

## Technical Advisory

# Field Testing of Concrete Curing Compound

TxDOT has implemented field sampling and testing of concrete curing compound to prevent its dilution before use.

## Purpose

Dilution prevents optimum curing conditions for the concrete by rendering the curing compound ineffective.

## Field Sampling

During paving and curing operations, pass a clean cylinder mold through the spray of a spray nozzle, capturing the entire width of the spray cone, until the mold is at least half full. If possible, obtain the sample from more than one nozzle. Immediately secure the cylinder mold cap onto the mold. Clean the outside of the cylinder mold and label accordingly.

It is imperative that this sample be taken to the laboratory and tested immediately, as evaporation of volatile materials will occur as soon as the sample is exposed to air.

### Testing (To be performed immediately by Area/District Laboratory)

ASTM D 2369 describes the procedure for testing curing compound for percent solids.

## Equipment

- *Analytical Balance*, capable of weighing  $\pm 0.0001$  g.
- *Aluminum Foil Dishes*, 58 mm in diameter by 18 mm high with a smooth (planar) bottom surface. Precondition the dishes for 30 minutes in an oven at  $230 \pm 10^\circ\text{F}$  ( $110 \pm 5^\circ\text{C}$ ) and store in a desiccator before use. Use tongs or rubber gloves, or both, to handle the dishes.
- *Forced Draft Oven*, capable of maintaining  $230 \pm 10^\circ\text{F}$  ( $110 \pm 5^\circ\text{C}$ ).
- *Syringe*, 1-ml without needle, but equipped with caps (Disposable syringes with caps are recommended.)
- *Desiccator*, any airtight glass container containing desiccant material, capable of receiving  $230^\circ\text{F}$  ( $110^\circ\text{C}$ ) samples
- *Paper Clips*

Step	Action
1	Thoroughly mix the sample in the sample container.
2	Fill a syringe (to prevent evaporation of the material) with curing compound. Wipe away excess material from the tip.
3	Place the filled syringe on an analytical balance capable of reading to the nearest $\pm 0.0001$ g and tare the scale.
4	Prepare an aluminum foil or ceramic dish with a partially unfolded metal paper clip to receive the sample.
5	Weigh $0.5 \pm 0.1$ g of the sample into the aluminum foil or ceramic dish by dispensing material from the syringe and reweighing the syringe. Do not wipe away any excess material from the tip of the syringe. Record this weight as $W_{\text{ini}}$ .
6	Add $3 \pm 1$ ml water to the sample and use the paper clip to stir thoroughly. This helps to prevent the sample from skinning over during the drying stage. <i>Note: This is a weighed sample. All curing compound material, including any adhering to the paper clip, must be returned to the sample dish.</i>
7	Leave the paper clip in the sample dish, ensuring the clean end remains propped on the side of the dish, out of the curing compound.
8	Place the dish containing the sample and paper clip in the oven at $230 \pm 10^\circ\text{F}$ ( $110 \pm 5^\circ\text{C}$ ) for a minimum of 60 minutes. <i>NOTE: It is important to make sure that all volatiles have evaporated prior to re-weighing to ensure an accurate result. It may be necessary to re-stir the sample with the paper clip and place back in the oven for an additional drying period.</i>
9	Once dry, reweigh the sample with the paper clip. Place immediately in a desiccator, cool to ambient temperature, weigh to the nearest $0.0001$ g, and record the final weight as $W_{\text{fin}}$ .

## Calculation

Calculate the percent solids in accordance with ASTM D 2369, Section 8.3 or by:

$$\text{Percent solids} = [1 - ((W_{ini} - W_{fin}) / W_{ini})] * 100\%$$

For convenience, an Excel application, “Percent Solids of Curing Compound,” is available in SiteManager and on the TxDOT Internet site at the SiteManager Forms webpage to automatically perform these calculations.

## Interpreting Results

Compare the field sample’s percent solids to the percent solids found on the Material Producer List (MPL) for [Concrete Curing Compounds](#).<sup>1</sup> The percent solids of the field sample should be within 4% of the percent solids found on the MPL.

Results outside of this range generally indicate that the sample has:

- been diluted
- become overly concentrated due to excessive evaporation of volatiles in the field or
- been improperly sampled.

**Note:** *The 2% tolerance range listed on the MPL is the required tolerance of the production sample. Field samples are given a wider tolerance due to the increase in error and variability associated with field samples.*

## CONTACT INFORMATION

For questions regarding sampling and testing of concrete curing compounds, please contact Johnnie Miller in the Coatings and Traffic Materials Section at:

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<sup>1</sup> TxDOT-approved manufacturers and producers of various products and materials can be found on the Material Producer List webpage.