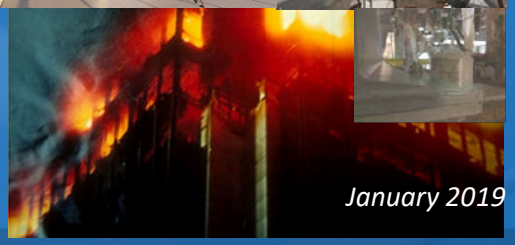
Bolted Connection Protection Primer

Productive All Weather Bolt Protection



Bolt Caps - Productive Protection

Construction Of Structures
Unavoidably Involves Connections

Riveting

Bolting

Welding

Bolts

- Ordinary bolts
- High strength friction grip bolts
- Anchor connections

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Fire protection of bolted connection

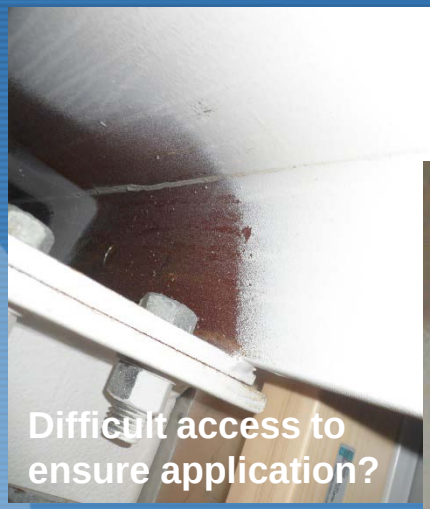
No standards or test specification and tradition specifies same protection as steel structure with manual touch up on site – weather dependant and variably quality

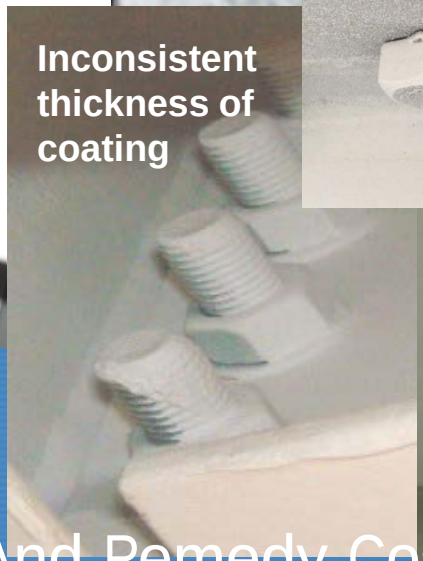
Bolt Cap offers Productive Quality Protection with **cost saving,** time saving, any weather application and consistent quality

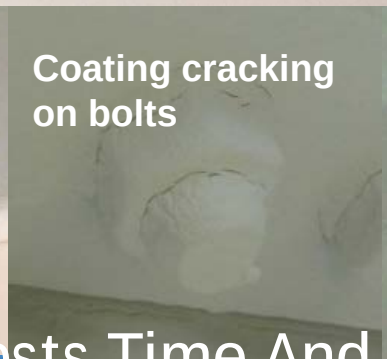
Bolt Caps - Productive Protection

Method of Fire Protection For Connections

Problems







Inspection And Remedy Costs Time And Money

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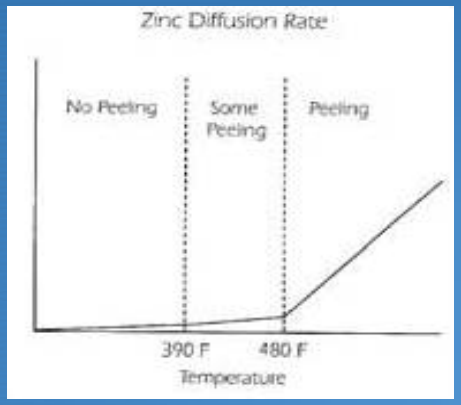
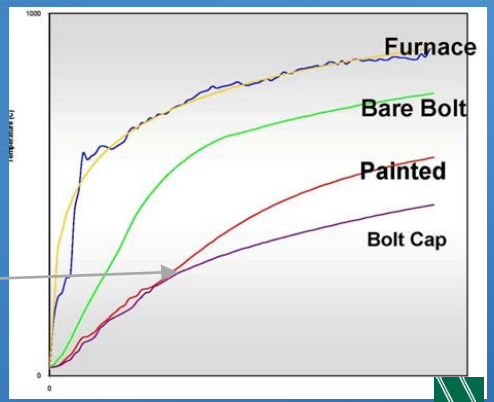
- Method of Fire Protection For Connections **Problems**
  - **Use Of Galvanised Bolts** - The process of galvanising bolts is called spun-galvanising which is hot dip galvanising with a post operative spinning process to remove the excess zinc.
  - Unfortunately zinc melts at 420°C, but more dangerously peels at around 200°C (the Kirkendall effect) as shown by the enclosed graph



  - This peel is confirmed indirectly by the graph below that compares a bare bolt to a painted bolt to a capped bolt. As can be seen the painted and capped bolt perform at a similar level until the Kirkendall peel temperature onset is reached and then they show divergence in performance.



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Method of Fire Protection For Bolted Connections - Choice

Intumescent coatings with on site touch up weather dependant and lots of preparation

Intumescent coatings with bolt caps applied in any weather and no preparation

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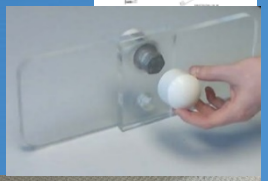
Eliminate the problems and inspection time of painting bolted connections - Use Bolt Caps

- **Quick And Easy** To Apply – up to 9 times faster

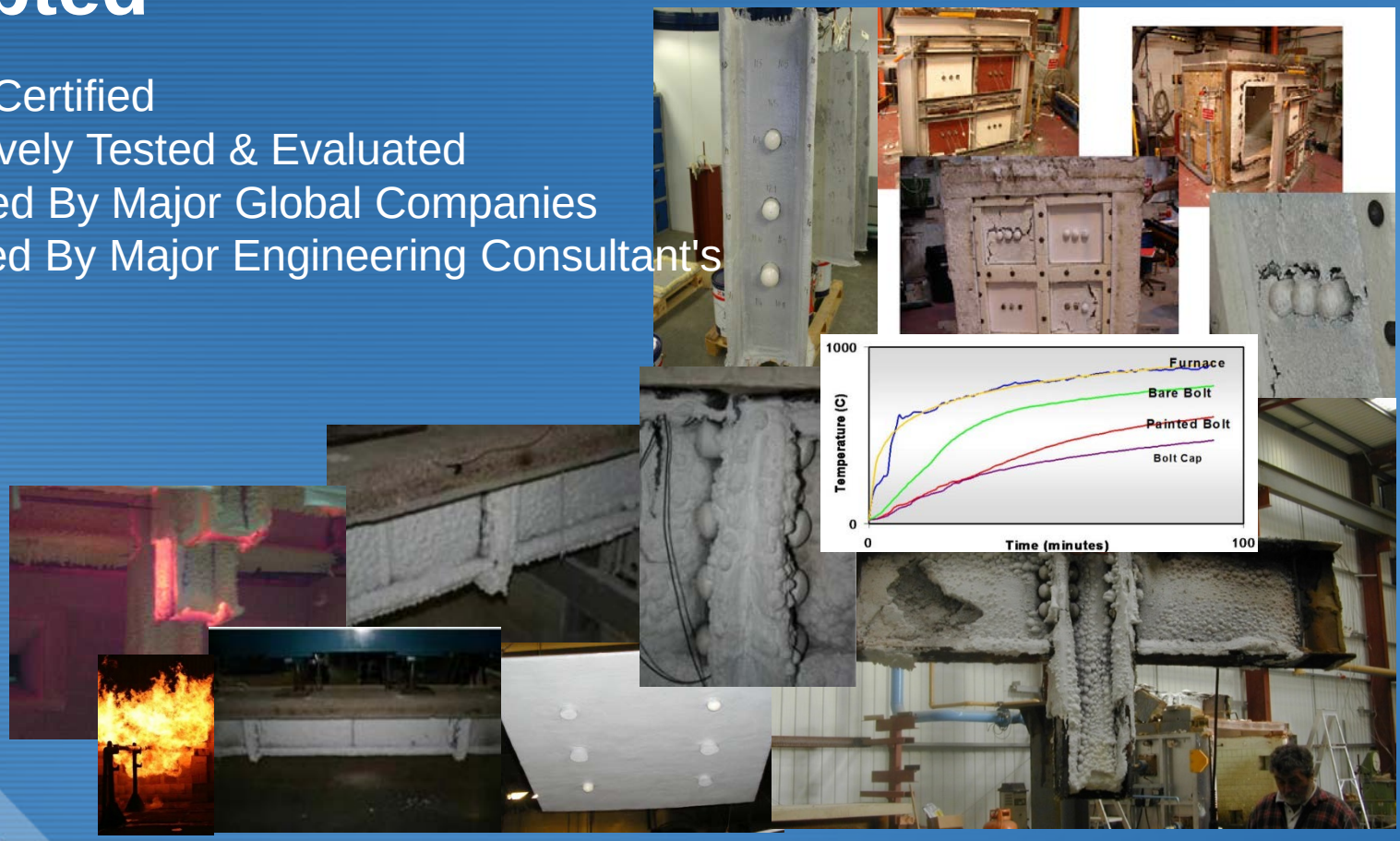
Built Environment	Oil & Gas Markets
BS-476 (2 hrs) ASTM E-119 / UL 263 (3 hrs)	UL 1709 (up to 4 hrs pool fire) ISO 22899 (2 hr jet fire)

- **Consistent Finish &** quality to all connections
- **Complements** Intumescent Coatings
- **All Weather Application**
- **Metric, Imperial & Custom Sizes &** Shapes Available
- **Tap on And Screw On** Fittings Available
- **Masking Inserts** Available
- **Health & Safety** – Less Working Time At Height



Bolt Caps - Productive Protection

- **Extensively Tested, Evaluated & Accepted**
  - Lloyds Certified
  - Extensively Tested & Evaluated
  - Accepted By Major Global Companies
  - Specified By Major Engineering Consultant's

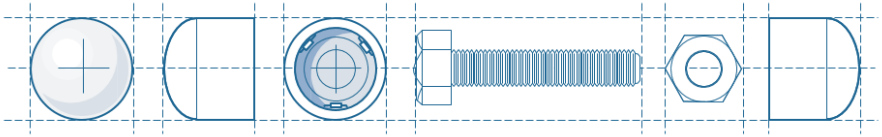


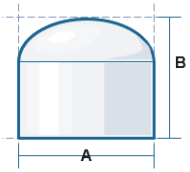
Bolt Caps - Productive Protection

- Standard **Metric & Imperial** Cap Size Available In Stock

- Custom Sizes And Shapes Made To Order

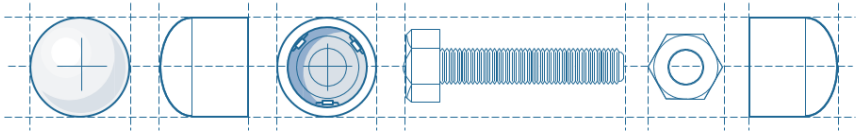
Metric Bolt Cap overall dimensions

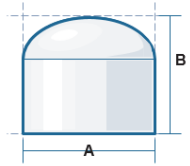




BOLT SIZE	DIMENSION A (mm)	DIMENSION B (mm)	WALL THICKNESS (mm)
M16	47.0	43.0	5
M20	53.0	45.0	5
M24	59.0	53.0	5
M30	70.0	63.0	5

Imperial Bolt Cap overall dimensions





BOLT SIZE	DIMENSION A (mm)	DIMENSION B (mm)	WALL THICKNESS (mm)
3/4"	50.0	47.0	5
7/8"	56.0	53.0	5
1"	63.0	58.0	5

Standard caps sized for bolt specified to BSEN 15048, AS 1111, EN ISO 4014 (DIN 931) and ASTM A325/F436

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Global Acceptance - Project Examples

- Up to 3 hours cellulosic protection,
- Up to 4 hours hydrocarbon protection
- Up to 2 hours jet fire protection

Scotland
Perth Prison
Cameron Bridge Distillery

Eire
Dublin Airport
Shire Pharmaceutical Project

England
West Ham Football Club
Victoria Embankment
Principle Place
North Wharf Road

Canada
St Laurent Sports Complex
Gilead Pharmaceutical
Inglewood Gardens
Muskrat Falls Hydro
Irving Refinery
Quebec Hydro

Kazakhstan
Caspian Sea Offshore

USA
El Dorado Refinery
Sunco Logistics Marcus Hook
Valero Refinery
Mont Belvieu
Dominion Cove Point LNG
Flint HILL Refinery
Disney/Universal Studios

France
Lyon Airport

Japan
Tokyo Bay LNG

Australia
Paramatta College
Obhan Tunnel

Fire threats ranging from cellulosic to hydrocarbon protection on these projects

Bolt Caps - Productive Protection

Save now, the bolt cap is used on many projects globally as the **most effective** solution to the fire protection of connections **applicable in <u>any weather</u>.**

For fire threats both **cellulosic** and **hydrocarbon, as well as corrosion protection in harsh environments.**

It shows both **significant savings**, as well as ease of cyclic inspection of connections if required and less working time at height.

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Productivity Enhanced **Masking Options** For
Offsite Coating Of Steel Elements Or Assemblies

- The masking inserts are placed in the end plate or connection face prior to painting. The facing surfaces are left unpainted.
- Once the fire protection is dry they can be removed leaving a clean surface for the bolts to be placed and tightened without damage to paint,
- Bolt caps are then installed over to close the gap and fully protect the connection, reducing the need for site touch up or site painting so saving cost and programme time.

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Bolt Caps - Productive Protection

- Typical steel frame building & structural assembly means **large numbers of connection visits to paint** the bolted connection properly by cherry picker.
- **Cost and time is eliminated** if the bolt cap is fitted when floor levelling or bolt tightening.
- **Quality assured protection** at minimum cost with no wet trades on site, can be applied in **any weather. Quality finish and aesthetics.**
- **Caps give cost saving over the proper painting cost** carried out to the fire certificate test standard, and **save significant build programme** time.
- **Easy subsequent gloss/colour painting** for exposed connections, no special primers/paints required.
- **Allows easy sustainability** for a construction with ease of subsequent bolt re-use if required.

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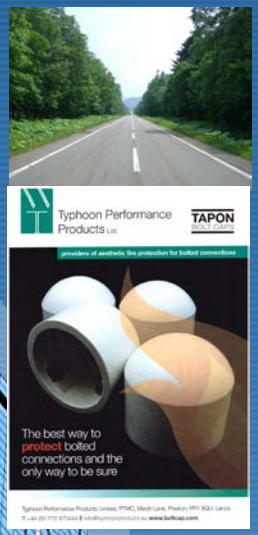
Bolt Caps - Productive Protection

- **Bolted connections are critical** to structural integrity.
- **Paint protected bolted** connections can be **under-protected in fire**, potentially leading to premature structure collapse as well as installation issues.

Bolt cap technology ensures **optimal fire protection**

- **Fast**, competitive all weather installed cost
- **Universal** application with variety of PFP systems
- **Protection** from cellulosic, hydrocarbon & jet fire scenarios
- **Easy** to inspect connections are fully protected

Bolt Caps - Productive Protection



- Take the clear road to more **profitable, quicker, all weather** and safer construction now
- Tapon Bolt Caps are available globally for both cellulosic and hydrocarbon protection direct or via distributors
- Benefit Now – Try Bolt Caps And See For Yourself

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