

TCE DECISION DOCUMENT

TO: TOM PYLE
Caltrans Co-Chair, Asphalt Task Group

FROM: **REDUCED EXPOSURE TO TRICHLOROETHYLENE (EMPLOYEE HEALTH AND SAFETY) WORK TEAM**

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SUBJECT: **PROPOSED REVISION FOR SOLVENT EXTRACTION REQUIREMENTS**

ISSUE

With the increased use of Reclaimed Asphalt Pavement (RAP) and Recycled Asphalt Shingles (RAS) in California the number of Trichloroethylene (TCE) solvent extractions required by the Caltrans specifications continue to rise. The increased use of TCE continues to be a major concern to Caltrans and their industry partners. This come on the heels of a February 2020 EPA finding that targets TCE as a source of unreasonable environmental risk for both water quality and toxic air emissions.

Environmental/Health Risks for TCE

Trichloroethylene (TCE) has a long history of use as an industrial solvent and degreaser in many applications. TCE has also been studied and evaluated at the Federal and State levels for environmental and occupational risk and health effects. TCE is a documented human carcinogen and is listed as a priority toxic chemical posing significant environmental impacts and risk. Human health impacts for kidneys and liver cancer have been established resulting from exposure to TCE. Unreasonable human health risks associated with dermal, inhalation exposure to workers, occupational non-users, consumers, and bystanders are also a key finding. Given the voluminous evidence and data related to TCE, Caltrans and their industry partners recognized the need for asphalt pavement industry to take decisive action to eliminate or significantly reduce the use of TCE within the asphalt pavement industry.

Opportunities to Limit the use of TCE for RAP Testing

Like other Hot Mix Asphalt (HMA) constituents, RAP must be characterized using laboratory tests that measure properties such as asphalt content, gradation, specific gravity, and other properties deemed essential to the HMA mix design process.

Being aware of the significant health, safety and environmental concerns, many agencies are moving away from the use of solvent extractions (AASHTO T164) as the sole methodology to measure the asphalt content in RAP. In turn, agencies are leveraging the use of the ignition oven (AASHTO T308) as a process control tool during the production of RAP stockpiles.

To accurately measure the asphalt content of RAP for use in HMA mix designs a limited number of RAP samples are tested using the solvent extraction methodology. In that process paired ignition oven tests can be performed to establish a correlation factor between the solvent extractions and the ignition oven. As noted earlier, the ignition oven correlation factor can then be used as a process control tool during the production of RAP stockpiles. This process significantly reduces the laboratory technician's exposure to TCE. When new RAP is added to an existing RAP stockpile additional ignition oven test can be performed to verify that new RAP has a binder content that falls within a specified tolerance of the ignition oven RAP content reported in the HMA mix design.

Improvements to worker health and safety

Currently, if the contractor builds a 60,000-ton RAP stockpile they would need to run 63 solvent extractions. Under the proposed revisions the number of solvent extractions will be reduced to 3 for the mix design submittal. All additional RAP binder content test would be performed using the uncorrected ignition oven.

RECOMMENDATION

Revise section 39-2.02A(4)(b)(iii) Reclaimed Asphalt Pavement to read as follows:

Sample and test mix design RAP stockpile under California Test 384. Report the average AASHTO T 308 uncorrected binder content on page 4 of your Contractor Hot Mix Asphalt Design Data form. When the mix design RAP stockpile is augmented, sample RAP used to augment the stockpile at a minimum frequency of 1 sample per 1,000 tons under California Test 384 before augmenting the stockpile . Test each sample to determine the uncorrected binder content under AASHTO T 308. Average the results of the 3 tests. When tested under AASHTO T 308, the uncorrected binder content of each augmented RAP sample must be within ± 2.00 percent of the average uncorrected asphalt binder content reported on page 4 of your Contractor Hot Mix Asphalt Design Data form. You must use the same ignition oven used to determine the uncorrected asphalt binder content reported on page 4 of your Contractor Hot Mix Asphalt Design Data form.

The augmented RAP sample when tested under AASHTO T 209 must be within ± 0.06 of the average maximum specific gravity reported on page 4 of your Contractor Hot Mix Asphalt Design Data form.

The Asphalt Task Group in consultation with the Executive Board approved this decision document.