



Designation: A1080 – 12

# Standard Practice for Hot Isostatic Pressing of Steel, Stainless Steel, and Related Alloy Castings<sup>1</sup>

This standard is issued under the fixed designation ; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This practice covers general requirements for Hot Isostatic Pressing (HIP) of steel, stainless steel, and related alloy castings.

1.2 *Units*—The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *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.*

## 2. Referenced Documents

2.1 *ASTM Standards*:<sup>2</sup>

A703 Specification for Steel Castings, General Requirements, for Pressure-Containing Parts

A781 Specification for Castings, Steel and Alloy, Common Requirements, for General Industrial Use

A957 Specification for Investment Castings, Steel and Alloy, Common Requirements, for General Industrial Use

A985 Specification for Steel Investment Castings General Requirements, for Pressure-Containing Parts

E220 Test Method for Calibration of Thermocouples By Comparison Techniques

2.2 *AMS Standards*:<sup>3</sup>

AMS 2750 Pyrometry

## 3. Terminology

3.1 *Definitions*:

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.18 on Castings.

Current edition approved May 1, 2012. Published June 2012. DOI: 10.1520/A1080-12

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, http://www.sae.org.

3.1.1 *autoclave, n*—a pressure-containing vessel used in the HIP process.

3.1.2 *hot isostatic pressing (HIP), n*—a solid state process which applies heat and pressure simultaneously to objects in an autoclave via an inert gas in such a way as to eliminate internal voids and obtain desired properties.

3.1.3 *inert gas, n*—a nonoxidizing gas used for pressurizing a HIP vessel.

## 4. Significance and Use

4.1 The authorization or requirement for hot isostatic pressing (HIP) shall be agreed upon between purchaser and supplier and must be documented.

4.1.1 The Supplementary Requirements of the Common Requirements Specifications contain a section for authorization of hot isostatic pressing (HIP) of castings. These Common Requirements Specifications include, but are not limited to:

A703 Specification for Steel Castings, General Requirements, for Pressure-Containing Parts

A781 Specification for Castings, Steel and Alloy, Common Requirements, for General Industrial Use

A957 Specification for Investment Castings, Steel and Alloy, Common Requirements, for General Industrial Use

A985 Specification for Steel Investment Castings General Requirements, for Pressure-Containing Parts

4.2 The HIP processing parameters shall be as agreed upon between the purchaser and supplier.

4.3 When agreed between purchaser and supplier, HIP may be substituted for required thermal treatment provided all requirements for that treatment are met.

## 5. Quality Requirements

5.1 The HIP process shall at a minimum document and have traceability for:

5.1.1 Operating parameters for each autoclave/vessel used in production.

5.1.2 Software and instrumentation used for control and documentation purposes.

5.1.3 Gas used to backfill or quench.

5.1.4 Contact fixturing within the autoclave.

5.2 Methods of gas dilution, replenishment, reuse, and purification shall be documented in a written procedure.