

# 2014 PennDOT Gmm Verification Program

*2015 PAPA Regional Technical Meeting*

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- FHWA Stewardship Review mandated that PennDOT develop a program to verify that the Gmm value submitted by producers is accurate.
- Gmm on all projects using Federal funds and National Highway System projects must be verified.

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# CY 2014 Gmm Verification - Results

Total LTS Gmm Verifications	PTM No. 1 Sublot > 0.030	Average of 2 Sublots > 0.030	Rechecks > 0.030	Total of Avg. or Rechecks > 0.030
911	60 (6.6%)	30 (3.2%)	14 (1.5%)	44 (4.7%)

Total of Avg. or Rechecks > 0.030	Reduced Density Pay Factor	Increased Density Pay Factor	Reduced Density PF and Resulting Lot Payment = R&R	Reduced Density PF and Resulting Lot Payment = Reduced Lot Payment
44	5 (0.5%)	1 (0.1%)	2 (0.2%)	3 (0.3%)

# CY 2014 Gmm Verification – Producer Stats

<b>Producer Stats:</b>	<b>Count</b>	<b>Percent of Total</b>
Total Locations with a Gmm Verification =	97	
Locations with < 5 Gmm Verifications =	43	44.8%
Locations with 5-10 Gmm Verifications =	27	28.1%
Locations with 10-20 Gmm Verifications =	16	16.7%
Locations with 20-30 Gmm Verifications =	5	5.2%
Locations with 30-50 Gmm Verifications =	5	5.2%
Locations with 60 Gmm Verifications =	1	1.0%

# CY 2014 Gmm Verification – Producer Stats

<b>Producer Stats:</b>	<b>Count</b>	<b>Percent of Total</b>
Locations submitting Gmm samples	97	
Average Gmm Verifications per Location	11.1	
Total Gmm Verification Failures	44	
Locations with No Gmm failures	74	76.3%
Locations with at least one Gmm failure	23	23.7%

# CY 2014 Gmm Verification – Producers with Failures - Stats

<b>Producer Stats:</b>	<b>Count</b>	<b>Percent of Total</b>
Producers with 1 Gmm Verification Failure	16	16.7% *
Producers with 2 Gmm Verification Failures	5	5.2% *
Producers with 3 Gmm Verification Failures	0	0.0% *
Producers with 4 Gmm Verification Failures	1	1.0% *
Producers with 14 Gmm Verification Failures	1	1.0% *

\* Out of Total 97 Producers

# CY 2014 Gmm Verifications – JMF Stats

JMF Stats:	Count	Percent of Total
Total JMFs with Gmm Verification =	315	
JMFs with < 3 Gmm Verifications =	245	66.9%
JMFs with 3-10 Gmm Verifications =	109	29.8%
JMFs with > 10 Gmm Verifications =	12	3.3%
Average Gmm Verifications per JMF =	2.8	
Min. Gmm Verifications per JMF =	1	
Max. Gmm Verifications per JMF =	32	

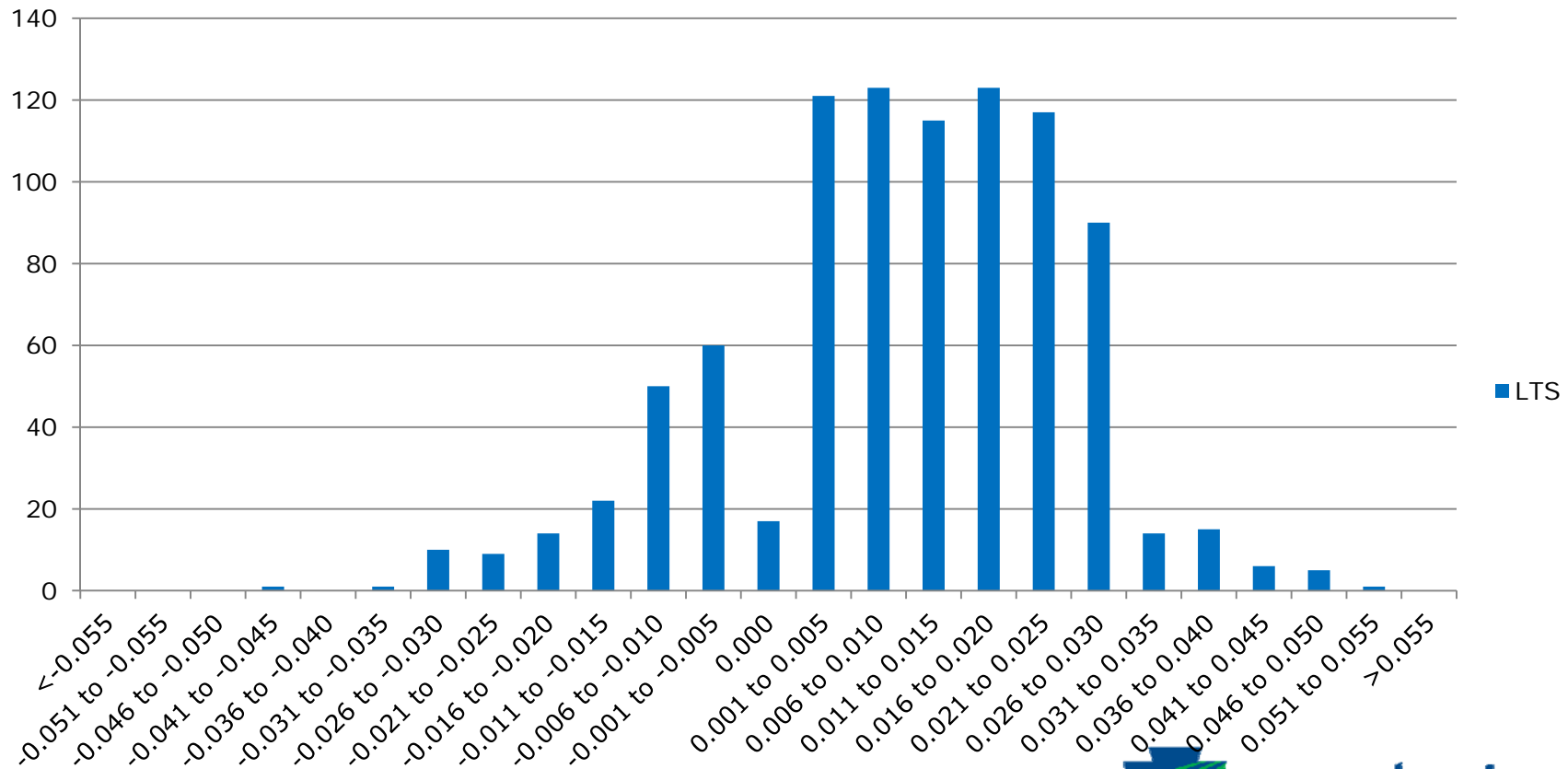


# CY 2014 Gmm Verifications – NMAS Stats

<b>NMAS:</b>	<b>Count</b>	<b>% of total lots</b>	<b>Failures</b>	<b>Failure rate</b>	<b>% of Total Failures</b>
9.5 mm	366	40.2%	10	2.7%	22.7%
12.5 mm	132	14.5%	2	1.5%	4.6%
19.0 mm	188	20.6%	10	5.3%	22.7%
25.0 mm	190	20.9%	19	10%	43.2%
37.5 mm	35	3.8%	3	8.6%	6.8%

# CY 2014 Gmm Verifications - Differences

## LTS



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  - If difference still exceeds .030, then LTS selects the next sample *from the same day* as the sample that was tested for Gmm.
  - LTS Gmm value from both samples is averaged and used to calculate density for the corresponding core samples *for that day*.

# T 209 Points of Emphasis

- Residual Pressure Manometer or Vacuum Gauge that has been standardized annually and accurate to 1 mm Hg.
  - Should calibrate to NIST Traceability Standards (recommended), maintain certificate in records
- Minimum sample size based on the nominal maximum aggregate size must be followed
- Vacuum is increased until the manometer reads between 25 and 30 mm Hg
  - Vacuum time of  $15 \pm 2$  minutes does not begin until the manometer reaches required vacuum pressure
- For either method of weighing (in air or suspended), the mass must be determined within  $10 \pm 1$  min after end of vacuum

# Bulletin 27 Points of Emphasis

- Mechanical agitation required.
- Proper conditioning time and temperature
- Use the appropriate oven conditioning temperatures based on the performance grade of the asphalt binder. For RAP mixes, use the final (blended) binder grade, not virgin binder grade
- Use the appropriate conditioning time based on the absorption of the coarse aggregate and/or as demonstrated by a series of tests.
  - Not less than 2 hours, potentially up to 6 hours
- Have a process to accurately determine the amount of time mixture is stored in the silo



# Recommendations/Best Practices

- Recommend daily standardization of pycnometer
- Tightly control the temperature of the water bath at  $77^{\circ}\text{F} \pm 2^{\circ}\text{F}$
- Variable speed agitators – set speed at approximate middle.
- Determine the maximum size of sample that can fit in pycnometer – larger sample sizes need split and results averaged.
- Verify production Gmm values are within  $\pm 0.030$  of JMF value.

# Recommendations

- Obtain QC field samples and compare to QC plant samples to determine any differences between field and plant sample values.
- Proper averaging of multiple values for the average daily Gmm.
- Sample preparation requires that the fine aggregate portion of the mixture be broken down to particles no larger than 1/4" inch
- Make sure to “dry out” vacuum pumps to maintain proper vacuum.

Questions?