**North Carolina Department of Transportation**

#  **NCDOT M&T Form 250VM**

 **AGGREGATE MOISTURE REPORT**

 **FOR VOLUMETRIC CONCRETE MOBILE MIXER**

 Date of Calibration       Project Number

 Fine Aggregate Source

 Coarse Aggregate Source

|  |  |  |  |
| --- | --- | --- | --- |
| Class of Concrete | Mix Design No. | Number of Loads | Total Yards Batched |
|       |       |       |       |
|       |       |       |       |

 **MOISTURE IN AGGREGATES**

 **Fine Aggregate:**

 ***Trial 1*** Time: \_\_     \_\_\_\_\_\_

 Wet Wt. \_     \_ **Minus** Dry Wt. \_     \_

* **------------------------------------------------------------------------------------------------------------------------------------------------------------------------- =** \_     \_ **X** 100 = \_     \_\_\_ % Total Moisture

 Dry Wt. \_     \_

* Total Moisture \_     \_\_ **Minus** Absorbed Moisture \_     \_ = \_     \_ % Free Moisture

 ***Trial 2***Time: \_     \_

 Wet Wt. \_     \_ **Minus** Dry Wt. \_     \_\_

* **------------------------------------------------------------------------------------------------------------------------------------------------------------------------- =** \_     \_ **X** 100 = \_     \_ % Total Moisture

 Dry Wt. \_     \_

* Total Moisture \_     \_ **Minus** Absorbed Moisture \_     \_ = \_     \_ % Free Moisture

 **Coarse Aggregate:**

 ***Trial 1***  Time: \_     \_

 Wet Wt. \_     \_ **Minus** Dry Wt. \_     \_

* **------------------------------------------------------------------------------------------------------------------------------------------------------------------------- =** \_     \_ **X** 100 = \_     \_ % Total Moisture

 Dry Wt. \_     \_

* Total Moisture \_     \_ **Minus** Absorbed Moisture \_     \_ = \_     \_ % Free Moisture

 ***Trial 2***Time: \_     \_

 Wet Wt. \_     \_ **Minus** Dry Wt. \_     \_

* **------------------------------------------------------------------------------------------------------------------------------------------------------------------------- =** \_     \_ **X** 100 = \_     \_ % Total Moisture

 Dry Wt. \_     \_

* Total Moisture \_     \_ **Minus** Absorbed Moisture \_     \_ = \_     \_ % Free Moisture

 Certified Technician:       Certification No.

 **North Carolina Department of Transportation**

**Field Verification Report for “C”-series Computerized Volumetric Concrete Mobile Mixer**

 Date of Verification:       Verified by (Name & PCT):

 VM Company       Mix Design:

 Date of Calibration:       Mixer Number:

 Project:       Resident Engineer:

 **Step VI – VERIFICATION OF THE CEMENT OUTPUT UTILIZING**

 **THE MIXER’S COMPUTER COUNT SYSTEM**

*The operator determines the exact meter count required to discharge a minimum of 80 pounds of the cement into a container. Record all weights and counts to nearest tenth.*

 **\*\* NOTE: It’s recommended to fill cement bin to at least half full.**

1. *Using “Pour Concrete” function* Minimum 5 runs of the cement should be made.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Run 1 | Run 2 | Run 3 | Run 4 | Run 5 |  | b) Total |
| Cement Weight (lbs.) |        |        |        |        |        |         |        |
| Meter Counts |        |        |        |        |        |         |        |

1. Determine the cement output per one count:

 \_      \_\_\_\_\_\_**÷**      \_\_\_\_\_\_ **=** \_     \_\_\_\_\_\_\_\_\_ lbs./count

 Total Cement Weight Total Meter Count Cement Output per count

 ***\*\*Note: The value for Cement output shall be recorded with a precision of 4 decimal places.***

1. Determine the Error of cement output per one count - divide cement output per one count by the average cement during calibration process by the computer from Step 1 (printed cement calibration ticket).

 Average cement output \_

      \_\_\_\_\_\_\_\_\_ **x** 100 **÷**  \_     \_\_\_\_\_\_\_\_\_\_\_ = \_      % 100% +/- 2% Pass [ ]  or Fail [ ]

Cement Output per count (Ref. VI c) Average cement output (Ref. Step 1) Error in cement output

1. Determine the number of Counts per one cubic yard of concrete:

 \_     \_\_\_\_ \_\_\_\_ **÷** \_     \_\_\_\_\_\_\_\_\_\_\_\_\_\_ = \_     \_\_\_\_\_\_\_\_

 Total Cement Design Weight Cement Output per count (Step VI c) Actual Counts per One yd³

1. Determine the error of system count – Divide actual Counts per one cubic yard of the mix by the number of counts indicated in the computer system for the calibration results in Step V (1):

 Counts per 1 yd³ by the calibration: \_     \_

 \_     \_\_\_\_\_\_\_\_\_\_\_\_\_\_ **x** 100 **÷** \_     \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ = \_     \_ %  100% +/- 2% Pass [ ]  or Fail [ ]

 Actual Counts per One yd³ (Step VI(e)). Counts per 1 yd³ (Ref. Calibration Step V(1)) Error in counts

 \*\* Note: Tolerance for the Cement output **for Verification process only: +/- 2%.**

 **Step VII – VERIFICATION OF THE SAND DISCHARGED UTILIZING**

 **THE MIXER’S COMPUTER SAND GATE OPENING**

1. Determine the amount of free moisture on the surface of the fine aggregate: \_      %.
2. Determine the amount of wet sand to be batched for one cubic yard of concrete:

      \_\_\_\_\_\_\_\_\_ X \_     \_\_ \_\_ **=**       **+** \_     \_\_\_\_\_\_\_ **=**      \_\_\_\_lbs.

 SSD Sand Design Weight Free Moisture of Sand SSD Sand Design Weight Wet Sand Weight

1. Determine the conversion factor for amount of the sand per one count:

 \_     \_\_\_\_\_\_\_\_\_\_ **÷**       *\_\_\_\_* **=**       lbs./count

 Wet Sand Weight (Step VII b). Counts per One yd³ (Step V) Conversion Factor of Sand per one count

 ***\*\*Note: The value for Conversion Factor shall be recorded with a precision of 4 decimal places.***

1. Sand gate settings shall be installed through the computer system based on the calibration results:

 (Verify from Step V): \_      .

 **\*\* Note: Actual moisture information shall be updated by the operator in the computer system**.

1. 5 runs of the Sand, *using “Pour Concrete” function, with disconnecting of the cement, coarse aggregate, water and admixtures feeders*, shall be made per about equal number of the counts in order to discharge approximately 100 to 130 lbs. of the Sand.

**\*\* NOTE: It’s recommended to fill sand bin with sand to at least half full.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  Run 1 |  Run 2 |  Run 3 |  Run 4 |  Run 5 |  | ***Average*** |
| **Gate Settings** |        |        |        |        |        |        |  |
| **Meter Counts** |        |        |        |        |        |        |        |
| **Sand Weight (lbs.)** |        |        |        |        |        |        |        |
|  Calculation the amount of required Sand based on the calibration results (f.) |
| **Target Weight of the Sand (reference Step VII (f.))**       **lbs.** |     |    |    |   |  |   |  Min \_      lbs. Max \_      lbs.  |
| Calculation the Error in Sand Weights (g.) |
| **Verification Error in Sand Weight****Error (VII(g) - 100%) =**       **%** |  |  |  |  |  |  |  Pass [ ]   Or Fail [ ]   |

1. Determine amount of required sand based on the calibration results:

 \_     \_\_\_\_\_\_\_ **X**        *\_\_\_\_\_\_\_\_\_\_\_\_* =      \_\_\_\_\_\_\_\_\_\_\_\_\_\_lbs.

 Average Meter Counts Conversion Factor of Sand per one count (Step VII c) Target Weight of required Sand

 (*With the tolerance ±3%:*       to \_      lbs.)

1. Determine the error in Sand weights between actual weight and target weight of the Sand:

 \_     \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **x** 100 **÷** \_     \_\_\_\_\_\_\_\_\_\_\_\_ = \_     \_\_\_\_\_\_\_ %. 100% +/- 3%

 Average of Actual Sand Weights Target Sand Weight (Step VII f). Error in Sand Weights

 \*\* Note: Tolerance for an Aggregate **for Verification process only:** ***+/- 3%.***

 **Step VIII – VERIFICATION OF THE STONE DISCHARGED UTILIZING**

 **THE MIXER’S COMPUTER STONE GATE OPENING**

1. Determine the amount of free moisture on the surface of the coarse aggregate: \_      %
2. Determine the amount of wet stone to be batched for one cubic yard of concrete:

 \_     \_\_\_\_\_\_\_\_\_ **X**       \_ \_\_ =       **+**       \_ **=**       lbs.

 SSD Stone Design Weight Free Moisture of Stone SSD Stone Design Weight Wet Stone Weight

1. Determine the conversion factor for amount of the Stone per one count:

       \_\_\_\_\_\_\_ **÷**      \_\_\_ \_\_\_\_\_\_\_ **=**        lbs./count

 Wet Stone Weight (Step VIII b). Counts per One yd³ (Step V) Conversion Factor of Stone per one count

 ***\*\*Note: The value for Conversion Factor shall be recorded with a precision of 4 decimal places.***

1. Stone gate settings shall be installed through the computer system based on the calibration results:

 (Verify from Step V): \_      .

 \*\* Note: Actual moisture information shall be updated by the operator in the computer system.

1. 5 runs of the Stone, *using “Pour Concrete” function, with disconnecting of the cement, fine aggregate,*  *water and admixtures feeders*, shall be made per about equal number of the counts in order to discharge approximately 100 to 130 lbs. of the Stone.

 **\*\*NOTE: It’s recommended to fill stone bin with stone to at least half full.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  Run 1 |  Run 2 |  Run 3 |  Run 4 |  Run 5 |   | ***Average*** |
| Gate Settings |        |        |        |        |        |        |  |
| Meter Counts |        |        |        |        |        |        |        |
| Stone Weight (lbs.) |        |        |        |        |        |        |        |
|  **Calculation the amount of required Stone based on the calibration results (f.)** |
| Target Weight of the Stone (reference Step VIII (f.))       lbs. |    |    |    |   |  |   |  Min \_      lbs. Max \_      lbs. |
| **Calculation the Error in Stone Weights (g.)** |
| Verification Error in Stone WeightError (VIII(g) - 100%)       % |  |  |  |  |  |  |  Pass [ ]   Or Fail [ ]   |

1. Determine amount of required Stone based on the calibration results:

 \_     \_\_\_\_\_\_\_\_ **X**      *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* = \_     \_\_ \_lbs.

 Average Meter Counts Conversion Factor of Stone per one count (Step VIII c) Target Weight of required Sand

 (*With the tolerance ±3%:*       to \_      lbs.)

1. Determine the error in Stone weights between actual weight and target weight of the Stone:

 \_     \_\_\_\_\_\_\_\_\_\_\_\_\_ **x** 100 **÷** \_     \_\_\_\_\_\_\_\_\_\_\_\_\_ = \_     \_\_\_\_\_\_\_\_\_ %. 100% +/- 3%

 Average of Actual Stone Weights Target Stone Weight (Step VIII f). Error in Stone Weights

 \*\* Note: Tolerance for an Aggregate **for Verification process only:** ***+/- 3%.***

 **Step IX – VERIFICATION OF THE WATER DISCHARGED UTILIZING**

 **THE MIXER’S COMPUTER WATER FLOW RATE**

1. Determine the total weight of free water that is on the surface of the sand and the stone together. Convert this weight into gallons (divide by 8.33):

 Sand: \_     \_\_\_\_\_\_\_\_\_ X      *\_\_\_\_ \_\_* =      \_\_\_\_\_\_\_ \_\_\_\_lbs.

 SSD Design Sand Weight Free Sand Moisture Weight of Free Water in Sand

 Stone: \_     \_\_\_\_\_\_\_\_\_\_ X      *\_\_\_ \_\_\_* = \_     \_\_\_\_\_\_\_ \_\_\_lbs.

 SSD Design Stone Weight Free Stone Moisture Weight of Free Water in Stone

 \_\_     \_\_\_\_\_\_\_\_\_ + *\_*     *\_\_\_\_\_ \_\_\_* =      **÷** \_*8.33*\_= \_     \_\_\_\_\_\_\_\_\_\_\_\_\_ gal.

 Weight of Free Water in Sand Weight of Free Water in Stone Total Volume of Free Water in Aggregate

1. Determine the target volume of the meter water in one cubic yard of the mix:

 \_     \_\_\_\_\_\_\_\_\_ gal. **-**      *\_\_\_\_\_\_\_\_\_ \_* gal. = \_     \_\_\_\_\_\_ \_\_\_ gal.

 Volume of Design Water Total Volume of Free Water Target Volume of Meter Water

1. Determine the conversion factor for Target Water Weight per one count:

       \_\_\_\_\_ \_ **÷**      *\_\_\_ \_\_\_\_\_\_\_\_\_* **x** 8.33 =       \_\_ lbs./count

 Target Volume of Meter Water Counts per One yd³ (From Calibration Step V) Conversion Factor for Target Water per one count.

 ***\*\*Note: The value for Conversion Factor shall be recorded with a precision of 4 decimal places.***

1. 5 runs of the water per about ¼ part of the counts for one yd³ of the concrete shall be made, using “Pour Concrete” function, with disconnecting of the cement, both aggregates and admixture feeders:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Run 1 | Run 2 | Run 3 | Run 4 | Run 5 |  | Average |
| Meter Counts |       |       |       |       |       |       |       |
| Actual Weight of Water (lbs.) |       |       |       |       |       |       |       |
|  Calculation the Target Weight of the meter water based on the number of counts per each run (e.) |
| Target Weight of Meter Water \_     \_\_\_\_ lbs. |  |  |  |  |  |  | Min \_      lbs.Max \_      lbs. |
|  Calculation the Error in Water Weights (f.)  |
| Verification Error in Water Weights (%)Error (IX(f) - 100%)       % |  |  |  |  |  |  |  Pass [ ]  Or Fail [ ]   |

1. Determine the Target Weight of the meter water based on the number of counts per each run:

 \_     \_\_\_\_\_\_\_ **x** *\_*     *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_* =\_     \_\_\_\_\_\_\_\_\_\_\_\_\_ lbs.

 Average Meter Counts Conversion Factor for Target Water per one count Target Weight of Meter Water

1. Determine the error in water weights between actual weight and target weight of the water:

 \_     \_\_\_\_\_\_ \_\_\_\_\_\_\_ **x** 100 **÷** \_      \_\_ \_\_\_\_\_ = \_     \_\_\_\_\_\_\_\_\_ %. 100% +/- 2%

 Average of Actual Water Weights Target Water Weight (Step IX e). Error in Water Weights

 \*\* Note: Tolerance for the water flow amount for **Verification process ONLY:** ***±2%.***