SAE The Engineering Society For Advancing Mobility Land Sea Air and Space

400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

AEROSPACE RECOMMENDED PRACTICE

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CERTIFICATION OF HEAT TREATING PERSONNEL

1. SCOPE:

1.1 Purpose: This document describes the practices and minimum standards for certification of personnel performing certain heat treating operations. It also establishes that only certified heat treaters may perform certain critical heat treating functions when conformance to this ARP is invoked by the applicable heat treating specification or by other contractural documentation.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein.

2.1 Metal Treating Institute (MTI) Publications: Available from Metal Treating Institute, 1311 Executive Center Drive, Suite 200, Tallahassee, FL 32301.

Heat Treater Certification Manual

3. TECHNICAL REQUIREMENTS:

3.1 The following functions shall be performed by certified heat treaters, except when these functions are performed by qualified (See Table I) engineers or metallurgists; no certification of these engineers or metallurgists is required. Table I provides summary guidelines for certification requirements.

3.1.1 Set up new job in plant.

3.1.2 Approve shop travelers, job cards, heat treat procedures, or any other document providing instructions for heat treating.

3.1.3 Determine which equipment to use.

3.1.4 Determine which test samples to run with work.

3.1.5 Determine temperatures and soak times.

3.1.6 Approve racking procedures and check racking.

3.1.7 Check surface cleanliness of parts before start of heat treating.

3.1.8 Approve and check load size.

3.1.9 Witness loading of work into furnace. At raw material producers, where continuous runs of the same material are processed, only the first setup run needs to be witnessed.

3.1.10 Approve and check furnace control settings.

3.1.11 Approve and check atmosphere and vacuum settings.

3.1.12 Determine and adjust heating and cooling rates.

3.1.13 Determine heat up times and stabilization or equalization times.

3.1.14 Determine quench media.

3.1.15 Determine retemper or reage temperature and time.

3.1.16 Prepare reheat treat instructions.

3.1.17 Check accuracy of heat treat log.

3.1.18 Check conformance of furnace recorder charts to specified requirements.

TABLE I

Personnel to be Certified

Job Classification	Heat Treat Vendors	Captive Heat Treat Departments
Heat Treater (1)	Yes	Yes
Metallurgical Technician (2)	Yes	Yes
Planner (2)	Yes	No (3)
Qualified Engineer or Metallurgist (4)	No	No
All Other Personnel Performing Above Functions	Yes	Yes

(1) Includes leads and foremen in heat treat department.
(2) Performing functions in 3.1.
(3) Except planner who prepares detailed heat treat instructions requires certification.
(4) A qualified engineer or metallurgist is a graduate metallurgical engineer or an engineer who has a minimum of 5 years of related Engineering experience in heat treating.

3.2 Certification Criteria: The following describes the criteria to be met in order for someone to be designated a certified heat treater, and thus perform the specific functions listed in 3.1 for the specific processes listed in Table II.

3.2.1 Prerequisites for Certification: A minimum on-the-job training time combined with optional classroom instruction, as shown in Table II, and the passing of a written test shall be required for certification.

3.2.1.1 Prior Experience: Personnel with verifiable, documented, heat treating experience in each of the specific processes for an equivalent time span to Table II may be certified for those processes after passing the test specified in 3.2.1.3. Experience and training in one category in no way allows certification in an unrelated category.

3.2.1.2 Classroom Instruction: Shall cover the specific process(es) for which the individual will be certified. In addition, it shall cover quality control, process control, non-destructive inspection and testing (hardness, etc), specifications, furnaces, pyrometry, instrumentation, and laboratory testing.

3.2.1.3 Testing: After completion of the training program, the passing of a written test shall be required. The test in the Metal Treating Institute Heat Treater Certification Manual shall be the minimum testing standard permitted. Test questions shall include coverage of the processes for which the heat treater is being certified. The test shall be administered by a plant quality control manager, metallurgist, or general manager. Additional test questions may be added by the certifier.

TABLE II

Prerequisites for Certification

Heat Treat Process (1)	Minimum Total Training (2); On-the-Job plus Classroom Months (3)	Permissible Maximum Portion which is Classroom Instruction, (4) Months
Air Atmosphere	9	3
Salt Bath	9	3
Magnesium	9	3
Controlled Atmosphere	12	3
Inert Gas Atmosphere	12	3
Furnace Brazing	12	3
Titanium	12	3
Aluminum	18	6
Vacuum	24	6
Carburizing/Carbonitriding	24	6
Nitriding	24	6
Ion Nitriding	24	6
Hydrogen Atmosphere	24	6
Induction	24	6
Flame Hardening	24	6
High Strength Steel (220 ksi (1515 MPa) and higher)	24	6
Nickel and Cobalt Alloys	24	6