

Comments on Draft MAG Precast Polymer Concrete MH – Section 744

Case 18-14, Revised 8-19-18

From: Blaine Robinson, Nicolas Zavala - City of Phoenix

Date: March 4, 2019

Response – 03-19-19

These comments don't necessarily fall in order of topics in the draft spec or details. We appreciate the effort that goes into creating a generic specification, hopefully our comments are useful to the spec writer.

- 1) Why have a cast-in-place bell section pipe for VCP as shown in Detail 419? If the VCP nipple gets broken during transport or unloading and placement it could complicate installation. Why not just specify flexible joint at the MH regardless of pipe material, that eliminates the breakage concern plus provides another flexible joint right at the connection point with the MH? And you can still add another(s) flexible joint at 2' and 4' out. Is double joint just for VCP or all pipe materials?
 - a. The reason for the integrated bell is simply just another option that municipalities or contractors can use for installation, it is not a requirement. Note 11 in the detail specifies that all joints shall be in compliance with the ASTM F477 or ASTM C425 requirements for the connections. This detail is simply pointing out the options available. MAG has been working to make the specifications and details more inclusive rather than exclusive.
 - b. If the structure or pipe components are broken during transport that lies on the contractor. The inspection team should be visually inspecting the structures and nipples prior to them being placed. Additionally, it is in the contractor's best interest to keep the structure and components intact. If there is damage during installation they risk failing the tests.
 - c. The double joint is strictly for VCP pipe. If you notice at the top of the drawing I tried to differentiate between VCP and other pipe types.

- 2) Spec Section 744.2 says to use steel or fiberglass reinforcing but Detail 419 calls for #5 fiberglass reinforcing mat, and doesn't mention steel. Nor does it mention rebar spacing dimensions. As we understand it some of the manufacturer's epoxy formulation allows steel and some don't. Either due to chemical interaction or shrinkage rates of the epoxy? This needs to be either evaluated further or just stated that reinforcing shall be per the manufacturer's recommendation.
 - a. The reinforcement has been modified to include both steel and fiberglass. While I was creating this detail I was in touch with 2 different manufacturers (ArmorRock and Solid Cast Polymer) and understand the need for the different types of reinforcement. The

spacing of the reinforcement is all based upon the manufacturer's requirements. Each structure is required to be designed and sealed by a professional engineer registered in Arizona.

We are not sure that barrel sections of all polymer concrete MH manufacturers include steel or fiberglass reinforcement. It would be good to verify this but if Note 8 below is followed and manufacturers take a look that should address this issue.

If you look at detail 419-1 in the notes, note 1 requires the manhole sections be manufactured in accordance with MAG section 744. 744 states all sections including barrel section be reinforced as required by the professional engineer.

- 3) Regarding different structural issues on strength, materials, reinforcing, etc., we should be protected by the requirement that an AZ structural engineer seal the manufacturer's drawings.
 - a. yes

- 4) Note 2 of Detail 419-2 says polymer concrete shall be 12,000 psi but U.S Composites only uses a 9,000 psi formulation per their specifications. Did we intend to exclude them from supplying MHs?
 - a. I was not in contact with U.S. Composites during the creation of this case. If you have a contact name and number I would be happy to send this to them for additional input.

- 5) Note 3 of Detail 419-2 says barrel connections (and we assume for precast base) shall be "positive connection type". We assume this includes bell and spigot or tongue and groove but we would suggest that the description includes made of the same material as the barrel sections themselves. Early on during development Armorock tried to use some type of plastic or fiberglass guide ring at the joint to align the barrel sections but we said we didn't like that and they moved on to a bell and spigot joint. We don't know if a guide ring could be considered a "positive connection type"? You might want to be more specific.
 - a. The joint sections are required to meet the ASTM C990 requirements. Section 7 of the ASTM standard states the joints shall be "Bell or groove on one end and spigot or tongue on the other end".

- 6) Under 744.1 General, the spec says polymer concrete barrels can be set on top of cast-in-place concrete bases poured in the field. We assume this means portland cement concrete? We believe at least one of the manufacturers can pour polymer concrete bases in the field if necessary. They are batched on site in a large portable mixer. So more research might be of benefit on this topic. If portland cement concrete is allowed as a base there should probably be a requirement on type of material, thickness, etc., to coat and protect the base from corrosion? There should probably be a note or specification reference on the Detail 419 regarding this issue, as details appear to only show precast bases of polymer concrete.
 - a. I spoke with ArmorRock and Solid cast Polymer about this issue. Both of the manufactures stated that they have means and methods to accomplish the connection between a cast in place Portland cement concrete manhole base and polymer riser sections (barrel sections).

- 7) Phoenix is a little concerned about allowing a minimum wall thickness of 2-inches, which is what Rock Hard SCP P3 utilizes but since the structural design must be sealed by an Arizona PE we guess that should protect users.
 - a. Your concern is well noted. With that said, the structure is required to be designed with the loading criteria that meets or exceeds the AASHTO M-306 H-20 design parameters and is sealed by the structural engineer.

- 8) Have you sent a copy of the specifications to the three (3) known (that is all we know about) manufacturers of polymer concrete MHs; Armorock, U.S. Composites, and Rock Hard SCP P3 to see if any elements of the specifications or details conflict with what they can provide?
 - a. Armorock and Solid Cast have both been very involved in this case. If you have contact information for U.S. Composites I would be happy to send this to them for additional input.

- 9) The specifications/details refer to Detail 422 for adjusting rings for frame and cover. Detail 422 is for portland cement adjusting rings. We don't know if any MAG City has enough experience with alternative non-corroding adjusting rings to support a specification for them to go along with the polymer MH specification? Phoenix is trying a few out but does not have any long term experience.
 - a. The city of chandler is working with a local manufacturer and supplier to bring a case forward in MAG for a non-corroding adjusting ring.

I really appreciate your comments. If there is additional information you would like or if I didn't answer your question please feel free to contact me and I will do what I can to get you the information you need.

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