

# 1114 - STONE FOR RIPRAP, DITCH LINING AND OTHER MISCELLANEOUS USES

## SECTION 1114

### STONE FOR RIPRAP, DITCH LINING AND OTHER MISCELLANEOUS USES

#### 1114.1 DESCRIPTION

This specification covers stone for the following uses:

- Riprap
- Aggregate Ditch Lining (D<sub>50</sub>)
- Filter Course
- Flumes, Flume Drains and Slope Drains
- Tree Wells or Cribs
- 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, Ditch Lining, and Shot Rock, provided the respective Soundness and Wear requirements are met.

#### 1114.2 REQUIREMENTS

##### a. Stone for Riprap.

(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**.

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<b>TABLE 1114-1: STONE FOR RIPRAP*</b>											
<b>Class</b>	<b>Percent Heavier Than</b>										
	<b>8 ton</b>	<b>4 ton</b>	<b>2 ton</b>	<b>1 ton</b>	<b>½ ton</b>	<b>¼ ton</b>	<b>250 lbs</b>	<b>200 lbs</b>	<b>100 lbs</b>	<b>75 lbs</b>	<b>5 lbs</b>
<b>Heavy Series</b>											
8 Ton	50+	95+									
4 Ton	0	50+	95+								
2 Ton		0	50+	95+							
1 Ton			0	50+	95+						
½ Ton				0	50+	95+					
¼ Ton					0	50+				90+	
<b>Light Series</b>											
Facing								0		50+	90+
Light 24"				0				50+			90+
Light 18"					0				50+		90+

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

**b. Stone for Aggregate Ditch Lining (D<sub>50</sub>).**

(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**.

<b>TABLE 1114-2: STONE FOR AGGREGATE DITCH LINING (D<sub>50</sub>)</b>												
<b>Size D<sub>50</sub></b>	<b>Max. Size</b>	<b>Percent Retained on Sieve Size (Minimum)</b>										
		<b>8"</b>	<b>6 ½"</b>	<b>6"</b>	<b>5"</b>	<b>4"</b>	<b>3"</b>	<b>2 ½"</b>	<b>2"</b>	<b>1 ½"</b>	<b>1"</b>	<b>½"</b>
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.

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(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**.

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

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(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**.

<b>TABLE 1114-4: AGGREGATE FOR GRANULAR DRAINAGE BLANKETS</b>	
<b>Percent Retained – Square Mesh Sieves</b>	
<b>4 in</b>	<b>No. 8</b>
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**:

<b>TABLE 1114-5: SEDIMENT BASIN RISERS</b>	
<b>Percent Retained</b>	
<b>5 in</b>	<b>2 in</b>
0	90

**1114.3 TEST METHODS**

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

**1114.4 PREQUALIFICATION**

Prequalify aggregate sources according to **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.