

McGard, LLC

SPECIAL PRODUCTS DIVISION

3875 California Road · Orchard Park, New York 14127 · (888)888-9192 · FAX (716)662-8985

FIBERSHIELD MANHOLE LOCK SPECIFICATION

(PROTECTED UNDER USA PATENT NUMBER 7,798,742 AND 7,896,574)

1.0 Required Function

The FiberShield is a lightweight manhole cover with H-20 & AASHTO HS-25 load rating. The FiberShield weighs approximately 1/4 of an equivalent size cast iron cover. A special operating key is required to unlock/remove the FiberShield from the frame.

2.0 Overall Design Criteria

The FiberShield is designed as a direct replacement for existing cast iron covers. The cover is rated to handle arterial traffic flow. The cover has a self contained locking system. The locking system provides cover to frame retention and security from unauthorized entry.

3.0 Specific Design Criteria

Base Cover

- The FiberShield Manhole cover is manufactured from Fiber Reinforced Polymer.
- The FiberShield is available in multiple colors, with custom logos or ID tags.
- The FiberShield is manufactured with an “anti-slip” top surface.
- The FiberShield can be supplied with a rubber gasket around the perimeter to provide dampening and reduce wear.
- The FiberShield is load rated for 80,000 lb, and has successfully passed AASHTO M-306 testing.
- The FiberShield has been successfully subjected to accelerated fatigue testing @ 16,000 lb & 2,000,000 cycles. Full details available upon request.
- The Fiber Shield has been successfully static and dynamic load tested at both 160°F and -60°F.
- The FiberShield is available in most common sizes from 24” to 32”. Custom sizes available upon request.
- The FiberShield has a self-contained locking system, mounted on the underside, to prevent the cover from lifting out of the frame.

Locking System – Standard Applications

- The locking system is manufactured from a combination of molded plastic, fiberglass composites and a few fabricated metal components.
- The locking system consists of security drive bolt, two spring loaded cartridges, skid runners, latch plate mechanism, direct connect bar and a plastic cap.
- The security drive bolt uses a proprietary key drive system and is manufactured from heat treated stainless steel to maximize strength, durability, and resist strong arm tools. The drive bolt actuates the latch mechanism. After installation the bolt is protected with a molded nylon cap.
- The latch mechanism is of molded plastic components and fiberglass composite rods, the mechanism consists of (2) spring loaded cartridges that slide on a bridge like structure which is mounted to the cover.
- The drive plate is made from a combination of corrosion resistant bronze, molded plastic for maximum strength and durability and a heat-treated stainless steel thread insert. The latch mechanism actuates both spring loaded cartridges. One side is pushed open directly by the drive plate. The opposite side is pulled open by the direct connect bar assembly.
- The spring loaded pistons are manufactured from a combination of fiberglass pultrusion and molded plastic to provide both strength and wear resistance. The compression springs are manufactured from polished 316 stainless steel.
- The skid runners are made from PVC tube, to allow the FiberShield to be removed from the manhole frame and dragged along the pavement without damaging the lock mechanism.
- The locking system components can be easily replaced with common tools in the event it they become damaged or worn.
- The locking system has drain slots located near the security drive bolt to allow water and debris to pass thru.

Locking System – H2S Gas Applications

- The locking system is of the same basic design with a few components changed to provide enhanced corrosion resistance.
- The standard security bolt is replaced by a bolt made from heat treated, highly corrosion resistant copper.
- The standard compression springs are replaced by springs made from heat treated highly corrosion resistant copper.
- The anchor bolts for the latch mechanism runner system are sealed with O-ring sealing plugs and rubber gaskets to prevent any corrosion.

Operating Key

- The multi-purpose (MP) T-Key is used to unlock and lock the cover.
- The MP T-Key is manufactured from alloy steel components which are covered with powder coat paint or zinc plating for corrosion protection.
- The MP T-Key has a screwdriver storage location in the handle. The screwdriver is used for removing the plastic protective cap and cleaning debris from the security bolt counterbore.
- The MP T-Key has a security key mounted on the lower end of the long shaft. The security key is manufactured from heat treated alloy steel and zinc plated for corrosion protection.
- The MP T-Key has a swivel joint on the top of the long shaft. The swivel joint has two features – a threaded stud and a straight stud. The threaded stud is used to remove the FiberShield from the frame. The straight stud is used to disengage the latch mechanism (lock the FiberShield).
- The MP T-Key has an extra key storage post located on the handle. The extra key storage post is used to store an extra key on the handle.
- The MP T-Key is supplied with a shorter handle located at the bottom of the unit, near the socket keyhead. This handle is provided to make removing the cover from the frame easier as well as making it easier to drag the cover back in place.

4.0 FiberShield Operation

The FiberShield is operated with the following sequence of operations (starting with the FiberShield in the frame in the locked position).

FiberShield Removal

- Remove the small screwdriver in the T-Key handle to pierce and remove the protective cap from the security drive bolt and cover lift hole.
- Insert T-Key drive pattern into security drive bolt.
- ¼ turn CCW until “audible click”. The pistons are retracted and held in the retracted position via a latch mechanism.
- Flip T-Key over and screw cover removal stud into the FiberShield lift hole (where it mates with a female thread).
- Lift and remove cover. Drag cover to a safe location.
- Leave T-Key attached to the cover. The T-Key acts as safety device to prevent the pistons from accidental activation.

FiberShield Replacement

- Drag FiberShield to the open frame and insert.
- Unscrew the T-Key from the FiberShield lift hole.
- Rotate and exchange the cover removal stud for the cover locking stud.
- Insert the cover locking stud into the FiberShield lift hole.
- Using your foot push the T-Key handle to disengage the latching mechanism.
- Replace the plastic protective cap on the security bolt and lift hole.

5.0 Accessories

The FiberShield is available with the following factory installed accessories, new accessories or custom solutions are available on a per application basis.

Rolled Angle Ring

- This option is available for Straight Wall frame applications, where there is no clearance under the flange for the pistons to lock under.
- Consists of stainless steel angle iron rolled into a ring sized for that application.
- The RAR is pre-drilled and countersunk for anchor bolts. The RAR is used as a template to drill the frame for the anchor bolts.
- The anchor bolts are stainless steel.

Egress Handle

- Provides a manual pull handle on the FiberShield for use by an individual inside the manhole a means to exit.
- All plastic construction to resist corrosion, the parts are molded in high visibility yellow.
- Pulling the handle will latch open one of the cartridge assemblies and allow the person to push the cover out of the frame and then exit.

Logo Plates

- Stainless steel plates with laser cut lettering can be mounted on the cover surface. In high volume applications the logo information can be molded into the cover surface.
- Logo plates are available in both standard and custom verbiage; contact your McGard representative for details.

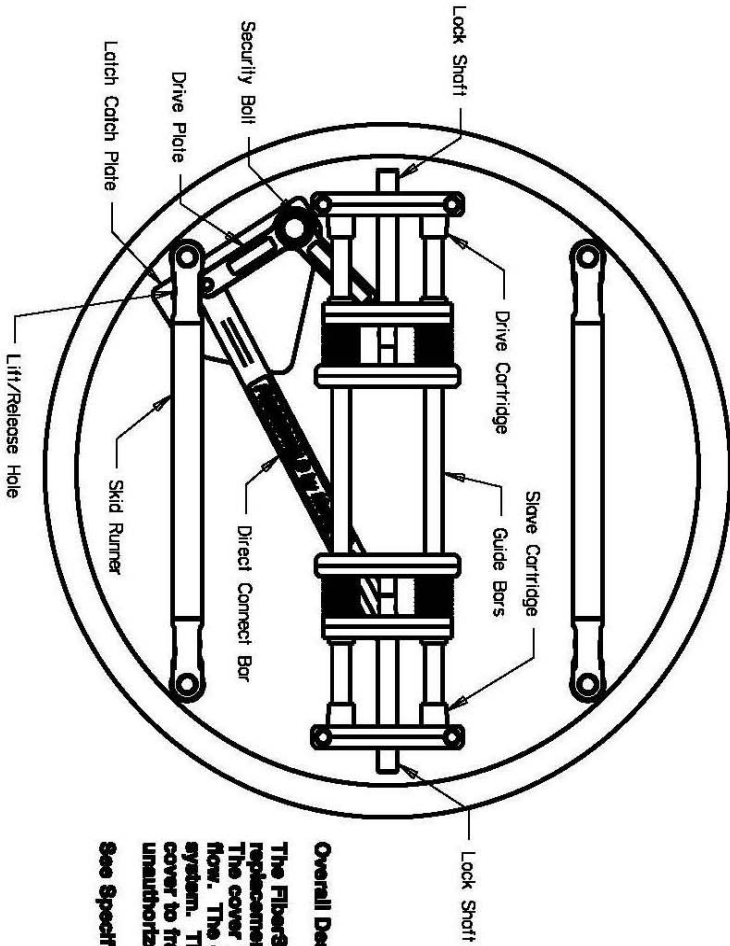
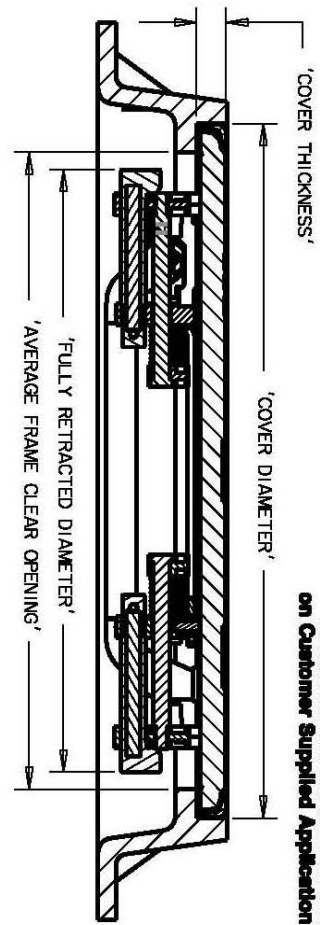
ID Tags

- Anodized aluminum plates with machined letters can be mounted on the cover surface.
- ID tags are supplied per the customer supplied numbering system.

Specifications subject to change without notice. Please consult McGard LLC regarding specific questions or requirements at 1-888-888-9192.

FIBERSHIELD BASICS

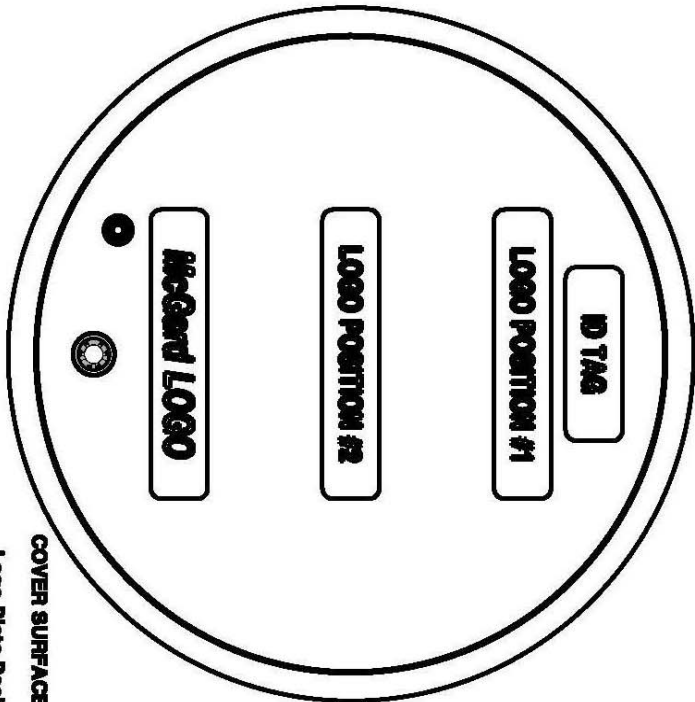
Fibershield Dimensions are based on Customer Supplied Application Data



Overall Design Criteria

The Fibershield is designed as a direct replacement for existing cast iron covers. The cover is rated to handle arterial traffic flow. The cover has a self contained lock system. The locking system provides cover to frame retention and security from unauthorized entry.

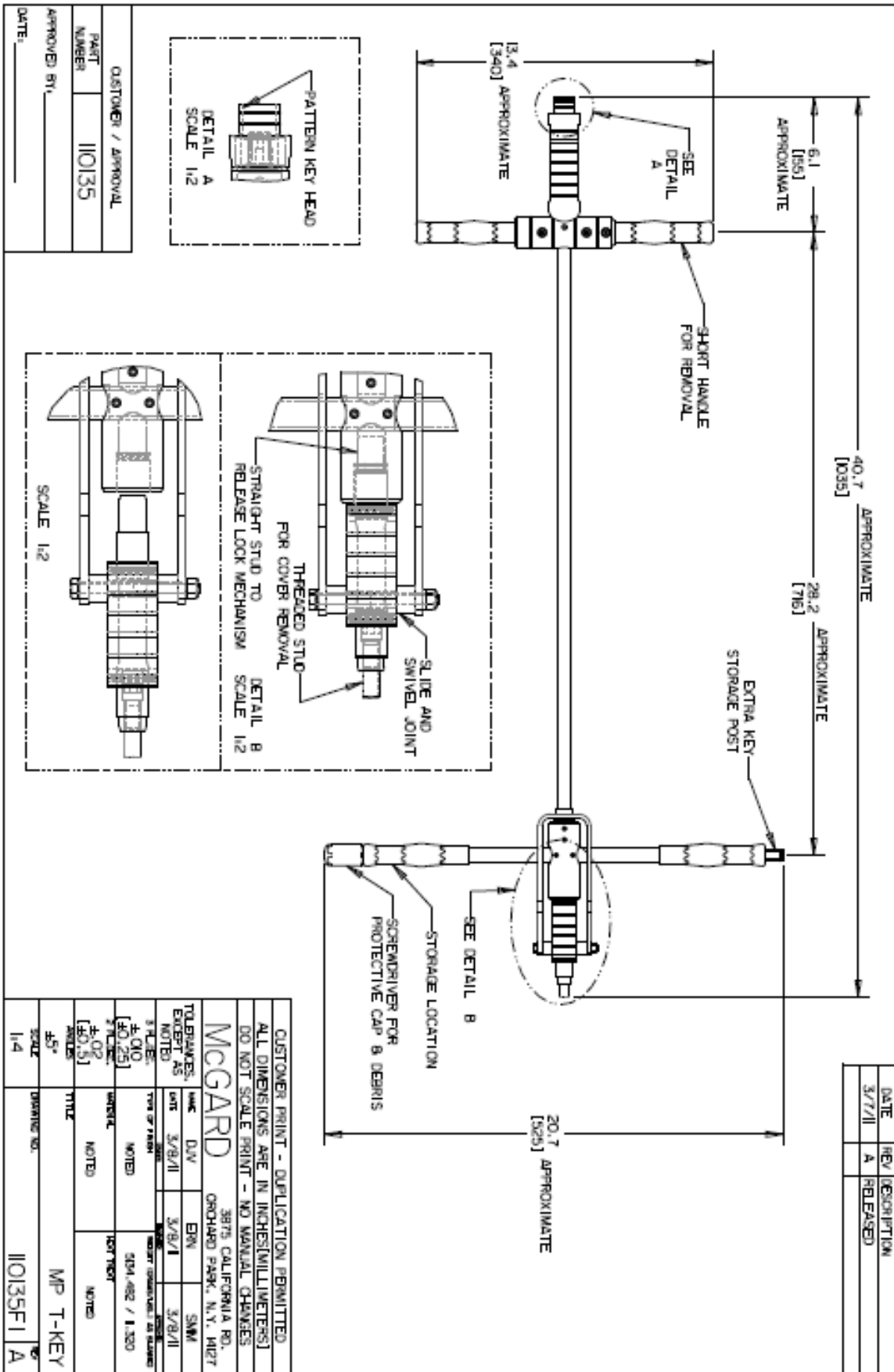
See Specification Sheets for more details.



COVER SURFACE VIEW
Logo Plate Positions
ID Tag Position

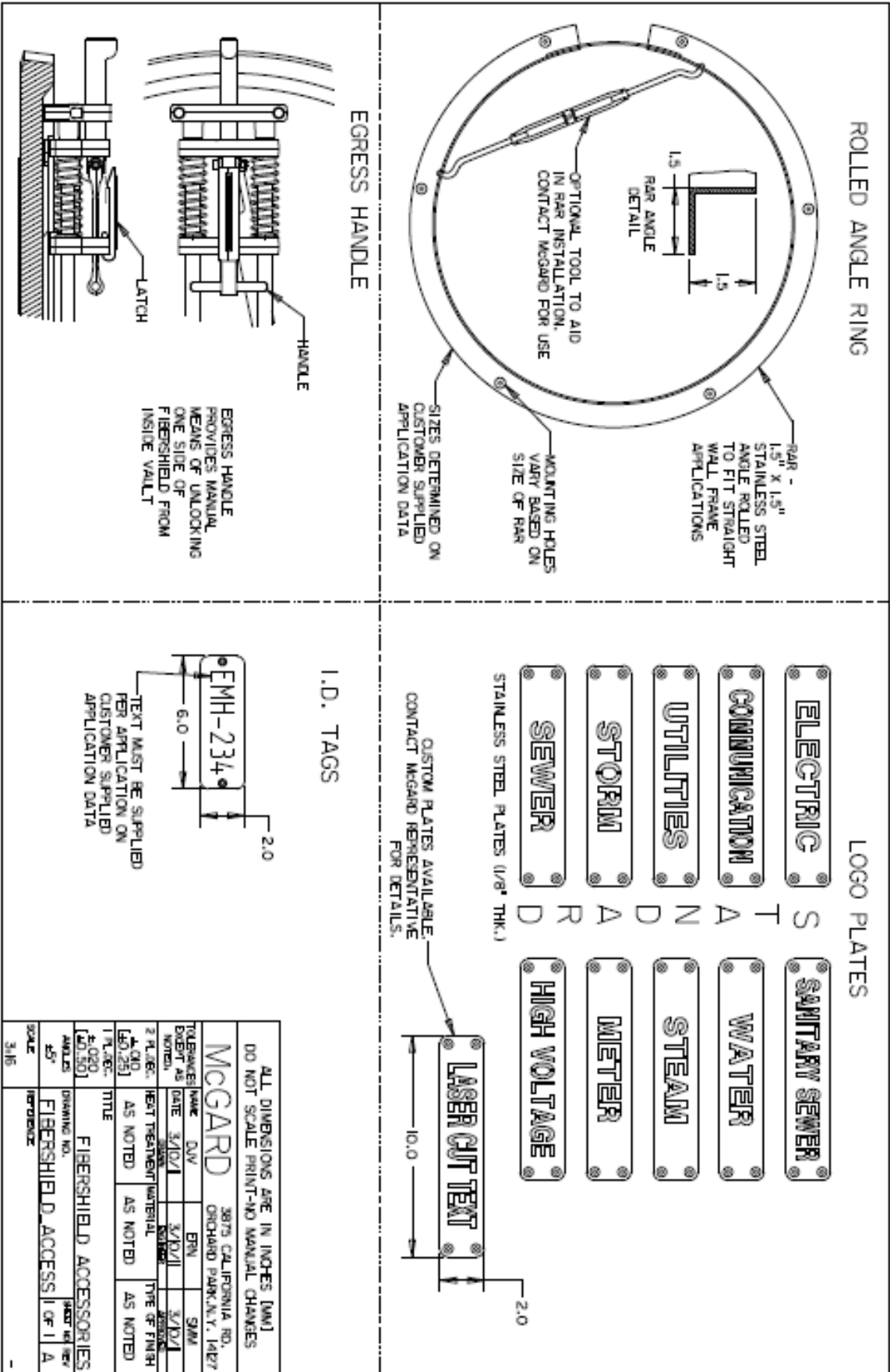
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SCALE	REFERENCE	N/A	

TITLE	FIBERSHIELD BASIC OUTLINE
DRAWING NO.	FIBERSHIELD1
SHEET NO. REV	1 OF 1 A



DATE	REV.	DESCRIPTION
3/7/11	A	RELEASED

CUSTOMER PRINT - DUPLICATION PERMITTED			
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FiberShield Test Regimen

- Fatigue
- Proof-load
- Destructive

The FiberShield load testing regimen demands ultimate performance. The Fibershield has been successfully subjected to accelerated fatigue tests at various loads in excess of 2,000,000 cycles. Destructive testing – includes common strong arm tools and ultimate load until failure.

FiberShield composite manhole covers have a proven field history and have stood up to the most severe environments. Environmental exposure tests are continually conducted at our facility, and are further reinforced with successful field testing.

Load Testing

FiberShield composite manhole cover and frames have an average proof load in excess of 100,000 lbs – more than five times the H-20 loading standard as called out in AASHTO (American Association of State Highway and Transportation Officials) Standard Specifications for Highway Bridges.

McGard tests production samples randomly throughout the manufacturing process. Independent certification is available for the following internationally accepted test standards (see attached):

AASHTO H-20 & H-25

United States Standard – AASHTO M 306 Standard Specification for Drainage, Sewer, Utility, and Related Castings, described as:

H-20 & HS-20 A 40,000 pound proof load concentrated on a nine inch by nine inch square area and held for one minute. The 40,000 lbs. proof load represents a safety factor of 2.5 for H-20 & HS-20 loading.

H-25 & HS-25 A 50,000 pound proof load concentrated on a nine inch by nine inch square area and held for one minute. The 50,000 lbs. proof load represents a safety factor of 2.5 for H-25 & HS-25 loading.

Environmental Exposure

FiberShield composite manhole covers subjected to harsh environments, including exposure to:

- Rain/Sleet/Snow/Ice
- Common Fuels (gasoline, diesel, etc.)
- Waste-Water environments (including H2S)

FiberShield products have been tested to destruction at temperature extremes of -60 degrees Fahrenheit and 160 degrees Fahrenheit. No loss in performance when tested at both extremes.

Ultraviolet radiation will not affect the long term performance of FiberShield composite manhole covers.

Customer specific testing can be performed upon request.



CHURCH STREET • BOHEMIA, LONG ISLAND, NEW YORK 11716
AREA CODE 631 589-6300

25 October 2010
410925-01-02-C10-2560

Certificate of Conformance for Proof Loading

Customer: McGard, LLC
3875 California Rd
Orchard Park, NY 14127

Attention: Chris Coffman

Part No.: 142490S
Test Date: 12 May 2009
Serial No.: N/A
Purchase Order No.: 10410
Part Nomenclature: 32-Inch Manhole Cover
Drawing No.: 142490S
Specification No.: Section 5 of AASHTO M306-05
Quantity: Meet Requirements: 1; Did Not Meet Requirements: 0

One 32-inch Manhole Cover was subjected to the following tests:

- Proof load to 40,000-pounds in compression using a 9" x 9" footprint in the center of the Cover
- Hold 40,000 pound load for 1 minute
- Measure total permanent deflection after release of 40,000-pound load
- Ultimate load to failure

Results:

No discrepancies were noted with proof loading. The Cover withstood the proof load of 40,000 pounds with a permanent deflection of less than 0.125 inch. The Cover failed at an ultimate load of 96,234 pounds.

The test results in this report relate only to the items tested. This report shall not be reproduced, except in full, without written approval from Dayton T. Brown, Inc.

Engineer 
Stephen Kelley

Engineering Manager 
Frank Milin

Quality Department 