ATT-12/2022, PART III, CORRECTION FACTOR,
Extracted Asphalt Content

1.0 SCOPE

This test method describes the procedure for obtaining a correction factor which is added to the extracted asphalt content of Virgin ACP (Asphalt Concrete Pavement) mixes, RAP (Recycled Asphalt Pavement) mixes and ASBC (Asphalt Stabilized Base Course) mixes.

2.0 EQUIPMENT

extraction equipment	(See ATT-12, Part I and II, Section 2.0)
25 000 µm minus sieve analysis equipment	(See ATT-26, Section 2.0)
filterless extraction apparatus	(See ATT-12, Part II)
filterless centrifuge apparatus	(See ATT-12, Part II)

Representative 1 litre sample of asphalt cement
5 – mixing bowls (3 for ASBC mixes)
5 - mixing spoons (3 for ASBC mixes)

Data Sheets: Extraction Asphalt Content Correction Factor, MAT 6-75 or
Correction Factor - Asphalt Stabilized Base Course Mixes, MAT 6-90

3.0 PROCEDURE

A correction factor for the extraction procedure is required because:
Some of the asphalt is absorbed into the aggregate and cannot be extracted.
Loss of fine aggregate particles during ignition.

This means that the results obtained by the extraction test are lower than the actual asphalt content. The type of aggregate in the mixture may affect the results of this test method because different aggregates absorb asphalt to varying degrees. To achieve accuracy, a calibration factor shall be established by testing five calibration samples for each mix type.

For Asphalt Concrete Pavement mixes (ACP), this procedure compares the known asphalt content added to laboratory-mixed aggregate specimens to the extracted asphalt contents of the same mix.

For Recycled Asphalt Pavement mixes (RAP), the total asphalt content is added to the virgin aggregate. The actual asphalt added to the virgin aggregate is compared to the extracted asphalt content of the sample. The average difference between the actual and the extracted asphalt content is then reduced by multiplying it by the proportion of virgin aggregate in the recycled asphalt concrete mix.

For Asphalt Stabilized Base Course mixes (cold mixes), this procedure compares the actual residual asphalt content to the extracted residual asphalt content. The difference is the percentage of residual asphalt retained in the aggregate.

The procedure is performed on 5 samples (or 3 for ASBC mixes) and the average difference is the correction factor. This value is added to all extraction results to determine the actual asphalt content of the mix.

The correction factor determination ties up the extraction and centrifuge equipment for approximately 1 day, therefore it should be performed before the plant starts mixing.

3.1 SAMPLE PREPARATION

1. Obtain a representative 1 litre sample of the asphalt cement, cutback or emulsified asphalt from the asphalt delivery tanks as outlined in ATT-42, SAMPLING ASPHALT.

2. Place the asphalt cement sample in the oven set at a temperature of 140°C ±5°C.

   Keep the cutback or emulsified asphalt at room temperature, or approximately 25°C, until it is added to the aggregate.

3. Label and tare 5 hot stainless steel mixing bowls (or 3 for ASBC mixes), and record the number and weight in line "B" of the data sheet as shown in Figure 2 for ACP and RACP mixes, or Figure 3 for ASBC mixes. For cutback or emulsified asphalt mixes, include the hot mixing spoon with the basin.

   Proceed to Section 3.1.1 for split stockpiles or to Section 3.1.2 for single stockpiled aggregates.

3.1.1 Split Stockpiles

1. Obtain a sample of approximately 10 kg from each aggregate stockpile,
   e.g. 10 kg of coarse aggregate, 10 kg of natural fines, 10 kg of manufactured fines, and 10 kg of blend sand as directed in ATT-38, SAMPLING, Gravel and Sand.

2. Oven-dry each sample to a constant weight. The aggregate may be dried on the stove burner, but the aggregate temperature must not exceed 150°C.

3. Cool the coarse aggregate, and then separate it by sieving on the 5 000 µm sieve.

4. Place each aggregate portion (coarse +5 000, coarse -5 000, natural fines, manufactured fines, blend sand, etc.) in separate pans. Mix each sample thoroughly.

5. Obtain the Mix Design aggregate proportions for the job of each aggregate type, and the design % passing for the 5 000 µm sieve of the coarse aggregate.

   For recycled asphalt concrete mixes, use the virgin aggregate proportions.

6. Calculate the weight of dry aggregate required to fabricate a combined 2000 g sample using the formulas:

$$\textit{Required Dry Wt. of Coarse +5 000 µm Aggregate} = \frac{\textit{2000 x \% Coarse Split x (100\% - Design \% Passing 5 000 µm Coarse Aggregate)}}{\textit{100\% x 100\%}}$$

$$\textit{Required Dry Wt. of Coarse -5 000 µm Aggregate} = \frac{\textit{2000 x \% Coarse Split x (Design \% Passing 5 000 µm Coarse Aggregate)}}{\textit{100\% x 100\%}}$$

$$\textit{Required Dry Wt. of Natural Fines} = \frac{\textit{2000 x \% Natural Fines}}{\textit{100\%}}$$

$$\textit{Required Dry Wt. of Manufactured Fines} = \frac{\textit{2000 x \% Manufactured Fines}}{\textit{100\%}}$$

$$\textit{Required Dry Wt. of Blend Sand} = \frac{\textit{2000 x \% Blend Sand}}{\textit{100\%}}$$

A typical example of the calculations is shown in Figure 1 below.

FIGURE 1

AGGREGATE TYPE				COARSE	NATURAL FINES	MANUF. FINES	BLEND SAND
A.	Design % passing 5000µm sieve		%	45			
B.	Design % retained on 5000µm sieve	100-A	%	55			
C.	Design % Split		%	50	25	15	10
D.	Required Dry Wt. of Aggregate	2000 C/100	g.	1000	**500***	**300***	**200***
E.	Required Dry Wt. of +5000µm Agg.	DB/100	g.	**550***			
F.	Required Dry Wt. of -5000µm Agg.	DA/100	g.	**450***			
				**** Weigh and combine flagged amounts***			

7. Fabricate one combined aggregate sample using the dry weight of +5000µm and -5000 µm coarse aggregate, natural fines, manufactured fines and blend sand calculated in step (6). Scoop the calculated weight into a tared drying pan.

8. Oven dry the fabricated sample to a constant dry weight, then perform a wash sieve analysis, as outlined in ATT-26, SIEVE ANALYSIS 25 000 minus, on the dry sample. If the gradation is within the Marshall Design limits, record the sieve analysis result in the lower portion of the data sheet and proceed with step 9 below. If the sample grading is outside the limits, investigate the reason for the discrepancy, fabricate a new sample and then perform a sieve analysis on the new sample.

9. Fabricate 5 combined aggregate samples (or 3 for ASBC mixes) using the dry weight of +5000 µm and -5000 µm of coarse aggregate, natural fines, manufactured fines and blend sand, as calculated in step (6). Scoop the calculated weight of each size into the 5 (or 3) tared basins.

10. Oven-dry the 5 (or 3) samples to a constant weight to ensure **all** water is removed from the fabricated samples. Any water left in the aggregate will result in inaccurate asphalt contents. Aggregate MUST NOT be dried on the stove burner, as this will affect the correction factor value.

11. After oven drying each fabricated sample to a constant weight, pour each sample into one of the previously heated, and tared, s/s mixing bowls. Keep all fabricated samples in the mixing bowls, with the mixing spoons, in the oven at 140°C, until you are ready to add the asphalt. Proceed to Section 3.2 or 3.3.

3.1.2 Single Stockpiles

If the aggregate was not split:

1. Obtain a representative sample of approximately 20 kg of the "single stockpiled" aggregate as directed in ATT-38, SAMPLING, Gravel and Sand.

2. Oven-dry the aggregate to a constant weight. The aggregate may be dried on the stove burner, but the aggregate temperature must not exceed 150°C.

3. Cool the aggregate and separate it on the 5,000 µm sieve.

4. Obtain the Mix Design % passing the 5 000 µm sieve of the unsplit aggregate.

5. Calculate the weight of dry aggregate required to fabricate a combined 2000 g sample using the formulas:

$$\textit{Required Dry Wt. of +5 000 µm Aggregate} = \frac{\textit{2000 x (100 - Design \% passing 5 000 µm sieve)}}{\textit{100\%}}$$

$$\textit{Required Dry Wt. of -5 000 µm Aggregate} = \frac{\textit{2000 x (Design \% passing 5 000 µm sieve)}}{\textit{100\%}}$$

6. Fabricate 3 combined aggregate samples (or 5 for ACP mixes), using the dry weight of +5 000 µm and -5 000 µm aggregate calculated in step 5 above.

7. Repeat steps 7 to 11 of Section 3.1.1.

3.2 VIRGIN AND RAP MIXES

3.2.1 Actual Asphalt Content

1. Remove the s/s mixing bowl containing the 150°C dry aggregate from the oven and form a crater in the aggregate into which asphalt can be poured.

2. Weigh the numbered mixing bowl containing the dry aggregate and mixing spoon and record as “Wt. of Dry Aggregate + Basin + Spoon” on line "A", then record the basin number in the corresponding column. The empty bowl weights (plus mixing spoon), line “B”, should already be recorded, as shown in Figure 2. Leave the basin containing the mixing spoon and aggregate on the scale. Use of a heat shield is recommended, such as a ceramic tile, to prevent damage to the electronic balance. Review and follow the electronic balance manufacturer’s operator’s manual recommendations for weighing hot objects.

3. Determine the “Weight of Dry Aggregate” on line "C" as follows:

   Wt. of Dry Agg. (g) = (Wt. of Dry Agg. + Basin + Spoon) - (Tare of Basin + Spoon)

4. Record the “Target Asphalt Content” on line "D".

   For recycled asphalt concrete pavement mixes use the Target total asphalt content. This includes the % asphalt to be added to the virgin aggregate and the % asphalt in the reclaimed pavement.

5. Calculate the “Weight of Asphalt Required” to be added to the dry aggregate on line "E" using the formula: (line C x line D) / 100%

   $$\textit{Wt. of Asphalt Req'd (g)} = \frac{\textit{Wt. of Dry Agg. x Target Asphalt Content}}{\textit{100\%}}$$

6. Determine the “Required Wt. of Basin + Spoon + Dry Aggregate + Asphalt, on line "F", as follows: Line “F” = Line “A” + Line “E”

   Line "F" = (Wt. of Asphalt Req'd) + (Wt. of Dry Agg. + Basin + Spoon)

7. Pour hot asphalt on the dry aggregate. If more asphalt is added than required, take an actual scale reading and record on line "G" as “Actual Wt. of Basin + Spoon + Dry Aggregate + Asphalt.

8. Calculate the “Weight of Asphalt Added”, on line "H", as follows: Line H = (Line G) – (Line A)

   = (Actual Wt. of Basin + Spoon + Dry Agg. + Asphalt) - (Wt. of Dry Agg. + Basin + Spoon)

9. Calculate the “Actual Asphalt Content”, on line "I", of the mix sample using the formula: Line “I” = (Line “H” / Line “C”) x 100%

   $$\textit{Actual Asphalt Content (\%)} = \frac{\textit{Wt. of Asphalt Added}}{\textit{Wt. of Dry Aggregate}} \textit{ x 100\%}$$

10. Remove the basin from the scale and use the mixing spoon to mix the aggregate and asphalt until all the aggregate is uniformly coated. Make sure no mix is lost during the mixing process, as this will cause inaccurate results.

Alberta Transportation

MAT 6-75/13

ASPHALT CONTENT CORRECTION FACTOR
EXTRACTION METHOD

ATT-12 PART III

CONTRACT :	12345	ASPHALT GRADE :	200-300A	DATE TESTED:	April 21, 1998
PROJECT :	HWY 92:12	ASPHALT SUPPLIER :	HUSKY	PROJECT MANAGER :	R. Roads
PIT NAME :	PEBBLE CREEK	PIT LOCATION :	SE-02-052-27-W4	TECHNOLOGIST:	J. Goodson

ACTUAL ASPHALT CONTENT AND SAMPLE PREPARATION								AGG BLEND	
SAMPLE NUMBER				1	2	3	4	5		
A WT. OF DRY AGGREGATE + BASIN + SPOON	@ 150°C	g.		2165.7	2163.5	2175.4	2168.7	2169.6	%	agg type
BASIN NO.				A	B	C	D	E	72.0	Coarse Agg
B WT. OF BASIN + SPOON	@ 150°C	g.		160.6	163.2	170.2	165.9	167.7	20.0	Nat. Fines
C WT. OF DRY AGGREGATE	A - B	g.		2005.1	2000.3	2005.2	2002.8	2001.9	8.0	Blend Sand
D TARGET ASPHALT CONTENT		%		5.80						
E WT. OF ASPHALT REQUIRED	(C x D) / 100	g.		116.3	116.0	116.3	116.2	116.1		
F REQ'D WT. OF BASIN + SPOON + DRY AGG. + ASP	A + E	g.		2282.0	2279.5	2291.7	2284.9	2285.7		
G ACTUAL WT. OF BASIN + SPOON + DRY AGG. + ASPHALT		g.		2283.1	2282.1	2294.3	2286.9	2286.5		
H WT. OF ASPHALT ADDED	G - A	g.		**117.4**	**118.6**	**118.9**	**118.2**	**116.9**		
I ACTUAL ASPHALT CONTENT	(H / C) x 100	%		5.86	5.93	5.93	5.90	5.84		

FILTERLESS EXTRACTION ASPHALT CONTENT							
PAN NO.			V	W	X	Y	Z
J WT. OF EXTRACTION PAN		g.	1127.3	1201.4	1310.6	1178.5	1256.1
K WT. OF DRY MIX	H + C or G - B	g.	2122.5	2118.9	2124.1	2121.0	2118.8
L WT. OF DRY AGGREGATE + PAN		g.	3129.4	3194.7	3311.1	3177.9	3254.1
M WT. OF DRY AGG. FROM EXTRACTION	L - J	g.	2002.1	1993.3	2000.5	1999.4	1998.0
N WT. OF DRY FINES + BEAKER		g.	146.7	150.3	149.8	146.8	148.8
O WT. OF BEAKER		g.	141.0	139.6	140.3	140.0	140.7
BEAKER NO.			1	16	4	10	8
P WT OF DRY FINES FROM CENTRIFUGE	N - O	g.	5.7	10.7	9.5	6.8	8.1
Q TOTAL WT. OF DRY AGGREGATE	P + M	g.	2007.8	2004.0	2010.0	2006.2	2006.1
R WT. OF ASPHALT	K - Q	g.	114.7	114.9	114.1	114.8	112.7
S ASPHALT CONTENT	100 x (R / Q)	%	5.71	5.73	5.68	5.72	5.62

CORRECTION FACTOR							
T DIFFERENCE OF ASPHALT CONTENTS	I - S		0.14	0.20	0.25	0.18	0.22
U CORRECTION FACTOR	$(T_1+T_2+T_3+T_4+T_5) / 5$		**0.20**				

GRADATION (% PASSING)											
SIEVE SIZE (µm)	20 000	16 000	12 500	10 000	5 000	2 500	1250	630	315	160	80
FABRICATED SAMPLE	**100**	**100**	**85**	**76**	**57**		**37**	**30**	**21**	**15.6**	**7.3**
TARGET	100	100	83	75	55		36	29	20	15.1	7.0

REMARKS: Correction Factor #1, Gradation within Design Limits.

enter data into shaded areas

FIGURE 2

3.2.2 Extraction Asphalt Content

1. Set the oven at a temperature of 130°C ±5°C.

2. Place the basin containing the mix and spoon in the oven for one hour to ensure asphalt absorption occurs.

3. Remove the sample from the oven and let it cool for at least 20 minutes.

4. Load the sample into extraction basket and thoroughly wash the material clinging to the basin and mixing spoon into the extraction apparatus.

5. Perform an extraction test on the mix sample using the Filterless Extraction and Centrifuge method ATT-12, Part II.

6. Use the extraction asphalt content portion of the data sheet to determine the “Extracted Asphalt Content”, on line "S", as outlined in ATT-12, Part II. Discard the extraction aggregate.

7. Determine the “Actual Asphalt Contents” and “Extracted Asphalt Contents” of the other four mix samples as described in Sections 3.2.1 and 3.2.2.

3.2.3 Correction Factor

1. For each sample, calculate the difference between the actual asphalt content (line "I") and the extracted asphalt content (line "S") and record it as “Difference of Asphalt Contents” on Line "T".

2. Determine the average difference to the nearest 0.01% and record as “Correction Factor” on Line "U"). This value is the absorbed asphalt content and will be added to subsequent extracted asphalt contents to yield the actual asphalt content of the asphalt concrete mix.

3. For recycled asphalt concrete mixes, the correction factor is a percentage of the virgin aggregate correction factor and is calculated using the formula:

$$\textit{RAP Correction Factor} = \frac{\textit{(Average Virgin \% Correction Factor) x (\% Virgin Aggregate)}}{\textit{100\%}}$$

This reduced correction factor will be added to subsequent extracted asphalt contents to yield the total actual asphalt content of the recycled asphalt concrete mix.

3.3 ASPHALT STABILIZED BASE COURSE MIXES

3.3.1 Actual Residual Asphalt Content

1. Remove, from the oven, one of the basins containing the 130°C dry aggregate and spoon.

2. Form a crater in the aggregate into which the cutback or emulsified asphalt will be poured. Set the spoon to the side of the crater.

3. Weigh the basin containing the dry aggregate (at 130°C) and mixing spoon. Record as “Wt. of Dry Aggregate + Basin + Spoon” on line "A", in the same column as the corresponding “Basin No.” and “Weight of Basin + Spoon”, as shown in Figure 3.

4. Leave the basin and mixing spoon on the scale and allow the aggregate to cool to 95°C.

5. Determine the “Weight of Dry Aggregate” on line "C" as follows:

   Wt. of Dry Agg. (g) = (Wt. of Dry Agg + Basin + Spoon) - (Wt. of Basin + Spoon)

6. Record the Design or Target Cutback or Emulsified Asphalt Content on line "D".

7. Calculate the “Weight of Cutback or Emulsified Asphalt Required” on line "E" to be added to the aggregate as follows:

   Wt. of Cutback/Emulsified Asphalt Req'd (g) =
   ((Wt. of Dry Agg) x (Target Cutback/Emulsified Asphalt Content)) / 100%

8. Determine the “Required Weight of Basin + Dry Aggregate + Spoon + Cutback/Emulsified Asphalt” on line "F" as follows:

   ((Wt. of Dry Agg. + Basin + Spoon) + (Wt. of Cutback/Emulsified Asphalt Req'd))

9. Add the Cutback or Emulsified Asphalt at room temperature to the dry aggregate at 95°C. If more cutback asphalt is added than is required, take the actual scale reading and record as “Actual Wt. of Basin + Dry Aggregate + Spoon + Cutback/Emulsified Asphalt” on line "G".

10. Calculate the “Weight of Cutback/Emulsified Asphalt Added” on line "H" by subtracting the “Wt. of Dry Aggregate + Basin + Mixing Spoon (line "A") from the Actual Wt. of Basin + Dry Aggregate + Spoon + Cutback/Emulsified Asphalt (line "G").

11. Calculate the “Actual Cutback/Emulsified Asphalt Content” in percent on line "I" of the mix sample using the formula:

$$\textit{Actual Asphalt Content (\%)} = \frac{\textit{(100 x Wt. of Cutback/Emulsified Asphalt Added)}}{\textit{Wt. of Dry Aggreggate}}$$

12. Remove the basin from the scale and use the mixing spoon to mix the aggregate and cutback or emulsified asphalt until all the aggregate is uniformly coated. Make sure no mix is lost during the mixing process, as this will cause inaccurate test results.

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MAT 6-90/13

AC CORRECTION FACTOR - ASBC MIXES
EXTRACTION METHOD

ATT-12 PART III

CONTRACT :	12345	ASPHALT GRADE :	MC-250	DATE TESTED:	May 16, 2013
PROJECT :	HWY 680:02	ASPHALT SUPPLIER :	HUSKY	PROJECT MANAGER :	I.M. GOOD
PIT NAME :	ARM	PIT LOCATION :	NE-12-091-26-W5	TECHNOLOGIST:	R. Goldblum

TARGET/CUTBACK/EMULSIFIED ASPHALT CONTENT & SAMPLE PREPARATION						AGG BLEND	
SAMPLE NUMBER			1	2	3		
A WT. OF DRY AGGREGATE +BASIN +SPOON		g.	2282.6	2296.7	2298.4	%	agg type
BASIN NO.			A1	B1	C1	72	Coarse Agg
B WT. OF BASIN +SPOON		g.	274.3	278.4	286.1	20	Nat. Fines
C WT. OF DRY AGGREGATE	A - B	g.	2008.3	2018.3	2012.3	8	Blend Sand
D TARGET CUTBACK/EMULSIFIED ASPHALT CONTENT		%		4.90			
E WT. OF CUTBACK/EMULSIFIED ASPHALT REQUIRED	(C x D) / 100	g.	98.4	98.9	98.6		
F REQURED WT. OF BASIN +DRY AGG. +SPOON +ASPHALT	A +E	g.	2381.0	2395.6	2397.0		
G ACTUAL WT. OF BASIN +DRY AGG. +SPOON +ASPHALT		g.	2382.6	2395.1	2397.8		
H WT. OF CUTBACK/EMULSIFIED ASPHALT ADDED	G - A	g.	**100.0**	**98.4**	**99.4**		
I ACTUAL CUTBACK/EMULSIFIED ASPHALT CONTENT	(100 x H) / C	%	4.98	4.88	4.94		

ACTUAL RESIDUAL ASPHALT CONTENT CALCULATION					
J WT. OF DRY MIX +BASIN +MIXING SPOON		g.	2353.2	2364.9	2367.3
K WT. OF DRY MIX	J - B	g.	2078.9	2086.5	2081.2
L WT. OF RESIDUAL ASPHALT	K - C	g.	70.6	68.2	68.9
M ACTUAL RESIDUAL ASPHALT CONTENT	(100 x I) / C	g.	3.52	3.38	3.42

FILTERLESS EXTRACTION AND FILTERLESS CENTRIFUGE					
N WT. OF DRY AGGREGATE +PAN		g.	3122.4	3148.4	3129.6
O WT. OF EXTRACTION PAN		g.	1121.8	1136.5	1128.4
EXTRACTION PAN NO.		g.	A	B	C
P WT. OF DRY AGGREGATE FROM EXTRACTION	N - O	g.	2000.6	2011.9	2001.2
Q WT OF DRY FINES +BEAKER		g.	150.8	145.1	158.7
R WT. OF BEAKER		g.	141.3	136.8	145.8
BEAKER NO.		g.	AA	BB	CC
S WT. OF DRY FINES FROM CENTRIFUGE	Q - R	g.	9.5	8.3	12.9
T TOTAL WT. OF DRY AGGREGATE	P +S	g.	2010.1	2020.2	2014.1

FILTER EXTRACTION					
U WT. OF DRY AGGREGATE +PAN +FILTERS		g.			
V WT. OF PAN +FILTERS		g.			
W WT. OF DRY AGGREGATE	U - V	g.			

EXTRACTED RESIDUAL ASPHALT CONTENTS					
X WT. OF RESIDUAL ASPHALT	K - (T or W)	g.	68.8	66.3	67.1
Y EXTRACTED RESIDUAL ASPHALT CONTENT	(100 x X) / (T or W)	%	3.42	3.28	3.33

RESIDUAL ASPHALT CORRECTION FACTOR					
Z DIFFERENCE OF RESIDUAL ASPHALT CONTENTS	M - Y	%	0.10	0.10	0.09
AA CORRECTION FACTOR	$(Z_1+Z_2+Z_3) / 3$	%		**0.09**	

FIGURE 3

GRADATION (% PASSING)										
SIEVE SIZE (µm)	16000	12500	10000	5000	2500	1250	630	315	160	80
FABRICATED SAMPLE	**100**	**84**	**75**	**56**		**35**	**30**	**22**	**14.0**	**8.2**
TARGET	100	83	75	55		36	29	20	15.1	7.0

REMARKS:

enter data into shaded areas

13. Set the oven at 130°C ± 5°C.

14. Place the basin containing the mix and spoon in the oven and dry the sample to a constant weight. This ensures all cutback and water is removed and that absorption occurs. The drying time also simulates the field procedures for moisture and residual asphalt contents.

15. Once the mix has reached a constant weight, weigh the basin containing the hot dry mix and spoon and record as “Wt. of Dry Mix + Basin + Mixing Spoon” on line "J".

16. Determine the “Weight of Dry Mix” on line "K" as follows:

Wt. of Dry Mix (g) = (Wt. of Dry Mix + Basin + Mixing Spoon) - (Wt. of Basin + Spoon)

17. Determine the “Weight of Residual Asphalt” on line "L" as follows:

Wt. of Residual Asphalt (g) = (Wt. of Dry Mix) - (Wt. of Dry Aggregate)

18. Calculate the “Actual Residual Asphalt Content” on line "M" as follows:

$$\textit{Actual Residual Asphalt Content (\%)} = \frac{\textit{(100 x Wt. of Residual Asphalt)}}{\textit{Wt. of Dry Aggreggate}}$$

3.3.2 Extracted Residual Asphalt Content

1. Remove the dry mix sample from the oven and let it cool for at least 20 minutes.

2. Load the sample into the extraction basket and thoroughly wash any material clinging to the basin and mixing spoon into the extraction apparatus.

3. Perform an extraction test on the mix sample using ATT-12, Part II Filterless Extraction and Centrifuge Method, or ATT-12, Part I, EXTRACTION, Reflux.

4. Use the extraction portion of the data sheet to determine the “Extracted Residual Asphalt Content” on line "Y" as outlined in ATT-12, Part I or II. Discard the extraction aggregate.

5. Determine the actual and extracted residual asphalt contents of the other two mix samples as described in Sections 3.3.1 and 3.3.2.

3.3.3 Correction Factor

1. For each sample calculate the difference between the “Actual Residual Asphalt Content” on line "M" and the “Extracted Residual Asphalt Content” on line "Y". Record as “Difference of Residual Asphalt Contents” on line "Z".

2. Determine the “Average Difference of Residual Asphalt Contents” to the nearest 0.01% and record as “Correction Factor on line "AA". This value is the absorbed asphalt content and will be added to subsequent extracted residual asphalt contents to yield the actual residual asphalt content of the sample.

4.0 HINTS AND PRECAUTIONS

1. A new correction factor must be established for each Marshall Design and Asphalt Type used on the project.

2. This procedure should be performed before mixing commences on each project, and whenever the results are in doubt.

3. **If the correction factor is negative, it can be assumed that the test is in error** and should be repeated.

4. If the Target Asphalt Content changes by more than 0.5%, a new correction factor should be done at the new target asphalt content, on two samples. **If** the average correction factor of the two samples is **within 0.05% of the previous correction factor**, a complete new correction factor is **NOT NECESSARY**.

5. Any aggregate proportion changes >5% require a new correction factor.

6. For any change in the nature or sources of the aggregates or RAP, a new correction factor is required. Unless otherwise specified, the Contractor may elect to use suitable RAP in the ACP mixture to a maximum RAP to virgin aggregate ration of 30/70.

7. The average correction factor value should normally be within 0.05% of any single correction value. Redo the tests on any samples that were outside these limits.

8. Studies have shown that asphalt and aggregate correction factors are unique to each ignition oven furnace, regardless of the manufacturer.

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