BoltShield®

Protect Bolts & Nuts from Damage and Corrosion

- THREAD & NUT PROTECTION
- CORROSION PREVENTION
- IMPROVED MAINTENANCE
- COST-EFFECTIVE
- CUSTOMIZED SOLUTIONS

www.boltprotection.com

BoltShield®

Features

- **Caps made of metal designed to protect bolts and nuts from thread damage, dirt and corrosion**;
- Special internal thread, named **SCREW-ON SYSTEM**, that ensures a strong and secure fastening to the bolt (a minimum of 4 – 5 threads protrusion from the nut is needed to allow fastening).
- **Two types of caps available**: TYPE TD caps protect both the exposed threads and the nut, TYPE TR caps protect the exposed bolt threads only;
- Both types of BoltShield can be supplied for bolt **sizes** ranging **from Ø ½" to 6" / M12 to M100;**
- All caps are available for both **imperial and metric thread sizes;**
- **CUSTOMIZED SOLUTIONS are available to meet customers' needs;**
- **Grease /paste /CORROSION INHIBITORS can also be supplied;**
- **Rubber / Silicon /PTFE washers also available for EXTRA SEALING;**
- Materials available: **STAINLESS STEEL (304, 316L) / ALUMINIUM / CARBON STEEL / ZINC ELECTROPLATED CARBON STEEL;**
- **WIDE RANGE OF COATINGS AVAILABLE– CAPS WITH GREASE NIPPLE ALSO AVAILABLE;**
- Rated for **temperatures up 550°c (aluminium caps) and over (steel).**
- **NEW: WE CAN LASER ENGRAVE YOUR COMPANY LOGO ON THE CAPS!**

The Best Protection for your Bolts & Nuts

What are BoltShield® protection caps?

BoltShield® caps are screw-on metal **caps designed to protect bolts and nuts from thread damage**, and to considerably **help prevent corrosion** (together with a proper paste / corrosion inhibitor).

By using BoltShield® caps you will **extend the life of bolts and nuts** and make **maintenance and repair procedures easier and faster**. This will help to **reduce expensive plant downtimes**, thus saving money and time.

BoltShield® caps are used in **refineries** and oil rigs, **petrochemical plants**, **LNG plants**, power plants, offshore platforms, steel structures.

BoltShield® are commonly installed on **pipelines**, **heat exchangers**, **reactors** and equipment operating at **temperatures up to 550° C** and over, where common plastic caps would melt.

You can find BoltShield® caps to protect bolts and nuts on pipeline **flanges,** valves, traffic sign posts, bridges, **wind turbines** and several other applications where bolts and nuts need to be protected.

BoltShield® metal protection caps have a **special thread**, named Screw-On System, that ensures a strong and secure fastening.

BoltShield® are **designed to be installed manually**; no extra tools are required, and they can be easily installed and removed when needed.

We offer **two types of BoltShield® caps** with **different levels of protection**.

Both types of caps are available made of **ALUMINIUM**, **STAINLESS STEEL (304/316)**, **CARBON STEEL**, **ZINC ELECTROPLATED CARBON STEEL** for bolt sizes ranging from **½" to 6"**, M12 to M100.

COATINGS and CUSTOM-MADE CAPS ARE ALSO AVAILABLE.

Available Materials:

ALUMINIUM

Light but strong, aluminium is **the most widely used material** where **ASTM A193 B7** stud bolts and A194 2H hex nuts on pipelines, heat exchangers, vessels, columns and other process equipment in the oil & gas and petrochemical industries have to be protected. Aluminium bolt caps are also a good solution for the protection of ASTM A320 L7 bolts in low temperature service applications, as well as for foundation anchor bolts. Last but not least, aluminium bolt protection caps have a beautiful appearance, shiny and aesthetic.

ANODIZE COATING AVAILABLE

Available sizes: **up to 4" – M100 for TD type** **up to 6" for TR type**

STAINLESS STEEL

(AISI 304 / AISI 316) **Our top-line BoltShield caps**. Stainless steel protection caps are in high use in **offshore applications**, plants located near the coastline or **high corrosive environments**. Stainless steel caps are the right choice to **protect B8 and B8M stud bolts** and nuts. Can you think of a better protection for your stainless steel bolts than stainless steel protective caps?

Available sizes: **up to 2" – M52 for TD type** **up to 2"1/2 – M64 for TR type**

CARBON STEEL

Carbon steel caps are **the best solution for coated bolts and nuts**, as **they are also suitable for coatings** (zinc, epoxy, paint, cadmium, PTFE etc.).

Available sizes: **up to 4" – M100 for TD type** **up to 4" – M100 for TR type**

ZINC ELECTROPLATED CARBON STEEL

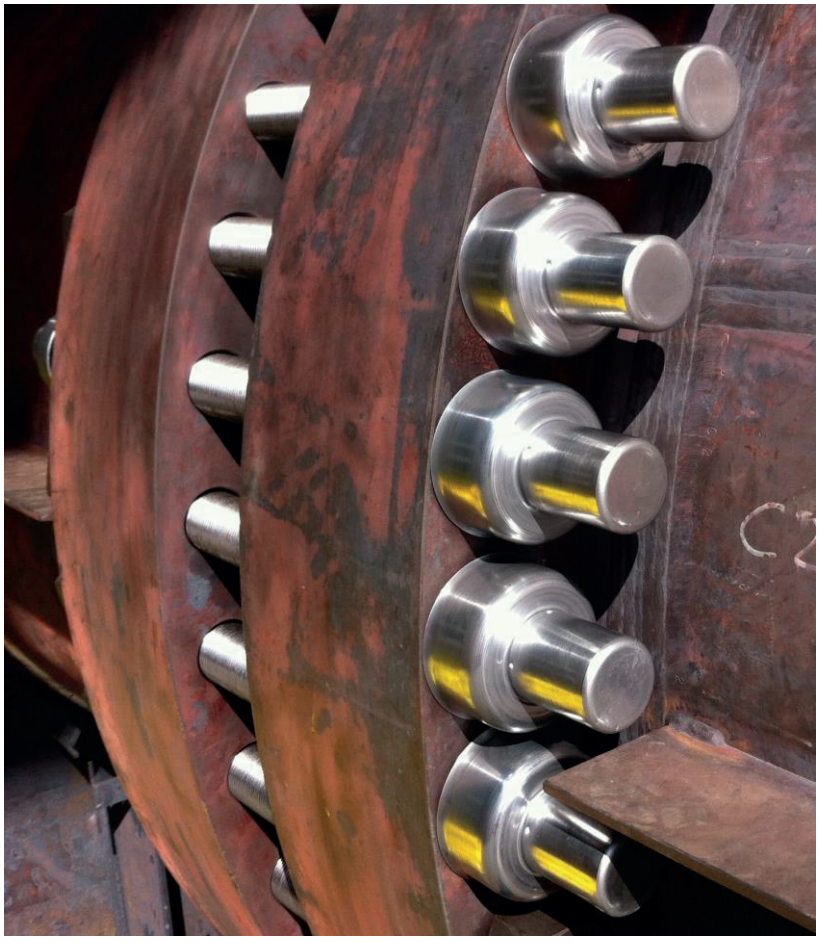
This is an **excellent coated solution** that we offer at the **same price of raw carbon steel caps.** Zinc is applied to the raw material (sheet metal carbon steel) through electrolysis, thus creating a layer that **protect the metal base against corrosion**. BoltShield made of zinc electroplated carbon steel are the right choice if you need to protect galvanized bolts and nuts, or when you want to **provide extra protection from corrosion thanks the properties of zinc.**

Available sizes: **up to 4" – M100 for TD type** **up to 4" – M100 for TR type**

Benefits provided by BoltShield®:

- ✓ **THREAD PROTECTION**
- ✓ **CORROSION PREVENTION**
- ✓ **EXTEND THE LIFE OF BOLTS AND NUTS**
- ✓ **EASIER AND FASTER MAINTENANCE**
- ✓ **LESS TIME SPENT ON REPAIR**
- ✓ **HELP TO REDUCE PLANT DOWNTIMES**
- ✓ **SAVINGS BY OPTING TO AVOID EXPENSIVE COATINGS**
- ✓ **NO NEED FOR TIME-CONSUMING AND MONEY-WASTING DESTRUCTIVE BOLT REMOVAL**

= SAVINGS



There are several reasons for using BoltShield® caps, the two most important being:

1. **THREAD PROTECTION**: BoltShield® caps protect bolts from accidental thread damage that may occur during handling, transportation and maintenance procedures.

2. **CORROSION PREVENTION**: Together with a proper paste / corrosion inhibitor, BoltShield® caps are proven to considerably help in preventing corrosion on bolts and nuts.

Mechanical protection and corrosion prevention translate into **easier and faster maintenance** as the bolt threads won't suffer any damage and will be protected from dirt and corrosion, which would lead to serious problems during maintenance and repair operations.

Think of the inconvenience and the **waste of time that a rusted bolt may cause** and multiply it by the number of unprotected bolts that you have in your assets: needless to remark how annoying that would be.

With BoltShield® caps, maintenance and repair will be much easier and faster, and this will help to considerably reduce expensive plant downtimes, thus saving money and time.

Why **BoltShield®** is **cost-effective**?

BoltShield® caps are **cost-effective** not only because they **help to reduce the time, thus the cost, of maintenance operations and plant downtimes**, but also because their use will prominently **extend the life of your bolts and nuts.**

BoltShield® caps are reusable and once tightly fixed onto bolts they will last for years.

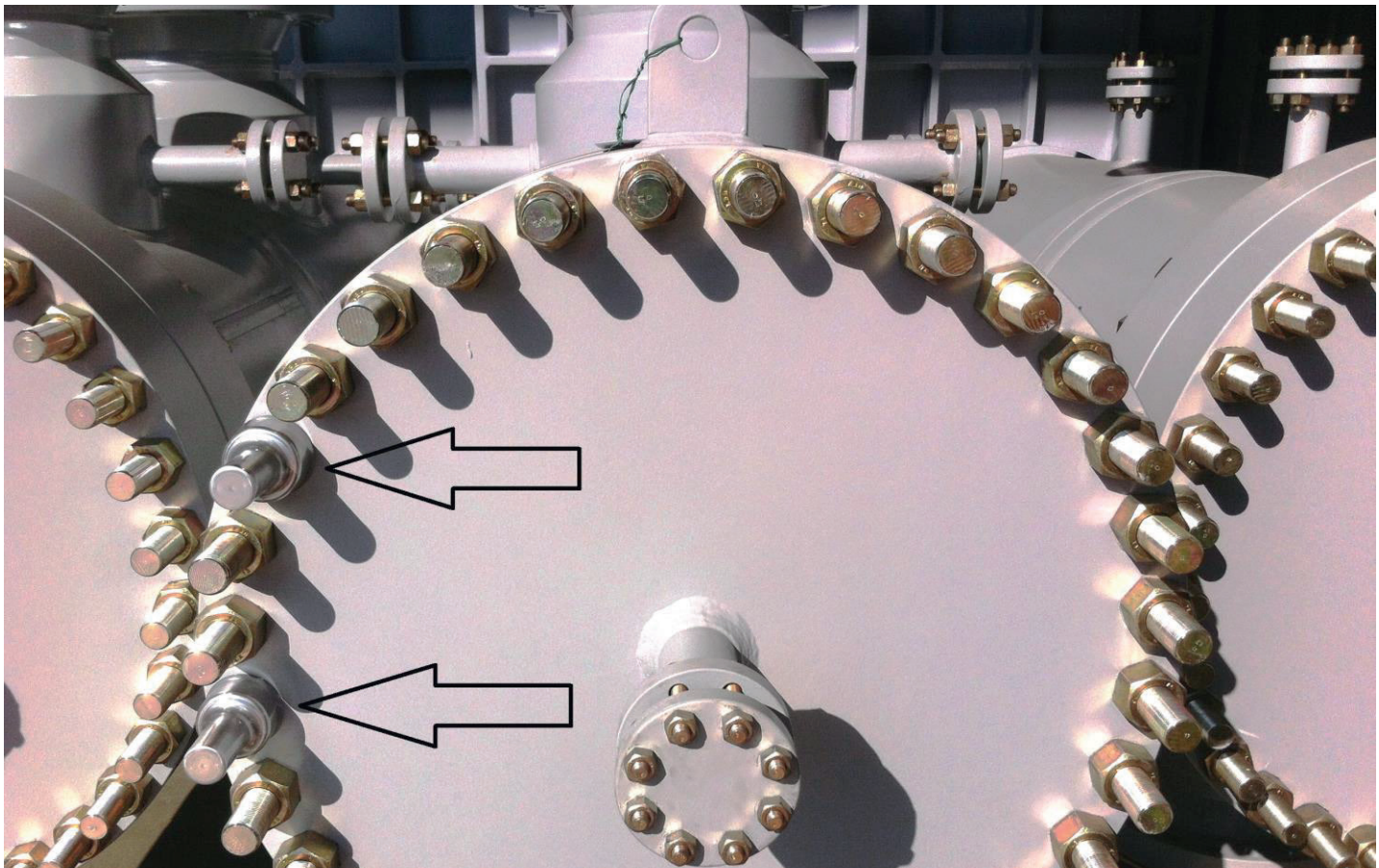
Indeed there are other ways to **prevent corrosion**, such as coatings or stainless steel.

However, **coatings are expensive and may not be enough to prevent corrosion**, as during transportation, handling and assembling **they may wear out**. Re-coating is expensive and time-wasting. This will result in unprotected bolts and nuts, which will soon be affected by corrosion.

Stainless steel is clearly a good choice to prevent corrosion, but it **is expensive**.

Last but not least: **coatings and stainless steel CANNOT prevent the bolt threads from accidental damage** that could compromise the integrity of your bolts.

BoltShield® protection caps provide thread protection and corrosion prevention at a cheaper price.



TYPE TD – Bolt & Nut Protection Caps

Available made of:

ALUMINIUM →up to 4" – M100
STAINLESS STEEL →up to 2" – M52
CARBON STEEL (also zinc electroplated) →up to 4" – M100

BoltShield® caps TYPE TD offer **the best protection**, as they cover both the exposed bolt threads (size HT of the chart) and the nut (size HD).

We offer our customers standard sizes (see the chart below), ranging from ½" to 4"**,** M12 to M100, according to the material required.

We also provide **custom-made sizes and bespoke solutions for any application**, to meet all customers' needs.

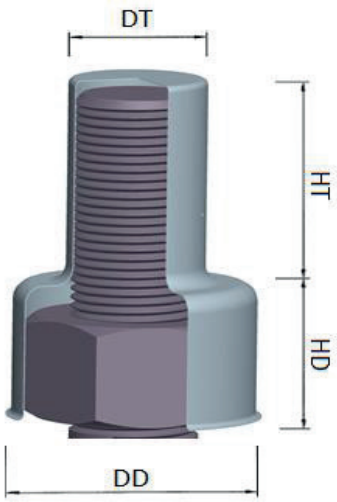
If the sizes indicated in the chart do not fit your requirement, don't worry: we can manufacture a tailor-made BoltShield cap for you!

BoltShield Type TD **are also available to fit bolts with two hex nuts, round nut**, with our without washer.

TYPE TD caps - standard sizes

Imperial					Metric				
Taglia	DT	DD	HD	HT	Taglia	DT	DD	HD	HT
-	-	-	-	-	M12	12	24	14	18
-	-	-	-		M14	14	29	16	20
-	-	-	-	-	M16	16	31	18	22
1/2"	12.7	27	15	20	M18	18	34	21	23
5/8"	16	34	19	22	M20	20	39	23	25
3/4"	19	39	22	23	M22	22	40	25	32
7/8"	22.3	44	26	33	M24	24	45	29	34
1"	25.5	48	29	37	M27	27	51	30	37
1"1/8	28.6	55	33	40	M30	30	55	33	40
1"1/4	31.8	60	36	44	M33	33	61	36	46
1"3/8	35	65	39	48	M36	36	65	39	48
1"1/2	38.2	70	42	53	M39	39	70	42	52
1"5/8	41.3	77	46	59	M42	42	77	46	59
1"3/4	44.5	83	49	64	M45	45	83	49	64
1"7/8	47.7	88	53	67	M48	48	88	53	67
2"	51	94	56	72	M52	52	94	56	72
2"1/4	57.2	105	62	80	M56	56	102	60	84
2"1/2	63.5	114	69	91	M64	64	113	69	91
2"3/4	70	125	75	99	M68	68	119	73	98
3"	76.3	136	81	107	M72	72	125	77	100
3"1/4	82.7	152	87	116	M76	76	131	81	105
3"1/2	89.2	160	94	126	M80	90	136	85	107
3"3/4	95.4	172	100	135	M90	90	159	95	126
4"	102	183	107	152	M100	100	183	105	144

Internal Dimensions (mm)



TYPE TR – Bolt Protection Caps

Available made of:

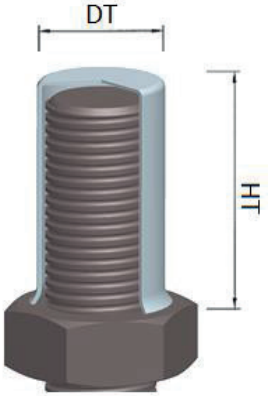
ALUMINIUM →up to 6" – M100
STAINLESS STEEL →up to 2"1/2 – M64
CARBON STEEL (also zinc electroplated) →up to 4" – M100

TYPE TR caps - standard sizes					
Imperial			Metric		
Taglia	DT	HT	Taglia	DT	HT
-	-	-	M12	12	18
-	-	-	M14	14	21
-	-	-	M16	16	24
1/2"	12.7	20	M18	18	27
5/8"	16	24	M20	20	30
3/4"	19	30	M22	22	33
7/8"	22.3	33	M24	24	36
1"	25.5	38	M27	27	38
1"1/8	28.6	42	M30	30	42
1"1/4	31.8	48	M33	33	48
1"3/8	35	53	M36	36	53
1"1/2	38.2	57	M39	39	57
1"5/8	41.3	62	M42	42	62
1"3/4	44.5	67	M45	45	67
1"7/8	47.7	72	M48	48	72
2"	51	77	M52	52	77
2"1/4	57.2	85	M56	56	85
2"1/2	63.5	94	M64	64	94
2"3/4	70	105	M68	68	105
3"	76.3	114	M72	72	105
3"1/4	82.7	123	M76	76	114
3"1/2	89.2	133	M80	80	114
3"3/4	95.4	138	M90	90	133
4"	102	151	M100	100	150
4"1/4	108	162	-	-	-
4"1/2	114.5	172	-	-	-
4"3/4	121	181	-	-	-
5"	127.2	190	-	-	-
5"1/4	133.5	199	-	-	-
5"1/2	140	207	-	-	-
5"3/4	146.2	222	-	-	-
6"	152.5	229	-	-	-
Internal Dimensions (mm)					

If you are interested in protecting the bolt threads only, BoltShield® caps TYPE TR offer the best thread protection.

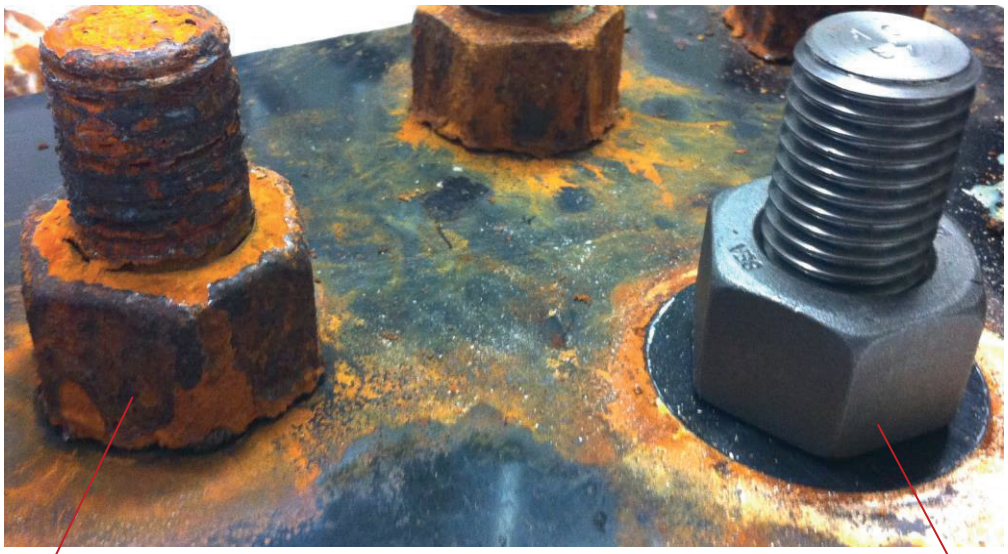
They are **designed to protect only the exposed bolt threads** (size HT of the chart below). BoltShield® caps TYPE TR do not cover the nut, which remains exposed.
We offer our customers standard size (see chart), ranging from ½" to 6"**,** M12 to M100**,** according to the material required.

We also provide custom-made sizes and bespoke solutions for any application in order to meet all customers' needs.



CORROSION PREVENTION

This picture was taken at the end of an ASTM B117 salt fog corrosion test (600 hours)



ASTM A193 B7 1" STUD BOLT & gr 2H NUT
EXPOSED TO SALT FOG FOR 600 HOURS

WITHOUT BoltShield® protection
COMPLETELY CORRODED

ASTM A193 B7 1" STUD BOLT & gr 2H NUT
EXPOSED TO SALT FOG FOR 600 HOURS

PROTECTED WITH BoltShield® cap
NO EVIDENCE OF CORROSION

Corrosion on bolts and nuts is a serious widespread issue, especially for applications located in aggressive environments (e.g. offshore, marine etc.).

Rusted bolts often need to be cut off and replaced, with a consequent loss of time and money.

BoltShield caps can considerably help to prevent corrosion on bolts and nuts. Together with a corrosion inhibitor or a proper paste, the use of BoltShield caps can reduce corrosion substantially, thus extending the life of your bolts and nuts.

For particularly aggressive environments where extra sealing is needed, we can provide silicon, rubber or PTFE washers.

BoltShield® caps were tested for corrosion prevention. The picture above refers to **ASTM B-117 salt fog test**. Such test was performed to determine to what extend the use of BoltShield metal caps can help to prevent corrosion on bolts and nuts. It provides a comparison, in terms of corrosion, between bolts and nuts protected by BoltShield caps and unprotected ones. Time of exposure to salt fog: 600 hours.

Several combinations of bolted joints protected with BoltShield caps (with and without rubber washers and paste) have been tested. After 600 hours of exposure of the specimens to salt fog, results document that **bolts and nuts protected with BoltShield caps show marginal corrosion only**, as it can be seen from the picture.

The official test report test is available upon request.

BoltShield® caps for WIND TURBINES

A new line of metal-made protection caps for specific application on foundation anchor bolts on wind turbines is now available. Choose amongst aluminium caps, carbon steel caps and a wide range of coatings. BoltShield® is just the right solution to protect bolts and nuts in your power plant (onshore / offshore) from corrosion and damage.

The Screw-On System

BoltShield® caps are designed to be installed manually. They have a **special thread**, named Screw-On System, **that ensures a strong and secure fastening**.

No extra tools are required, and caps can be easily installed and removed when needed.

How to install BoltShield® caps:

BoltShield® caps are "screw-on" type, not "snap-on". This means that installation and tightening are obtained by turning/ screwing/ fastening the cap onto the bolt manually, NOT by pushing or snapping the cap onto the bolt (this would only be counterproductive and would complicate the installation procedure). A minimum of 4 to 5 threads protrusion from the nut is needed to allow fastening.

In order to properly install the caps:
1 Take the BoltShield® cap and place it onto the bolt.
2 Do not push! Pushing is not necessary for the reasons explained above.
3 Now slowly start turning the cap clockwise.
4 When you feel that the screw-on system (the punchings you see on the cap) has properly matched the bolt thread (thus allowing screwing), you can go on turning the cap clockwise until it touches the flange.
5 Now tighten firmly with your hands.
Thanks to the Screw-on System, BoltShield® caps will remain in place and withstand high vibrations.

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BoltShield® is an initiative of

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