

**METHODS OF SAMPLING AND TESTING
MT 226-04
MAXIMUM ACCEPTABLE DEVIATIONS
IN THE SIEVE ANALYSIS OF INDEPENDENT ASSURANCE SAMPLES
(MONTANA METHOD)**

1 Scope:

1.1 The charts included in this method shall serve as a guide in evaluating the maximum acceptable deviations in the sieve analysis of **Independent Assurance** samples. If the individual grading percentages vary from the group average percentages by more than the amounts listed, the cause must be determined and the error remedied. Deviation percentages are based on the weight of the total sample.

2 References:

2.1 MT Manual:

MT 201 Preparing the Three-way Split Samples for Test and the Responsibility for Investigating Discrepancies.

MT 602 The Federal Highway Administration Policy and Procedure for Sampling and Testing Independent Assurance and Final Record Samples.

MT 607 Procedure for Reducing Field Samples of Aggregate to Testing Size

Note 1 - The specifications apply to the material while the permissible deviation is used only to compare sieve analysis obtained in the field, division or area laboratory and Materials Bureau.

FINE AGGREGATE FOR CONCRETE

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES		
Sieve Size	Percent Passing	Permissible Variation
3/8" (9.5 mm)	100	- 2%
No. 4 (4.75 mm)	95 - 100	± 2%
No. 8 (2.36 mm)	80 - 100	± 2%
No. 16 (1.18 mm)	50 - 85	± 2%
No. 30 (0.600 μm)	25 - 60	± 2%
No. 50 (0.300 μm)	5 - 30	± 2%
No. 100 (0.150 μm)	0 - 10	± 2%
No. 200 (0.075 μm)	0 - 3	± 2%

COARSE AGGREGATE FOR CONCRETE

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES				
GRADATION	No. 1	No. 2	No. 3	No. 4
Sieve Size	1 1/2" to No. 4	3/4 " to No. 8	1 1/2" to 3/8"	1/2" to No. 8
2" (50 mm)	100 - 2%		100 - 2%	
1 1/2" (37.5 mm)	95 - 100 ± 3%		90 - 100 ± 3%	
1" (25 mm)		100 - 2%	20 - 55 ± 3%	
3/4" (19 mm)	35 - 70 ± 3%	90 - 100 ± 3%	0 - 15 ± 3%	100 - 2%
1/2" (12.5 mm)				90 - 100 ± 3%
3/8" (9.5 mm)	10 - 30 ± 2%	20 - 55 ± 2%	0 - 5 ± 2%	40 - 70 ± 2%
No. 4 (4.75 mm)	0 - 5 ± 2%	0 - 10 ± 2%		0 - 15 ± 2%
No. 8 (2.36 mm)		0 - 5 ± 2%		0 - 5 ± 2%

SELECTED SURFACING

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES						
Sieve Size	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
4" (100 mm)	100 - 2%					
3" (75 mm)		100 - 2%				
2 1/2" (63 mm)			100 - 2%			
2" (50 mm)				100 - 2%		
1 1/2" (37.5 mm)					100 - 2%	
1" (25 mm)						100 - 2%
No. 200 (75 µm)	15 max ± 1.5%	15 max ± 1.5%	15 max ± 1.5%	15 max ± 1.5%	15 max ± 1.5%	15 max ± 1.5%

SAND SURFACING

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES					
Sieve Size	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
1 1/2" (37.5 mm)	100 - 2%				
1" (25.0 mm)		100 - 2%			
3/4" (19.0 mm)			100 - 2%		
1/2" (12.5 mm)				100 - 2%	
No. 4 (4.75 mm)					100 - 2%
No. 10 (2.00 mm)	65 min ± 2%	65 min ± 2%	65 min ± 2%	50 min ± 2%	50 min ± 2%
No. 200 (75 µm)	20 max ±1.5%	20 max ±1.5%	20 max ±1.5%	20 max ±1.5%	20 max ±1.5%

CRUSHED TOP SURFACING, TYPE "A"

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES					
Sieve Size	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
1" (25 mm)	100 - 2%				
3/4" (19.0 mm)		100 - 2%			
5/8" (16.0 mm)			100 - 2%		
1/2" (12.5 mm)				100 - 2%	
3/8" (9.5 mm)					100 - 2%
No. 4 (4.75 mm)	40 - 70 ± 2%	40 - 70 ± 2%	40 - 70 ± 2%	40 - 70 ± 2%	50 - 80 ± 2%
No. 10 (2.00 mm)	25 - 55 ± 2%	25 - 55 ± 2%	25 - 55 ± 2%	25 - 60 ± 2%	35 - 70 ± 2%
No. 200 (75 µm)	2 - 8 ± 1.5%	2 - 8 ± 1.5%	2 - 8 ± 1.5%	2 - 8 ± 1.5%	2 - 8 ± 1.5%

CRUSHED TOP SURFACING, TYPE "B"

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES			
Sieve Size	Grade 1	Grade 2	Grade 3
1 1/2" (37.5 mm)	100 - 2%		
1" (25 mm)		100 - 2%	
3/4" (19.0 mm)			100 - 2%
1/2" (12.5 mm)			
No. 4 (4.75 mm)	40 - 80 ± 2%	40 - 80 ± 2%	40 - 80 ± 2%
No. 10 (2.00 mm)	25 - 60 ± 2%	25 - 60 ± 2%	25 - 60 ± 2%
No. 200 (75 µm)	5 - 20 ± 1.5%	5 - 20 ± 1.5%	5 - 20 ± 1.5%

CRUSHED BASE COURSE, TYPE "A"

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES				
Sieve Size	Grade 5A Target Limits	Job Mix Tolerance	Grade 6A Target Limits	Job Mix Tolerance
2" (50 mm)	100			
1 1/2" (37.5 mm)	97	±3%	100	
3/4" (19.0 mm)	78 - 80	±8%	82 - 88	±8%
3/8" (9.5 mm)	58 - 62	±8%	52 - 64	±12%
No. 4 (4.75 mm)	42 - 50	±8%	36 - 48	±12%
No. 40 (425 µm)	14 - 22	±8%	16 - 24	±10%
No. 200 (75 µm)	3 - 5	±3%	3 - 5	±3%

CRUSHED BASE COURSE, TYPE "B"

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES			
Sieve Size	Grade 1	Grade 2	Grade 3
2" (50 mm)	100 - 2%		
1 1/2" (37.5 mm)		100 - 2%	
1" (25 mm)	50 - 80 ± 2%		100 - 2%
No. 4 (4.75 mm)	20 - 50 ± 2%	25 - 55 ± 2%	30 - 60 ± 2%
No. 10 (2.00 mm)			20 - 50 □ ± 2%
No. 200 (75 μm)	8 max ± 1.5%	8 max ± 1.5%	8 max ± 1.5%

COVER MATERIAL

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES					
Sieve Size	Grade 1A	Grade 2A	Grade 3A	Grade 4A	Grade 5A
5/8" (16.0 mm)	100 - 2%				
1/2" (12.5 mm)		100 - 2%	100 - 2%		
3/8" (9.5 mm)	33 - 55 ± 2%	40 - 90 ± 2%	95 - 100 ± 2%	100 - 2%	100 - 2%
No. 4 (4.75 mm)	0 - 15 ± 2%	0 - 15 ± 2%	0 - 30 ± 2%	0 - 30 ± 2%	9 - 50 ± 2%
No. 8 (2.36 mm)	0 - 5 ± 2%	0 - 5 ± 2%	0 - 15 ± 2%	0 - 15 ± 2%	2 - 20 ± 2%
No. 200 (75 μm)	2 max ± 1.5%	2 max ± 1.5%	2 max ± 1.5%	2 max ± 1.5%	2 max ± 1.5%

AGGREGATE FOR CEMENT-TREATED BASE

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES	
Sieve Size	Job Mix Target Limits
3/4" (19.0 MM)	100 - 2%
No. 4 (4.75 mm)	40 - 70 ± 2%
No. 10 (2.00 mm)	25 - 55 ± 2%
No. 200 (75 µm)	4 - 12 ± 1.5%

FILTER MATERIAL

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES		
Sieve Size	Gradation No. 1	Gradation No. 2
2" (50 mm)		100 - 2%
1 1/2" (37.5 mm)		95 - 100 ± 3%
3/4" (19.0 mm)		35 - 70 ± 3%
3/8" (9.5 mm)	100 - 2%	10 - 30 ± 2%
No. 4 (4.75 mm)	95 - 100 ± 2%	5 max ± 2%
No. 8 (2.36 mm)	80 - 100 ± 2%	
No. 16 (1.18 mm)	50 - 85 ± 2%	
No. 30 (600 µm)	25 - 60 ± 2%	
No. 50 (300 µm)	5 - 30 ± 2%	
No. 100 (150 µm)	10 max ± 1.5%	

PLANT MIX SURFACING

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES				
Sieve Size	Grade A Target Limits	Job Mix Tolerance	Grade B Target Limits	Job Mix Tolerance
3/4" (19.0 mm)	100		100	
1/2" (12.5 mm)	87 - 93	±8%	86 - 90	±7%
3/8" (9.5 mm)	77 - 83	±8%	75 - 79	±7%
No. 4 (4.75 mm)	52 - 58	±7%	51 - 57	±7%
No. 10 (2.00 mm)	36 - 41	±6%	32 - 40	±6%
No. 40 (0.425 mm)	19 - 21	±5%	14 - 16	±4%
No. 200 (75 µm)	6 - 8	±2%	4.5 - 6.5	±1.5%

PLANT MIX SURFACING

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES		
Sieve Size	Grade D Target Limits	Job Mix Tolerance
3/4" (19.0 mm)	100	
1/2" (12.5 mm)	79 - 83	±7%
3/8" (9.5 mm)	68 - 72	±7%
No. 4 (4.75 mm)	44 - 50	±7%
No. 10 (2.00 mm)	27 - 33	±6%
No. 40 (0.425 mm)	12 - 15	±4%
No. 200 (75 µm)	4.5 - 6.5	±1.5%

BEDDING MATERIAL

PERCENTAGE BY WEIGHT PASSING SQUARE MESH SIEVES	
Sieve Size	Percent Passing
4" (100 mm)	100 - 2%
No. 4 (4.75 mm)	25 - 60 ± 2%
No. 200 (75µm)	0 - 12 ± 1.5%

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