

# Special Specification 3038

## Rubblizing Existing Concrete Pavement




---

### 1. DESCRIPTION

Rubblize and compact existing concrete pavement.

---

### 2. MATERIALS

- 2.1. **Aggregate.** Furnish aggregate of the type and grade shown on the plans and conforming to the requirements of Item 247, "Flexible Base."
- 2.2. **Hot-Mix Asphalt.** Furnish dense-graded hot-mix asphalt of the type shown on the plans and conforming to the Item number 340 "Dense-Graded Hot-Mix Asphalt (Method)". (Note: This is patching materials for failed areas, not HMA overlay).

---

### 3. EQUIPMENT

Provide either a Type I or Type II rubblizer, unless otherwise shown on the plans, and necessary rollers for compacting the rubblized pavement.

- 3.1. **Type I Rubblizer.** A self-contained, self-propelled, resonant frequency breaker, capable of producing low-amplitude, 2,000 lb blows, at a rate not less than 44 Hz.
- 3.2. **Type II Rubblizer.** A self-contained, self-propelled, multiple-head breaker, with each hammer independently adjustable, and capable of rubblizing a width of up to 13 ft. in one pass.
- 3.3. **Roller-Vibratory.** Drum (Type C), with a static weight  $\geq$  10 tons, meeting the requirements of Item 210, "Rolling."
- 3.4. **Roller-Medium Pneumatic.** Conforming to the requirements of Item 210, "Rolling."
- 3.5. **Roller-Heavy Pneumatic.** Conforming to the requirements of Item 210, "Rolling."
- 3.6. **Roller-Z Grid Vibratory.** When rubblizing with Type II equipment, provide a steel wheel, self-propelled vibratory roller, with a minimum weight of 10 tons, and a Z-pattern cladding bolted transversely to the surface of the drum.
- 3.7. **Concrete Saw.** When rubblization is required adjacent to concrete pavement to be retained, provide a concrete saw capable of sawing a vertical cut full depth through the concrete pavement and reinforcing steel in a single pass.

---

### 4. CONSTRUCTION

- 4.1. **Preparatory Work.** Prior to initiating rubblization, the following work must be complete:
- Construct pavement drainage systems at least two weeks prior to rubblization.
  - Remove all existing materials overlaying the concrete pavement. Material removed will remain property of the Department unless otherwise shown on the plans. Transport and stockpile the removed materials at locations shown on the plans.

- Adjustments or additions to the pavement adjacent to the existing concrete must be brought to the elevation of the concrete pavement to be rubblized.
- Before rubblizing a section, cut full-depth saw cut joints at any locations shown on plans, to protect facilities that will remain in place.

4.2. **Rubblization, Proof Rolling and Compaction.** Operate equipment in a manner that will not damage the base, underground utilities, drainage structures, and other facilities on the project; in the event that damage to such features occurs, the Contractor will be fully responsible for their repair.

Use a Type I or Type II rubblizer to completely de-bond any reinforcing steel and rubblize the existing concrete pavement. Other types of rubblizing equipment will only be used if shown on the plans or approved in writing. Above the reinforcing steel or upper one-half of the pavement (if un-reinforced), the equipment must produce at least 75% of resulting pieces less than 3 in. in size. At the surface of the rubblized layer, all pieces must be less than 6 in. Below the reinforcing steel or in the lower half of the slab, the maximum size piece shall be 1.25 times the slab thickness. By using a test pit, the Contractor must demonstrate that the slab is fractured full depth. Any large concrete pieces that do not meet the size requirements previously specified must be removed and the area treated as follows:

- If the affected area is less than 10 ft<sup>2</sup>, the area may be patched with base.
- Areas greater than 10 ft<sup>2</sup> that do not meet the specified particle size must be repaired with hot-mix asphalt, unless otherwise approved by the Engineer.

The Contractor must demonstrate that all reinforcing steel is debonded. Reinforcing steel exposed and projecting from the surface after rubblization or compaction must be cut off below the surface and removed.

4.2.1. **Type I Rubblization.** Begin at a free edge or previously broken edge and work transversely towards the other edge. In the event the rubblizer causes ruts in excess of 1 inch in the pavement, the Engineer may require high flotation tires with tire pressures less than 60 psi. Any displaced areas must be considered non-conforming and treated as described above.

Compact by seating rubblized pavement with the following rolling pattern:

- 1 pass from a vibratory roller,
- followed by at least 1 pass with the pneumatic roller,
- followed by at least 2 more passes with the vibratory roller

The rolling pattern may be changed as directed.

4.2.2. **Type II Rubblization.** Unless otherwise directed, rubblize the entire lane width in 1 pass. Provide a screen to protect vehicles from flying particles as directed. Compact by seating the pavement with the following rolling pattern:

- a minimum of 4 passes with the Z-grid vibratory roller,
- followed by 4 passes with a vibratory roller,
- then at least 2 passes from a pneumatic roller

The rolling pattern may be changed as directed.

4.3. **Verification of Rubblization Process.** Before full production begins, the Engineer will select approximately 200 ft. of one lane width to verify the rubblization operation. Rubblize the test section, using the section to adjust equipment. From within this test section, the Engineer and Contractor must agree upon a test pit location. At the test pit, starting at the edge of the rubblized lane, excavate a 4 ft. square test pit. The Engineer must test the material to verify that the specified particle size distribution has been achieved in the

upper part of the slab. The operation will also remove the lower part of the slab. It must be demonstrated to the Engineer that this part of the slab is fractured. The operator must also demonstrate that existing steel is debonded and can be easily removed from the shattered slab. Additional test pits may be required during the project to confirm ongoing compliance with the particle size specification. Test pit areas must be patched as directed either with aggregate or hot-mix asphalt.

If the rubblized material from the test pit does not meet specifications, another test strip must be conducted and tested. Should this pit also fail, rubblization operations must be suspended until the Contractor demonstrates to the satisfaction of the Engineer that specifications can be met, at which time the Engineer will allow the Contractor to conduct another test strip.

- 4.4. **Identifying and Removing Weak Sections.** Unless otherwise shown on the plans, perform proof rolling of the rubblized areas using a heavy pneumatic roller in accordance with Item 216, "Proof Rolling". Unless otherwise directed by the Engineer, load the heavy pneumatic roller to an approximate weight of 25 tons. Increase the roller weight up to 50 tons when directed by the Engineer. Based on the recommendations of the Engineer, the weak and/or unstable areas will be removed and replaced with full depth HMA or Flexible Base material.
- 4.5. **Traffic.** Opening to Traffic will not be allowed on the rubblized pavement, except at Engineer-approved access points. Minimize the rubblized pavement construction equipment travel.
- 4.6. **Placement of Surfacing.** Construct the first overlay course of the rubblized area within 48 hours after completion of rubblization. Cease paving operations if rain occurs after rubblization but before paving has been completed. Resume paving operations only after the Engineer has determined that the rubblized area is dry and stable. After rainfall, remove natural soil from edges of the pavement area to facilitate drainage from the the rubblized areas when directed by the Engineer. Restore soil to former condition when directed.

---

## 5. MEASUREMENT

- 5.1 **Rubblization.** Rubblization will be measured by the square yard of surface area rubblized in place.
- 5.2 **Repair of Localized Areas.** Repair of localized material will be measured by the square yard of repaired area as defined by the Engineer.

---

## 6. PAYMENT

- 6.1 **Rubblization.** The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Rubblizing Existing Concrete Pavement." This price is full compensation for removal, transportation and stockpiling of surface materials removed, rubblizing and compacting existing concrete pavement, proof rolling (including any propulsion equipment), saw-cutting required locations, cutting and removing exposed reinforcing steel, repairing any damaged facilities, conducting required test pits, removing and replacing soil at pavement edges to facilitate drainage, and equipment, labor, tools, and incidentals.
- 6.2 **Repair of Localized Areas.** The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit bid price for "Repair of Localized Material" of the type specified. This price is full compensation for cutting and removing reinforcing steel in the repair area, and equipment, labor, tools, and incidentals.