

~ 0.95 → 1.0?

POST-TENSIONING GROUT – LABORATORY TEST.
(REV 5-14-14)

SUBARTICLE 938-4.2 is deleted and the following substituted:

• EUCLID SAYS
A MAX OF 1.0 WOULD
BE A FAIR THRESHOLD.

938-4.2 Laboratory Test: The grout shall meet or exceed the specified physical properties stated herein as determined by the following standard and modified ASTM and FM test methods conducted at normal laboratory temperature (65°F-78°F) and conditions. Conduct all grout tests with grout mixed to produce the minimum time of efflux. Establish the water content to produce the minimum and maximum time of efflux.

Property	Test Value	Test Method
Total Chloride Ions	Max. 0.41-20.8 lbs/yd ³	FM 5-516
Fine Aggregate (if utilized)	99% passing the No. 50 Sieve (300 micron)	ASTM C136*
Hardened Height Change @ 24 hours and 28 days	0.0% to + 0.2%	ASTM C1090**
Expansion	≤ 2.0% for up to 3 hours	ASTM C940
Wet Density - Laboratory	Report maximum and minimum obtained test value lb/ft ³	ASTM C185
Wet Density - Field	Report maximum and minimum obtained test value lb/ft ³	ASTM C138
Compressive Strength 28 day (Average of 3 cubes)	≥7,000psi	ASTM C942
Initial Set of Grout	Min. 3 hours Max. 12 hours	ASTM C953
Time of Efflux	***	***
(a) Immediately after mixing	Min. 20 Sec. Max. 30 Sec.	ASTM C939
	or Min. 9 Sec. Max. 20 Sec.	ASTM C939****
(b) 30 minutes after mixing with remixing for 30 sec	Max. 30 Sec.	ASTM C939
	or Max. 30 Sec.	ASTM C939****
Bleeding @ 3 hours	Max. 0.0 percent	ASTM C940*****
Permeability @ 28 days	Max. 2,500 coulombs at 30 V for 6 hours	ASTM C1202

*Use ASTM C117 procedure modified to use a #50 sieve. Determine the percent passing the #50 sieve after washing the sieve.
**Modify ASTM C1090 to include verification at both 24 hours and 28 days.
***Adjustments to flow rates will be achieved by strict compliance with the manufacturer's recommendations. The time of efflux is the time to fill a one liter container placed directly under the flow cone.

Thomas, Frances

From: Bergin, Michael
Sent: Thursday, June 05, 2014 8:33 AM
To: Thomas, Frances
Cc: Hurtado, Dan; Brautigam, Duane; Robertson, Robert; Scheer, Daniel; Mario Paredes (mparedes@ashto.org); Simmons, Ronald; Lasa, Ivan
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Frances:

After much discussion with Corrosion and others in Structural Materials and Construction, please replace the current value of 1.2 lbs/cyd of chlorides with 0.8 lbs/cyd of chlorides.

Please let me know if there are any additional questions and thanks for all of your efforts, ---- Mike

Michael Bergin, PE
State Structural Materials Engineer
State Materials Office
Gainesville, FL 32609
352-955-6666
New Email, michael.bergin@dot.state.fl.us

From: Thomas, Frances
Sent: Wednesday, June 04, 2014 8:44 AM
To: Bergin, Michael
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Before we move to Industry Review, would you like to respond?

Thanks.

Frances Thomas

Specifications Development Specialist
State Specifications/Estimates Office
Phone: (850) 414-4101
Fax: (850) 414-4199
frances.thomas@dot.state.fl.us

From: Brautigam, Duane
Sent: Wednesday, June 04, 2014 8:27 AM
To: Scheer, Daniel; Robertson, Robert
Cc: Thomas, Frances
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

So if we made a mistake in cutting chlorides so low manufacturers could not meet the spec, why would we continue to be more conservative than the FHWA recommendation, whatever that is? Since everyone, including FHWA, was so hard on Sika about their chlorides, there must have been a major change in thinking from the referenced FHWA study for them to reverse their position. Have we looked at what is practical from a manufacturing standpoint as opposed to a just some theoretical modest increase (i.e., more conservatism)? Reality is that manufacturers are not going to manufacture a special Florida grout. Why wouldn't we line up with the FHWA findings?

Duane F. Brautigam, P.E.
Director, Office of Design
Florida Department of Transportation
605 Suwannee Street, MS 38
Tallahassee, FL 32399-0450
(850) 414-4175
duane.brautigam@dot.state.fl.us

From: Robertson, Robert
Sent: Wednesday, June 04, 2014 8:10 AM
To: Brautigam, Duane; Vallier, Rick; Boyd, Charles
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

FYI

Robert V. Robertson, Jr., P.E.
State Structures Design Engineer
605 Suwannee St., MS 33
Tallahassee, Fl. 32399-0450
(850) 414-4267

From: Lasa, Ivan
Sent: Wednesday, June 04, 2014 8:06 AM
To: Robertson, Robert
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Robert:

Your statement is correct. On tendon grouts since the main components is cement (especially now that PTI is restricting the fillers), there are more hydroxides in the mix to passivate the steel. Therefore, it would take more chlorides to actually break that passivation and prompt corrosion as compared to standard concrete.

FHWA recent study regarding the high chlorides in the SIKA grout confirms the above. Because of the problems of industry meeting the 0.4 lb/CuYd limit, and based on the FHWA study, we made the decision to allow a modest increase in allowable chlorides. The change is a modest increase when compared to the FHWA findings, but because we consider that the FHWA study was somewhat limited and it is only one study, we want to stay conservative.

The proposed change will prevent that we run out of approved grouts while maintaining a still conservative approach.

So your statement is correct. The above just expands on it.

Ivan

From: Robertson, Robert
Sent: Tuesday, June 03, 2014 1:51 PM
To: Lasa, Ivan
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Maybe you can answer the questions below

Robert V. Robertson, Jr., P.E.
State Structures Design Engineer
605 Suwannee St., MS 33
Tallahassee, Fl. 32399-0450
(850) 414-4267

From: Robertson, Robert
Sent: Monday, June 02, 2014 1:38 PM
To: Bergin, Michael
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Is the following a true statement about what on the surface appears to be an allowable increase in the chloride content?

This was debated for a couple years as we went through the recent grout evaluation. The 0.4 value was the same as for concrete which contains many other components than just the cement and the low number was the result of the dilution of the chloride content of the cement portion by the remaining components. In grout, the cement is the main agent and thus the value is higher even though the cement is essentially the same as it was previously.

The 0.4 number was not achievable in the grout as currently required by the specifications.

Robert V. Robertson, Jr., P.E.
State Structures Design Engineer
605 Suwannee St., MS 33
Tallahassee, Fl. 32399-0450
(850) 414-4267

From: Brautigam, Duane
Sent: Monday, June 02, 2014 1:00 PM
To: Robertson, Robert
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Raising the allowable chloride content in PT grout??

Duane F. Brautigam, P.E.
Director, Office of Design
Florida Department of Transportation
605 Suwannee Street, MS 38
Tallahassee, FL 32399-0450
(850) 414-4175
duane.brautigam@dot.state.fl.us

From: Thomas, Frances
Sent: Friday, May 30, 2014 1:38 PM
To: Sadler, David A; Powell, Jr., Rudy; Davis, Greg; Boyd, Charles; McDaniel, Gevin; Lattner, Tim; Johnson, Calvin; Ruelke, Timothy J.; Brautigam, Duane; Tillander, Trey; Hollis, Melissa
Cc: Burluson, Bob - FL Transportation Builders Assn.; Scheer, Daniel; Hughes, Allen; Broxsie, Darrell D.; Toole, Deborah
Subject: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Please review the attached document and return any comments to me within 5 days for further processing.

Thanks,

Frances Thomas

Specifications Development Specialist

State Specifications/Estimates Office

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Fax: (850) 414-4199

frances.thomas@dot.state.fl.us

Thomas, Frances

From: Vinik, Paul
Sent: Wednesday, June 04, 2014 5:42 PM
To: Scheer, Daniel
Cc: Robertson, Robert; Hurtado, Dan; Lasa, Ivan; Bergin, Michael; Thomas, Frances; Brautigam, Duane; Paredes, Mario
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Dan: The same question was asked recently of Mario before sending this up by those here at SMO. Mario's response is below. He may respond again, and is of course copied.

From: Paredes, Mario
Sent: Wednesday, May 14, 2014 1:57 PM
To: Ruelke, Timothy J.; Bergin, Michael
Cc: Vinik, Paul; Lasa, Ivan
Subject: RE: Euco Cable Grout PTX QPL requalification

Tim,

This was part of the suggestions we had that were presented to the executive board in Tally at the end of last year. It is based on FHWA work where they found that the chlorides can be as high 0.4% (~very rough approximation about 5 Lbs/cyd) and not cause corrosion in a well hydrated mix.

Our chloride threshold has been 1.2 Lbs/cyd for concrete and other application since decades ago, so this is as high as we should go.

We do need to do the change because producers can not stay under the 0.4 lb/cyd limit all the time.

Thanks

From: Ruelke, Timothy J.
Sent: Wednesday, May 14, 2014 1:41 PM
To: Bergin, Michael
Cc: Paredes, Mario; Vinik, Paul
Subject: RE: Euco Cable Grout PTX QPL requalification

Would like confirmation from Mario.

Timothy J. Ruelke, P.E.
Director, Office of Materials
Florida Department of Transportation
5007 N.E. 39th Avenue
Gainesville, FL 32609
(352) 955-6620

From: Bergin, Michael
Sent: Wednesday, May 14, 2014 11:21 AM
To: Ruelke, Timothy J.
Cc: Paredes, Mario; Vinik, Paul
Subject: FW: Euco Cable Grout PTX QPL requalification

Tim

Prior to Mario leaving there was discussion to change the chloride requirements in Section 938, Post Tensioning Grout, to 1.2 lbs/cyd of chlorides based on their research and findings.

Since this is the only change, I would like to move this directly to the Specs Office for industry review. I don't believe the industry will have any issue with the change since it is relaxing what was thought to be the threshold for chlorides in the grouts.

In addition, we have a previously approved grout Euclid PTX that would like to provide their grout to a contractor under the new limits but need something from us in order to do that since the specification change has not been approved. Would you consider allowing Euclid to provide their PTX grout to the contractor?

Let me know when you can and please copy all, thanks ---- Mike

Michael Bergin, PE
State Structural Materials Engineer
State Materials Office
Gainesville, FL 32609
352-955-6666
New Email, michael.bergin@dot.state.fl.us

From: Paredes, Mario
Sent: Wednesday, May 14, 2014 10:08 AM
To: Jeffrey Ohler
Cc: Brian Lewis; Bergin, Michael; Frank, Thomas
Subject: RE: Euco Cable Grout PTX QPL requalification

Mike,

Can you check with Tim if there is anything he can do?

Thanks

From: Jeffrey Ohler <JOhler@euclidchemical.com>
Sent: Wednesday, May 14, 2014 9:27 AM
To: Paredes, Mario
Cc: Brian Lewis; Bergin, Michael; Frank, Thomas
Subject: RE: Euco Cable Grout PTX QPL requalification

Mario,

We currently are in the process of reviewing a specification for SR 417/Boggy Creek in FL. The only discrepancy we see is the 0.40 lb/yd of maximum chloride when tested according to FM 5-516. Since the proposed specification change will not be completed for some time, are you able to supply us with some documentation stating Euco Cable Grout PTX is an acceptable material for the SR 417/Boggy Creek project?

Jeff Ohler
Grout and Mortar Technical Manager

The Euclid Chemical Company

19320 Redwood Rd.

Cleveland OH 44110

(216) 692.8296

(216) 531.9399 fax

"Paredes, Mario" <Mario.Paredes@dot.state.fl.us>

05/14/2014 08:43 AM To Brian Lewis <BLewis@euclidchemical.com>,

cc "Bergin, Michael" <Michael.Bergin@dot.state.fl.us>, "Frank, Thomas" <Thomas.Frank@dot.state.fl.us>, Jeffrey Ohler <JOhler@euclidchemical.com>

SubjectRE: Euco Cable Grout PTX QPL requalification

Brian,

I talked to Mike this morning. He tells me that a Materials Memo can not go out until FHWA approves the change in the spec. This is the last step in a very lengthy process of spec modification.

I am sending him the spec change today to start the process but it will be a while before you see it.

How fast do you need this?

Thanks

From: Brian Lewis <BLewis@euclidchemical.com>

Sent: Monday, May 12, 2014 4:17 PM

To: Paredes, Mario

Cc: Bergin, Michael; Frank, Thomas; Jeffrey Ohler

Subject: RE: Euco Cable Grout PTX QPL requalification

Mario, Can you send me a copy of the Memorandum with the change on the amount of permissible chloride form your email below.

Thank You

Brian Lewis

DOT Products Manager

Office phone: 216-692-8305

Cellular phone: 216-375-9027

Fax: 216-531-9399

lewisbr@euclidchemical.com

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From: "Paredes, Mario" <Mario.Paredes@dot.state.fl.us>
To: "Frank, Thomas" <Thomas.Frank@dot.state.fl.us>, Brian Lewis <BLewis@euclidchemical.com>
Cc: "zveres@euclidchemical.com" <zveres@euclidchemical.com>, "Bergin, Michael" <Michael.Bergin@dot.state.fl.us>
Date: 11/26/2013 10:54 AM
Subject: RE: Euco Cable Grout PTX QPL requalification

Thomas,

We discussed this today as part of SMS's Lead Staff meeting. We are going to issue a Memorandum with the change. I will prepare it today or tomorrow and it will go out next week.

Thanks

Mario A. Paredes, PE
State Corrosion Engineer
Corrosion Research Laboratory
Structural Materials Unit
State Materials Office
Florida Department of Transportation
5007 NE 39th Avenue
Gainesville, Fl. 32609
mario.paredes@dot.state.fl.us
352-955-6690
Work Hours: M to F 8:00am to 4:30pm

Due to the multiple exciting projects I am involved throughout the state of Florida, some things fall through the cracks. If I have not responded to your email within 2 days, please do not hesitate to send me a reminder.

From: Frank, Thomas
Sent: Tuesday, November 26, 2013 9:00 AM
To: Paredes, Mario; Brian Lewis
Cc: zveres@euclidchemical.com; Bergin, Michael
Subject: RE: Euco Cable Grout PTX QPL requalification

Brian,

Please disregard my previous email. There is no need to send the additional samples, given that there may be a specification change on the horizon regarding PT grout chloride content requirements.

I will report out the requalification test results shortly after the 28 day physical testing is complete in mid-December.

Thank you,

Thomas Frank
Structural Materials Evaluation Specialist FDOT State Materials Office
5007 NE 39th Avenue
Gainesville, FL 32609
ph (352)955-6649
fax (850) 412-8130
email: thomas.frank@dot.state.fl.us
work hours: M-F 7:00-3:30

Please note: Florida has a very broad public records law. Most written communications to or from state officials regarding state business are public records available to the public and media upon request. Your e-mail communications may be subject to public disclosure.

From: Paredes, Mario
Sent: Tuesday, November 26, 2013 8:38 AM
To: Brian Lewis; Frank, Thomas
Cc: zveres@euclidchemical.com; Bergin, Michael
Subject: RE: Euco Cable Grout PTX QPL requalification

Thomas,

We are going to change it to 1.2 Lbs/Cyd.

Let's discuss this with Mike.

Mario A. Paredes, PE
State Corrosion Engineer
Corrosion Research Laboratory
Structural Materials Unit
State Materials Office
Florida Department of Transportation
5007 NE 39th Avenue
Gainesville, Fl. 32609
mario.paredes@dot.state.fl.us
352-955-6690
Work Hours: M to F 8:00pm to 4:30pm

Due to the multiple exciting projects I am involved throughout the state of Florida, some things fall through the cracks. If I have not responded to your email within 2 days, please do not hesitate to send me a reminder.

From: Brian Lewis [mailto:BLewis@euclidchemical.com]

Sent: Tuesday, November 26, 2013 8:35 AM
To: Frank, Thomas
Cc: zveres@euclidchemical.com; Paredes, Mario
Subject: Re: Euco Cable Grout PTX QPL requalification

Hello Thomas.

Sorry, I just got your phone message. I've been out because my Mom died.

You said that our PTX grout was out of spec at 0.5 lbs/yd³ chloride(?)

Last I heard Mario was changing the spec to 1.2 lbs/yd³.

We have had many discussions concerning the current specification.

The sample you tested is from the same lot we tested and obtained 0.37 lbs/yd³ chloride.

If the spec of 0.4 lbs/yd³ chloride is going to remain, then we may have difficulty in supplying grout.

Please let me know if the spec will be changed to a higher amount.

I will get with production and have new samples sent to you asap.

Thank You

Brian Lewis
DOT Products Manager

Office phone: 216-692-8305
Cellular phone: 216-375-9027
Fax: 216-531-9399
lewisbr@euclidchemical.com

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"Frank, Thomas" <Thomas.Frank@dot.state.fl.us>

11/26/2013 06:59 AM

To "lewisbr@euclidchemical.com" <lewisbr@euclidchemical.com>,

cc "zveres@euclidchemical.com" <zveres@euclidchemical.com>

Subject Euco Cable Grout PTX QPL requalification

Brian,

As a follow up to my voicemail to you on 11/25 regarding the Euco Cable Grout PTX requalification, the chloride content from the sample submitted (#5847699, manufacture date 9/24/2013) exceeded the maximum allowed amount of 0.4 lbs./cubic ft. (per FDOT Spec 938).

Please submit 2 bags from different lots and we will re-test.

Thank you,

Thomas Frank
Structural Materials Evaluation Specialist FDOT State Materials Office
5007 NE 39th Avenue
Gainesville, FL 32609
ph (352)955-6649
fax (850) 412-8130
email: thomas.frank@dot.state.fl.us
work hours: M-F 7:00-3:30

Please note: Florida has a very broad public records law. Most written communications to or from state officials regarding state business are public records available to the public and media upon request. Your e-mail communications may be subject to public disclosure.

Thanks,
Paul

Paul Vinik, P.E.
State Structural Material Systems Engineer
5007 N.E. 39th Avenue, Gainesville, FL. 32609 Paul.Vinik@dot.state.fl.us
352-955-6686 (ofc)
352-231-5335 (cell)
Work hrs = M-Tr 7:30AM-5:30PM; Fr 7:30-11:30AM

-----Original Message-----

From: Lasa, Ivan

Sent: Wednesday, June 04, 2014 4:17 PM

To: Scheer, Daniel; Paredes, Mario; Bergin, Michael; Thomas, Frances; Brautigam, Duane

Cc: Robertson, Robert; Hurtado, Dan

Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Dan: I would let Mario comment on that since he is the lead person.

Ivan

-----Original Message-----

From: Scheer, Daniel

Sent: Wednesday, June 04, 2014 3:15 PM

To: Lasa, Ivan; Paredes, Mario; Bergin, Michael; Thomas, Frances; Brautigam, Duane

Cc: Robertson, Robert; Hurtado, Dan

Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Mario / Ivan:

Is FHWA/PTI still using the 0.08% by weight of cement? We had that value in the JAN2010 Spec Book, and subsequently modified it in the JAN2012 Workbook, where it remained till this latest update (see attached).

Should we just go back to the PTI standard of 0.08% by weight of cement, or is 1.2 a number that industry can meet and we prefer?

I guess I am trying to play head 'middle-man' here and find a solution that industry can meet, design and materials are comfortable with, and we can expect to perform in our state to the high standard we demand...

Thanks for everyone's input and dialog, this all helps make our Specs the best in the nation.

V/r,

Dan

Daniel L. Scheer, P.E.

State Specifications Engineer

(850) 414-4130

LCDR, CEC, USN(R)

“Seabees Can Do!”

-----Original Message-----

From: Lasa, Ivan

Sent: Wednesday, June 04, 2014 10:40 AM

To: Paredes, Mario; Bergin, Michael; Thomas, Frances; Brautigam, Duane

Cc: Scheer, Daniel; Robertson, Robert; Hurtado, Dan

Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

All:

Following up on Mario's Response,

Seems that we should clarify that the FHWA study is not a specification. They just showed some results for a particular situation. The recommendations were for the particular situation with SIKA and they attached some out of the ordinary conditions for more frequent inspections for the structures with tendons with chlorides in the higher end, and based on their location (believe we do not want that).

I personally believe that the study was not an open statement recommending for agencies to adopt those high limits. We have done numerous tests of grouts. At this time, there is NOT a confirmed study that establishes what is the chloride threshold for grouts, since the formulation of each of these grouts is different. Understand that the Department do not have control of the formulations or the material sources for the grouts. Therefore, the most reasonable specification approach would be to establish a value that would ensure that no corrosion develops under the known possible scenarios.

If the problem is the language on my email that indicates a "conservative approach", I apologize. Remember, that we always need to find that balance as to how far we go to accommodate Industry and what is best for the Department and tax payers.

Regards
Ivan

-----Original Message-----

From: Paredes, Mario [mailto:mparedes@aaashto.org]

Sent: Wednesday, June 04, 2014 10:21 AM

To: Bergin, Michael; Thomas, Frances; Brautigam, Duane

Cc: Scheer, Daniel; Robertson, Robert; Lasa, Ivan; Hurtado, Dan

Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Ya'll,

First a couple of clarifications.

1. On the suggestion that I made a mistake by choosing a low chloride. The low level chosen (0.4 Lbs/cyd) at the time the issue with segregated grout showed up was the easy choice at a time when we knew very little as to what caused the problem. Euclid was able to produce grout for a while by putting strict requirements on their cement source. As Sika stopped producing grout and Euclid became the dominant source of PT Grout in the nation, this became increasingly more difficult for Euclid. However, it did prove that it is possible to produce a low chloride grout for Florida only without increasing the cost.

2. On the manufacturers producing a grout for Florida only. If we are going to stop these things from happening again, it may require a grout exclusively for Florida regardless of cost. It is a lot cheaper to pay for a cement designed for the application than to deal with the repair consequences that we are facing today in traffic disruption and destructive examination of tendons. The AASHTO and ASTM cement specs will allow a jumbo jet thru and these were not created for prevention of segregation but rather for strength.

3. The FHWA study on chlorides was based on non-segregated grout only. In other words, well-hydrated mixes that hydrated completely. The corrosion that they saw was only during the initial wet setup time. In fact, I understand that at least one mix had segregation (with heavy extended corrosion) and the data was kept out because FHWA felt that the study was about chlorides, not segregation. They were trying not to scare the states.

4. There is a lot of argument as to what the chloride threshold is but it ranges from about 1 lb/yd to almost 10. However, it is clear that the low limit is possible and will happen. FHWA found significant corrosion at 0.4% of total cementitious (~5 lbs/cyd depending on manufacturer). They did confirm that corrosion starts about 1lb/cyd albeit characterize as slight corrosion.

5. 1.2 Lbs/cyd has been FDOT chloride threshold since way before my time (Tobby Larsen), it has served us well as we have the best marine program in the nation. So being conservative is not a bad idea and can come at minor cost.

6. Monitoring production. We have been testing grouts that are used at the projects since 2011 when the issue appeared. Euclid data has shown that they can achieve 0.5 as a target and they indicated that they can stay below 0.6 using regular ASTM/AASHTO cements.

So based on those points, our monitoring of delivered grouts, and FHWA report, I think 1.2 is quite aggressive while still serving our conservative approach with a material that has a lot of uncertainties in terms of performance.

By the way, Dan Hurtado has requested lowering the number to 0.8 Lbs/cyd, so I suggest Design and construction get together to decide on the number to use. I do not support any number about 1.2 but I can be overridden by management any time.

If you guys would like to talk I can get on the phone just about any time. I am in a pavement preservation meeting today until about 1:30 PM.

I hope you find that info helpful.

From: Bergin Michael J
Sent: Wednesday, June 04, 2014 9:05 AM
To: Thomas, Frances; Brautigam Duane
Cc: Scheer, Daniel; Robertson Robert V.; Lasa, Ivan; Paredes, Mario
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Frances and Duane:

The value selected was not “some theoretical modest increase” or an arbitrarily selected value. It was based on data collected through research and was within the comfort level of the Corrosion Section of the State Materials Office. Several of us in this office have been directly involved in the discussions of chlorides and specifically in the discussion of chlorides allowed in PT grouts.

Mario, I don't think we've convinced the folks in central office that the 1.2 pounds per cubic yard is a reasonable maximum value for chlorides in PT grouts. Please provide input to resolve the issue so we can get this approved. If necessary suggest some additional value that will provide them with some level of comfort. Please respond when you can and thanks in advance for your input.

Michael Bergin, PE
State Structural Materials Engineer

State Materials Office
Gainesville, FL 32609
352-955-6666
New Email, michael.bergin@dot.state.fl.us

From: Thomas, Frances
Sent: Wednesday, June 04, 2014 8:44 AM
To: Bergin, Michael
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Before we move to Industry Review, would you like to respond?

Thanks.

Frances Thomas
Specifications Development Specialist
State Specifications/Estimates Office
Phone: (850) 414-4101
Fax: (850) 414-4199
frances.thomas@dot.state.fl.us<mailto:frances.thomas@dot.state.fl.us>

From: Brautigam, Duane
Sent: Wednesday, June 04, 2014 8:27 AM
To: Scheer, Daniel; Robertson, Robert
Cc: Thomas, Frances
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

So if we made a mistake in cutting chlorides so low manufacturers could not meet the spec, why would we continue to be more conservative than the FHWA recommendation, whatever that is? Since everyone, including FHWA, was so hard on Sika about their chlorides, there must have been a major change in thinking from the referenced FHWA study for them to reverse their position. Have we looked at what is practical from a manufacturing standpoint as opposed to a just some theoretical modest increase (i.e., more conservatism)? Reality is that manufacturers are not going to manufacture a special Florida grout. Why wouldn't we line up with the FHWA findings?

Duane F. Brautigam, P.E.
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Tallahassee, FL 32399-0450
(850) 414-4175
duane.brautigam@dot.state.fl.us<mailto:duane.brautigam@dot.state.fl.us>

From: Robertson, Robert
Sent: Wednesday, June 04, 2014 8:10 AM
To: Brautigam, Duane; Vallier, Rick; Boyd, Charles
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

FYI

Robert V. Robertson, Jr., P.E.

State Structures Design Engineer
605 Suwannee St., MS 33
Tallahassee, Fl. 32399-0450
(850) 414-4267

From: Lasa, Ivan
Sent: Wednesday, June 04, 2014 8:06 AM
To: Robertson, Robert
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Robert:

Your statement is correct. On tendon grouts since the main components is cement (especially now that PTI is restricting the fillers), there are more hydroxides in the mix to passivate the steel. Therefore, it would take more chlorides to actually break that passivation and prompt corrosion as compared to standard concrete.

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The proposed change will prevent that we run out of approved grouts while maintaining a still conservative approach.

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Sent: Tuesday, June 03, 2014 1:51 PM
To: Lasa, Ivan
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

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To: Bergin, Michael
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From: Brautigam, Duane
Sent: Monday, June 02, 2014 1:00 PM
To: Robertson, Robert
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Raising the allowable chloride content in PT grout??

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Florida Department of Transportation
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From: Thomas, Frances
Sent: Friday, May 30, 2014 1:38 PM
To: Sadler, David A; Powell, Jr., Rudy; Davis, Greg; Boyd, Charles; McDaniel, Gevin; Lattner, Tim; Johnson, Calvin; Ruelke, Timothy J.; Brautigam, Duane; Tillander, Trey; Hollis, Melissa
Cc: Burleson, Bob - FL Transportation Builders Assn.; Scheer, Daniel; Hughes, Allen; Broxsie, Darrell D.; Toole, Deborah
Subject: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Please review the attached document and return any comments to me within 5 days for further processing.

Thanks,

Frances Thomas
Specifications Development Specialist
State Specifications/Estimates Office

Phone: (850) 414-4101

Fax: (850) 414-4199

frances.thomas@dot.state.fl.us<mailto:frances.thomas@dot.state.fl.us>

Thomas, Frances

From: Paredes, Mario <mparedes@ashto.org>
Sent: Wednesday, June 04, 2014 3:28 PM
To: Scheer, Daniel; Lasa, Ivan; Bergin, Michael; Thomas, Frances; Brautigam, Duane
Cc: Robertson, Robert; Hurtado, Dan; Simmons, Ronald
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Lutente,

They are using a similar number but now it is reference to total cementitious and not just cement. I think 1.2 Lbs is actually very aggressive but still safe at the same time. I didn't come by this number easily. In fact, Ron Simmons was concerned I was going too high.

1.2 meets all the criteria you give below plus it is our chloride threshold. It is connected logically to what we use for concrete so it doesn't look like we got the number out of the air.

One item to keep in mind is that the formulation of PT grouts changes with the source of cement. SIKA had 4 plants using 4 different cements each (producing the same grout product) and the percent of cement went from 53% to something like 85%.

The amount of cement was determined by the properties of the cement so that they could get all the flow properties of the PTI spec. Do not think that PT Grouts are consistent within one manufacturer. In fact, they can change from batch to batch.

Is Pat still your marine boss or did you jump him already?

Thanks

Mario A. Paredes, P.E.
Engineering Management Fellow
Phone: 202-624-3632
Fax: 202-624-5469
Email: mparedes@ashto.org

444 North Capitol Street NW
Suite 249
Washington, DC 20001
www.transportation.org

-----Original Message-----

From: Scheer, Daniel [<mailto:Daniel.Scheer@dot.state.fl.us>]
Sent: Wednesday, June 04, 2014 3:15 PM
To: Lasa, Ivan; Paredes, Mario; Bergin Michael J; Thomas, Frances; Brautigam Duane
Cc: Robertson Robert V.; Hurtado, Dan
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Mario / Ivan:

Is FHWA/PTI still using the 0.08% by weight of cement? We had that value in the JAN2010 Spec Book, and subsequently modified it in the JAN2012 Workbook, where it remained till this latest update (see attached).

Should we just go back to the PTI standard of 0.08% by weight of cement, or is 1.2 a number that industry can meet and we prefer?

I guess I am trying to play head 'middle-man' here and find a solution that industry can meet, design and materials are comfortable with, and we can expect to perform in our state to the high standard we demand...

Thanks for everyone's input and dialog, this all helps make our Specs the best in the nation.

V/r,

Dan

Daniel L. Scheer, P.E.
State Specifications Engineer
(850) 414-4130

LCDR, CEC, USN(R)
"Seabees Can Do!"

-----Original Message-----

From: Lasa, Ivan
Sent: Wednesday, June 04, 2014 10:40 AM
To: Paredes, Mario; Bergin, Michael; Thomas, Frances; Brautigam, Duane
Cc: Scheer, Daniel; Robertson, Robert; Hurtado, Dan
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

All:

Following up on Mario's Response,

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If the problem is the language on my email that indicates a "conservative approach", I apologize. Remember, that we always need to find that balance as to how far we go to accommodate Industry and what is best for the Department and tax payers.

Regards

Ivan

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Sent: Wednesday, June 04, 2014 10:21 AM

To: Bergin, Michael; Thomas, Frances; Brautigam, Duane

Cc: Scheer, Daniel; Robertson, Robert; Lasa, Ivan; Hurtado, Dan

Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

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So based on those points, our monitoring of delivered grouts, and FHWA report, I think 1.2 is quite aggressive while still serving our conservative approach with a material that has a lot of uncertainties in terms of performance.

By the way, Dan Hurtado has requested lowering the number to 0.8 Lbs/cyd, so I suggest Design and construction get together to decide on the number to use. I do not support any number about 1.2 but I can be overridden by management any time.

If you guys would like to talk I can get on the phone just about any time. I am in a pavement preservation meeting today until about 1:30 PM.

I hope you find that info helpful.

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Sent: Wednesday, June 04, 2014 9:05 AM
To: Thomas, Frances; Brautigam Duane
Cc: Scheer, Daniel; Robertson Robert V.; Lasa, Ivan; Paredes, Mario
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

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Michael Bergin, PE
State Structural Materials Engineer
State Materials Office
Gainesville, FL 32609
352-955-6666
New Email, michael.bergin@dot.state.fl.us

From: Thomas, Frances
Sent: Wednesday, June 04, 2014 8:44 AM
To: Bergin, Michael
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Before we move to Industry Review, would you like to respond?

Thanks.

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Specifications Development Specialist
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Fax: (850) 414-4199
frances.thomas@dot.state.fl.us<mailto:frances.thomas@dot.state.fl.us>

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Cc: Thomas, Frances
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FYI

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Thomas, Frances

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Cc: Scheer, Daniel; Robertson, Robert; Hurtado, Dan
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Expires: Saturday, October 17, 2015 12:00 AM

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Thomas, Frances

From: Lasa, Ivan
Sent: Wednesday, June 04, 2014 4:17 PM
To: Scheer, Daniel; Paredes, Mario; Bergin, Michael; Thomas, Frances; Brautigam, Duane
Cc: Robertson, Robert; Hurtado, Dan
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Expires: Saturday, October 17, 2015 12:00 AM

Dan: I would let Mario comment on that since he is the lead person.

Ivan

-----Original Message-----

From: Scheer, Daniel
Sent: Wednesday, June 04, 2014 3:15 PM
To: Lasa, Ivan; Paredes, Mario; Bergin, Michael; Thomas, Frances; Brautigam, Duane
Cc: Robertson, Robert; Hurtado, Dan
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Mario / Ivan:

Is FHWA/PTI still using the 0.08% by weight of cement? We had that value in the JAN2010 Spec Book, and subsequently modified it in the JAN2012 Workbook, where it remained till this latest update (see attached).

Should we just go back to the PTI standard of 0.08% by weight of cement, or is 1.2 a number that industry can meet and we prefer?

I guess I am trying to play head 'middle-man' here and find a solution that industry can meet, design and materials are comfortable with, and we can expect to perform in our state to the high standard we demand...

Thanks for everyone's input and dialog, this all helps make our Specs the best in the nation.

V/r,

Dan

Daniel L. Scheer, P.E.
State Specifications Engineer
(850) 414-4130

LCDR, CEC, USN(R)
"Seabees Can Do!"

-----Original Message-----

From: Lasa, Ivan
Sent: Wednesday, June 04, 2014 10:40 AM
To: Paredes, Mario; Bergin, Michael; Thomas, Frances; Brautigam, Duane
Cc: Scheer, Daniel; Robertson, Robert; Hurtado, Dan

Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

All:

Following up on Mario's Response,

Seems that we should clarify that the FHWA study is not a specification. They just showed some results for a particular situation. The recommendations were for the particular situation with SIKKA and they attached some out of the ordinary conditions for more frequent inspections for the structures with tendons with chlorides in the higher end, and based on their location (believe we do not want that).

I personally believe that the study was not an open statement recommending for agencies to adopt those high limits. We have done numerous tests of grouts. At this time, there is NOT a confirmed study that establishes what is the chloride threshold for grouts, since the formulation of each of these grouts is different. Understand that the Department do not have control of the formulations or the material sources for the grouts. Therefore, the most reasonable specification approach would be to establish a value that would ensure that no corrosion develops under the known possible scenarios.

If the problem is the language on my email that indicates a "conservative approach", I apologize. Remember, that we always need to find that balance as to how far we go to accommodate Industry and what is best for the Department and tax payers.

Regards

Ivan

-----Original Message-----

From: Paredes, Mario [mailto:mparedes@ashto.org]

Sent: Wednesday, June 04, 2014 10:21 AM

To: Bergin, Michael; Thomas, Frances; Brautigam, Duane

Cc: Scheer, Daniel; Robertson, Robert; Lasa, Ivan; Hurtado, Dan

Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Ya'll,

First a couple of clarifications.

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understand that at least one mix had segregation (with heavy extended corrosion) and the data was kept out because FHWA felt that the study was about chlorides, not segregation. They were trying not to scare the states.

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5. 1.2 Lbs/cyd has been FDOT chloride threshold since way before my time (Tobby Larsen), it has served us well as we have the best marine program in the nation. So being conservative is not a bad idea and can come at minor cost.

6. Monitoring production. We have been testing grouts that are used at the projects since 2011 when the issue appeared. Euclid data has shown that they can achieve 0.5 as a target and they indicated that they can stay below 0.6 using regular ASTM/AASHTO cements.

So based on those points, our monitoring of delivered grouts, and FHWA report, I think 1.2 is quite aggressive while still serving our conservative approach with a material that has a lot of uncertainties in terms of performance.

By the way, Dan Hurtado has requested lowering the number to 0.8 Lbs/cyd, so I suggest Design and construction get together to decide on the number to use. I do not support any number about 1.2 but I can be overridden by management any time.

If you guys would like to talk I can get on the phone just about any time. I am in a pavement preservation meeting today until about 1:30 PM.

I hope you find that info helpful.

From: Bergin Michael J
Sent: Wednesday, June 04, 2014 9:05 AM
To: Thomas, Frances; Brautigam Duane
Cc: Scheer, Daniel; Robertson Robert V.; Lasa, Ivan; Paredes, Mario
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Frances and Duane:

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Michael Bergin, PE
State Structural Materials Engineer
State Materials Office
Gainesville, FL 32609
352-955-6666
New Email, michael.bergin@dot.state.fl.us

From: Thomas, Frances
Sent: Wednesday, June 04, 2014 8:44 AM
To: Bergin, Michael
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Before we move to Industry Review, would you like to respond?

Thanks.

Frances Thomas
Specifications Development Specialist
State Specifications/Estimates Office
Phone: (850) 414-4101
Fax: (850) 414-4199
frances.thomas@dot.state.fl.us<mailto:frances.thomas@dot.state.fl.us>

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Sent: Wednesday, June 04, 2014 8:27 AM
To: Scheer, Daniel; Robertson, Robert
Cc: Thomas, Frances
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

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Tallahassee, FL 32399-0450
(850) 414-4175
duane.brautigam@dot.state.fl.us<mailto:duane.brautigam@dot.state.fl.us>

From: Robertson, Robert
Sent: Wednesday, June 04, 2014 8:10 AM
To: Brautigam, Duane; Vallier, Rick; Boyd, Charles
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

FYI

Robert V. Robertson, Jr., P.E.
State Structures Design Engineer
605 Suwannee St., MS 33
Tallahassee, Fl. 32399-0450
(850) 414-4267

From: Lasa, Ivan
Sent: Wednesday, June 04, 2014 8:06 AM
To: Robertson, Robert
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Robert:

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The proposed change will prevent that we run out of approved grouts while maintaining a still conservative approach.

So your statement is correct. The above just expands on it.

Ivan

From: Robertson, Robert
Sent: Tuesday, June 03, 2014 1:51 PM
To: Lasa, Ivan
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Maybe you can answer the questions below

Robert V. Robertson, Jr., P.E.
State Structures Design Engineer
605 Suwannee St., MS 33
Tallahassee, Fl. 32399-0450
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From: Robertson, Robert
Sent: Monday, June 02, 2014 1:38 PM
To: Bergin, Michael
Subject: RE: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

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Raising the allowable chloride content in PT grout??

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From: Thomas, Frances
Sent: Friday, May 30, 2014 1:38 PM
To: Sadler, David A; Powell, Jr., Rudy; Davis, Greg; Boyd, Charles; McDaniel, Gevin; Lattner, Tim; Johnson, Calvin; Ruelke, Timothy J.; Brautigam, Duane; Tillander, Trey; Hollis, Melissa
Cc: Burleson, Bob - FL Transportation Builders Assn.; Scheer, Daniel; Hughes, Allen; Broxsie, Darrell D.; Toole, Deborah
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Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test
Attachments: 9380402.Internal.doc

We received the following comment during our Internal Review. Before proceeding to Industry Review, would you like to respond?

Thanks.

Frances Thomas

Specifications Development Specialist
State Specifications/Estimates Office
Phone: (850) 414-4101
Fax: (850) 414-4199
frances.thomas@dot.state.fl.us

From: Hurtado, Dan
Sent: Monday, June 02, 2014 3:21 PM
To: Thomas, Frances
Cc: Powell, Jr., Rudy
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

After speaking with Ron Simmons and Mario Paredes, the State Construction Office requests the State Materials Office to re-evaluate the proposed chloride limit. 0.4pcy is difficult to attain and 1.2pcy is the anticipated corrosion threshold. PT mixing water may also introduce additional chlorides. Based on recent problems with PT grout and tendon corrosion, request that SMO re-consider a limit which is both conservative and attainable.

Dan L. Hurtado, P.E.
State Construction Structures Engineer
Office of Construction
Florida Department of Transportation
605 Suwannee Street, MS#31
Tallahassee, FL 32399-0431
Phone: (850) 414-4155
Fax: (850) 414-8021

From: Powell, Jr., Rudy
Sent: Friday, May 30, 2014 11:28 PM
To: Hurtado, Dan
Subject: FW: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Comments/ concerns? Raising the chloride content is a shift from a few years ago. What grouts meet the 0.4 and now what grouts will meet the 1.2?

From: Thomas, Frances

Sent: Friday, May 30, 2014 1:38 PM

To: Sadler, David A; Powell, Jr., Rudy; Davis, Greg; Boyd, Charles; McDaniel, Gevin; Lattner, Tim; Johnson, Calvin; Ruelke, Timothy J.; Brautigam, Duane; Tillander, Trey; Hollis, Melissa

Cc: Burluson, Bob - FL Transportation Builders Assn.; Scheer, Daniel; Hughes, Allen; Broxsie, Darrell D.; Toole, Deborah

Subject: Internal Review 9380402 Post-Tensioning Grout - Laboratory Test

Please review the attached document and return any comments to me within 5 days for further processing.

Thanks,

Frances Thomas

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