



Designation: B 320 – 60 (Reapproved 1997)

Endorsed by American
Electroplaters' Society
Endorsed by National
Association of Metal Finishers

Standard Practice for Preparation of Iron Castings for Electroplating¹

This standard is issued under the fixed designation B 320; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice is intended to assist electroplaters in establishing and maintaining a satisfactory pre-electroplating cycle for malleable iron, gray iron, nodular iron, and white iron castings. It is also intended to indicate certain foundry practices which will facilitate subsequent finishing. Most of the practices that follow have been based on experience with malleable and gray iron. However, since they are related to the other forms, the same practices will probably apply. Nodular iron is also known as spheroidal or ductile iron, which is defined as cast iron with the graphite substantially in spherical shape and substantially free of flake graphite.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific precautionary statements are given in 2.1.

2. Reagents

2.1 *Purity of Reagents*—All acids and chemicals used in this practice are technical grade. Diluted acid solutions are based upon the following assay materials:

Hydrochloric acid (HCl):	31 mass %, density 1.16 g/mL
Hydrofluoric acid (HF):	47 mass %, density 1.186 g/mL

Caution—Use hydrofluoric acid with extreme care.

Sulfuric acid (H_2SO_4):	93 mass %, density 1.83 g/mL
--	------------------------------

Caution—Sulfuric acid should be slowly added to the approximate amount of water required with rapid mixing, and then after cooling, diluted to exact volume.

2.2 *Purity of Water*—Ordinary industrial or potable water may be used for preparing solutions and rinsing.

3. Foundry Practices

3.1 The seacoal content of the molding and facing sands should be maintained at the maximum practicable limits to minimize the occlusion of sand in the surfaces of the castings.

3.2 Upon removal from the molds, castings should be subjected to an abrading action (such as tumbling, grit blasting, or shot blasting) to remove as much as practicable of the occluded molding sand. Residual sand and scale may be removed, if necessary, by treatment in various proprietary descaling baths. These are usually based on fused caustic soda, some of which use chemical oxidizing or reducing agents and others employ electrochemical action as well. This is particularly important in the case of castings that will be annealed, to prevent the burning on of sand during this operation. Castings that will be warped or damaged by a blasting operation may be pickled in a solution containing 200 to 250 mL/L of sulfuric acid to remove occluded molding sand. See **Caution** in 2.1.

3.3 Annealed castings should be given an additional abrading as described in 3.2 to remove any scale that may have been formed, as well as graphitic carbon that may be present at the surface.

4. Nature of Cleaning

4.1 The preparation of ferrous castings for electroplating involves the following basic steps in the order named:

4.1.1 The removal of oils, greases, residual polishing and buffing compounds (if any), and shop dirt by cleaning,

4.1.2 The removal of oxide films and scales and the loosening of surface carbon by pickling or by salt bath treatment (see 3.2),

4.1.3 The removal of smut caused by 4.1.2, and

4.1.4 Activation for electroplating.

4.2 Where excessive amounts of cutting oils used in machining operations are present, it may be necessary to preclean the parts before they reach the electroplating room. This may require the use of organic solvents, vapor degreasers, washing machines of the power-spray type, emulsion cleaners, or simple alkaline soak tanks. As short a time as possible should elapse between this precleaning and the preplating cleaning cycle so as to prevent rusting of the parts. Where control of the interval is not possible, parts should be left with a slightly alkaline or very thin organic film.

5. Cleaning Solutions and Equipment

5.1 The various solutions used for the treatment of malleable and gray iron castings should be maintained by chemical analysis so far as is practicable, such as determining the free acid and iron concentrations of the acid baths and using tests

¹ This practice is under the jurisdiction of ASTM Committee B-8 on Metallic and Inorganic Coatings and is the direct responsibility of Subcommittee B08.02 on Substrate Preparation.

Current edition effective Sept. 19, 1960. Originally issued 1957. Replaces B 320 – 57 T.