Design Standard

Utility Manhole Covers

Texas A&M University in College Station has standardized utility manhole covers to be used for all underground utility access on campus. Until further notice, manhole covers manufactured by McGard Special Products shall not be used in roadways or parking lots. Cast iron covers shall be used for these applications. The McGard covers shall be used in all other applications.

Detailed specifications follow.

Reinforced Polymer Manhole Covers

Part 1 General

1.1 Reinforced polymer manhole covers can be ordered in a variety of sizes, will all have built-in locking devices with an internal release and have a number of other benefits over conventional cast iron or steel covers:

A. Polymer covers are approximately ¼ the weight of an equivalent size cast cover

B. Standard thickness is used for pedestrian and non-vehicular application

C. Available in DOT-rated thickness to be used for vehicular traffic on roadways and drives

D. Top surface is slip resistant

E. Does not retain heat as readily as conventional cast covers

F. Available with venting if needed for specific application

G. Locking device will be used with a unique key for Texas A&M University in College Station

H. Locking device must be ordered with internal release mechanism to allow for personnel egress

I. Available in standard sizes and also in a variety of round, square, and rectangular sizes

J. Custom sizes with custom locking mechanism available depending upon specific requirement

K. “UTILITIES” to be cast into center of all manholes together with utility commodity name (ELECTRICAL, THERMALS, SANITARY, STORM) where applicable – see attached drawing

L. No commodity name to be shown on access covers for utility tunnels
M. All covers to be ordered with locking device and internal release

N. Use McGard Registration Code No. 9500540 to order cover locking device unique to TAMU

O. TAMU Utilities & Energy Services will maintain and control inventory of unique cover keys

FiberShield Manhole and Lock Specification

PART 1 GENERAL

1.1 The FiberShield is a lightweight manhole cover with H-20 & AASHTO HS-25 load rating. The FiberShield weighs approximately ¼ of an equivalent size cast iron cover. A special operating key is required to unlock/remove the FiberShield from the frame.

1.2 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.

PART 2 DESIGN CRITERIA

1.1 Base Cover

A. The FiberShield Manhole cover is manufactured from Fiber Reinforced Polymer.

B. The FiberShield is available in multiple colors and custom logos.

C. The FiberShield is manufactured with an “anti-slip” top surface.

D. The FiberShield utilizes an optional rubber gasket around the perimeter to provide dampening and reduce wear.

E. The FiberShield is available in two load ratings – 80,000 lb & 50,000 lb.

F. The FiberShield has maximum deflection of 0.75 inches @AASHTO H-20 wheel loading of 16,000 lb.

G. The FiberShield has been successfully subjected to accelerated fatigue testing @ 29,000 lb and 20,000 cycles. Full details available upon request.

H. The FiberShield has been successfully static and dynamic load tested at both 160°F and -60°F.

I. The FiberShield is available in most common sizes from 24” to 32”. Custom sizes available upon request.

J. The FiberShield has a self-contained locking system mounted on the underside. The locking system prevents the FiberShield from lifting out of the frame.
1.2 Locking System

A. The locking system is manufactured from a combination of molded plastic and fabricated stainless steel components.

B. The locking system consists of security drive bolt, two spring loaded pistons, skid runners, latch plate mechanism, piston actuation cable, and two plastic protective caps.

C. The security drive bolt uses a proprietary key drive system.

D. The security drive bolt is protected with a molded nylon protective cap.

E. The security drive bolt is manufactured from heat treated stainless steel to maximize strength, durability, and resist strong arm tools. The drive bolt actuates the latch mechanism.

F. The latch mechanism is manufactured from heat treated stainless steel for maximum strength and durability. The latch mechanism actuates both spring loaded pistons. The master side is connected directly to the latch mechanism. The slave side is driven via a nylon coated stainless steel braided cable.

G. The spring loaded pistons are manufactured from 304 stainless steel tubing. The springs are manufactured from 302 stainless steel.

H. The skid runners are manufactured from PVC tube. The skid runners are attached to the underside of the cover via molded nylon feet.

I. The skid runners allow the FiberShield to be removed from the manhole cover frame and dragged along the pavement without damaging the lock mechanism.

J. The locking system components can be easily replaced with common tools in the event they become damaged or worn.

K. The locking system has drain slots located near the security drive bolt to allow water and debris to pass thru.

1.3 Operating Key

A. The multi-purpose (MP) T-Key is used to unlock and lock the cover.

B. The MP T-Key is manufactured from alloy steel components which are covered with powder coat paint or zinc plating for corrosion protection.

C. 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.

D. 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.
E. 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).

F. 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.

PART 3  FIBERSHEILD OPERATION

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

3.1 FiberShield Removal

A. 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.

B. Insert T-Key drive pattern into security drive bolt.

C. ¼ turn CCW until “audible click.” The pistons are retracted and held in the retracted position via a latch mechanism.

D. Flip T-Key over and screw cover removal stud into the FiberShield lift hole (where it mates with a female thread).

E. Lift and remove cover. Drag cover to a safe location.

F. Leave T-Key attached to the cover. The T-Key acts as safety device insuring the pistons aren’t accidently activated.

3.2 FiberShield Replacement

A. Drag FiberShield to the open frame and insert.

B. Unscrew the T-Key from the FiberShield lift hole.

C. Rotate and exchange the cover removal stud for the cover locking stud.

D. Insert the cover locking stud into the FiberShield lift hole.

E. Using your foot push the T-Key handle to disengage the latching mechanism.

F. Replace the plastic protective cap on the security bolt and lift hole.
Utility Manhole Cover Standards Diagram

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<tr>
<th>Cover Diameter</th>
<th>Cover Thickness</th>
<th>Average Frame Clear Opening</th>
<th>Fully Retracted Diameter</th>
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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.

See Specification Sheet for more details.
Manhole Cover Marking Standards

EXAMPLE TUNNELS

COVER LOGO INFORMATION
CENTER INSERT (18” x 6”)
UPPER INSERT (10” x 2”)

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