

9290400 SUPPLEMENTARY CEMENTITIOUS MATERIALS
COMMENTS FROM INTERNAL/INDUSTRY REVIEW

Anonymous

Comments: (Industry 6-10-21)

Section 929-4.2: Defines SO3 for two different items (sulfate sulfur and total sulfur as sulfate). Section 929-4.2.1: In item 2, sulfate sulfur is already defined so can only refer to as SO3.

Response:

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Comments: (Industry6-24-21)

Section 929-4.2: Defines SO3 for two different items (sulfate sulfur and total sulfur as sulfate). Section 929-4.2.1: In item 2, sulfate sulfur is already defined so can only refer to as SO3.

Response:

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Comments: (Industry 6-27-21) **Please note the respondent increased the numerical list to separate actions taken.**

1) We have tested multiple Type I/II(MH) and Type IL cements in Florida and all meet the ASTM C1012 acceptance criteria without slag or other SCM. We have tested multiple slags with alumina up to 14% and blaine up to 670 m2/kg and performance in ASTM C1012 was always improved. Therefore, the requirement for ASTM C1012 testing is overly conservative and may needlessly interrupt FDOT projects while waiting for ASTM C1012 testing results.

2) According to ASTM C989, Section X.2.3 “high alumina content can have a detrimental influence at low slag cement-replacement”. However, X.2.3.3 notes that this occurred with alumina contents of greater than 18% and slag contents 50% and less, but not all cements were Type II (<8% C3A). Since FDOT requires at least than 50% slag content, this should not be an issue. We would propose a higher alumina content of at least 16% to trigger ASTM C1012 testing and only if slag is used at less than 50% of the cementitious materials. FDOT is further protected by required surface resistivity testing, which corresponds to a low concrete permeability that reduces the ingress of sulfates from soil or seawater.

3) In 929-4.2.1, clarify whether the two conditions of Al2O3 and blending are “and” or “or”.

4)(IN RESPONSE.) Clarify if the requirement on blending of two different slag granules applies if both sources are less than 11% alumina, if the average of the granules is less than 11% (e.g. a 50/50 blend of 9 and 12% alumina), if one of the granules is greater than 11%, the average is greater than 11%, or both a greater than 11%.

5)(IN RESPONSE.) Clarify if blending means two granule sources interground at the same time or two granule sources at different times. We suggest the following alternative: “If two or more granule sources are blended together at the same time and any one granule source exceeds 11% alumina”

6)(IN RESPONSE.)4) In 929-4.2.1, define provisional acceptance. If the slag has expansion at 6 months of less than 0.05% and is given provisional acceptance, but exceeds 0.1% at 12 months, indicate what action will be taken by FDOT. Clarify how provisional acceptance affect the slag supplier and concrete producer.

7)(IN RESPONSE.)5) For the retesting criteria in 929-4.2.1, wider criteria are needed because slag is a byproduct and suppliers may need to make changes to ensure consistent performance. Suppliers of granules typically cannot commit to +/-1% alumina. We suggest the change in alumina should be at least 2%, the blaine at least 100 m2/kg, and the SO3 at least 1%.

8)(IN RESPONSE.) Also, clarify that the retesting only applies when any of these changes occur and alumina is above the 11% threshold.

9)(IN RESPONSE.) Clarify that the retesting requires if “any” or “all” conditions change.

10)(IN RESPONSE.)6) Concrete producers are not able to substitute slag sources without retesting all concrete mixtures in the lab and in some cases the field. If a slag source changes and does not have ASTM C1012 data, a concrete producer may not be able to change mixes in sufficient time to avoid delays on FDOT projects. Consider a slag substitution process similar to that in the Materials Manual for fly ash and aggregate.

Response:
