

**KANSAS DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION TO THE
STANDARD SPECIFICATIONS, 2015 EDITION**

SECTION 1114

STONE FOR RIPRAP, DITCH LINING AND OTHER MISCELLANEOUS USES

1114.1 DESCRIPTION

This specification covers stone for the following uses:

- Riprap and Slope Protection (riprap stone)
- Aggregate Ditch Lining (D_{50}) and Slope Protection (aggregate)
- Filter Course
- Flumes, Flume Drains and Slope Drains
- Tree Wells or Cribs
- Slope Protection (shot rock)
- Granular Drainage Blanket
- Sediment Basin Risers

Where referred to, quarried stone is defined as limestone, dolomite, calcite cemented sandstone, rhyolite, quartzite, basalt and granite, removed from naturally occurring formation by standard extraction and sizing methods. Recycled PCCP may be used for Riprap, Slope Protection (riprap stone), Aggregate Ditch Lining, Slope Protection (aggregate) and Slope Protection (shot rock), provided the respective Soundness and Wear requirements are met.

1114.2 REQUIREMENTS

a. Stone for Riprap and Slope Protection (riprap stone).

(1) Composition. Provide quarried stone for riprap that meets the installation class specified in the Contract Documents.

(2) Quality.

- Soundness, minimum (KTMR-21)..... 0.85
- Wear, maximum (AASHTO T 96) 45%
- Inspection of the quarry ledge, stock piles, and available sites where comparable stone from the same bed(s) is in service to verify the Product Control requirements have been met.

(3) Product Control.

- Provide stone for riprap that is free of soil, shale or shale-like material and cracks, seams or other defects that will decrease the durability of the material after placement.
- Provide riprap from sources that have been inspected and approved by the KDOT Geologist.
- A riprap source may be rejected if more than 15% of the product from the source deteriorates within 5 years of exposure, either in service or in a natural weathering test plot (such as a boulder pile at the quarry). Deterioration is defined as any one piece losing more than 25% of its original volume either due to damage during handling and placement or due to cracking or splitting as a result of weak seams in the rock. Determination is made by visual inspection.
- Size. The class requirements are given in **TABLE 1114-1**.
- Field Inspection Method to determine acceptable material size.
 - Measure a minimum of 3 sides of the boulder.
 - Use a density of 150 lbs. per cubic foot to calculate the weight of the boulder.
(Weight = Volume * Density)
 - On visible faces, measure the length of the boulder at a minimum of 3 locations; average the measurements to establish the dimensions and calculate the volume.
 - Example calculation to determine the approximate weight:
Volume: 1.5 feet x 1.5 feet x 1.5 feet = 3.375 cubic feet;

Weight: 3.375 cubic feet x 150 lbs. per cubic foot = 506.25 lbs.

- Any dispute of calculated measurements of weights can be determined from actual weight of the boulder in question.

TABLE 1114-1: STONE FOR RIPRAP*													
Class	Percent Heavier Than												
	4 tons	3 tons	2 tons	1 ½ tons	1 tons	¾ tons	½ tons	¼ tons	250 lbs.	200 lbs.	100 lbs.	75 lbs.	5 lbs.
HEAVY													
2 Ton	0		50+			75+		90+					
1 ½ Ton		0		50+			75+		90+				
1 Ton			0		50+			75+	90+				
¾ Ton				0		50+				90+			
½ Ton					0		50+				90+		
¼ Ton						0		50+				90+	
LIGHT													
200 Lb.							0	0-5		50+			95+
100 Lb.							0	0-5			50+		95+
Facing										0		50+	95+

*Percent of total sample weight composed of pieces heavier than the indicated weight

b. Stone for Aggregate Ditch Lining (D₅₀) and Slope Protection (aggregate).

(1) Composition. Provide crushed or uncrushed gravel or quarried stone meeting the size of ditch lining aggregate specified in the Contract Documents.

(2) Quality

- Soundness, minimum (KTMR-21)..... 0.85
- Wear, maximum (AASHTO T 96)..... 45%
- Inspection of the quarry ledge, stock piles, and available sites where comparable stone from the same beds is in service to verify the Product Control requirements have been met.

(3) Production Control.

- Provide stone for ditch lining that is free of soil, chert, shale or shale-like material and cracks, seams, or other defects that will decrease the durability of the material after placement. No more than 10% of individual rocks shall have their least dimension less than 1/3 of their greatest dimension.
- Provide ditch lining from sources that have been inspected and approved by the KDOT Geologist.
- A ditch lining source may be rejected if more than 15% of the product from the source deteriorates within 5 years of exposure, either in service or in a natural weathering test plot (such as a boulder pile at the quarry). Deterioration is defined as any one piece losing more than 25% of its original volume either due to damage during handling and placement or due to cracking or splitting as a result of weak seams in the rock. Determination is made by visual inspection.
- Size. Provide stone for ditch lining that complies with **TABLE 1114-2.**

TABLE 1114-2: STONE FOR AGGREGATE DITCH LINING (D ₅₀)													
Size D ₅₀	Max. Size	Percent Retained on Sieve Size (Minimum)											
		8"	6 ½"	6"	5"	4"	3"	2 ½"	2"	1 ½"	1"	½"	
1	2											50	85
2	4							15*	50			85	
3	6					15*	50			85			
4	8				15*	50			85				
5	10		15*		50			85					
6	12	15*		50			85						

*Suggested

c. Stone for Filter Course.

(1) Composition. Provide crushed or uncrushed gravel or quarried stone for filter course that meets the installation type specified in the Contract Documents.

(2) Quality.

- Soundness, minimum (KTMR-21) 0.85
- Wear, maximum (AASHTO T 96) 45%

(3) Product Control.

- Size. Provide stone for filter course material that complies with **TABLE 1114-3**.

TABLE 1114-3: STONE FOR FILTER COURSE									
Material	Percent Retained on Sieve Size								
	6"	5"	4"	3"	2"	1"	½"	3/8"	No. 4
Type I		0	0-5		10-40	25-60		55-85	70-95
Type II			0	0-5			50-90		
Type III	0	0-25			40-60			75-95	

d. Stone for Flumes, Flume Drains and Slope Drains.

(1) Composition. Provide aggregate that is crushed or uncrushed gravel or quarried stone.

(2) Quality.

- Soundness, minimum (KTMR-21) 0.85
- Wear, maximum (AASHTO T 96) 45%

(3) Product Control.

- Deleterious Substances. Provide stone that is free from soapstone, shale, shale-like or other easily disintegrated material.
- Size. Provide stone for flumes, flume drains and slope drains as shown in the Contract Documents or as required by the Engineer.

e. Stone for Tree Wells or Cribs. Stone may be set aside during excavation on the project or obtained from nearby deposits. If stone is not available, use salvaged, durable concrete blocks from old structures or other materials approved by the Engineer.

f. Stone for Slope Protection (shot rock).

(1) Composition. Provide stone resulting from drilling and blasting or other various methods of excavation. Shot rock may be subsequently sized using heavy equipment or other suitable methods.

(2) Quality.

- Soundness, minimum (KTMR-21) 0.85
- Wear, maximum (AASHTO T 96) 45%

(3) Product Control.

- Deleterious Substances. Provide stone for shot rock that is free from injurious quantities of clay and soapstone.
- Size. Shot rock shall be quarry run with no more than 10 percent larger than 7 feet in circumference measured in any direction and not more than 10 percent passing the 1 inch sieve as determined by visual inspection. The maximum size of the shot rock will be limited by the thickness of the rock to be placed, as shown on the Contract Documents.

g. Granular Drainage Blanket

(1) Composition. Provide aggregate that is crushed or uncrushed gravel or quarried stone.

(2) Quality

- Soundness, minimum (KTMR-21)..... 0.85
- Wear, maximum (AASHTO T 96)..... 45%

(3) Product Control.

- Deleterious Substances. Stone for these types of construction shall be free from soapstone, shale, shale-like or other easily disintegrated material.
- Size Requirements. Provide aggregate for granular drainage blankets that complies with **TABLE 1114-4**.

TABLE 1114-4: AGGREGATE FOR GRANULAR DRAINAGE BLANKETS	
Percent Retained – Square Mesh Sieves	
4 in	No. 8
0	95-100

h. Sediment Basin Risers

(1) Composition. Provide aggregate that is crushed or uncrushed gravel or quarried stone.

(2) Quality

- Soundness, minimum (KTMR-21)..... 0.85
- Wear, maximum (AASHTO T 96)..... 45%

(3) Product Control.

- Deleterious Substances. Stone for these types of construction shall be free from soapstone, shale, shale-like or other easily disintegrated material.
- Size Requirements. Provide stone for sediment basin risers that complies with **TABLE 1114-5**:

TABLE 1114-5: SEDIMENT BASIN RISERS	
Percent Retained	
5 in	2 in
0	90

1114.3 TEST METHODS

Test aggregates according to the applicable provisions of **SECTION 1115**.

1114.4 PREQUALIFICATION

a. Stone for riprap and slope protection (riprap stone); and stone for Aggregate Ditch Lining (D₅₀) and slope protection (aggregate) must be prequalified. In-state producers wishing to get their product prequalified must obtain a written request to the District Materials Engineer for the District in which the production facility is located. Out-of-state producers must submit their written request to the Engineer of Tests. Sources that comply with all applicable requirements (i.e. those for composition, quality, and product control) will be added to a list of prequalified riprap and ditch liner sources maintained by the Bureau of Construction & Materials. Any change in material source, equipment, or process voids the prequalification and a new prequalification will be required.

b. Sources of stone for Filter Course, Flumes, Flume Drains, Slope Drains, Tree Wells or Cribs, Shot Rock, Granular Drainage Blanket, and Sediment Basin Riser require an “Official Quality” in accordance with **subsection 1101.4**.

1114.5 BASIS OF ACCEPTANCE

a. Aggregates covered by this subsection, except stone for tree wells and cribs, are accepted based on the procedures described in **subsection 1101.5**.

b. Stone for tree wells or cribs are acceptable based on visual inspection by the Engineer.

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