

INTRODUCTION TO ICRI TECHNICAL GUIDELINE NO. 320.5-2012, “PICTORIAL ATLAS OF CONCRETE REPAIR MATERIAL MIXING EQUIPMENT”

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Specifying appropriate equipment for mixing concrete repair materials is extremely difficult. For better communication and improved end results, specifiers, contractors, and material suppliers need to speak a common language when relating to equipment and tools. Terminologies related to commonly used tools and equipment such as mixing paddles, mortar mixers, and drill machines are often vague, resulting in confusion and less-than-optimal performance. ICRI Committee 320, Concrete Repair Materials and Methods, realized these problems and recently developed a document to remedy this situation.

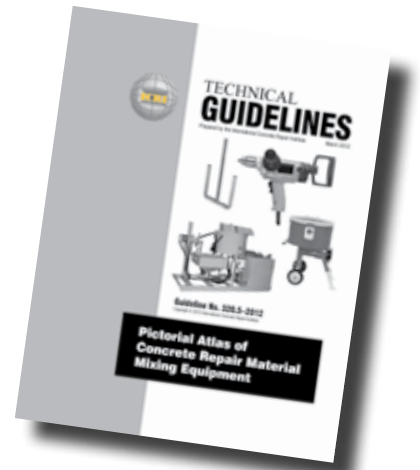
The pictorial atlas depicts various types of mixing equipment as drawings to provide a simplified common reference by the concrete repair materials industry for mixing instructions and specifications. This document contains brief descriptions and illustrations of common mixing equipment used in the concrete repair industry, but recommendations for particular equipment are beyond the scope of the document. The Guideline is intended to be relatively easy to expand as more types and classes of equipment are added. Future additions are being developed by Committee 320 for hand tools (floats, trowels, darbies, and so on) and shotcrete equipment. The committee hopes that readers will provide additional drawings or photographs that will continue to increase the usefulness of this document.

In the first edition of this Guideline, the Committee has tried to streamline the following basic tools by classifying them. The list of tools and equipment in this edition include:

1. Mixing paddles;
2. Drills; and
3. Mortar mixers.

MIXING PADDLES

Mixing paddles are used with drills to mix repair materials of different consistencies. Different paddle designs provide different efficiencies of shear and air entrapment, yet most instructions just



say “mix with a drill and mixing paddle.” Anyone who has mixed the same material using different paddles can obviously see differences in consistency, density, mixing stress, and the time required to achieve a satisfactory consistency. The shaft diameter of the mixing paddle should be appropriate for the drill chuck size selected. Some paddles introduce cutting action through sharp edges that cut through the material as the paddle rotates, while others impart shear through flattened sections that produce friction. Many paddles also impart a vertical mixing action to blend the top and bottom of the mixing container to produce a homogenous consistency over the time of mixing. The order of illustrations used in this document intentionally has no significance and a generic number has been provided to describe commonly used mixing paddles. Numbers are used so that additional paddle types can be easily added. Currently, 13 mixing paddles are shown in the document and a few examples from the pictorial atlas are shown herein.

DRILLS

Drills are generally specified in terms of multiple factors, such as the following:

1. Maximum shaft diameter or chuck size (for example: 0.25 in. [6.4 mm], 3/8 in. [9.5 mm], and so on);
2. Chuck type—keyed or keyless;
3. Handle configurations—pistol type, auxiliary side handle, and so on;
4. Speed—constant, variable, or dual, typically with no load rotational speed listed on the nameplate or a speed range; and

5. Motor load—light, medium, or heavy duty, typically described with either horsepower (watts) or ampere load of the motor.

The pictorial atlas is illustrated using pictures that assign a generic type to various drill configurations so that a common language can be used to generically describe appropriate drills for the required performance in mixing of the product when paired with the paddles described previously. Some examples from the Guideline are shown herein.

MORTAR MIXERS

Mortar mixers are intended to be used to mix from one bag to a few ft³ (L) of repair materials. The mixing speed is usually constant for a given mixer. In this document, mortar mixers are classified from Type A to Type H mixers. Letters are used because there are fewer potential major equipment types than with mixing paddles. The use of letters also avoids confusion in specifications with the numbers used for drill and paddle combinations.

Type A horizontal shaft mortar mixers can typically mix from fluid to dry pack consistencies. Some rotating drum-type mixers (Type B tumble mixers and Type C rotating-drum stationary-arm mixers) may not produce sufficient shearing action without coarse aggregate and they may not be able to mix all repair mortar consistencies. Type D pan-type mixers, Type E rotating-tub rotating-paddle, and Type F planetary paddle mixers are typically manufactured for specific types of materials. Mixer pump combinations are also available and two common types are shown. Hopefully, future work will develop a separate chapter on pumping equipment and the range of mixer types can be further expanded. A few of the drawings from the Guideline are shown as examples.

This initial publication of the pictorial atlas is the first step that has the potential to streamline the way we talk about tools and specify equipment.

It is anticipated that future editions of this atlas will include other various equipment associated with the different materials and methods used for



Drill mixing paddle #1



Drill mixing paddle #2



Drill mixing paddle #3



Type 1 light-duty high-speed pistol grip



Type 2 heavy-duty pistol grip with rotating side handle



Type 3 heavy-duty D (or spade) handle with pipe handle



Type A horizontal shaft mortar mixer



Type B tumble mortar mixer



Type C rotating-drum, stationary-arm mortar mixer

concrete repair, such as shotcrete equipment, trowels, sprayers, and impact hammers, as well as additional examples of mixing paddles, drills, and mortar mixers.

The journey to standardization of tools and equipment in our business has now started. ICRI Committee 320, Concrete Repair Materials and Methods, requests that readers interested in further development of this document contact ICRI staff to join the committee to continue to improve and refine this and other documents.



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