

Reduced Exposure by Paving Asphalt at Reduced Temperature – WMA (Warm Mix Asphalt)



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Paving Asphalt at Reduced Temperature – WMA (Warm Mix Asphalt)

The following tables are taken from the descriptions of exposure (in German):

- ‘Mechanical Working of Mastic Asphalt’
- ‘Manual Working of Mastic Asphalt for Residential and Industrial Construction’
- ‘Paving of Conventional Rolled Asphalt in Road Construction’

Source: (bgbau.de)

When calculating the reduction of exposure by paving warm mix asphalt, this is with reference to the 95th percentile quoted in these tables.

Notes on how to determine:



- reduction of exposure
- energy savings
- reduction in carbon dioxide emissions

Concentrations of Fumes and Aerosols Emitted in mg/m³:

Manual Paving of Conventional Mastic Asphalt at Temperatures over 230 °C

	Number	Minimum value	50 th percentile	95 th percentile	Maximum value
Outdoors					
Filling	50	0.5	3.0	14.6	16.0
Bucket transport	17	0.1	0.6	9.0	9.0
Barrow transport	8	0.7	–	–	16.8
Smoothing	13	0.9	4.2	7.6	8.1
Indoors					
Filling	59	1.3	5.3	24.1	77.0
Bucket transport	77	0.5	3.1	7.6	26.3
Barrow transport	86	0.6	5.4	32.8	66.0
Smoothing	234	0.8	8.1	34.0	71.7
Gritting	36	0.6	5.7	27.9	36.8

Manual Paving of Viscosity-Modified Mastic Asphalt at Temperatures up to 230 °C

	Number	Minimum value	50 th percentile	95 th percentile	Maximum value
Outdoors					
Filling	1	–	–	–	0.3
Bucket transport					
Barrow transport	1	–	–	–	1.0
Smoothing	3	0.5	–	–	1.0
Indoors					
Filling	3	0.5	–	–	8.6
Bucket transport	2	2.3	–	–	7.3
Barrow transport	1	–	–	–	3.6
Smoothing	7	1.9	–	–	9.5
Gritting					

Concentrations of Fumes and Aerosols Emitted in mg/m³:

Machine Paving of Conventional Mastic Asphalt at Temperatures over 230 °C

	Number	Minimum value	50 th percentile	95 th percentile	Maximum value
Outdoors					
Charger	64	0.4	6.3	57.8	75.4
Screed operator	91	0.3	3.7	38.1	45.9
Finishing	52	0.1	1.3	9.7	14.0
Indoors					
Charger	0	–	–	–	–
Screed operator	25	1.1	6.1	12.8	34.2
Finishing	16	4.0	6.4	14.7	16.1

Machine Paving of Viscosity-Modified Mastic Asphalt at Temperatures up to 230 °C

	Number	Minimum value	50 th percentile	95 th percentile	Maximum value
Outdoors					
Charger	43	0.3	2.4	7.7	12.0
Screed operator	57	0.3	2.9	9.0	11.9
Finishing	43	0.3	0.3	2.9	5.8

Paving of Conventional Rolled Asphalt

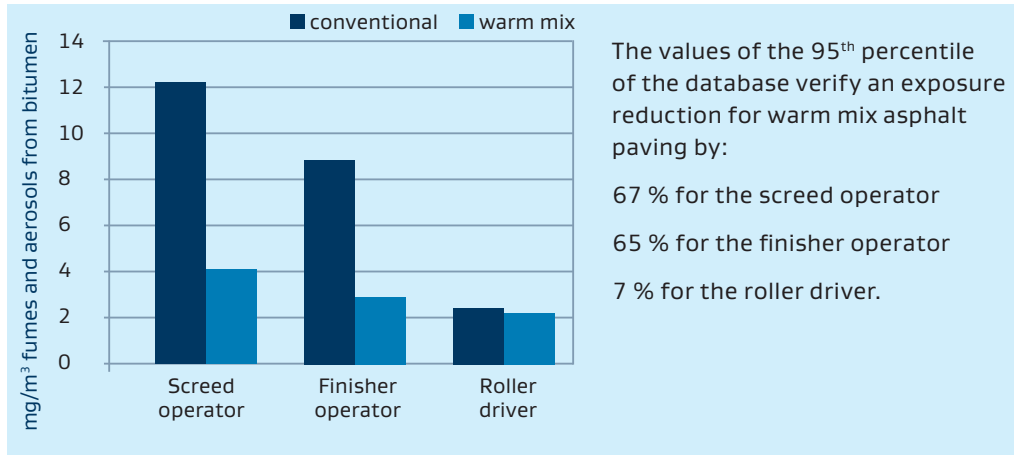
	Measured value	Minimum value	50 th percentile	95 th percentile	Maximum value
Gang leader, screed operator	225	0.12	2.70	12.4	20.80
Finisher operator	161	0.12	2.40	8.9	17.60
Roller driver	56	0.17	0.90	2.5	3.10

Paving of Rolled Asphalt with Viscosity-Modifying Additives

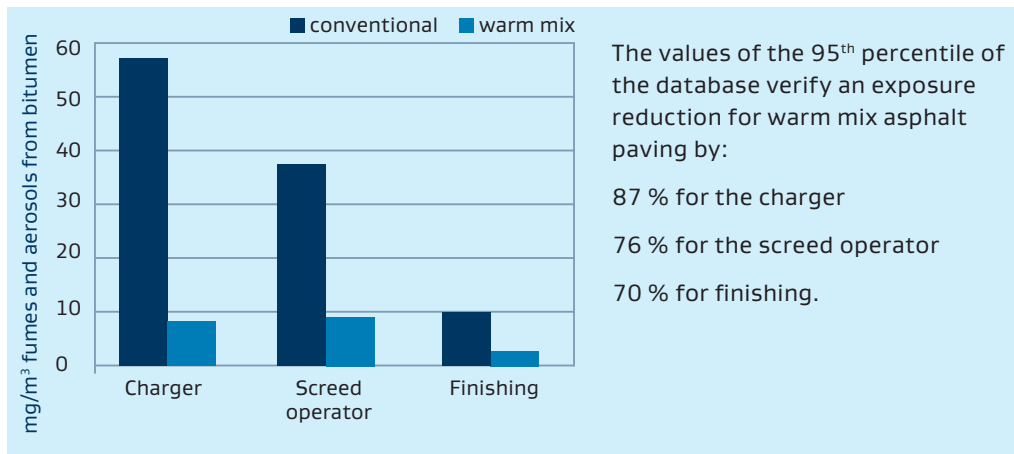
	Measured value	Minimum value	50 th percentile	95 th percentile	Maximum value
Gang leader, screed operator	77	0.18	1.00	4.1	9.40
Finisher operator	45	0.25	1.00	3.1	5.00
Roller driver	29	0.21	0.25	2.3	4.40

Comparison of the Values of the 95th Percentile:

Paving Conventional Rolled Asphalt Versus Paving of Rolled Warm Mix Asphalt



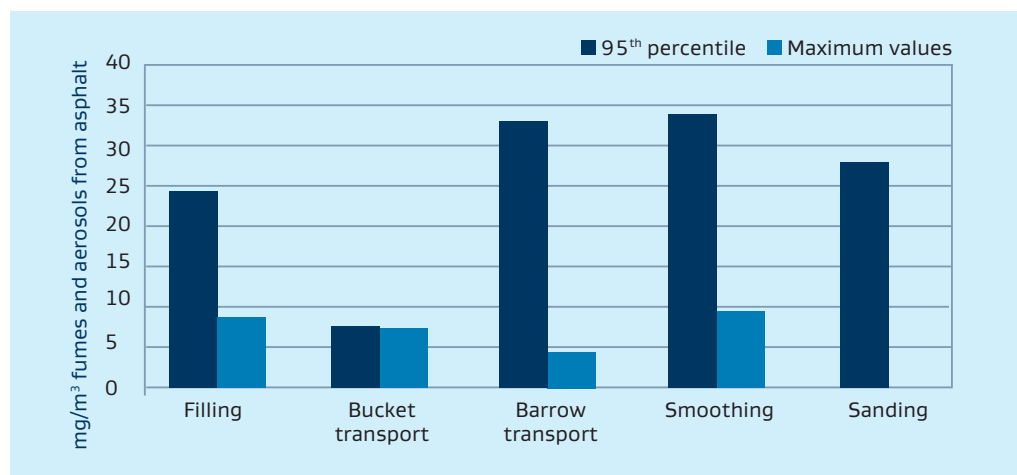
Conventional Mechanical Paving of Mastic Asphalt Outdoors Versus Mechanical Paving of Warm Mix Mastic Asphalt



The reductions at the construction sites documented on this Webpage depend on the climatic conditions but particularly on the experience of the gangs paving warm mix asphalt. Because these experiences will result in improvements when paving warm mix asphalt, the reduction of exposure at future construction sites will presumably be greater than as shown.

Comparison of the Values of the 95th Percentile:

Conventional Manual Paving of Mastic Asphalt Indoors Versus Manual Paving of Warm Mix Mastic Asphalt



For paving warm mix asphalt, there is not yet sufficient measured data available to allow a comparison of the values for the 95th percentile in the database. For this reason, the 95th percentile values of the database for conventional paving are compared with the maximum values for paving warm mix asphalt.

This comparison reveals an exposure reduction for warm mix paving by:

- 64 % for filling
- 4 % for bucket transport
- 89 % for barrow transport
- 72 % for smoothing.

There are still no measured data available for sanding when paving warm mix asphalt.

The reductions at the construction sites documented on this Webpage depend on the ambient temperatures and climatic conditions but particularly on the experience of the gangs paving warm mix asphalt. Because this experience will result in improvements in paving warm mix asphalt, the reduction of exposure at future construction sites will presumably be greater than as shown in Figure 3.

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