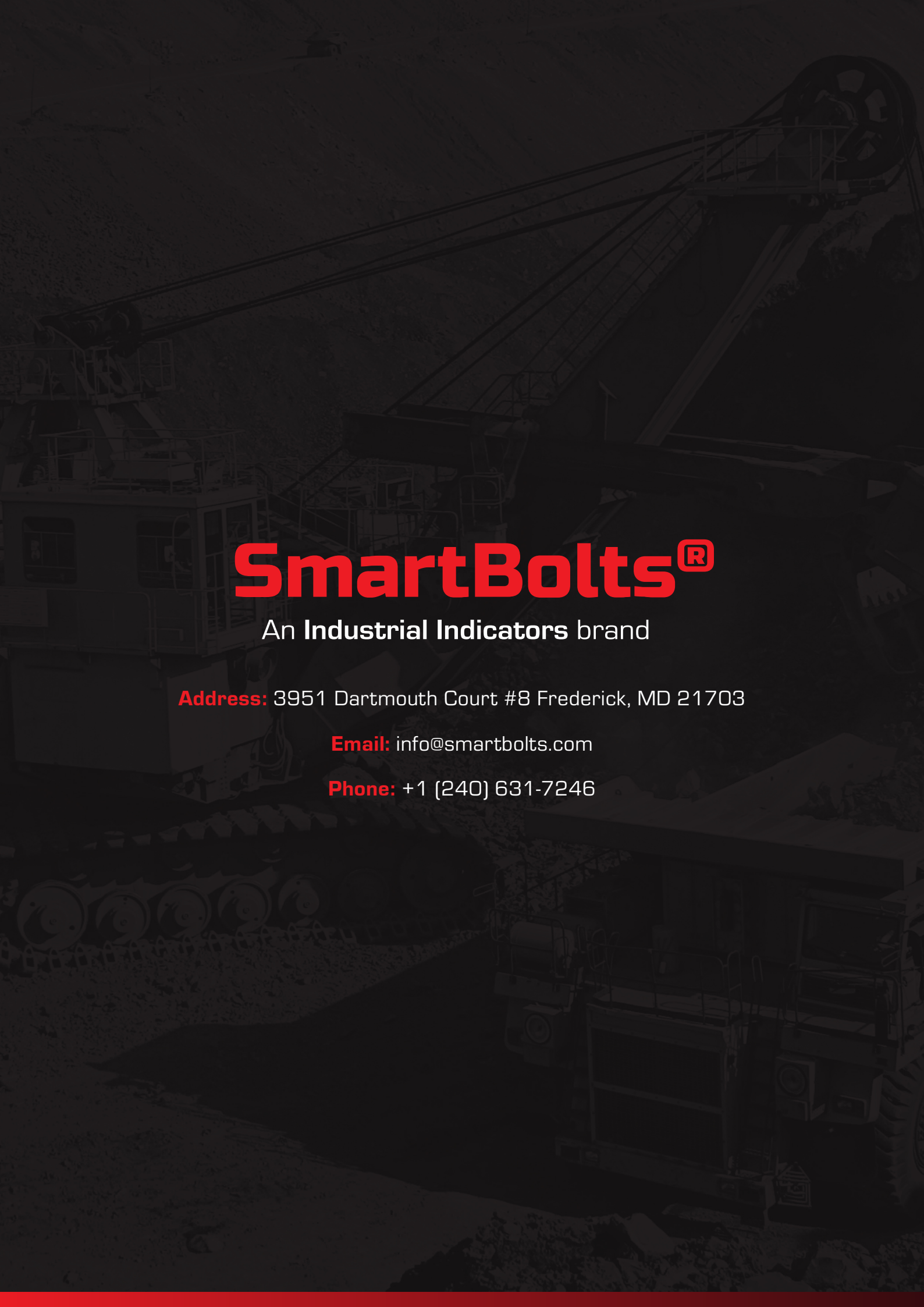
Fastener Quality Act Conformance

Products may not be identical to the original record of conformance to the Fastener Quality Act due to their alteration and conversion to direct tension-indicating SmartBolts. The raw bolts have been drilled and machined and tension-indicating components have been installed. In most cases, the conversion process will have negligible effect on bolt strength. The customer will be informed of any significant strength reduction due to the alteration.

Disclaimer

While we try to make sure that all data posted in this catalog is accurate at all times, we are not responsible for typographical and other errors that may appear. Data is subject to change without notice. Industrial Indicators assumes no responsibility or liability for any damages incurred directly or indirectly as a result of any data errors, omissions, or discrepancies.





SmartBolts®

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