

OPSS.PROV 914

Comments received by TCP			
Comment ID	Organization	Comment	Response
No comments were received on the TCP portal, all comments were sent via e-mail, see table below.			

Comments received by email			
Number	Organization	Comment	Response
1	McAsphalt	In the OPSS 914 there is a cold weather plan but nothing in place for hot/humid weather should there be something in place for that?	There is no requirement for a hot/humid weather plan. Primer and membrane would take longer to cure/set, but MTO does not have a specific concern that would require submission of a hot weather plan.
2	McAsphalt	As well we have concerns about the cold weather plan being put in place with the 0-5° to waterproof but the deck/culvert has to be above 10° which means the season to waterproof will be shortened to start and end the season.	The current (2014) specification does not allow waterproofing below 5° C, the update has allowed waterproofing at temperatures between 0 and 5° C, with an acceptable plan. The specified requirement of 10 ° C, is to ensure that the deck retains heat once the protection is removed, and is required if waterproofing is done at temperatures below 5° C.
3	McAsphalt	Also concern about the no rain or moisture on the deck for 72 hours prior to the start of the waterproofing but is that realistic given the shortened time frame to get work completed.	This is a long-standing requirement (in OPSS 904 for structures) to ensure that the concrete is dry prior to placement of waterproofing. There is no change, other than to include the requirement in OPSS 914.
4	McAsphalt	A big concern for us as a manufacturer is the requirement for the contractors to arrive on site with an empty kettle and then at the end of the day use what is in the kettle to precisely finish the project with an empty kettle. Is that realistic and what about the material in the kettle at the end of the day is that now a waste material as in your specification there is no reheating of material allowed. Also, as the kettle is being emptied as it reaches the end of the deck is that material going to be less mixed and more of the kettle	This is specified to ensure that waterproofing material is not overheated. Agitators can't start until material is hot, so there is a concern with overheating of the non-agitating membrane if the kettle is not empty. In addition, the CA can't confirm the product name, if it isn't added to the kettle in the presence of the CA. If the CA can't verify the material that is added, there is a concern that the DSM waterproofing could be mixed with materials previously heated in the kettle. This requirement is unchanged, and is in the current (2014) version of OPSS 914.

		bottoms as the majority of the kettles in Ontario use a sweep agitator which does not actually help keep material in suspension. Seems like an extra cost for projects is going to be happening.	
5	McAsphalt	As with all the other manufacturers we are concerned with the level of debate over bubbling and or pinholing which inspectors throughout the Province are engaging with our customers and applicators. Perhaps it is time to actually enforce or introduce the 2 ply system as the standard instead of testing a square meter at the start of the project and then make the decision. This seems to work best with the lowering of the Cone Penetration from 160 down to 140 on the 50° C which I believe was the specification for super elevated bridge decks anyway. Just seems to make common sense.	MTO has decided to follow this recommendation, which is consistent with the recommendation of another DSM supplier (see comments 9 and 18, below), to specify the two-layer method in the updated 914. The specification has been modified to specify the two-layer waterproofing, interlayered with membrane reinforcement. MTO will continue to monitor and assess the performance of the two-layer waterproofing system.
6	McAsphalt	Should we have a better definition of bubbling and pinholing to clarify what these are so there is no ambiguity when decisions are being made.	Photograph examples of acceptable and excessive bubbling have been included in the new field guide for waterproofing.
7	McAsphalt	One comment on the OPSS 1216 the acceptance requirement first temperature should read as 190°C not 90°C.	Thank you, error was corrected.
8	Crafco	914.04.01.01 <ul style="list-style-type: none"> • C)iii – size of batch or lot – not currently included on packaging. Is this to be included or simply 	MTO wants to have a record of the manufacturer's lot number for the waterproofing, to allow identification of any deficient material used on other contracts with the same lot, should testing indicate unacceptable material.

		part of submittal? Why is this needed or relevant?	
9	Crafc	914.04.01.02 Include “hot weather / humid conditions protection plan” - or, in lieu of a protection plan, perhaps all systems should be fully reinforced and included as part of the project bidding parameters. Other than bridges where the rest of the country follows MTO, the industry moved away from single layer systems back in the 90s.	Please see response to comment 5, above.
10	Crafc	<ul style="list-style-type: none"> Define pinholing / bubbling <p><u>Suggested language regarding pinholing, air voids, etc.</u> The presence of bubbles is a sign that relatively low levels of moisture are being outgassed and won't inhibit the membrane adhesion. Additional causes can include vapor from primer if not fully cured, texture and/or roughness of the deck can entrap air – a gas which will also expand under heat. Normal off gassing bubbles will dissipate with the installation of the protection board and should not be of concern. With high moisture levels, larger bubbles are created leaving unprotected deck, and this is what is called a pinhole. While the physical action of creating bubbles is the same, the finish of the installation is varied as a result of the level of the presence of water. When a pinhole is present and there is unprotected deck,</p>	<p>MTO specifications do not attempt to provide explanations or reasons for specified requirements.</p> <p>The term pinhole isn't used in 914. Rather, 914 refers to discontinuities, such as bubbles or other voids, which doesn't require a definition in our view.</p>

		<p>the recommendation is to apply more hot membrane material to the unprotected area to create a monolithic coverage of the area. In areas of low thickness and bare deck occurrence, the recommendation is the same – to apply more hot membrane material to the specified thickness, creating a monolithic coverage of the area. The placement of the board imbedded in the hot tacky membrane will complete the system and it will then be fully monolithic.</p>	
11	Crafc	<p>914.04.01.02 - Cold weather plan – NOTE of CONCERN – The requirement for 24 hours of continuous 10°C temperatures will certainly cut the application season by weeks in both the spring and fall. How would there be able to be waterproofing with any temperature below 10C? There is a call out for 0-5, but what about 6-9? Below 0C application? Are there any special circumstances where waterproofing would be allowed? The information is included on the packaging as is the case with all other components in the system.</p>	<p>Please see response to comment 2, above.</p>
12	Crafc	<p>914.05.03 Allowable time for existing material that hasn't been labeled - Will there be time allowed to sell through unlabeled inventories if they have a certification provided by the manufacturer? Is this labelled or printed? Why is this necessary?</p>	<p>Once the specification is included in contracts, the requirement for labelling will be in effect for those contracts. The reinforcement must have the information printed on the material itself, every 1 meter.</p>

13	Crafco	914.05.04 Primer: Error on distillate. Believe it should be 190°C, not 90. Clarification on 80 or 85% minimum	<p>Thank you, OPSS 1216 specification has been corrected to state 190 °C.</p> <p>Agree, clarified that it is 80%, consistent with ASTM D 402, in OPSS 1216.</p>
14	Crafco	<p>914.06 Equipment</p> <ul style="list-style-type: none"> • No reheat of material. Start with empty melter. <ul style="list-style-type: none"> ○ NOTE of CONCERN: As a manufacturer, this procedure is fine; however, from the contractor's point of view it may not work. As an example: what would happen in a situation where there was a weather stoppage and material was left in the melter? It's not reasonable that the contractor would be responsible for wasted material that could be reheated in compliance with manufacturer's specifications and guidance. • NOTE of CONCERN: if an inspector notices bubbles inside of the melter, those are likely caused by the action of agitation and would NOT be an indicator of non-conforming material. 	<p>Please see response to comment number 4, above.</p> <p>MTO has modified OPSS 914 to include two-layer method, in which case a trial will no longer be required if bubbling in the kettle is observed.</p>
15	Crafco	914.07.03	<ul style="list-style-type: none"> • No, reinforcement is included in the tender item price. MTO will modify the draft 914 to specify

		<ul style="list-style-type: none"> • D. Is this a paid situation for additional reinforcement? What would cause that? • Anything below 0°C is unacceptable – does this mean absolutely NO special circumstances? No longer allow for special permission? • At start of season, cannot begin until after 24 hours of temp above 10°C • Front and back end of season will be shortened substantially as stated above in response to the cold weather plan. • 72 hours instead of 48 hours for precipitation – how frequently in Ontario are there 3 dry days in a row? Is there a measure to the amount of precipitation? Define precipitation – does a light, brief shower count? • Primed and waterproofed the same day – what happens with the primed deck in the case of interruption / stoppage due to precipitation? 	<p>the two-layer method, with reinforcement, please see response to comment 5, above.</p> <ul style="list-style-type: none"> • The General Conditions (OPSS 100) allow contractors to make proposals. • Please see response to comment 2, above. • 72 hours air curing – please see response to comment 3, above. • The deck needs to be re-primed if there is an interruption/ stoppage due to precipitation.
16	Crafco	914.07.07 – Any reference to “cakes” change to “material”. “Cakes” is an outdated term.	Agree, the term “cakes” has been changed to “packages”.
17	Crafco	914.07.07 “HRA waterproofing membrane and joint sealing compound shall not be re-heated.”	<ul style="list-style-type: none"> • Please see response to comment number 4, above.

		<ul style="list-style-type: none"> • Good, but is it practical? It's not reasonable that the contractor would be responsible (and financially penalized) for wasted material that could be reheated in compliance with manufacturer's specifications and guidance. • Propose using "melter" instead of "kettle" throughout document. Kettle is terminology that is usually associated with direct-fired equipment and would not be in compliance to use with this type of material. 	<ul style="list-style-type: none"> • The requirement for the kettle to provide indirect heat is specified, prefer to use the term kettle which has always been used in 914.
18	Crafco	<p>914.07.09 Membrane Reinforcement</p> <ul style="list-style-type: none"> • In lieu of a protection plan, perhaps all systems should be fully reinforced and included as part of the project bidding parameters. 	Please see response to comment 5, above.
19	Crafco	<p>914.07.10 Application of Protection Board</p> <ul style="list-style-type: none"> • Suggest terminology change. This product doesn't "cure" because there is no chemical change or solvent associated. The term should be changed to "cool" to the point where the material sets to a point of no movement of the protection board. 	Agree, the term "cured" has been changed to "set".
20	Crafco	914.07.11 Culverts	The requirement is to cover all areas of the waterproofing with protection board to protect the

		<ul style="list-style-type: none"> Suggest protection board be abutted at corners and adjacent sheets. 	<p>membrane. Intent is to lap the protection board as is done now for bridge decks.</p>
21	Crafco	<p>914.07.13 Material Sampling and Testing</p> <p>There should be a specific procedure about how to obtain samples including:</p> <ul style="list-style-type: none"> Primer: Should pull from original packaging immediately upon opening. Should secure lid of the sample container immediately upon obtaining the sample of primer to ensure airtight closure. Membrane – need to verify the procedure in “Field guide for Acceptance of Hot Mix and Bridge Deck Waterproofing”: need a copy – it is important that the sample be pulled from material during the application of membrane when the melter is at least half full. If a sample is pulled at the end of the day when the melter is close to empty or has been shut off, the likelihood of overheating the material is high. 	<ul style="list-style-type: none"> OPSS 914 has been modified to add the suggested language about the lid being properly secured, however the sample should be taken from the sprayer, to represent what is being placed on the concrete surface, this has been clarified. The ministry can sample the materials at any time during the placement; the waterproofing membrane must meet the specified material requirements, including not being overheated, for all portions of the lot.
22	Crafco	<p>914.07.14 Repairs</p> <ul style="list-style-type: none"> Same as mentioned above, in regards to bubbling/pinholes and in lieu of a protection plan, perhaps all systems should be fully reinforced and included as 	<ul style="list-style-type: none"> See response to comment number 5, above. Agree, the wording in the Repairs section has been revised.

		<p>part of the project bidding parameters.</p> <ul style="list-style-type: none"> • “The Contractor shall be responsible for all costs associated with removing and replacing rejectable lots.” • Rejectable lots are NOT repairs and should be in different area of document, perhaps Quality Assurance OR Measurement for Payment. 	
23	Crafco	<p>914.08 Quality Assurance</p> <ul style="list-style-type: none"> • Please see notes regarding OPSS 1213 • Flexibility - this is the only manually performed test with the most restrictive penalties. Crack bridging is a true performance indicator and this test has been deleted from the specification. Whereas the Flexibility test is bending specimens to a 90° angle – which is NOT a circumstance that would occur in the field. <ul style="list-style-type: none"> ○ There are 5 flexibility specimens poured at the same time from the same sample material. ○ There is no difference between any of the 5 separate flexibility specimens. 	<p>This test has been specified for many years. The testing ensures that the waterproofing membrane will have the required flexibility in the environmental conditions to which it will be exposed. It has been demonstrated, based on years of quality assurance testing, that this requirement can be consistently met. No change will be made to this requirement.</p>

		<ul style="list-style-type: none"> ○ Each of these specimens should perform exactly the same. ○ The testing is conducted by hand over a mandrel while reaching into a freezer. ○ The flexibility test is the only manually performed test in the specification and therefore will have some repeatability variation. ○ It is common practice, when designing test methods, to have a precision statement on the repeatability. For example, a similar flexibility test method is ASTM D5683. In this method, the precision allows for 6 mm differences in mandrel diameter to be considered within precision. This represents a 24% range based on starting with a 25 mm mandrel. ○ Suggest changing back to 2008 specification penalty for flexibility which would allow for the weighted point system: Low Temperature Flexibility at - 25 °C - Pass - 5.0 for Failure 	
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24	Crafco	<p>914.08.02</p> <ul style="list-style-type: none"> • D. “The presence of discontinuities, including bubbles or other voids in the HRA waterproofing membrane” • Define bubble and void • Some bubbles do not result in discontinuities <p><u>Suggested language regarding pinholing, air voids, etc.</u></p> <p>The presence of bubbles is a sign that relatively low levels of moisture are being outgassed and won't inhibit the membrane adhesion. Normal off gassing bubbles will dissipate with the installation of the protection board and should not be of concern. With high moisture levels, larger bubbles are created leaving unprotected deck, and this is what is called a pinhole. While the physical action of creating bubbles is the same, the finish of the installation is varied as a result of the level of the presence of water. When a pinhole is present and there is unprotected deck, the recommendation is to apply more hot membrane material to the unprotected area to create a monolithic coverage of the area. In areas of low thickness and bare deck occurrence, the recommendation is the same – to apply more hot membrane material</p>	Please see response to comment 10, above.
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		to the specified thickness, creating a monolithic coverage of the area. The placement of the board imbedded in the hot tacky membrane will complete the system and it will then be fully monolithic.	
25	Crafco	<p>914.08.04.02 Basis of Acceptance</p> <ul style="list-style-type: none"> C. "The sample representing the lot is not able to be tested due to the condition in which it is received (e.g, the sample is too hard, too fluid, contaminated, or in an unacceptable container)." This is TOO EXTREME because an error would be made by the one collecting the sample or delivering the sample, yet the contractor would be held liable and responsible to remove and replace. This circumstance would not be the contractor's fault. The CA or Inspector would be liable in this case. 	The contractor is responsible for providing the container and taking the sample, ensuring it is placed in an acceptable container and properly sealed. The contractor can witness the sample condition by invoking referee testing.
26	Crafco	<p>914.08.04.03 Referee Testing</p> <ul style="list-style-type: none"> Must be invoked within 3 business days of receiving notification – reconsider leaving at 5 days due to holidays, time zones, etc. 	<ul style="list-style-type: none"> Change has been made to 3 days, to invoke referee testing, in a number of ministry specifications.
27	Crafco	<p>914.08.05.03</p> <p>"If the lot mean is less than 4.0 mm or greater than 6.0 mm, the entire lot is rejectable and the Contractor shall</p>	<ul style="list-style-type: none"> Acceptance is based on the lot mean and standard deviation, not on a single measurement. The contractor can elect to invoke referee testing.

		<p>remove and replace the waterproofing system of the lot.”</p> <ul style="list-style-type: none"> As written, a single measurement on a deck can result in removal and replace. Ok with this statement as long as it is consistent with 914.08.05.04 which allows for additional measurements to be taken. <p>Table 2.</p> <ul style="list-style-type: none"> Discrepancy between table cone penetration at 50°C (is max 160 with rejection values up to 180) which does not align with OPSS 1213 which has a spec limit of 140. Suggest changing back to 2008 specification penalty for flexibility which would allow for the weighted point system: Low Temperature Flexibility at -25 °C - Pass - 5.0 for Failure 	<ul style="list-style-type: none"> Table 2, Cone Penetration: Thank you, this is an error, the value should be 160 in OPSS 1213, consistent with 914 and previous version of 1213. This specification requirement has been corrected. Table 2, Low Temperature Flexibility – please see response to comment 23, above.
27	ORBA	<p><i>Spec: All concrete surfaces against which the waterproofing system is applied shall be air cured, with no exposure to precipitation or water, for at least 72 hours immediately prior to the application of the waterproofing system.</i></p> <p>Comment: 72 hours seems excessive. The contractor will be subject to severe delays.</p>	Please see response to comment 3, above.

28	ORBA	<p><i>Spec: Cakes of HRA waterproofing membrane and joint sealing compound shall be melted at the job site and shall be continuously agitated in the mechanically agitated heating and mixing kettle. The contents shall be continuously agitated until the material is homogenous and can be drawn free flowing and lump free from the mixing kettle at a temperature within the range recommended by the manufacturer.</i></p> <p>Comment: The material temperature needs to be approx. 110 - 140 degrees before agitator starts to prevent equipment breakdown.</p>	<p>Oil in kettle should be heated first, once the oil is at the right temperature, the packages of waterproofing can be added to the kettle with agitation. The kettle should be empty prior to starting the work.</p>
29	ORBA	<p><i>Spec: HRA waterproofing membrane and joint sealing compound shall not be re-heated. The Contract Administrator shall be informed at least 24 hours prior to the charging of the kettle with HRA waterproofing membrane or joint sealing compound. The initial charge of material shall be placed in an empty kettle for each Day's placement of waterproofing. The Contract Administrator shall be granted access to witness the empty kettle and initial charge of sealant upon request.</i></p> <p>Comment: Continuously emptying kettle after each day is wasteful. The MTO is permitted to take samples at anytime during waterproofing operations to determine if the sample meets Contract requirements.</p>	<p>Please see response to comment 4, above.</p>

30	ORBA	<p>The HRA waterproofing membrane shall be applied immediately after application of the scratch coat, where applicable, to form a uniform film having a thickness of 5 ± 1 mm, with no bubbles or other voids.</p> <p>The presence of discontinuities, including bubbles or other voids in the HRA waterproofing membrane.</p>	<p>The specification has been modified as follows: “There shall be no discontinuities, such as bubbles or other voids that extend through the full depth of the HRA waterproofing membrane.”</p>
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