

**KANSAS DEPARTMENT OF TRANSPORTATION  
SPECIAL PROVISION TO THE  
STANDARD SPECIFICATIONS, 1990 EDITION**

**SUBSECTION 1103**

**AGGREGATE FOR BITUMINOUS MIXTURES**

**Page 741, subsection 1103.02(a). Add the following to this subsection:**

(1.6) Crushed steel slag shall be produced by the mechanical crushing of electric furnace steel slag.

**Page 743, Table 5. Add the following to this table:**

CSSL	Crushed Steel Slag	Gradation shall blend with other aggregates in the mix
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**Page 744, subsection 1103.02(b)(1.3). Add the following paragraph to this subsection:**

The quantity of crushed steel slag (CSSL) used in the mix shall not exceed 50%.

**Page 745, subsection 1103.02(b)(1.4.4). In this subsection, change the sentence that begins "The primary aggregate shall....." to read as follows:**

The primary aggregate shall be chat, crushed porphyry, crushed sandstone, crushed gravel, or crushed steel slag.

**Page 746, subsection 1103.02(b)(2.3). Delete the first paragraph of this subsection and replace it with the following:**

These mixes may be composed of any combination of aggregates and mineral filler supplements meeting the applicable requirements in TABLE 5, providing the mix meets the general composition requirements of 1103.02(b)(1.3); contains a minimum of 50% crushed for BM-2, BM-2B, BM-2C, and BM-2D, and 65% for BM-2A (unless specified otherwise in the Contract); and meets the following composition limits when applicable:

**Page 749, subsection 1103.02(c)(1). Delete the first sentence of this subsection and replace it with the following:**

(1) Required Submittals. Not less than 4 weeks before the beginning of plant mix operations, the Contractor shall submit the following to the Engineer:

**Page 749, subsection 1103.02(c)(1.3). Delete the first sentence of this subsection and replace it with the following:**

(1.3) A sufficient quantity of each asphalt, aggregate, and mineral filler supplement proposed for use shall be delivered to the Engineer not less than 4 weeks before beginning production of the bituminous mixture.

**Page 749, subsection 1103.02(c)(2). Add the following after the first paragraph of this subsection:**

The Engineer will use the Superpave gyratory compactor to evaluate the bituminous mixture. The number of gyrations for compaction of the mixture ( $N_{\text{initial}}$ ,  $N_{\text{design}}$ , and  $N_{\text{maximum}}$ ) will be listed in the Contract documents.

**Page 750, subsection 1103.02 (c)(2). Add the following paragraphs after the second paragraph from the top:**

Also, final approval of the Contractor's design job mix shall not be granted until the Engineer determines that the mix at the recommended asphalt content meets or exceeds a tensile strength ratio (TSR) of 80 percent. The TSR value will be determined in accordance with the procedures of KT-56, Resistance of Compacted Bituminous Mixture to Moisture Induced Damage, dated 01-99 (latest revision). The Department will perform 2 TSR tests per mix designation at no charge to the Contractor. Additional TSR tests requested by the Contractor, will be paid for by the Contractor. Liquid anti-strip, if used, will be added in 0.25% increments, and no more than 1.00% liquid anti-strip will be allowed. If a mix design fails to comply with the TSR requirement then redesign of the mix with new aggregate combinations or liquid anti-strip will be required. If liquid anti-strip additives are added at the Contractors' plant, a "totalizer" must be installed to monitor the amount of anti-strip additive being added.

The initial TSR value will be determined without lime. The Contractor shall determine if the initial TSR test is conducted with or without liquid anti-strip additive. If the Contractor requests that the initial TSR value be determined with liquid anti-strip additive, the Contractor shall indicate the percentage of liquid anti-strip to be used. If the initial TSR test result (with liquid anti-strip) is 85 percent or greater, a second TSR test will be conducted without liquid anti-strip additive. If the initial TSR test result (without liquid anti-strip) is 80 percent or greater, a second TSR test is not required. If the initial TSR test result (without liquid anti-strip) is less

than 80 percent, the Department will consult with the Contractor to determine the materials for the second TSR test.

If, after the Contractor demonstrates a good faith effort (see note below) to submit an acceptable mix design using various aggregate combinations or with liquid anti-strip additives, the TSR value fails to meet requirements, then the Engineer will evaluate the Contractor's proposal to add 1 percent hydrated lime to the mixture. If hydrated lime is added to the mixture, the TSR value will be checked for compliance with the TSR requirement. If hydrated lime is added, it shall be mixed in an approved pug mill to ensure the adequate coating of the combined aggregates. The combined virgin aggregate shall be moistened to at least three percent above the saturated surface dry condition prior to, or during the addition of the hydrated lime.

The Engineer may test the plant produced material for compliance with the TSR requirements. If the field TSR values are less than the design TSR requirements, the Contractor and KDOT District personnel will work together to adjust the mix to meet the design TSR requirement. The TSR requirements do not apply to mix designations BM-4, BM-5, and BM-6. Also, BM-1 produced for maintenance stockpile is not subject to the TSR requirements.

Price adjustments for use of liquid anti-strip additives or lime are included in **Section 603**.

Note: Before accepting a Contractor's offer to incorporate hydrated lime into a mix design, the good faith effort will be evaluated by the District Engineer, the Chief of Construction and Maintenance and the Chief of Material and Research.

**Page 750, subsection 1103.02 (d). Delete the first sentence of this subsection and replace with the following:**

Except for bituminous mix designations BM-1, BM-1A, BM-1B, BM-1T, BM-2A, BM-2C, and BM-7, the Contractor may use all new materials or a blend of new materials in combination with a maximum of 10 percent reclaimed asphalt pavement (RAP).

Pages 752 and 753, Table 6. Revise the table as follows:

**TABLE 6**  
**REQUIREMENTS OF COMBINED AGGREGATES FOR BITUMINOUS MIXTURES**

Mix Designation	Percent Retained - Square Mesh Sieves											
	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	600 $\mu$ m	300 $\mu$ m	150 $\mu$ m	75 $\mu$ m	Max. Moist.
BM-1			0	0-8	18-39	35-53	50-68	60-80	72-90	82-95	92-98	0.5
BM-1A		0	6-13	14-23	32-47	49-65	62-76	72-85	81-91	86-96	92-98	0.5
BM-1B		0	0-10	7-22	41-59	61-79	75-89	82-94	86-97	89-99	93-99	0.5
BM-1T			0	0-14	39-59	57-72	70-85	78-91	87-99	90-99	92-98	0.5
BM-2		0		8-30		42-72		64-88			92-98	0.5
BM-2A		0		6-21	23-40	38-56		61-82		88-99	92-99	0.5
BM-2B	0	0-5		10-30		42-72		64-88			92-98	0.5
BM-2C	0	0-10	12-22	19-39	51-69	65-83	75-91	82-95	87-99	90-99	93-99	0.5

**JOB MIX TOLERANCES**

	25.0 mm	19.0 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	600 $\mu$ m	300 $\mu$ m	150 $\mu$ m	75 $\mu$ m	
BM-1					$\pm 5$	$\pm 5$	$\pm 5$	$\pm 5$	$\pm 4$	$\pm 3$	$\pm 2$	
BM-1A					$\pm 5$	$\pm 5$	$\pm 4$	$\pm 3$	$\pm 3$	$\pm 3$	$\pm 2$	
BM-1B				$\pm 5$	$\pm 5$	$\pm 5$	$\pm 4$	$\pm 3$	$\pm 3$	$\pm 3$	$\pm 2$	
BM-1T					$\pm 6$	$\pm 5$	$\pm 5$	$\pm 4$	$\pm 3$	$\pm 3$	$\pm 2$	
BM-2A				$\pm 5$	$\pm 5$	$\pm 5$	$\pm 5$	$\pm 4$	$\pm 4$	$\pm 3$	$\pm 2$	
BM-2, 2B, 2D, 3				$\pm 6$	$\pm 6$	$\pm 6$	$\pm 5$	$\pm 5$	$\pm 4$	$\pm 4$	$\pm 2$	
BM-2C				$\pm 6$	$\pm 6$	$\pm 6$	$\pm 5$	$\pm 5$	$\pm 4$	$\pm 3$	$\pm 2$	

Page 753, TABLE 6. Below the table, delete the sentence that reads:

The Plasticity Index (P.I.) shall not exceed 6 for any mix designation listed in the above table.

Page 753, TABLE 6. Below the table, add the following:

The Sand Equivalent (SE) shall be equal to or greater than 45.0 for any mix designation (combined gradation) listed in the above table.

If the District approves the use of MFS-4 (hydrated lime) as an anti-strip agent, then the lower gradation limit on the 75  $\mu$ m sieve will be reduced 1 percent. For example: the specification limit for the 75  $\mu$ m sieve for BM-2A will be changed from 92-99 to 91-99.

07-09-99 M&R (RGM)