
Technical Procedure for Dental Stone Casting

1.0 Purpose – This procedure describes how to use dental stone to cast three-dimensional footwear and tire track impressions.

2.0 Scope – This procedure applies to three-dimensional impressions that are to be cast with dental stone.

3.0 Definitions

- **Dental stone** – Commercially prepared casting material.

4.0 Equipment, Materials and Reagents

4.1 Equipment and Materials

- Dental stone (powder)
- Water
- Plastic zip-top bag and/or mixing container
- Stirrer
- Cardboard to be used as a pouring aid

4.2 Reagents – N/A

5.0 Procedure

5.1 Mixing Procedure

- 5.1.1** Dental stone is a commercially prepared powder and comes in 25 lb containers. For ease of transport and use, dental stone may be weighed in 2 lb increments and stored in individual zip-top plastic bags.
- 5.1.2** Pour 12 ounces of water into a zip-top plastic bag containing 2 lbs of dental stone. Carefully remove the air from the bag and seal the zip-top. Use hands to squeeze and manipulate the zip-top bag to mix water and powder thoroughly until all powder is incorporated and the mixture is the consistency of pancake batter. Particular attention should be paid to powder in the corners of the plastic bag.
- 5.1.3** If mixing larger quantities of dental stone, a bucket may be necessary. If mixing in a bucket, scoop dental stone powder into the bucket and then add the water in small increments. Mix/stir continuously until the consistency of pancake batter is achieved. Scrape the bottom of the bucket with the stirrer to ensure that no powder remains unmixed. Caution shall be exercised to ensure that the bucket containing the mixture does not become too heavy to lift or pour.

Note: Mixture will begin to set/harden immediately so the dental stone must not be allowed to sit prior to pouring the cast.

5.2 Pouring Procedure

- 5.2.1 Footwear Impressions and Small Tire Track Impressions** – Impressions that may be cast using a 2 lb portion of dental stone.

- 5.2.1.1 Photograph the impression from multiple directions and several lighting angles prior to attempting to cast any impression (see Preservation of Footwear and Tire Tread Evidence).
- 5.2.1.2 Open one end of the zip-top bag containing the mixed dental stone. Slowly pour the dental stone from approximately an inch above the impression, starting in a location that is outside of the impression and allow the dental stone to flow into and cover the impression.
- 5.2.1.3 When a thin layer of dental stone covers the entire surface of the impression, pour the remaining dental stone slowly and carefully into the impression. Care shall be taken to pour the dental stone from a height that does not damage the impression. Ideally, one inch of dental stone is the preferred depth.
- 5.2.1.4 Dental stone casts must be allowed to set up/dry for at least 30 minutes. Drying time will be affected by the size of the impression, the substrate moisture content and the ambient temperature. Low ambient temperatures and high substrate moisture content will necessitate longer drying times.
- 5.2.1.5 Once dry, the cast shall be carefully removed from the impression. For smaller impressions, the cast may be removed manually by grasping the edge with the fingers and applying gentle upward pressure. For larger impressions a shovel or spade will be needed. Caution shall be taken to avoid contact between the shovel/spade and the actual dental stone surface. When removing impressions, insert the shovel/spade blade deeply into the substrate adjacent to the impression and use gentle upward pressure to release the impression. Any substrate material that adheres to the cast shall be allowed to remain until the cast has been allowed to dry completely for 24 hours. Once the cast has been removed, it must be identified using the appropriate case number, date, item number, and the initials of the employee who poured the cast.
- 5.2.1.6 After 24 hours, any dirt or mud may be cleaned from the cast using water and a soft bristled brush.

Note: All standards, lifts, photographs and casts created during the examination process must be entered into FA as an item/sub-item of evidence.

5.2.2 Large Tire Track Impressions – Impressions that are large enough that they cannot be cast using a 2 lb portion of dental stone.

- 5.2.2.1 Photograph the impression from multiple directions and several lighting angles prior to attempting to cast any impression (See Preservation of Footwear and Tire Tread Evidence).
- 5.2.2.2 Pouring larger dental stone casts requires at least 2 people (1 to pour the mixture and 1 to direct the direction and rate of flow using a folded piece of cardboard).
- 5.2.2.3 Slowly pour the dental stone from approximately one inch above the impression onto a piece of folded cardboard. Use the crease in the cardboard to control the speed and direction of flow of the dental stone into the impression. Starting in a location that is outside of the impression, advance into the impression allowing the dental stone to cover the entire surface. Ensure the entire surface of the impression is covered with a consistent amount of dental stone to prevent weak spots. Care shall be taken to pour the dental stone from a height that does not damage the impression.

5.2.2.4 Dental stone casts must be allowed to set up/dry for at least 30 minutes. Drying time will be affected by the size of the impression, the substrate moisture content, and the ambient temperature. Low ambient temperatures and high substrate moisture content will necessitate longer drying times.

5.2.2.5 Once dry, the cast shall be carefully removed from the impression. For smaller impressions, the cast may be removed manually by grasping the edge with the fingers and applying gentle upward pressure. For larger impressions a shovel or spade will be needed. Caution shall be taken to avoid contact between the shovel/spade and the actual dental stone surface. When removing impressions, insert the shovel/spade blade deeply into the substrate adjacent to the impression and use gentle upward pressure to release the impression. Any substrate material that adheres to the cast shall be allowed to remain until the cast has been allowed to dry completely (24 hours). Once the cast has been removed, it shall be identified using the appropriate case number, date, item number, and the initials of the individual who poured the cast.

5.2.2.6 After 24 hours, any dirt or mud may be cleaned from the cast using water and a soft bristled brush.

Note: When using dental stone to pour large casts it is not necessary to add reinforcing material to the cast.

Note: All standards, lifts, photographs and casts created during the examination process shall be entered into FA as an item/sub-item of evidence.

5.3 Standards and Controls – N/A

5.4 Calibration – N/A

5.5 Sampling - N/A

5.6 Calculations – N/A

5.7 Uncertainty of Measurement – N/A

6.0 Limitations - N/A

7.0 Safety – N/A

8.0 References

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9.0 Records – N/A

10.0 Attachments – N/A

Revision History		
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10/31/2013	2	Added issuing authority to header
04/07/2017	3	Header Update – Removed Digital reference.
02/01/2019	4	Changed issuer in header Changed number references to be numerals only instead of spelled out throughout document