ATT-15/22, MOISTURE CONTENT, Oven Method
Part V, Asphalt Concrete Mixes

1.0 SCOPE

This method describes the procedure for determining the moisture content of plant produced asphalt concrete mixes using a field laboratory oven.

2.0 EQUIPMENT

Electronic Balance: for measuring the mass of wet and dried samples (sensitive to 0.1 g). The balance must be operated as per manufacturer's recommendations. Balances must be inspected, cleaned, and calibrated annually.

Drying Oven: capable of maintaining a temperature of 130 ± 5°C for heating aggregates, asphalt mixes, mixing tools and containers, and other equipment.

Thermometers: armored, glass, or dial-type with metal stem, 50°C to 230°C, for determining the temperature of aggregates, asphalt and asphalt mixes.

Sample Container: metal pail, plastic pail, or plastic bag which can be sealed to prevent moisture loss.

drying pans
large mixing pan (round)
heat resistant gloves
large grocer scoop

Data Sheet: Mix Moisture Content and Marshall Density Data, such as MAT 6-80

3.0 PROCEDURE

The following procedure is used for uncompacted ACP plant mixes, or reclaimed asphalt concrete pavement (RAP).

The moisture content of cores is described in test method ATT-7, Section 3.5.1.

Field formed Marshall specimens are assumed to have the same moisture content as the fresh mix sample.

Determine the moisture content of a loose mix sample as follows:

1. Label and tare a drying pan.
   Record the weight and pan number on line "D" as shown in Figure 1.

2. Obtain 20 kg of representative mix as directed in ATT-37, SAMPLING MIXES.

3. Place the mix into a mixing pan and use the large heated grocer scoop to thoroughly blend the mix.

4. Place a minimum of 1000 g of mix in the tared drying pan.

5. Weigh the pan and mix and record as “Wt. of Moist Sample + Pan” on line "A".

6. While the scoop is still hot, use the heated putty knife to clean off any mix adhering to the scoop.

7. Place the drying pan with the mix in the oven set at 130 ± 5^{o}C.

8. Oven dry the mix sample to a constant weight as follows:

   a) After the RAP sample has been in the oven for about half an hour, use a putty knife to break up any lumps, if applicable. Clean off any mix adhering to the putty knife back into the pan.

   b) Oven dry the mix sample for at least four hours, then weigh.

   c) Replace the sample in the oven for approximately one hour and re-weigh.

   d) Repeat step (c) until two consecutive weights are the same.

9. Weigh the hot sample and record as “Wt. of Dry Sample + Pan” on line "B".

10. Calculate the “Weight of Water” removed on line "C" as follows:

    Wt. of Water (g) = (Wt. of Moist Sample + Pan) - (Wt. of Dry Sample + Pan)

11. Determine the oven dry weight of the mix sample on line "E" as follows:

Wt. of Dry Sample (g) = (Wt. of Dry Sample + Pan) - (Wt. of Pan)

12. Calculate the Moisture Content to the nearest 0.01% on line "F" of the plant mix using the formula:

$$\textit{Moisture Content (\%)} = \frac{\textit{Wt. of Water}}{\textit{Wt. of Dry Sample}} \times 100\%$$

Alberta Transportation

MAT 6-80/12

MIX MOISTURE CONTENT AND MARSHALL DENSITY DATA

PROJECT :	**HWY 99:08**	**CONTRACT NO.:**	**12345**
LOT NO. :	**8**	**DATE LAID :**	**17-Aug-2012**
TECHNOLOGIST :	**B. Good**	**DATE TESTED :**	**18-Aug-2012**

MIX MOISTURE CONTENT

(see ATT-15, Part V, Moisture Content)

TIME SAMPLE PLACED IN OVEN		00:00	7:46	10:05	12:42	15:04	
TIME SAMPLE TAKEN OUT OF OVEN		00:00	12:03	14:10	16:55	19:16	
A. WEIGHT OF MOIST SAMPLE + PAN		g	1745.1	1737.5	1670.2	1704.4	
B. WEIGHT OF DRY SAMPLE + PAN		g	1743.0	1734.9	1667.3	1701.1	
C. WEIGHT OF WATER	**A - B**	g	2.1	2.6	2.9	3.3	
D. WEIGHT OF PAN		g	646.3	655.1	646.3	655.1	
E. WEIGHT OF DRY SAMPLE + PAN	**B - D**	g	1096.7	1079.8	1021.0	1046.0	
F. MOISTURE CONTENT	**(100 C) x E**	%	**0.19**	**0.24**	**0.28**	**0.32**	
LOT AVERAGE MIX MOISTURE CONTENT		%	**0.26**				

FIGURE 1

4.0 HINTS AND PRECAUTIONS

1. Use a separate mix sample of at least 2,000 grams (from the same representative mix sample) for the extraction test as described in ATT-12, Part I or II.

2. Ensure that the oven temperature is maintained at 130 ± 5°C. Do not allow the oven door to stay open for too long as it takes a while for the oven to regain the set drying temperature.

3. Do not put moist samples in the oven on a shelf below dry samples. Place moist samples on the top shelf and partially dried samples on the lowest shelf.

4. Do not over-load the oven as samples will require a longer drying time.

5. Oven dried samples may pick up moisture after they are left to sit around for a long time after removal from the oven. Instead, remove the oven dry samples from the oven, then ***COOL the pan and dried sample until the pan can be handled without gloves, and then IMMEDIATELY weigh the samples.***

6. Keep the laboratory trailer counters clean so that spilled samples can be readily noticed and retrieved.

7. Use heat-resistant gloves, or tongs, when handling hot samples.

8. It is recommended that Balance Check Weights should be used daily, and the results recorded, to identify if calibration drift has occurred. Drift can occur for any number of reasons: such as temperature changes, being moved, or aging electronics.