Table of Contents

MAXTORQUE HIGH-PERFORMANCE WORM GEARS

Introduction ........................................................................................................ 1
Performance ...................................................................................................... 2
Quality ................................................................................................................ 3
Motorized, Manual, Subsea and Specialty Applications .................................. 4
CAMSERV Services for Actuation and Valves .............................................. 5
Cameron is a leading provider of flow equipment products, systems and services to worldwide oil, gas and process industries. We offer products primarily used to control, direct and measure the flow of oil and gas as it is moved from individual wellheads through flowlines, gathering lines and transmission systems to refineries, petrochemical plants and industrial centers for processing.

Cameron is a complete systems solution supplier, delivering new levels of efficiency and cost savings to our customers due to our full in-house capability to provide controls engineering and manufacturing together with choke, actuation and automation expertise, as well as project management, system engineering, operability and training.

Cameron’s MAXTORQUE™ gears feature patented AutoLock® technology that allows for high-performance worm gear solutions with the self-locking characteristics of conventional gearboxes. This means less work is required to actuate valves, leading to an improved HSSE profile and worker efficiency on manual valves and smaller actuators on motorized valves.

Our MAXTORQUE gear technology offers value-based solutions for a broad range of applications – from manual to motorized – and in the most challenging environments – from subsea to arctic.
MAXTORQUE High-Performance Worm Gears

PERFORMANCE – BETTER TECHNOLOGY

High-Efficiency, Double-Enveloping Worm Gears

MAXTORQUE Features

- Efficiencies 2 to 2.5 times commodity gears
- Self-locking design
- Double-enveloping gear set
- Unique tooth form to reduce microscopic stresses
- Superior sealing system
- Capable of handling torques in excess of 1,000,000 ft-lb

MAXTORQUE Benefits

- Reduces work by up to 75%
  - Reduces turns, handwheel size and rim pull
  - Reduces stroke time
- Improves HSSE profile
- Reduces need for actuators
- Smaller MOV packages reduce cost and weight
- Quick stroke times where required
- Near-zero backlash for process control
- Ingress protection rating IP 68
- Features increased durability

TYPICAL SAVINGS

Gear Requirements for 600# Trunnion Ball Valves – Manual Solution

<table>
<thead>
<tr>
<th>Valve Size (in.)</th>
<th>Cameron Part Number</th>
<th>Torque with 1.25 SF</th>
<th>Handwheel Diameter (in.)</th>
<th>Break Rim Pull (lb)</th>
<th>Turns-to-Close MAXTORQUE Technology</th>
<th>Turns-to-Close Conventional Technology</th>
<th>Turn Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>BW1-156</td>
<td>180,650</td>
<td>36</td>
<td>79</td>
<td>40</td>
<td>190</td>
<td>150</td>
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<tr>
<td>30</td>
<td>BW2-312</td>
<td>327,175</td>
<td>36</td>
<td>62</td>
<td>98</td>
<td>297</td>
<td>199</td>
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<tr>
<td>36</td>
<td>BW3-470</td>
<td>478,800</td>
<td>36</td>
<td>75</td>
<td>118</td>
<td>297</td>
<td>179</td>
</tr>
</tbody>
</table>
QUALITY – RELIABILITY BY DESIGN

Robust Design and Testing

- Rigorous PC/PLC cycle testing and qualification
- Best-in-class materials of construction
- Bronze output bearings to prevent galling
- Use of roller bearing instead of traditional/conventional plain/needle bearings
- ATEX/CE certified
- Compliant to AWWA, Mil Spec, ISO 9001:2000
- Made in the USA
MOTORIZED, MANUAL, SUBSEA AND SPECIALTY APPLICATIONS

Motorized/Process Control
- Smaller actuators
- Faster operating times
- Dependability in demanding environments
- Near-zero backlash for exacting control

Manual
- Improves HSSE by significantly reducing turns and rim pull
- Reduces requirement for actuators, thus reducing project cost and complexity
- Smaller operators and handwheels where size and weight are a premium

Specialty
- Engineering-based creative solutions
- Custom, specialty requirements
- Harsh or challenging environments
- Military and naval standard and specialty operators

Subsea
- Quality and performance where it matters most
- Independent hyperbaric testing for ultra-deepwater applications
- Support or ancillary equipment, including panels, spools and retrievable systems

Ultra-large
- Supplied to 1,000,000 ft-lb (1,355,000 N-m)
- Scalable to 1,500,000 ft-lb (2,000,000 N-m)
- Mechanical option to large hydraulic and electrohydraulic actuators
CAMSERV Services for Actuation and Valves
WE BUILD IT. WE BACK IT.

Startup and Commissioning
Our experts understand that each project is unique. That’s why Cameron’s CAMSERV™ services help facilitate commissioning and startup activities.

- Integrated solutions, onsite or at our global service centers
- Increased equipment and product performance
- The shortest possible trouble-free startup for your critical assets

Spare Parts and Asset Management
Cameron offers the assets and expertise to cover all aspects of valve management.

- Full inventory of quality exact OEM parts and spares
- Complete asset risk and criticality assessments
- Comprehensive inventory of your assets, including a complete recommended spare valves and parts list

Operational Support
Cameron’s ability to address valve requirements in the field is a reflection of our commitment to life-of-asset support.

- Innovative asset management solutions
- Trouble-free installation, startup and operations
- Support from commission to operation – extending through all phases of a valve’s life cycle
- Extensive inventory of spare valves and parts

Cameron’s CAMSERV site management mitigates the risk of project delays by identifying issues in the construction process prior to valve installation to ensure valve integrity.
HSE Policy Statement
At Cameron, we are committed ethically, financially and personally to a working environment where no one gets hurt and nothing gets harmed.