

RotaBolt Tension Control

assured joint integrity



James Walker[®]

assured bolted

RotaBolt tension control technology assures the integrity, reliability and safety of bolted joints.



Tension control is essential in achieving 100% reliability. Our unique fasteners achieve the correct design tension at installation and throughout the life of the bolted joint.



In offshore exploration & extraction, refining, chemical processing & power, civil engineering, defence and transport, we are global leaders in tension control.



joint integrity

- >> **reduced maintenance costs**
- >> **better design efficiencies**
- >> **reduced installation costs**

- >> **improved safety**
- >> **reduced build costs**
- >> **enhanced design performance**

- >> **reduced operational costs**
- >> **greener environmental regimes**
- >> **extended equipment life**





'leak free environments'

RotaBolt tension control fasteners assure joint integrity wherever bolted joints are subject to

pressure containment, vibration loosening, fatigue and structural slippage.

Pressure Containment

RotaBolts are providing joint integrity on pressure vessels, reactors, heat exchangers and high integrity pipeline flanges. Our technology is helping to make leak-free environments a reality.

Vibration Loosening

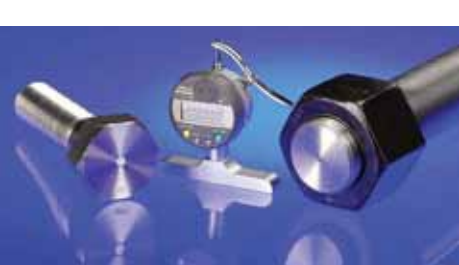
When bolts are not tightened to the correct tension, vibration loosening can be a common problem. On mountings, tracks, couplings and rail rolling stock our tension control technology is delivering assured integrity.

OIL & GAS



POWER GENERATION





'fit and forget'

Fatigue

Bolted joints that are subject to cyclical loading are vulnerable to fatigue failure. Failure occurs when bolts are tightened with insufficient bolt tension - the cyclic load exceeds the fatigue strength of the bolt, resulting in a fatigue crack.

In construction, transport, engineering and power generation RotaBolt fasteners are leading the way in regimes that are 'fit and forget'.

Structural Slippage

RotaBolts are being used on communications towers, major road bridges, cranes, mechanical handling systems and in extreme military environments. They are the solution to assured reliability.





RotaBolt Tension Control *assured joint integrity*

‘tension control - critical to bolted joint integrity’

Bolted joint integrity relies on three factors:

- **joint design**
- **bolt quality**
- **tension control**

The first two of these factors are controlled and measured.

The majority of bolted joints are tightened in an uncontrolled manner and the bolt tension achieved at the

end of the tightening cycle is unknown. Traditional tightening methods, such as torque and hydraulic tensioning, measure the effort applied and not the tension achieved across the bolted joint.

The operator may well be highly trained and the installation procedures followed to the letter, but failure can still occur if all three reliability factors are not properly measured.





'we are global leaders in tension control technology'

90 – 95% of all bolted joint failures are attributed to insufficient bolt tension on installation.

It is tension control that is critical to the reliability and safety of bolted joints.

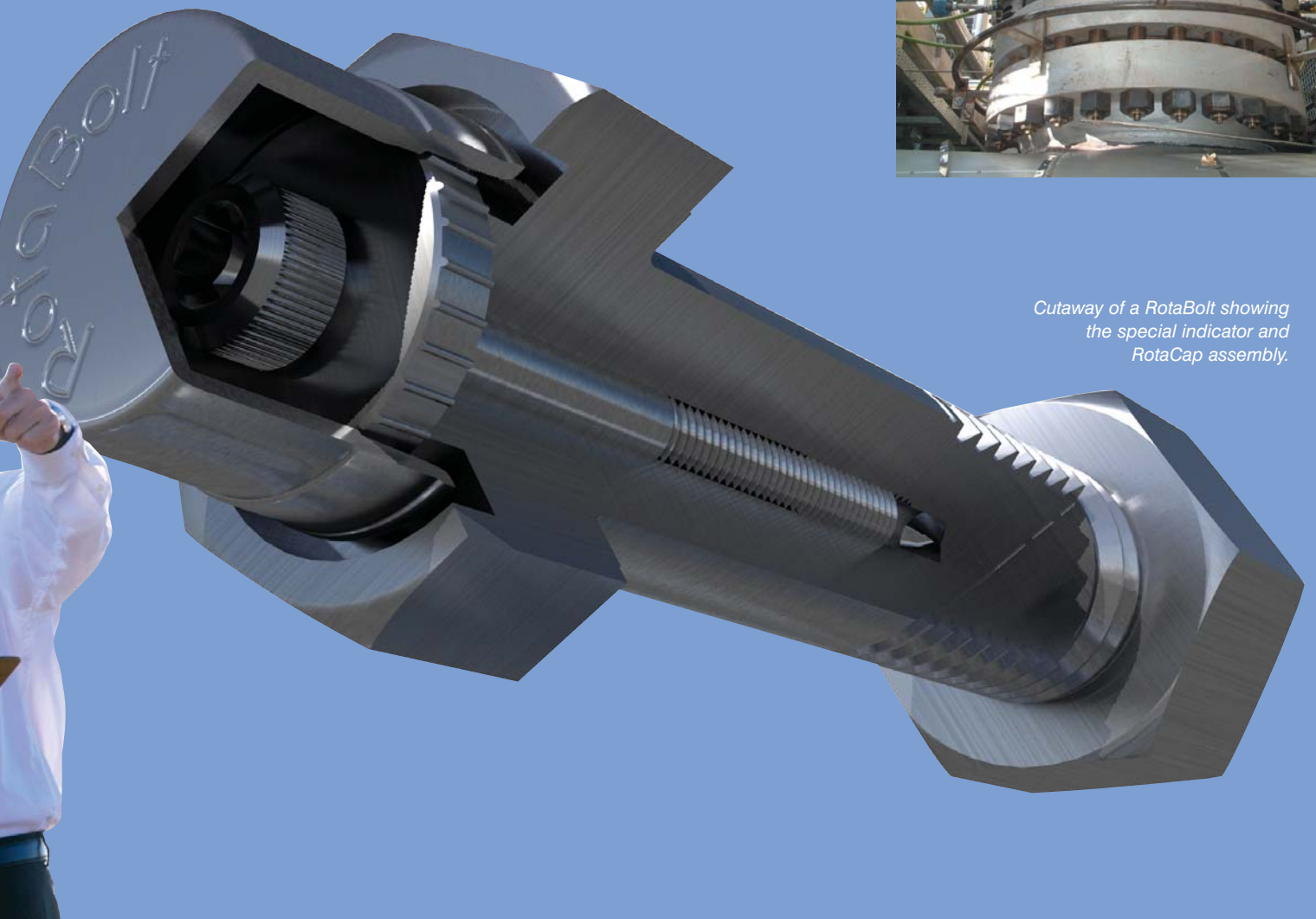
RotaBolts uniquely deliver tension control at installation, and throughout

the life of the bolted joint. They give a simple, accurate and continuous measurement.

No other product in the marketplace provides tension control assurance which is vital to bolted joint integrity.



Cutaway of a RotaBolt showing the special indicator and RotaCap assembly.





'technology driven control'

Direct Length Measurement

RotaBolt has applied its technology to the standard Indicating Rod Bolt outlined in ASME PCC-1-2000, to develop new bolts which are a generational step forward.

An Indicating Rod Bolt uses direct length measurement to gauge the delivery of load - RotaBolt's new version of the fastener gives a much more accurate measurement of bolt

tension from the length extension to guarantee the uniform delivery and maintenance of load.

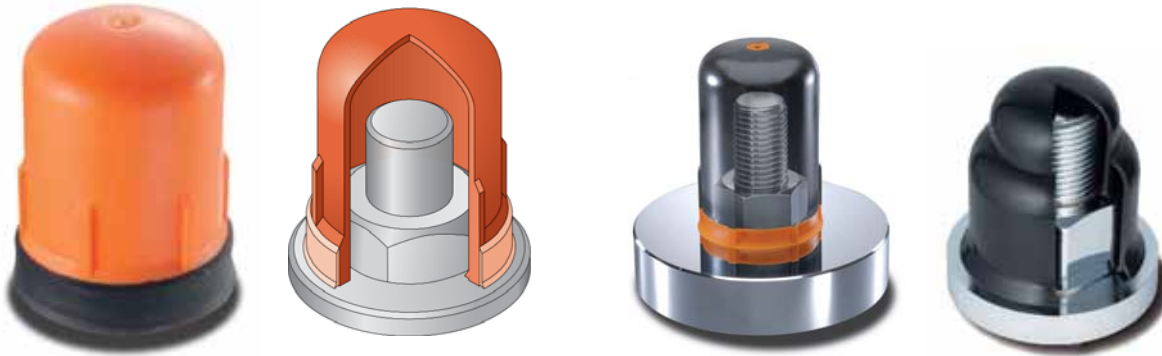
The Company has applied its technology to produce bolts which are individually 100% load test calibrated and fitted with a special indicator to measure extension. Every bolt's extension measurement is individually certified.



RotaBolt's Indicating Rod Bolt



'extended product life'



RODOLID®

Protecting Bolts & Bolted Applications

- Easy to Fit
- Tough & Durable
- Cost Effective

- SW -** locking caps for hexagon bolts and nuts - suitable for practically any application.
- TSW -** telescopic caps for large bolt length above nut - height-adjustable and suitable for applications with large bolt ends.
- ASW -** bayonet caps for hexagon bolts and hexagon nuts - ideal for screw connections that require continuous monitoring.
- B -** screw caps for bolt threads to protect the threaded ends - can be used for practically all types, even under extreme environmental conditions.
- BM -** screw caps for bolts and nuts - screw-in 'self-cutting' fit that works independently of the screw thread and shape of the nut.
- KSW -** wedge caps for wheel nuts and bolts available in various heights.
- ISK -** hexagon socket caps for Allen screws.
- EB/EBM -** This new cap is produced in a 2 component moulding – suitable for offshore applications and other industries with high humidity.

RotaBolt High Performance Lubricants

Graphite Grease

Thick paste containing 50% graphite by weight, has good adhesion on metal surfaces, spreads with reasonable ease with no solvent content.

Molyon Grease

Has soft consistency with fine particles of pure high quality molybdenum disulphide. Good adhesion and spread on metal surfaces, and film of lubricating molybdenum disulphide remains on surface even when grease carrier has gone.



our clients

AMEC	David Brown Vehicle Transport	Metronet Rail BCV
Associated British Ports	Doosan	Mitsubishi Heavy Industries
Acordis Acetate	Dow Corning	MOD
Alstec	E.ON	National Oilwell
Alstom	Expro	New South Wales State Rail Authority
Applied Materials	Exxon Mobil	Nippon Oil
Aughinish Alumina	Favelle Favco Cranes	NTL
Balfour Beatty	FMC	Petronas
BAe	Halliburton KBR	Petroplus
BASF	Huntsman Tioxide	Shell
BJ Services	Ineos Chlor	Sparrows Offshore
Bluewater	Invista	Suzlon Energy
BNFL	Jaguar	Talisman Energy(UK)
Bombardier Transportation	Kemira GrowHow	Terex Comedil
BP	Kvaerner Oil & Gas	Transocean
British Energy	Kenz Cranes	Vetco Gray
Butterly Engineering	Liebherr	Vestas Wind Systems
Cegelec	Lindsey Oil Refinery	WFEL
Conoco Phillips	MAN B&W Diesel	
Cooper Cameron	Maersk Oil & Gas	
Corus	Marathon Oil	

‘our expertise and our services are geared to a global market’...

- Joint Design
- Bolt Design
- Alloy Selection
- Application Engineering
- Metallurgy
- Bolted Joint Management
- Site Surveys
- Bolted Joint Technology Training
- LDAR
- Tightening Selection
- On-site Installation

‘assuring integrity and reliability’

BSI Accreditation

RotaBolt is BSI accredited to BS EN ISO 9001:2000. Our processes and procedures are geared to assured product quality, continuous improvement, employee development and customer satisfaction.



FM 09646

Germanischer Lloyd Wind Energy Assurance

Germanischer Lloyd is an independent approvals and certification organisation. They have approved the use of RotaBolt control for general industrial usage. Certification was based on an extensive product test programme carried out by German Armed Forces University, Hamburg. RotaBolt was tested for accuracy and repeatability, fatigue strength and resistance to dynamic and temperature loading. Results of corrosion testing carried out by the UK based Defence Research Agency also formed part of the approval process.



Germanischer Lloyd
WindEnergie GmbH

DIBt

RotaBolt also has approval from the German Institute for Building Technology (DIBt) for the use of RotaBolt technology in general building constructions, including wind towers.

DIBt

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James Walker®