Ethylene Glycol Testing Position Statement – February 2024

In summary, the AQA believes that the T20 test method:

1. Cannot be considered ratified for New Zealand basecourses.
2. Is slower, more expensive and more dangerous than alternate tests.
3. Should not have absolute limits set in contract specifications.
4. Should only be used on basecourse materials.

AQA recommends that:

1. Petrography testing or XRD testing be considered instead of T20
2. T20 be used as an indicator test only, i.e. no limit, report-only
3. Interlab testing should be undertaken with priority

Background:

AQA understands the need to provide rigorous testing of aggregate properties in New Zealand, and that tests from a wide range of sources can be used and/or adapted to New Zealand conditions.

The T20 accelerated weathering test was created and introduced in New Zealand with the purpose of identifying problematic swelling clays (smectites) inside parent rock – particularly igneous rocks – being used for basecourse production in New Zealand. The test was mainly rolled out in the Waikato / Bay of Plenty regions, spurred by premature highway failures.

Initial testing showed 25% of basecourses tested to what is now T20, required further investigation through petrographic analysis, with all samples tested showing “abundant” smectite presence. This indicated a solid correlation between a positive accelerated weathering test and the presence of deleterious smectites.

Albeit that a strong correlation was found in this sampling and testing supervised by NZTA, other testing of multiple samples from within the same quarry found large variation in results and “false positives” were given in some cases where no smectite was present. Therefore doubt is cast on the robustness of reproducibility within quarries – of which there is limited data for New Zealand.

Interlab testing has not yet been carried out in NZ, mainly due to lack of interest from laboratories so the test cannot yet be considered ratified for NZ. Interlab testing is imperative to form robustness data on the T20 test method and those (five IANZ accredited) laboratories testing against it.

Further to the lack of interlab testing issue, from a pragmatic perspective, the test is slower, more expensive and more dangerous (fumes from ethylene glycol causing dizziness and oven deterioration) than XRD or petrography testing.

Also, although the T20 accelerated weathering test was introduced as a “pass/fail” test, it is limited to being an “indicator” test, which flags potential issues for further investigation.

Because this test is only an indicator of deleterious smectites and further X-Ray Diffraction (XRD) testing is required to identify the true nature of the clays present, it should not have absolute limits set in contract specifications.

AQA recommends that, at this stage, petrography testing is more beneficial to the aggregate producer than using the T20 test. This can be carried out by XRD or thin section testing.

AQA further suggests that interlab testing should be carried out with priority, so that relevant robustness data can be generated.

AQA Technical Committee, February 2024