NAVSEA 0948-LP-045-7010, VOLUME I, REVISION 2

MATERIAL CONTROL STANDARD

(NON-NUCLEAR)

JUNE 1989

(Incorporates ACNs 1-1, 1-2, 1-3, 1-4, 1-5, and 1-6)

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON DC 20362 5101

IN REPLY REFER TO

9090
OPR: 05B21
Ser 05B21/17
7 May 1992

MATERIAL CONTROL STANDARD (NON-NUCLEAR) NAVSEA 0948-045-7010, VOL 1, REV 2 CHANGE TRANSMITTAL ACN 1-1

From: Commander, Naval Sea Systems Command

Subj: ACN 1-1 TO NAVSEA 0948-045-7010, VOL 1, REV 2, MATERIAL CONTROL STANDARD (NON-NUCLEAR)

1. Purpose: To promulgate editorial and administrative changes to the subject manual.

2. Action: Make the following pen and ink changes to the manual:

a. Delete section 3.4.2 and replace with the following:

"Altering of a MIC marking is prohibited except to make documented corrections. A new MIC marking shall be added whenever Level I material is heat treated or worked in such a way as to alter mechanical properties. The new MIC number shall provide traceability to the original MIC number and recertification test reports for mechanical properties."

b. In Table 3-4 replace lot size "6 to 25" with "16 to 25.

c. Delete section 1.2.2.1 of Appendix A and replace with the following:

"Main steam and catapult steam systems and all branch piping designed for temperatures above 775^0F. Included will be high pressure steam drains up to and including the last valve downstream of the trap or orifice designed for temperatures above 775^0F."

d. Delete section 1.2.3.2 of Appendix A and replace with the following:

"Main steam, catapult steam (including the trough heating system), and reboiler systems, and all branch piping connected to these systems designed for main steam system design pressure. Included will be high pressure steam drains up to and including the last valve downstream of the trap or orifice designed for main steam system design pressure."

e. Delete section 1.3.1 of Appendix A and replace with the following:

"The above Level I boundary requirements apply to new construction, repairs, modifications, alterations and conversions for all submarines and surface ships regardless of the material identification and control requirements invoked, or not invoked, by the original shipbuilding specifications and/or system diagrams and component drawings. It is not the intent to remove non-level I material solely for the purpose of installing Level I material. Level I material shall be installed in new Level I systems or components or when replacing material incident to the repair or refurbishment of a Level I system component(s)."

f. Delete section 1.1.6.5 of Appendix B and replace with the following:

"All submarine seawater or sea connected hull and backup valve internal metallic pressure containing parts that serve to directly isolate seawater from the atmosphere or downstream connected system(s) (e.g., balls, disks, flappers, and poppets)."

g. Delete section 1.1.6.6 of Appendix B and replace with the following:

"Valve stems which penetrate the pressure boundary."

h. Delete section 2.1.1 of Appendix B and replace with the following:

"Packing gland assemblies located in the systems and their components identified in Appendix A of this document. This includes their associated flanges, fasteners, followers and retainers."

i. Add section 2.1.12 to Appendix B as follows:
"Valve seat retainers and other internal parts that are totally enclosed within the pressure boundary except for those parts described in paragraph 1.1.6.5 of this appendix."

j. Delete section 1.3.1 of Appendix D and replace with the following:

"Marking that will be removed by a manufacturing, fabrication, or maintenance process shall be recorded prior to removal and immediately restored upon completion of the process. Responsibility shall be assigned for transfer and reapplication of marking. Retesting of such material is not required if traceability is maintained to OQE attesting to actual chemical and mechanical property values of the end product. See paragraph 3.6.3."

3. Upon completion of the change, insert this change transmittal letter in the front of the manual. Indicate on the cover that ACN 1-1 is entered and the date entered.

M. S. FIREBAUGH
Deputy Commander for
Ship Design and Engineering

DEPARTMENT OF THE NAVY
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IN REPLY REFER TO

9090
Ser 03Y1/375
13 Dec 95

MATERIAL CONTROL STANDARD (NON-NUCLEAR) NAVSEA 0948-LP-045-7010, VOL 1, REV 2 CHANGE TRANSMITTAL ACN 1-2

From: Commander, Naval Sea Systems Command

Subj: ACN 1-2 TO NAVSEA 0948-LP-045-7010, VOL 2., REV 2, MATERIAL CONTROL STANDARD (NON-NUCLEAR)

1. Purpose: To promulgate editorial and administrative changes to the subject manual.

2. Action: Make the following change to the manual:

a. Delete Page 8, in paragraph 3.9.1.1 “except as allowed by paragraph 3.9.1.2” and replace with “except MIC markings subsequently covered over or obliterated (e.g., painted over, welded) need not be reapplied.”

b. Delete Page 8, paragraph 3.9.1.2 and replace with the following:

3.9.1.2 Installation Records:

3.9.1.2.1 New Construction:

Shipbuilders shall maintain records for Level I material which document the end use of the material on the ship and the MIC number marked on the piece. This requirement may be met in accordance with paragraph 3.9.1.2.2 below or by the shipbuilder’s quality program which generates records of manufacturing or fabrication, welding, quality control, material issue and process control.

3.9.1.2.2 Other than New Construction:

Records required by fabrication processes such as welding, brazing, mechanical joint assembly, etc. are acceptable Level I material installation records. When such documentation requirements do not exist, an installation record shall be completed at the time of installation of Level I material into a subassembly or aboard ship, which indicates the location of the piece on the ship and the permanent Level I MIC marking of the

piece. For consumable material, the material grade or type shall be recorded instead of a MIC marking, as applicable. Recording MIC markings on installation records must be done prior to performance of any fabrication step which will result in loss of identification markings.

3. Upon completion of the change, insert this change transmittal letter in the front of the manual. Indicate on the cover that ACN 1-2 is entered and the date entered.

RECORD NOTE: The above change introduces an acceptable alternate to recording end use application. All other requirements have been retained verbatim.

D. C. DYER
By direction

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IN REPLY REFER TO

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13 Dec 95

MATERIAL CONTROL STANDARD (NON-NUCLEAR) NAVSEA 0948-LP-045-7010, VOL 1, REV 2 CHANGE TRANSMITTAL ACN 1-3

From: Commander, Naval Sea Systems Command

Subj: ACN 1-3 TO NAVSEA 0948-LP-045-7010, VOL 1, REV 2, MATERIAL CONTROL STANDARD (NON-NUCLEAR)

1. Purpose: To promulgate changes to the subject manual to include non-structural SUBSAFE components that require Verification of Material (VM) because they are part of the hull integrity boundary to remove unnecessary cross referencing of NAVSEA 0924—062-0010, to include all gas systems with design pressures 1500 PSIG and above, to require VM for replacement plugs and fasteners in exempt equipment installed in Level-I systems, to exempt all stuffing boxes and to include Nickel-Chromium-Molybdenum-Columbium Alloy fasteners in Table C-l.

2. Action: Make the following changes to the manual:

a. Page 5, Section 3, paragraph 3.3.5.2, delete “in Section 3.4”

b. Page 5, Section 3, paragraph 3.3.5.3, delete “either” and “or NAVSEA 0924—062—0010”

c. Delete Page 7, “Note: For material .. NAVSEA 0924—062-0010.”

d. Delete Appendix A, paragraph 1.1.1 and replace with the following:

> “Air, nitrogen and other gas systems, except oxygen and hydrogen, with design pressures 1500 PSIG and above. Oxygen and hydrogen systems with a design pressure of 100 PSIG and above.

e. Delete Appendix A, paragraph 1.1.8

f. Delete Appendix B, paragraph 1.1.6.1 and insert:

"Portions of submarine pressure hull penetrations, excluding hull structure items, which isolate seawater from the submarine atmosphere. Examples of hull penetrations are: hull fittings (electrical and fiber optic), rodmeters, periscopes and periscope hoist cylinders, radar masts and antennas, main propulsion shaft seal housings, floating wire and towed array shear valve assemblies, lubrication distribution valves."

g. Delete Appendix B, paragraph 1.1.6.10 and replace with the following:

"Through hull operating shafts for submarines."

h. Delete Appendix B, paragraph 1.1.6.11 and replace with the following:

"Fasteners and plugs replaced on the assemblies identified in Appendix B, Section 2.1.9 which satisfy the above description of a Level I pressure boundary part. The applicable repair parts drawings and provisioning documents are to be marked for Level I Control."

i. Delete Appendix B, paragraph 2.1.1 and replace with the following:

"Packing gland assemblies located in the systems and their components identified in Appendix A of this document and stuffing boxes. This includes their associated flanges, fasteners, followers and retainers."

j. Appendix B, paragraph 2.1.9 delete ",except when specifically included by paragraph 1.1.6.1 of this appendix"

k. Add Appendix B, paragraph "2.1.13 Non-consumable weld backing rings."

1. Add Appendix B, paragraph "2.1.14 Piping system sleeves"

m. Modify page C-2, Table C-l, "Fasteners Color Coding Chart" as follows:

Subj: ACN 1-3 TO NAVSEA 0948-LP—045-7010, VOL 1, REV 2, MATERIAL CONTROL STANDARD (NON-NUCLEAR)

Under “Material Type, Specification (Note 1)” column add: “Nickel-Chromium-Molybdenum—Columbium Alloy (UNS N06625), MIL—S—1222”

Under “Grade, Class, Condition” column add:
“Grade 625. Annealed”

Under “Marking” column, add:
“625”
“Vendor Symbol”
“Lot No.”

Under “Color” column, add:
“Brown”
“(NSN 8010—00—721—9742 or equal)”

n. Appendix D, page D-5, paragraph 1.6.4, delete “in Section 3-4”,

3. Upon completion of the change, insert this change transmittal letter in the front of the manual. Indicate on the cover that ACN 1-3 is entered and the date entered.

D. C. DYER
By direction

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
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IN REPLY REFER TO

9090
Ser 03L32/117
5 Mar 97

MATERIAL CONTROL STANDARDS (NON-NUCLEAR) NAVSEA 0948-LP-045-7010, VOL 1, REV 2 CHANGE TRANSMITTAL ACN 1-4

From: Commander, Naval Sea Systems Command

Subi: ACN 1-4 TO NAVSEA 0948-LP-045—7010, VOL 1, REV 2, MATERIAL CONTROL STANDARD (NON-NUCLEAR)

1. Purpose: To promulgate changes to the subject manual which provide a redefination of surface ship 02N2 piping.

2. Action: Make the following change to the manual:

Delete Appendix A, paragraph 1.2.1,2 and replace with:
"1.2.1.2 Gaseous oxygen (02) piping from the 02N2 producer plant, storage tanks and fill station above 100 PSIG deaign pressure, including low pressure gaseous oxygen vent piping which is or can be cross-connected with high pressure gaseous oxygen piping."

3. Upon completion of the change, insert this change transmittal letter in the front of the manual. Indicate on the cover that ACN 1—4 is entered and the date entered.

Thomas W Allen

T. W. ALLEN
By direction

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IN REPLY REFER TO
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01 March 99

MATERIAL CONTROL STANDARD (NON-NUCLEAR) NAVSEA 0948-LP-045-7010, VOL 1, REV 2 CHANGE TRANSMITTAL ACN 1-5

From: Commander, Naval Sea Systems Command

Subj: ACN 1—5 TO NAVSEA 0948—LP—045—7010, VOL 1, REV 2, MATERIAL CONTROL STANDARD (NON-NUCLEAR)

1. Purpose: To promulgate changes to the subject manual which provide a clarification of the interrelationship between SUBSAFE and LEVEL I.

2. Action: Make the following change to the manual:

Delete Appendix A, paragraphs 1.1.5 and 1.1..6 and replace with:
"1.1.5 All circulating sea water systems (e.g., MSW,ASW, SSW) or portions thereof, continually open to the sea below 200 feet."

"1.1.5.1 The brine and seawater feed portion of the Distilling or Reverse Osmosis System which provides the through path of Shaft Seal Water to the Main or Auxiliary Sea Water System."

"1.1.6 All sea water and sea connected systems or portions thereof, which are intermittently subject to submergence pressure below 200 ft and which are within the SUBSAFE Certification Boundary as defined by NAVSEA 0924—062—0010."

Delete Appendix B, paragraph 2.1.6 and rep1ace with:
"2.1.6 Pipes, fittings, Mufflers and Quiet Pressure Release Devices (QPDRs) for the HP Air System, etc., continuously open to ambient conditions and only transiently subjected to pressures in excess of Appendix A criteria (e.g., open-ended ballast tank piping outboard of the pressure hull penetration, open-ended vents and drains)."

3. Upon completion of the change, insert this change transmittal letter in the front of the manual. Indicate on the cover that ACN 1-5 is entered and the date entered.

James M. Lawrence
By Direction

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IN REPLY REFER TO

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6 Aug 98

MATERIAL CONTROL STANDARD (NON-NUCLEAR) NAVSEA 0948-LP-045-7010, VOL 1, REV 2 CHANGE TRANSMITTAL ACN 1-6

From: Commander, Naval Sea Systems Command

Subj: ACN 1-6 TO NAVSEA 0948-LP-045-7010, VOL 1, REV 2, MATERIAL CONTROL STANDARD (NON-NUCLEAR)

1. Purpose: To promulgate changes to the subject manual that adds hydraulic accumulators to the list of excluded components.

2. Action: Make the following change to the manual:

Delete Appendix B, paragraph 2.1.9 and replace with:

"2.1.9 Pumps, distilling plants, compressors, heat exchangers, oxygen generators, steam turbines, condensers, hydraulic accumulators and dehydrators."

3. Upon completion of the change, insert this change transmittal letter in the front of the manual. Indicate on the cover that ACN 1-6 is entered and the date entered.

D. C. Dyer
By direction

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VOLUME II

MATERIAL DESIGNATOR CATALOG

TABLE 1-1. REFERENCE DOCUMENTS

DOCUMENT IDENTIFICATION	TITLE/SUBJECT
ASTM F606	Fasteners, Externally and Internally Threaded, Washers and Rivets, Conducting Tests to Determine the Mechanical Properties For
FF-S-86	Screw, Cap, Socket Head
DI-MISC-80705	Certification Data for Non-Nuclear Level I Material
DOD-STD-480/MIL-STD-481	Configuration Control-Engineering Changes, Deviations and Waivers
MIL-STD-792	Identification Marking Requirements for Special Purpose Components
MIL-S-1222	Military Specification, Studs, Bolts, Hex Cap Screws, Socket Head Cap Screws and Nuts
MIL-B-7838	Bolt, Internal Wrenching, 160 KSI FTU
MIL-Q-9858	Quality Program Requirements
MIL-N-25027	Nut, Self-Locking, 250 Deg. F, 450 Deg. F, and 800 Deg. F
MIL-I-20037	Military Specification, Indicators, Sight, Liquid Level, Direct Reading, Reflex Tubular Gage Glass
MS17828	Nut, Self-Locking, Hexagon, Regular Height, (Non-Metallic Insert) 250 Deg. F, Nickel-Copper Alloy
MIL-I-45208	Inspection System Requirements
NAS 1347	Fasteners, Identification of
NAVSEA Instruction 4355.2	NAVSEA Unified Vendor Evaluation Program (NUVEP)
NAVSEA 0924-062-0010	Submarine Safety (SUBSAFE) Requirements Manual
NAVSEA 0900-LP-079-6010	Ship Acquisition Contract Administration Manual
NAVSEA 0900-LP-079-5010	Ship Repair Contracting Manual

SECTION 1

INTRODUCTION

1.1 Purpose

1.1.1 This material control standard establishes a material identification and control (MIC) program for systems and associated components designated as Level I. This material control standard is designed to ensure that the correct material is installed in Level I systems and component installations aboard ship and that such material is traceable to records of objective quality evidence. It provides for the procurement, receipt inspection, storage, installation, and verification of Level I material during construction, conversion, overhaul, repair, and alteration of Naval ships. This standard program also provides direction and guidance for:

1.1.1.1 Developing implementing instructions for public and private shipyards and other activities engaged in the design, construction, conversion, overhaul, and repair of Naval ships.

1.1.1.2 Defining Level I Material Control Program requirements for Navy facilities, shipbuilders, forces afloat and other activities authorized by NAVSEA to certify Level I material for Navy use.

1.2 Scope

1.2.1 This standard applies to non-nuclear Level I material. It establishes minimum requirements and control procedures for Level I material from procurement through installation aboard ship.

1.2.2 Level I is a designation for systems and components for which the Navy requires a high degree of assurance that the chemical composition and mechanical properties of the installed materials meet the specified requirements.

1.2.3 Appendix A provides the criteria for determining the Level I system boundaries. The designation of a system as Level I does not require that all parts or components of that system be controlled as Level I. Appendix B lists metallic components within Level I systems that are to be controlled, as well as parts to be excluded from Level I control.

1.2.4 Definitions of terms are contained in Appendix F.

1.2.5 For Level I items within Submarine Safety (SUBSAFE) certification boundaries, the requirements of NAVSEA 0924-062-0010 shall also apply, and where conflicts occur, shall take precedence over this document.

SECTION 2

REQUIREMENTS

2.1 Applicability

2.1.1 The requirements of this document are invoked on all prime contractors and fleet activities of the Navy including shipbuilders, Master Ship Repair agreement holders, Naval supply facilities, shipyards, Intermediate Maintenance Activities (IMA), and Ship's Force.

2.1.2 It is not intended that this standard be invoked in total on subcontractors. For subcontractor application, the applicable requirements of this standard shall be included in the procurement document.

2.1.3 Unless specifically invoked, requirements of this standard do not apply to the separate and independent quality control or material control programs of organizations under the cognizance of the Navy Nuclear Propulsion Directorate.

2.2 Program Administration

2.2.1 The activity's Level I material control program shall be established in written procedures that clearly identify the requirements of this standard and the responsibilities for carrying out these requirements.

2.2.2 Assignment of responsibility for implementing the requirements of this standard shall be made to personnel who are knowledgeable in and well-oriented with the requirements of this standard and the operation of the activity's Material Identification and Control (MIC) program within the areas for which they are responsible.

2.2.3 Activities shall perform inspections and periodic audits of their Level I material control program to assure compliance with the requirements of this standard.

2.2.4 Compliance by activities with the requirements of this standard does not, in any way, waive or modify Government specifications or contract requirements that contractors shall use correct material and shall supply the Government with the correct material.

2.2.5 Naval supply facilities, IMAs, and Ship's Force may obtain assistance from other qualified Navy activities in order to comply with the requirements of this standard.

SECTION 3

PROCEDURES

3.1 The Level I MIC Program shall:

3.1.1 Specify in procurement documents the Level I material to be supplied and the requirements to certify conformance to the applicable specification or drawing requirements. The OQE required in support of product quality shall also be specified. Procurement requirements are specified in Appendix E.

3.1.2 Ensure that when production processes (e.g., segmenting, machining) will change or obliterate any marking, the marking shall be restored upon completion of processing to maintain traceability to the OQE. During a process or series of processes, traceability may be maintained by methods such as bagging and/or tagging. Consumable material identity shall be maintained by means of production or installation records as specified in paragraph 3.8.1.2.

3.1.3 Provide a system to assure that vendor documentation accurately certifies compliance with the specification requirements for chemical composition and mechanical properties and that Level I material is correctly identified and marked. This must be accomplished prior to release of an assembly or item to storage or to production shops. Verification testing shall be performed on Level I material and components in accordance with paragraph 3.3 to establish confidence that the chemical composition and mechanical properties are as specified.

3.2 Designation of MIC Level I on Documents

3.2.1. The "MIC Level" shall be specified for each item on Government approved drawings and material ordering documents. When Level I materials are shown in the lists of material, mark Roman numeral "I" adjacent to the item in the "MIC Level" column. For items which are not Level I, "NA" (not applicable), dash or other appropriate material control symbol shall be marked in the "MIC Level" column. All Government approved drawings which describe or list Level I material (e.g., diagrams, arrangements, detail, assembly drawings) shall reference this standard in the general notes and be stamped or labeled "Level I" in or near the title block. It is not the intent to modify any existing drawings to satisfy this requirement.

3.2.2 Job orders or similar work authorizing documents involving Level I materials shall be stamped or labeled "Level I" in letters that are legible and of sufficient size to be easily recognized.

3.2.3 The top sheet of purchase documents which include Level I material shall be identified "Level I" in letters that are legible and of sufficient size to be easily recognized.

3.3 Receipt Inspection

3.3.1 All Level I receipt inspection activities shall be approved by NAVSEA and assigned a Certifying Activity Designator (CAD) prior to being authorized to certify material for Level I use.

3.3.2 Receipt inspection activities shall work to formal inspection procedures that specify the attributes, inspections, and tests defined in this standard. The procedures shall specify accept and reject criteria for Level I material and provide instructions for performing inspections and tests and recording results. The inspection and test results shall be retained as part of the OQE for that item. Written procedures shall also be established for analyzing and verifying the chemical composition and mechanical properties of the material to determine conformance to the applicable specification, drawing, or purchase order requirement.

3.3.3 Level I material shall be receipt inspected in accordance with the material specification requirements of the applicable procurement contract and all contractually invoked waivers, deviations, and engineering changes thereto. Material verification shall be performed to the extent specified in tables 3-1, 3-2, and 3-3 (pages 9-13) to ensure chemical and mechanical property values reported on test documentation conform to the applicable contract requirements. Material awaiting or undergoing receipt inspection shall be physically segregated from accepted or rejected material.

3.3.4 Tables 3-1, 3-2, and 3-3 identify receipt inspection requirements for Level I material of the following types:

3.3.4.1 Mill products (plate, bar stock, tubing, pipe, etc.) and fasteners.

3.3.4.2 Assemblies/finished components (valves, fittings, hull penetrators, etc).

3.3.4.3 Welding and brazing filler material.

3.3.5 Pre-certified Level I Material:

3.3.5.1 When Level I material that has been certified by a NAVSEA authorized certifying activity is transferred to another activity the MIC mark shall serve as indication that the material is to be accepted "as is" (see paragraph 3.3.5.2), subject to the following verifications.

3.3.5.1.1 Inspection for shipping damage and completeness.

3.3.5.1.2 Visual verification that the MIC number marked on the material and that the stock number or part number called out on the ordering document agree with the shipping document. If a stock or part number does not apply or is not identified, verification shall include ensuring that the material designator part of the MIC number marked on the material correctly identifies the generic material identified on the shipping document.

3.3.5.1.3 Verification that the Level I CAD is traceable to a NAVSEA approved activity. See Appendix D.

A listing of all NAVSEA approved Level I certifying activities shall be periodically updated and distributed by NAVSEA. If the Level I CAD portion of the MIC number is not included on the NAVSEA approved list, NAVSEA should be contacted to determine the validity of the activity in question.

3.3.5.2 For material within SUBSAFE system and component boundaries, as defined by NAVSEA 0924-062-0010, only the certifying activities designated therein are authorized to certify materials for another activity's use.

3.3.5.3 For material that departs from the certification attributes of this document, the following applies:

3.3.5.3.1 Material conforming to modifications shown on the NAVSEA Approved Engineering Change List shall be accepted without further verification.

3.3.5.3.2 For non-conforming material not shown on the above list, a NAVSEA approved waiver or deviation shall be obtained.

3.3.6 Material Certified to Previous Revisions

Material certified and properly marked in accordance with previous revisions of this document does not require recertification and is considered acceptable.

3.4 Material Marking

3.4.1 Level I material shall be marked in accordance with Appendices C and D.

3.4.2 Altering of a MIC marking is prohibited except to make documented corrections. A new MIC marking shall be added whenever Level I material is heat treated or worked in such a way as to alter mechanical properties. The new MIC number shall provide traceability to the original MIC number and recertification test reports for mechanical properties.

3.5 Material Handling

3.5.1 Material handling procedures shall provide methods for controlling Level I material from receipt through issue, fabrication, and installation.

3.5.1.1 Level I material that is awaiting or undergoing receipt inspection or is in storage shall be physically segregated from non-level material to prevent commingling and unauthorized use. Segregation may be accomplished by use of separate cages, racks, bins, shelves, boxes, or roped-off areas which are distinctly marked for Level I material. Segregation shall be maintained until the material is installed aboard ship or identified to a specific end-use.

3.5.1.2 Material control tags shall be used to positively identify Level I material in transit to avoid unauthorized movement, commingling, and improper use.

3.5.2 Staging of Level I material with other material is acceptable for a specific job or fabrication process involving more than one material, provided the material is clearly marked as required and the material for the specific job or fabrication process is grouped together, identified by the job or process number, and segregated from material grouped for other processes or jobs.

3.5.3 Level I materials of different material types, grades, or condition shall be segregated through physical separation unless readily differentiated by other attributes, such as size or physical appearance. When physical segregation cannot be practically accomplished an alternate positive system of control shall be used. The method used shall assure that different materials that appear to be similar are not mixed (unless such materials are approved alternates for each other as indicated by stock or part number).

3.6 Manufacture of Level I Items by Activity for its Own Use

3.6.1 Activities manufacturing items for their own use shall have an inspection system or quality program in operation that complies with MIL-I-45208, MIL-Q-9858, the Shipyard Quality Program Manual, or the appropriate Type Commander's Quality Assurance Manual, as applicable.

3.6.2 Manufactured items shall meet all the requirements of this document and the applicable specifications or drawings. Upon inspection and acceptance, a MIC marking shall be applied in accordance with Appendix D which provides traceability to test documentation resulting from the material verification inspections of paragraph 3.3.4 or to the raw stock MIC number, as applicable.

3.6.3 The testing requirements of tables 3-1, 3-2, and 3-3 can be performed during any stage of the processing evolution from receipt as raw material through final inspection providing the following is complied with:

3.6.3.1 The testing and associated OQE reflect the actual chemical and physical properties of the finished product (i.e., the material is not treated in any way following testing that would alter its mechanical properties).

3.6.3.2 Traceability to the base material OQE is maintained throughout the manufacturing process.

3.6.4 For items manufactured from Level I raw stock, testing need not be performed provided the requirements of paragraph 3.6.3.1 and 3.6.3.2 are complied with.

3.7 Nonconforming Level I Material

3.7.1 When Level I material is found to be incorrectly marked, tagged, or otherwise improperly identified, or does not comply with the requirements of this document or the applicable specifications or drawings, the material shall be placed in a hold or reject status and clearly identified (e.g., with tags) until the material is properly dispositioned. Upon determination that the material is nonconforming and unusable for Level I applications, the material shall be clearly identified as rejected and the MIC marking shall be removed or obliterated. For Government Furnished Material (GFM), this shall be performed only as authorized by the responsible Government representative. When it is suspected that other activities may have been supplied similarly deficient material, the user activity shall inform its designated Government representative or NAVSEA, who shall initiate or request corrective action from the cognizant activity (e.g., Navy Ships Parts Control Center, shipyard or SUPSHIP). Corrective action by the user activity shall include determining the cause and extent of the material error, searching out similar errors which might be reasonably expected based on the nature of the error found, and, if directed by NAVSEA, identifying the location of all installed deficient material. If the error was caused by a vendor, the vendor shall be advised to take the necessary corrective action to prevent recurrence of the problem.

3.7.2 All waivers and deviations to the MIC requirements of this standard shall be processed in accordance with DOD-STD-480 or MIL-STD-481 or applicable contract requirements.

3.8 Upgrading Non-level Material

3.8.1 Upgrading non-level material to Level I, or procuring material with the intent to upgrade, is not permitted except in emergent situations where it is not possible to obtain certified Level I material in the time frame necessary to support ship schedules.

3.8.2 Upgrading shall be accomplished in accordance with the material verification requirements of Tables 3-1, 3-2 and 3-3 based on the starting condition of the material (homogeneous lot with OQE, homogeneous lot without OQE, or non-homogeneous material).

3.9 Installation of Level I Material

3.9.1 New Material

3.9.1.1 At the time of or subsequent to installation of a piece of Level I material into a system subassembly or aboard ship, the permanent material designator markings, material type for fasteners, or grade/type for consumable material, inscribed on the piece of material shall be visually verified to be correct in accordance with the generic material requirements of the applicable drawing and/or NAVSEA approved departures and Engineering Changes. Disassembly of assembled components for this verification is not required or intended. MIC marking, when required, or some evidence of material acceptance (color coded fasteners) shall remain on each piece of material after installation, except MIC markings subsequently covered over or obliterated (e.g., painted over, welded) need not be reapplied. Assemblies and subassemblies must be clearly identified to ensure that they are installed in their proper place in the ship.

3.9.1.2 Installation Records:

3.9.1.2.1 New Construction:

Shipbuilders shall maintain records for Level I material which document the end use of the material on the ship and the MIC number marked on the piece. This requirement may be met in accordance with paragraph 3.9.1.2.2 below or by the shipbuilder's quality program which generates records of manufacturing or fabrication, welding, quality control, material issue and process control.

3.9.1.2.2 Other than New Construction:

Records required by fabrication processes such as welding, brazing, mechanical joint assembly, etc. are acceptable Level I material installation records. When such documentation requirements do not exist, an installation record shall be completed at the time of installation of Level I material into a subassembly or aboard ship, which indicates the location of the piece on the ship and the permanent Level I MIC marking of the piece. For consumable material, the material grade or type shall be recorded instead of a MIC marking, as applicable. Recording MIC markings on installation records must be done prior to performance of any fabrication step which will result in loss of identification markings.

3.9.2 Existing Material

3.9.2.1 For previously installed material in a Level I system which is removed and is to be reinstalled, positive control and identification of the material shall be maintained from removal through reinstallation. The material shall be verified at the time of or subsequent to reinstallation to ensure that it is reinstalled in the correct location.

3.9.2.2 It is not required to verify or record as-received markings found on material to be reinstalled. However, if the material is obviously damaged or is identifiable as a generic material not compatible with the system application, disposition instructions for replacement or reinstallation shall be obtained.

3.10 Retention of Inspection Records

3.10.1 Records required by this document shall be retained as follows:

3.10.1.1 For submarine SUBSAFE applications, Level I records shall be maintained for the life of the ship. For all other application, Level I records shall be retained a minimum of seven years from the ship's delivery date for new construction or seven years from the availability completion date for repairs, overhauls, conversions, etc. Disposition instructions shall be requested at that time.

3.10.2 All records within the scope of this manual shall be maintained by installing and certifying activities and shall be made available for audit upon request. Forces afloat should make maximum use of existing records systems to record information required by this document. It is not intended that records generated or received by ships must be maintained on the ship. Storage of records ashore is acceptable.

3.10.3 Disposal of these records shall only be accomplished with the approval of NAVSEA.

TABLE 3-1. RECEIPT INSPECTION REQUIREMENTS FOR
LEVEL I MILL PRODUCTS AND LOOSE FASTENERS

MATERIAL CONDITION	VISUAL EXAMINATION	MATERIAL VERIFICATION TESTS		
		CHEMICAL COMPOSITION	MECHANICAL PROPERTIES	SEAMLESS TESTS FOR PIPE & TUBE
Homogeneous Lot with Objective Quality Evidence (OQE)	Each piece in Lot (100%) (See Note 1)	1. Generic test sample per Table 3-4, Col. A. 2. Semi-quantitative analysis one piece per lot	Tensile test one piece per lot. For internally threaded fasteners, proof load test one piece per lot in lieu of Tensile test (See Note 2.a.)	Test one piece per lot (See Note 4)
Homogeneous Lot without OQE (See Note 5)	Each piece in Lot (100%)	Quantitative analysis sample per Table 3-4, Col. A; (Col. B for fasteners) (See Note 6 for fasteners)	Tensile test sample per Table 3-4 Col. A (Col. B for fasteners) (See Note 2.b)	Test each Piece (100%) (See Note 4)
Non-homogeneous Material	Each piece (100%)	Quantitative analysis of each piece (See Note 6 for fasteners)	Tensile test each piece (100%) (See Note 2.b)	Test each piece (100%) (See Note 4)

TABLE 3-2. RECEIPT INSPECTION REQUIREMENTS
FOR LEVEL I ASSEMBLIES/FINISHED COMPONENTS

MATERIAL CONDITION	VISUAL EXAMINATION	MATERIAL VERIFICATION TESTS	
		CHEMICAL COMPOSITION	MECHANICAL PROPERTIES
Homogeneous Lot with Objective Quality Evidence (OQE)	Each piece in lot (100%) (See Note 1)	Generic test sample per Table 3-4, Col. A. Semi-quantitative analysis one piece per lot (See Note 10)	Test one piece per lot (See Note 3)
Homogeneous Lot without OQE (See Note 5)	Each piece in lot (100%)	Quantitative analysis Sample per Table 3-4, Col. A (See Note 6)	Sample per Table 3-4 Col. A (See Note 6)
Non-homogeneous Material (See Note 7)	Each piece (100%)	Quantitative analysis of each piece (See Note 6)	Test each piece (100%) (See Note 6)

TABLE 3-3. RECEIPT INSPECTION REQUIREMENTS
FOR WELDING AND BRAZING FILLER MATERIALS

(BARE, COVERED, FLUX AND ALLOY COVERED ETC.)

MATERIAL CONDITION	VISUAL EXAMINATION	MATERIAL CHEMICAL COMPOSITION/ VERIFICATION TEST
Homogeneous Lot with Objective Quality Evidence (OQE) (See Note 8)	Each unit container (100%) (See Notes 1 and 11)	1. Perform quantitative analysis in accordance with material specifications on one sample from each lot. (See Note 9) 2. Perform generic testing on the lot using samples selected per Table 3-4, Col. A
Homogeneous Lot without Objective Quality Evidence (OQE) (See Notes 5 and 8)	Each unit container (100%) (See Note 11)	1. Perform all quality conformance tests required by the specification. 2. Perform generic testing on the lot using samples per Table 3-4, Col. A.
Non-homogeneous Material	Non-homogeneous welding or brazing filler material shall not be used in fabricating Level I piping systems or components.	

	NOTES FOR TABLE 3-1, 3-2, AND 3-3
NOTE	DESCRIPTION
1.	a. In accordance with applicable Table 3-1 through 3-3, check the identification marking (heat, lot, code, etc.) on assemblies and finished components or each piece of raw stock, or container of welding electrodes and filler material, to ensure that the marking provides traceability from the material received to the OQE. Do not disassemble items received in a homogeneous lot. b. Review the vendor's test and inspection reports provided with the material to ensure that they include all data required by the applicable material specification, drawing, or purchase order. Verify that the reported results for chemical composition and mechanical properties are in compliance with the material specification, as required.
2.	a. When tensile testing of fasteners is not possible based on size, configuration, or quantity required for end-use, a substitute test in accordance with ASTM F606 shall be performed. A hardness test may only be used as a substitute test if required by the applicable material specification and the above tests cannot be performed. In cases where the above substitute tests cannot be performed on fasteners or mill products without damage or destruction of the quantity required for end-use, the material shall be accepted based on OQE, as noted in the receipt inspection record. No waiver request is required. b. When tensile testing is not possible based on size or configuration, a substitute test (for fasteners see ASTM F606) shall be performed. In cases when the above tests cannot be performed for mill products and fasteners, waivers shall be processed in accordance with DOD-STD-480, MIL-STD-481, or applicable requirements and submitted to NAVSEA. Hardness test values should only be provided as supporting rationale if specified by the applicable material specification.
3.	For those materials having hardness values listed in material specifications, hardness testing shall be performed on the major pressure boundary part. Material that has no specified hardness value in the specification or that cannot be hardness tested due to size, configuration, material condition (e.g., surface finish) may be certified on the basis of OQE and local analysis.
4.	Seamless verification: For each lot of pipe or tube (ordered seamless), seamless verification shall be performed by the certifying activity in accordance with a local procedure.

	NOTES FOR TABLE 3-1, 3-2, AND 3-3 (CONT'D)
NOTE	DESCRIPTION
5.	a. The provisions of this note apply to special cases where lots of material, by virtue of a heat or similar traceability number marked on material, are considered to have homogeneity relative to their chemical composition and mechanical properties, where actual OQE is not available. b. In establishing a lot as homogeneous without the vendor's OQE, the certifying activity shall document the rationale used to determine that the material meets the criteria for homogeneity. c. The material shall be sorted by heat or similar traceability numbers marked on the material. If no markings exist, the material shall be determined to be non-homogeneous and controlled in accordance with the requirements of this standard. d. The grouping into one lot of all material under a given stock number, part number or other such identifier as a basis for establishing homogeneity is expressly prohibited.
6.	In cases where chemical analysis or mechanical property testing would result in destruction or damage to the assembly or component, the extent of testing shall be limited to testing for conformance to the procurement specifications as closely as possible without requiring destruction or damage to the material. Where required testing cannot be performed, a request for waiver shall be submitted in accordance with DOD-STD-480/MIL-STD-481, or applicable requirements.
7.	Components and assemblies comprised of more than one pressure boundary part (e.g., valve) shall be disassembled as necessary to conduct visual and material verification tests.
8.	The lot definition shall be in accordance with the applicable material specification.
9.	For covered welding electrodes or flux cored welding wire, the quantitative analysis shall be performed on a deposit of weld metal made with the sampled electrodes.
10.	Level I assemblies (excluding in-line unions and similar connectors) shall not be disassembled to perform receipt inspection or verification testing. For the purpose of performing material verification and assigning MIC numbers, a lot of assemblies is defined as all assemblies with the same heat number for the major pressure boundary component received in a single shipment for a single purchase order line item. A log must be kept for each MIC number assigned to a lot of assemblies documenting the Level I components comprising the assembly, the heat numbers associated with each component, and the quantity of components from each heat. A semi-quantitative analysis and hardness test (see note 3) shall be performed on one major pressure boundary part in each lot. Generic

	testing is allowed if semi-quantitative analysis will cause destruction or damage to the item. All remaining accessible Level I parts of like configuration on assemblies within the sample (stems, bonnets, fasteners) shall be generically tested in accordance with Table 3-4, Col. A. For the purpose of material verification, components of in-line unions and similar connectors shall be grouped by like items and treated as finished components. Each part shall be marked with a MIC number.
11.	For hermetically sealed containers, the tests and inspections may be deferred until the container is opened for its intended use. The moisture content of the remaining electrodes in the open container(s) shall be maintained in accordance with the applicable material specification.

Table 3-4

SAMPLE PLANS

Samples shall be randomly drawn from each lot separately. The sample specimens shall be identified to show the lot from which they were drawn. Sampling shall be performed in accordance with Table 3-4. If one or more pieces of any sample do not conform to material composition specifications, none of the material in the lot shall be issued to the ship or placed in stock for issue. The entire lot shall be held for further inspection and testing or may be rejected (see paragraph 3.7). If the lot consists of fewer items than the required sample size, all items in the lot shall be inspected.

LOT SIZE (NOTE 1)	SAMPLE SIZE	
	COLUMN (See Note 2)	
	A	B
2 to 8	3	2
9 to 15	4	2
16 to 25	5	2
26 to 50	7	2
51 to 90	10	3
91 to 150	13	3
151 to 280	17	3
281 to 500	25	3
501 to 1,200	32	5
1,201 to 3,200	55	5
3,201 to 10,000	80	5
10,001 to 35,000	-	5
Over 35,000	-	8

NOTE 1 For generic testing of welding and brazing consumables, the lot size above shall be the total number of unit containers, packages, spools, etc. in the lot, and the sample size above shall be the number of electrodes, rods, rings, etc. to be generically tested. For hermetically sealed covered electrodes, select sample unit containers to permit taking no more than ten sample electrodes from any one unit container. For other filler materials, select each sample from a different unit container.

NOTE 2 For use of columns refer to Tables 3-1, 3-2, and 3-3.

APPENDIX A

SYSTEMS REQUIRING LEVEL I
MATERIAL IDENTIFICATION AND CONTROL

1.1 Submarines Only

1.1.1 Air, nitrogen and other gas systems, except oxygen and hydrogen, with design pressures 1500 PSIG and above. Oxygen and hydrogen systems with a design pressure of 100 PSIG and above.

1.1.2 Feedwater system with design pressure 600 PSIG and above.

1.1.3 Main steam system, and all branch piping from this system which is designed to the main steam system design pressure, up to and including the first valve downstream of pressure reducing valves and their by-pass valves. Included will be high pressure steam drains up to and including the first valve downstream of the trap or orifice.

1.1.4 Hydraulic systems for any steering or diving control surface, failure of which would cause loss of both the normal and emergency modes of operation for the control surface, except that internal wrenching bolts per MIL-B-7838 and NAS cap screws with NAS 1347, Type IV identification need not be to Level I requirements.

1.1.5 All circulating seawater systems (e.g., MSW, ASW, SSW) or portions thereof, continually open to the sea below 200 feet.

1.1.5.1 The brine and seawater feed portion of the Distilling or Reverse Osmosis System which provides the through path of Shaft Seal Water to the Main or Auxiliary Sea Water System.

1.1.6 All sea water and sea connected systems or portions thereof, which are intermittently subject to submergence pressure below 200 ft and which are within the SUBSAFE Certification Boundary as defined by NAVSEA 0924-062-0010.

1.1.7 Torpedo, signal ejector/launcher and trash disposal unit tubes. Included are the breech and muzzle doors and associated piping system components installed between the breech and muzzle doors that form part of the pressure boundary up to and including the inboard joint of the backup closure.

1.2 Surface Ships Only

1.2.1 All Surface Ships

1.2.1.1 Gaseous oxygen systems above 100 PSIG design pressure except for both the diver's recompression chamber and the divers surface supplied oxygen systems, which are excluded from Level I unless specifically invoked by NAVSEA in writing.

1.2.1.2 Gaseous oxygen (O2) piping from the O2N2 producer plant, storage tanks and fill station above 100 PSIG design pressure, including low pressure gaseous oxygen vent piping which is or can be cross-connected with high pressure gaseous oxygen piping.

1.2.2 Fossil Fuel Powered Ships

1.2.2.1 Main steam and catapult steam systems and all branch piping designed for temperatures above 775°F. Included will be high pressure steam drains up to and including the last valve downstream of the trap or orifice designed for temperatures above 775°F.

1.2.3 Nuclear Power Ships

1.2.3.1 Feed systems with design pressure 600 PSIG and above.

1.2.3.2 Main steam, catapult steam (including the trough heating system), and reboiler systems, and all branch piping connected to these systems designed for main steam system design pressure. Included will be high pressure steam drains up to and including the last valve downstream of the trap or orifice designed for main steam system design pressure.

1.3 Both Submarine and Surface Ship Requirements

1.3.1 The above Level I boundary requirements apply to new construction, repairs, modifications, alterations and conversions for all submarines and surface ships regardless of the material identification and control requirements invoked, or not invoked, by the original shipbuilding specifications and/or system diagrams and component drawings. It is not the intent to remove non-level I material solely for the purpose of installing Level I material. Level I material shall be installed in new Level I systems or components or when replacing material incident to the repair or refurbishment of a Level I system component(s).

1.4 Level I Designated Systems

Cognizant NAVSEA technical codes are responsible for determining any additional scope and boundary of individual systems, including the components and parts of components, that are to be controlled as Level I material.

APPENDIX B

LEVEL I COMPONENTS

1.1 Pressure Boundary Parts - Pressure Boundary parts of components within Level I systems shall be controlled. Level I pressure boundary parts include piping, tubing and the following:

1.1.1 Bodies. In general, these are the parts of a component that are the pressure boundaries of the component, including end connections. Examples are:

1.1.1.1 Valve bodies.

1.1.1.2 Strainer bodies.

1.1.1.3 Cylinders (flasks, reservoirs, etc.)

1.1.1.4 Pipe fittings (elbows, tees, couplings, union assemblies, separately furnished union tail-pieces, etc.)

1.1.1.5 Trap bodies (housings).

1.1.1.6 Orifice plates.

1.1.2 Covers. In general, these are component parts which act as pressure boundaries for the bodies listed above and other items. Examples are:

1.1.2.1 Valve bonnets.

1.1.2.2 Valve caps.

1.1.2.3 Strainer caps.

1.1.2.4 Closure plates for cylinders.

1.1.2.5 Oxygen and nitrogen valve cartridges.

1.1.3 Plugs. All plugs, including submarine zinc anode plugs, set screws, adjusting screws and vent and drain plugs which form a part of the Level I pressure boundary, or otherwise opened to the sea below 200 feet.

1.1.4 Fasteners. Bolts, nuts, studs, stud-bolts, and screws used when joining two pressure boundary parts. All hull integrity fasteners shall be Level I. Fasteners used for joining non-Level I machinery or equipment to Level I material shall be Level I when the component is located within the Level I boundary.

1.1.5 Extension Pieces. In general, these are branch systems connecting to "bodies" and "covers" which are subject to piping system pressures and temperatures and in many cases are furnished with end-connections for installing into either main or branch system piping. Examples are:

1.1.5.1 Blowdown or drain nipples (e.g., pipe, including pipe fittings or flanges).

1.1.5.2 Union tail-pieces when part of a component end connection (including flange union connections).

1.1.5.3 Separate bosses (attached to "bodies" or "covers" and providing connections for external piping).

1.1.6 Miscellaneous

1.1.6.1 Portions of submarine pressure hull penetrations, excluding hull structure items, which isolate seawater from the submarine atmosphere. Examples of hull penetrations are: hull fittings (electrical and fiber optic), rodmeters, periscopes and periscope hoist cylinders, radar masts and antennas, main propulsion shaft seal housings, floating wire and towed array shear valve assemblies, lubrication distribution valves.

1.1.6.2 Brazing alloys and welding filler metals, including consumable inserts.

1.1.6.3 Union nuts (both bonnets and end-connection unions).

1.1.6.4 Hose assembly end fittings and the nipple, flange, and body of sound isolation couplings (e.g., rubber insert sound isolation couplings (RISIC)) which form a part of the pressure boundary.

1.1.6.5 All submarine seawater or sea connected hull and backup valve internal metallic pressure containing parts that serve to directly isolate seawater from the atmosphere or downstream connected system(s) (e.g., balls, disks, flappers, and poppets).

1.1.6.6 Valve stems which penetrate the pressure boundary.

1.1.6.7 Oxygen charging lines and assemblies.

1.1.6.8 In-line instrumentation components and parts:

INSTRUMENTS	LEVEL I PARTS
Temperature	Thermowell (Welded and Flanged Bare Bulb)
Flow	Meter Casing
Liquid Level	Tank Penetration Fitting
Pressure	Root Valve Open of Pressure Instrument Piping
Gage Column (MIL-I-20037)	Isolation Valve

1.1.6.9 Propulsion shafts for submarines.

1.1.6.10 Through hull operating shafts for submarines.

1.1.6.11 Fasteners and plugs replaced on the assemblies identified in Appendix B, Section 2.1.9 which satisfy the above description of a Level I pressure boundary part. The applicable repair parts drawings and provisioning documents are to be marked for Level I Control.

2.1 Exclusions. Items and components specifically excluded from the classification of Level I are:

2.1.1 Packing gland assemblies located in the systems and their components identified in Appendix A of this document and stuffing boxes. This includes their associated flanges, fasteners, followers and retainers.

2.1.2 Pressure seal rings, gaskets, "O" rings, packing and similar sealing members used in conjunction with joining two pressure boundary parts.

2.1.3 Silver braze flux.

2.1.4 Flexible hoses and rubber insert sound isolation coupling (RISIC) rubber elements.

2.1.5 Gages, gage valves, pressure indicators, measuring instruments, and their associated piping installed downstream of root valves in instrumentation piping or that which does not form a part of the pressure boundary.

2.1.6 Pipes, fittings, Mufflers and Quiet Pressure Release Devices (QPDRs) for the HP Air System, etc., continuously open to ambient conditions and only transiently subjected to pressures in excess of Appendix A criteria (e.g., open-ended ballast tank piping outboard of the pressure hull penetration, open-ended vents and drains).

2.1.7 Valve yokes and bonnet retainers restrained by the body inside diameter that do not directly form the pressure boundary but retain parts that do form the pressure boundary, unless otherwise specified.

2.1.8 Items not permanently installed (portable) and designated only for dockside use.

2.1.9 Pumps, distilling plants, compressors, heat exchangers, oxygen generators, steam turbines, condensers, hydraulic accumulators, and dehydrators.

2.1.10 Washers.

2.1.11 Valve stem retaining nuts that do not come in direct contact with system fluid and serve no other function than to retain the stem.

2.1.12 Valve seat retainers and other internal parts that are totally enclosed within the pressure boundary except for those parts described in paragraph 1.1.6.5 of this appendix.

2.1.13 Non-consumable weld backing rings.

2.1.14 Piping system sleeves.

APPENDIX C

FASTENERS

1.1 Procurement of Fasteners

All fasteners to be used in Level I or submarine hull integrity applications shall be procured in accordance with MIL-S-1222 or as otherwise approved by NAVSEA. (e.g., NAVSEA approved drawing, NAVSEA Technical Manual, etc.).

1.2 Fastener Identification and Control

1.2.1 All Level I fasteners, 1/2 inch nominal diameter and larger, and all hull integrity fasteners regardless of size shall be marked as specified in Table C-1 with the kind of material, manufacturer's trademark or symbol, and traceability number (i.e., heat number, heat-treat number, and/or lot number, as applicable - see Appendix F, paragraph 1.8). All Level I fasteners less than 1/2 inch nominal diameter (excluding hull integrity) shall be marked in accordance with Appendix D, paragraph 1.4.4. Such markings shall be maintained on the fasteners through installation.

1.3 Fastener Color Coding

1.3.1 Level I fasteners marked by the manufacturer in accordance with the applicable specification shall be color coded after acceptance, as specified in Table C-1. Markings required by Table C-1 shall remain legible following color coding.

1.3.2 Material verification of loose (i.e., uninstalled) fasteners shall be performed in accordance with Table 3-1, Section 3, to assure compliance with the applicable specification requirements. All loose Level I fasteners shall be color coded in accordance with Table C-1 after satisfactory completion of the required material verification tests.

1.3.3 Color coding is not necessary for fasteners supplied as part of assemblies or for fasteners MIC marked in accordance with paragraph 1.5 of Appendix D.

SEE NEXT PAGE FOR FASTENER COLOR CODING CHART, TABLE C-1

TABLE C-1 FASTENER COLOR CODING CHART

Material Type, Specification (Note 1)	Grade, Class, Condition	Marking	Color
Carbon or Alloy Steels MIL-S-1222	Nuts Grades 2H, 4 or 7	2H, 4, or 7 Vendor Symbol Lot No.	Blue (NSN 8010-00-721-9746 or equal)
	Externally Threaded Fasteners Grades B-7, B-16 or 4340	B-7, B-16 or 4340 Vendor Symbol Lot No.	
Nickel Copper MIL-S-1222 (Note 2)	Grade 400	NC or NICU Vendor Symbol Lot No.	Green (NSN 8010-00-141-2951 or equal)
	Grade 405	NC-R or NICU-R Vendor Symbol Lot No.	
Nickel Copper Aluminum MIL-S-1222	Grade 500 AH Annealed 20% Min. Elongation	•K• Vendor Symbol Lot No.	Pink (NSN 8010-00-584-3155 or equal)
Nickel-Chromium-Molybdenum-Columbium Alloy (UNS N06625) MIL-S-1222	Grade 625 Annealed	625 Vendor Symbol Lot No.	Brown (NSN 8010-00-721-9742 or equal)
Other Materials/Types		Per Specification Vendor Symbol Lot No.	Orange (NSN 8010-00584-3148 or equal)

Notes:
1. FF-S-86 is an acceptable alternate specification for socket head cap screws
2. For self locking nuts, use MS-17828 and MIL-N-25027

APPENDIX D

MATERIAL IDENTIFICATION AND CONTROL (MIC) MARKING

1.1 Marking Requirements

1.1.1 Material Identification and Control (MIC) markings are to be applied to the material only by those activities that have been authorized by NAVSEA and issued a Level I Certifying Activity Designator (CAD); except as allowed by paragraph 1.4 of Appendix E.

1.1.2 The MIC marking is in addition to the marking required by the applicable material specification, drawing, or procurement document.

1.1.3 Excluding fasteners, any manufacturer's markings that are removed during receipt inspection testing or production processes need not be maintained or restored after MIC marking has been applied. Markings (manufacturers) on fasteners shall be maintained in accordance with paragraph 1.3 below.

1.1.4 MIC marking is required on all parts that are designated Level I, except for fasteners (See Appendix C) and those items noted in paragraphs 1.4.5 and 1.4.6 of this appendix. Disassembly of a component shall not be performed for marking purposes (See paragraph 1.4.1 of this appendix). Additional marking, such as drawing piece number, etc., is optional.

1.1.5 A unique MIC marking shall be assigned for each homogeneous lot of material received. For non-homogeneous lots each piece or each assembly as applicable shall receive a unique MIC marking. Each accessible pressure boundary part of an assembly shall be marked with identical MIC markings upon receipt acceptance. The material designator portion of the MIC mark must correctly identify the material of the part marked. (See Appendix F for definition of homogeneous lot).

1.1.6 For the purpose of assigning MIC numbers to assemblies on a lot basis, a lot shall consist of those assemblies whose major pressure boundary part is of the same homogeneous lot.

1.2 Purpose of Marking

1.2.1 The purposes of MIC marking are:

1.2.1.1 To denote that Level I material has been inspected, verified, and accepted.

1.2.1.2 To provide a means of verifying the material in hand by comparing it to the applicable drawings, plans, ordering requirements, and installing documents.

1.2.1.3 To provide traceability from installed material to OQE.

1.2.1.4 To preclude complete re-inspection of material previously accepted by a NAVSEA approved activity.

1.3 Continuity of MIC Markings and Fastener Markings

1.3.1 Marking that will be removed by a manufacturing, fabrication, or maintenance process shall be recorded prior to removal and immediately restored upon completion of the process. Responsibility shall be assigned for transfer and reapplication of marking. Retesting of such material is not required if traceability is maintained to OQE attesting to actual chemical and mechanical property values of the end product. See paragraph 3.6.3.

1.3.2 When material is to be cut into multiple pieces or otherwise processed, all pieces shall be marked prior to cutting or processing. If this cannot be done or is impractical, the marking shall be added immediately after the cutting or processing operation or the appropriate material control procedure (such as bag and tag, tagging, and/or tote box control) must be employed, provided the material proceeds directly to the next manufacturing station. The material that is to be stored after the cutting operation must be marked prior to cutting, if practical, or immediately after the cutting operation.

1.3.3 Prior to restoring permanent marking on a piece from which material identification marking has been inadvertently removed or separated, a generic material identification check shall be performed on the piece to verify its correct identity. This check is only required on one piece if all pieces are of the same size, configuration and lot of material and are manufactured at the same time in accordance with a single work instruction.

1.4 Marking Method

1.4.1 Marking shall be applied in accordance with MIL-STD-792 and as stated herein. An alternate marking method is permissible provided it is an available option in the applicable specification or drawing. For items which cannot be marked without disassembly, oxygen clean items, welding and brazing filler material, plated parts, or hardened material (where the material finish condition precludes permanent marking), the marking information shall be on a tag or other temporary marking attached to each package, container, can, etc., up to installation. For thin wall material which might be damaged by permanent marking methods, temporary methods are permitted per MIL-STD-792 provided an installation record documents the marking.

1.4.2 Marking shall be legible.

1.4.3 Marking shall be located so as not to affect the form, fit, or function of the item and, whenever possible, should be visible following assembly or installation.

1.4.4 Marking shall be permanent whenever the type, size, and condition of material permits, except as stated in this appendix. If all of the marking on the item cannot be applied due to space limitations, the permanent marking shall be applied using the following order of precedence (abbreviations are permitted):

MANUFACTURER'S MARKING-FASTENERS	MIC MARKING-NON-FASTENERS
(a) The kind of material. (mandatory)	(a) The kind of material (unless already correctly provided).
(b) The manufacturer's name, trademark or symbol.	(b) Level I Certifying Activity Designator (CAD).
(c) The traceability code number.	(c) The traceability number.

1.4.5 Permanent marking is not required for small, unassembled items whose type or condition preclude the use of permanent markings. However, such items shall be identified as follows:

1.4.5.1 Package or segregate small, unassembled items by homogeneous lot and label the package with the required marking.

1.4.5.2 All marking on labels shall be done with a substance that will not be obliterated by water, oil, sunlight, grease, etc. If material is packaged in see-through bags, the labels should be placed inside the bags. When labels are placed on the outside of material or packages, they shall be of a type that will remain attached during normal handling.

1.4.5.3 When issuing small quantities from a defined lot; small, unassembled items shall be repackaged with the required marking on an envelope, tag, label or tape, unless being removed from the package for immediate installation. This includes items that are maintained separately as stock or in a bin, etc.

1.4.6 Permanent marking is not required for small or inaccessible items which are required to be Level I and are included as part of the pressure boundary of a completed assembly. Certification statements relating these items and their OQE shall be provided and included in the records for the completed assembly.

1.4.7 Marking of materials, except fasteners, shall be as stated in paragraph 1.5 below. Fasteners shall be marked and controlled as stated in Appendix C.

1.4.8 Volume II of this document, the NAVSEA Material Designator Catalog, shall be used to assign material designators. Only those materials that are normally used in Level I applications will be assigned material designators. Volume II contains specific instructions for applying for a material designator when not listed in the catalog. Contractors shall make their requests via the cognizant government representative assigned to their activity.

1.4.8.1 Naval Sea Systems Command is responsible for administering the Material Designator Catalog.

1.5 Standard Marking System

1.5.1 The material control marking shall be as follows:

FIRST GROUP	SECOND GROUP	THIRD GROUP
ST or STG	87041-001	P

1.5.1.1 The first group of alpha identifiers shall be a two or three letter generic material designator. The purpose of this designator is to assure installation of correct generic material. Accordingly, two or three letter designators are required to maximize simplicity. Any instances where it is considered necessary to use more than three letter designators to assure a specific material attribute (e.g., heat treatment) shall be referred to NAVSEA for approval in writing and be incorporated into Volume II.

1.5.1.2 The second group of numeric identifiers shall be the traceability number. It consists of the last two digits of the year, Julian calendar date of inspection, a hyphen, and an assigned lot number (three-digit maximum). These identifiers provide traceability to records and data generated by the Material Control System required by this standard.

Note: The hyphen may be omitted due to space limitations.

1.5.1.3 The third group of alpha/numeric identifiers shall consist of the NAVSEA approved Level I CAD. This identifies the inspection activity responsible for the inspection, verification, acceptance and retention of the certification documentation for the Level I material.

1.5.1.4 Marking may be provided on two lines or in a vertical format where a single line format is not practicable.

1.6 Certified Activity Designator (CAD)

1.6.1 The Level I CAD completes the MIC marking and, when applied, designates acceptance of material for use. The Level I CAD shall not be marked on material until the material has been completely verified and accepted. The Level I CAD shall be applied only by those activities approved by NAVSEA. The Level I CAD shall not be delegated to subcontractors, suppliers, distributors or other activities, unless approved by NAVSEA.

1.6.2 Each certification activity must have documented procedures, adequate facilities and capable personnel. The personnel shall be trained (see paragraph 2.2.2, page 2) and have demonstrated ability to comply with the requirements of this document. After the activity's Level I program is determined acceptable by the Supervising Authority (Naval shipyards, SUPSHIPs, Type Commanders), NAVSEA shall assign an alpha or alpha/numeric Level I CAD. Unsatisfactory performance by certifying activities or noncompliance with the requirements of this standard (to the extent that Level I material certified by the respective activity is suspect) shall result in withdrawal of the Level I CAD approval by NAVSEA.

1.6.3 NAVSEA field activities and other Navy activities requiring a Level I CAD shall contact NAVSEA. Private shipyards shall make requests for the Level CAD via the cognizant Government representative assigned to their activity who, in turn, will contact NAVSEA. Fleet activities shall contact their respective Fleet Commander concerning the implementation of the requirements of this standard.

1.6.4 Administering Level I CADs is the responsibility of NAVSEA. For information regarding the NAVSEA policy for acquiring a Level I CAD and activities authorized to certify Level I material, contact NAVSEA or other NAVSEA authorized Government activity. A comprehensive listing of all activities authorized to certify Level I material is periodically updated and distributed by NAVSEA. For material within SUBSAFE system and component boundaries, as defined by NAVSEA 0924-062-0010, only the certifying activities designated therein are authorized to certify materials for another activity's use.

1.6.5 Following is a list of the most common CADs encountered and the applicable certifying activity:

Certifying Activity	CAD
Charleston Naval Shipyard	C
Long Beach Naval Shipyard	L
Mare Island Naval Shipyard	MS
Norfolk Naval Shipyard	N
Pearl Harbor Naval Shipyard	P
Philadelphia Naval Shipyard	H
Portsmouth Naval Shipyard	A
Puget Sound Naval Shipyard	S
Avondale Shipbuilding	E
General Dynamics (Electric Boat)	G
Ingalls Shipbuilding	M
Bath Iron Works	W
Newport News Shipbuilding	NN
Naval Weapons Station Yorktown	YT

APPENDIX E

ACQUISITION OF LEVEL I MATERIAL

1.1 Control of Manufacturers of Level I Components

1.1.1 Procurement documents for Level I material shall include and invoke the applicable requirements of this standard on manufacturers and suppliers.

1.1.2 Manufacturers of Level I components shall be required by the shipbuilder, shipyard or procuring activity to have an effective quality system in operation that complies with the requirements of MIL-I-45208 or MIL-Q-9858, as applicable. Quality assurance programs shall be established and maintained to assure that these manufacturers have effective systems for controlling Level I material. The system utilized must assure that the OQE is established and controlled in accordance with the requirements of this document. Special quality provisions along with the applicable specifications and/or drawing requirements shall be included in the purchase order.

1.2 Ordering Data for Level I Material

1.2.1 Material markings shall be traceable to the OQE provided with the Level I material. The method of marking shall be controlled in accordance with Appendix D.

1.2.2 Procuring activities shall include in contracts and ordering data the minimum requirements of this document to be invoked on the vendor, supplier, or manufacturer. The development, control and delivery of OQE shall be described by the procuring activity in written procedures which comply with the requirements of this standard. Such procedures shall be provided to suppliers as an addendum to procurement contracts which involve Level I material. Traceability to chemical composition and mechanical properties shall be established for each piece of material designated as Level I. The vendor shall furnish quantitative certification data for each homogeneous lot of material supplied attesting to chemical composition and mechanical properties. Such data shall be reported in accordance with Data Item Description DI-MISC-80705 as required by federal acquisition regulations for government contracts or in accordance with the purchase document where not required by these regulations and for non-government procuring activities. The certification data report shall be identified through a unique traceability number, heat-lot number, or heat-treat number, as applicable, which shall also be marked on the material. This traceability number marked on the material shall provide direct traceability to the material's chemical composition and mechanical properties certification data.

1.2.2.1 Material certification data shall be recorded on the testing company's letterhead and shall bear the name, title and signature of the authorized company representative. The name and title shall be clearly legible. Certification data supplied to the government shall be either the original mill material certification, the original copy from the testing facility, or exact photocopies of these documents. The data forwarded by the manufacturer shall contain a signed certification that the reported results represent the actual attributes of the material furnished and indicate full compliance with all applicable specification and contract requirements. Statements on material certification documents must be positive and unqualified. Words such as "to the best of our knowledge" or "we believe the information contained herein is true" are not acceptable.

1.2.2.2 If the starting material or raw stock is processed in a manner that will not affect it's chemical composition or mechanical properties, the original certifications for the chemical composition and mechanical properties, as required by the material specification, is acceptable. Re-certification of the mechanical properties is required if a metal working process is used during fabrication that alters the original properties of the material (e.g., heat treating or forming). In these instances, the mechanical properties of the material must be re-determined and documented to reflect the altered condition. The altered material shall be uniquely re-identified. The mechanical properties thus determined and documented, are required for final certification and shall conform to the material/procurement specification or purchase order requirements. Additionally, the original certification for chemical composition shall be annotated with the unique traceability marking used with the altered material (see para 1.2.2.5 below). Alternately, altered mechanical properties may be certified by a testing facility or laboratory and reported in accordance with paragraph 1.2.2.1 of this appendix. The altered mechanical properties report must be maintained with the chemical composition certification data.

1.2.2.3 In cases of foreign certification, conversion of foreign language units of measure into U.S. units of measure shall be annotated on the furnished foreign certifications, if space permits, or placed on an addendum in the same format as the foreign certification data. Such conversion shall be identified as to origin with name, title and signature of the authorized representative of the company making the conversion.

1.2.2.4 The certification data requirements contained in this appendix shall be invoked on the prime contractor who shall delegate these requirements to all sub-tier vendors supplying Level I material.

1.2.2.5 When the mechanical properties are altered, the original certification data report shall be overstamped and/or annotated to contain the following information:

Traceability No. _____
(marking on finished item)

is fabricated from raw material.

Heat No. _____ and

Heat-Treat No. _____
when applicable

_____ Date _____
(Name and Signature of Auth Co. Rep)

NOTE: When applying an overstamp or annotation to the certification data report, no pertinent data shall be obliterated or rendered illegible.

1.3 Except for fasteners (see Appendix C), the MIC mark shall be the only material marking that denotes a ready-for-use condition. Manufacturer's identification markings required by applicable specifications or drawings may be used to supplement material identification, but shall not be used in lieu of MIC marking to denote ready-for-use material.

1.4 When shipbuilder and/or NAVSEA field activities procure Level I material, the material designator, traceable serial number, and the CAD shall normally be applied to the material at the time of acceptance by the NAVSEA authorized certifying activity. When an approved certifying activity elects to have the material marking requirements of this document applied to material by the supplier at time of manufacture, the NAVSEA authorized certifying activity must preassign and validate the material designator and traceable serial numbers. In doing so, the certifying activity assumes full responsibility for the correctness of the material at the time of the application of the material designator and traceable serial numbers. However, under no circumstances shall the remaining part of the MIC number be applied until the material has been receipt inspected in accordance with Section 3.3 (page 4). Activities certifying Level I material whose CAD appears on the material shall be responsible for and must maintain the OQE on file at their activity. Departure from these requirements for applying Level I MIC numbers requires waiver approval from NAVSEA.

2.1 Control of Vendors

2.1.1 Activities shall perform periodic product-oriented technical visits or surveys of vendors from whom they procure Level I material. Each visit shall include, as a minimum, to review the vendor's material identification and control system and to ensure compliance with the applicable portions of MIL-I-45208 or MIL-Q-9858. The visiting activity shall follow-up or have the Defense Contract Administration Services (DCAS) follow-up on vendor corrective actions to ensure system deficiencies are corrected. In order to avoid unnecessary duplication of effort, visiting government activities shall send reports of these visits to the Navy Material Quality Assessment Office (NMQAO) for distribution or input into their data base per NAVSEAINST 4355.2. Private activities may also, at their option, participate in this exchange of information. The need to perform a visit to a vendor and the frequency of visits shall be based on the vendor's quality assurance history as measured by reports of previous vendor visits and the quality of previous material supplied by that vendor. Vendor visits by joining activity teams are encouraged. Arrangements for joint visits are the responsibility of the participating activities.

2.1.2 Activities shall have a vendor evaluation program, utilizing available inspection and defect data. Feedback from this program shall be used in the vendor selection process.

3.1 Government Source Inspection of Level I Material

3.1.1 NAVSEA field activities shall invoke Government Source Inspection (GSI) when procuring Level I materials.

3.1.2 Private shipbuilders and contractors procuring Level I material shall perform source inspection or periodic product oriented technical surveys to ensure adequate vendor controls.

3.1.3 Supervisors of shipbuilding conversion and repair shall use the criteria identified in Chapter 8-4 of the Ship Acquisition Contract Administration Manual or Chapter 12-4 of the Ship Repair Contracting Manual to invoke GSI at the subcontractor level.

3.1.4 Quality Assurance Letters of Instruction (QALIs) to the Contract Administration Services (CAS) offices for Product Verification Inspection (PVI) shall be prepared when specific government quality actions at source are considered necessary or as required by higher authority. QALIs cannot impose more stringent quality requirements than are included in the contract. QALIs are to include:

3.1.4.1 Specific inspection actions to be accomplished by CAS (e.g., selected characteristics from specifications, tests or inspections to be witnessed).

3.1.4.2 Description on how the inspection action is to be performed (e.g., perform or physically accomplish test, witness or observe suppliers' performance, verify or review suppliers' documented evidence).

3.1.4.3 Identification of the amount of inspection (sampling or 100% inspection).

3.1.4.4 Use of the Master List Inspection Attributes contained in NAVSEAINST 4355.2 for each specific inspection included in the letter of instruction to permit CAS inspection data to be inserted into the NAVSEA Unified Vendor Evaluation Program (NUVEP) data bank.

3.1.4.5 Requests for CAS offices to notify the shipyard or purchasing activity of the results of the PVIs or provide a statement that the results of the PVIs have been satisfactorily completed and are properly documented.

3.1.4.6 Requirements for CAS offices to acknowledge receipt of PVI requirements.

APPENDIX F

DEFINITIONS

1. The following definitions apply for Level I material identification and control (MIC):

1.1 Activity

Any organization, Government or private, that procures, accepts, or utilizes Level I material in the construction, overhaul, or repair of U.S. Naval ships.

1.2 Certification

Declaration by a certifying activity that receipt inspection and verification test results of the material are acceptable and within specified limits based on comparison with a standard.

1.3 Certifying Activity Designator (CAD)

An alpha or alpha/numerical designation assigned by NAVSEA to NAVSEA field activities, shipbuilders, Master Ship Repair and Commercial Industrial Services Contractors and others which authorizes these activities to certify Level I material for Navy use during ship construction, overhaul, or repair.

1.4 Chemical Composition

The constituent elements and their percentages that make a compound alloy.

1.5 Contractor

Any organization that furnishes material or services in accordance with an issued purchase document. This is not to include private shipyards, ship repair or overhaul activities. Wherever this word appears in this standard, it shall be considered synonymous with the word "vendor".

1.6 Fasteners

Male and female threaded type items such as bolts, socket head cap screws, studs, bolt studs and nuts.

1.7 Generic Material Verification/Generic Testing

A broad identification of materials by alloy families using simple, direct and rapid analysis methods or a combination of methods (e.g., color, magnetic properties test, acid spot tests, and metal comparator tests). These tests are designed for simple screening and identification of materials by alloy family (as opposed to classification of specific alloys within a family).

1.8 Heat Number

The numeric or alpha/numeric designator assigned to material produced in a common batch or under a continuous pour process by the activity that produces the material.

1.9 Heat Treat Number

The numeric or alpha/numeric designator assigned to material when a process (i.e., heat-treatment, hot forged, extrusion, etc.) alters the original mill source mechanical properties of the material.

1.10 Homogenous Lot

A group of like items that are produced in a common heat or batch, or are produced under continuous cast or pour process with the same vendor traceability numbers, are of the same nominal size, and are received in a single shipment. For batch or continuous cast/pour processes, samples for chemical and mechanical properties shall be taken no less than once in every eight hours of operation. If additional production processes are utilized that alter the mechanical properties of the material (e.g., heat-treat, cold or hot forge, extrusion), then all items of the same "Heat" number and additionally processed under the same conditions at the same time shall be considered as a homogeneous lot.

1.11 Identification

The ability to show the required characteristics of a material.

1.12 Material Composition

The composition and mechanical properties (see definitions 1.4 and 1.14) of an alloy as prescribed in the applicable specification, drawing, or procurement document.

1.13 Material Designator

A group of alpha identifiers (two or more letters) which represent a specific material or material type. The first two letters of the material designator indicates the generic material grouping and the last one or two letters identify the specific alloy and/or condition.

1.14 Mechanical Properties

The properties of a material that influence its strength and elastic behavior when force is applied, thereby indicating its suitability for mechanical applications (e.g., tensile or yield strength, elongation, hardness, etc.)

1.15 Mill Products

Various forms of raw stock (i.e., bar, rod, plate, sheet, pipe, etc.) that normally require further fabrication.

1.16 Non-Homogeneous Lot

A group of items that are not produced in a common heat or batch, or not produced under continuous pour or cast process, and do not have the same traceable markings.

1.17 Objective Quality Evidence (OQE)

Within the context of this document, objective quality evidence (OQE) refers to quantitative and qualitative data of all mechanical, chemical, and performance tests performed (as required by the applicable specification, drawing, or purchase document) to prove that the material supplied conforms to the specified requirements.

1.18 Procurement Document

A written agreement for the procurement of supplies or services that describes what is to be supplied and what requirements are to be met.

1.19 Quantitative Chemical Analysis

Assuring conformance to procurement or specification requirements by the determination of the exact concentration of all constituent elements present in a material based on the applicable specification requirements.

1.20 Segregated Material

Material that is kept separate from other material based on a specified condition or attribute.

1.21 Semi-Quantitative Analysis

The resolution of alloys by analysis methods (such as the emission spectrograph of X-ray spectrometer) designed to determine the approximate concentration of the alloy characterizing elements present, thereby, assuring conformance with the material procurement document.

1.22 Small Items

Items that have a marking surface areas less than 3/8 inches square.

1.23 Supervising Authority

The officer designated by the Commander Naval Sea Systems Command to represent the Navy Department at a shipyard; normally, a Supervisor of Shipbuilding or the Commander of a Naval Shipyard. For the fleet, this designated officer is the Type Commander.

1.24 Traceability

A positive means of identifying material to its OQE.

1.25 Verification

An examination performed to determine compliance with a specific requirement.

COMPENDIUM
REDLINE/STRIKEOUT

NAVSEA 0948-LP-045-7010, VOLUME I, REVISION 2

MATERIAL CONTROL STANDARD

(NON-NUCLEAR)

JUNE 1989

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MATERIAL DESIGNATOR CATALOG

TABLE 1-1. REFERENCE DOCUMENTS

DOCUMENT IDENTIFICATION	TITLE/SUBJECT
ASTM F606	Fasteners, Externally and Internally Threaded, Washers and Rivets, Conducting Tests to Determine the Mechanical Properties For
FF-S-86	Screw, Cap, Socket Head
DI-MISC-80705	Certification Data for Non-Nuclear Level I Material
DOD-STD-480/MIL-STD-481	Configuration Control-Engineering Changes, Deviations and Waivers
MIL-STD-792	Identification Marking Requirements for Special Purpose Components
MIL-S-1222	Military Specification, Studs, Bolts, Hex Cap Screws, Socket Head Cap Screws and Nuts
MIL-B-7838	Bolt, Internal Wrenching, 160 KSI FTU
MIL-Q-9858	Quality Program Requirements
MIL-N-25027	Nut, Self-Locking, 250 Deg. F, 450 Deg. F, and 800 Deg. F
MIL-I-20037	Military Specification, Indicators, Sight, Liquid Level, Direct Reading, Reflex Tubular Gage Glass
MS17828	Nut, Self-Locking, Hexagon, Regular Height, (Non-Metallic Insert) 250 Deg. F, Nickel-Copper Alloy
MIL-I-45208	Inspection System Requirements
NAS 1347	Fasteners, Identification of
NAVSEA Instruction 4355.2 (NUVEP)	NAVSEA Unified Vendor Evaluation Program
NAVSEA 0924-062-0010	Submarine Safety (SUBSAFE) Requirements Manual
NAVSEA 0900-LP-079-6010	Ship Acquisition Contract Administration Manual
NAVSEA 0900-LP-079-5010	Ship Repair Contracting Manual

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SECTION 1

INTRODUCTION

1.1 Purpose

1.1.1 This material control standard establishes a material identification and control (MIC) program for systems and associated components designated as Level I. This material control standard is designed to ensure that the correct material is installed in Level I systems and component installations aboard ship and that such material is traceable to records of objective quality evidence. It provides for the procurement, receipt inspection, storage, installation, and verification of Level I material during construction, conversion, overhaul, repair, and alteration of Naval ships. This standard program also provides direction and guidance for:

1.1.1.1 Developing implementing instructions for public and private shipyards and other activities engaged in the design, construction, conversion, overhaul, and repair of Naval ships.

1.1.1.2 Defining Level I Material Control Program requirements for Navy facilities, shipbuilders, forces afloat and other activities authorized by NAVSEA to certify Level I material for Navy use.

1.2 Scope

1.2.1 This standard applies to non-nuclear Level I material. It establishes minimum requirements and control procedures for Level I material from procurement through installation aboard ship.

1.2.2 Level I is a designation for systems and components for which the Navy requires a high degree of assurance that the chemical composition and mechanical properties of the installed materials meet the specified requirements.

1.2.3 Appendix A provides the criteria for determining the Level I system boundaries. The designation of a system as Level I does not require that all parts or components of that system be controlled as Level I. Appendix B lists metallic components within Level I systems that are to be controlled, as well as parts to be excluded from Level I control.

1.2.4 Definitions of terms are contained in Appendix F.

1.2.5 For Level I items within Submarine Safety (SUBSAFE) certification boundaries, the requirements of NAVSEA 0924-062-0010 shall also apply, and where conflicts occur, shall take precedence over this document.

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SECTION 2

REQUIREMENTS

2.1 Applicability

2.1.1 The requirements of this document are invoked on all prime contractors and fleet activities of the Navy including shipbuilders, Master Ship Repair agreement holders, Naval supply facilities, shipyards, Intermediate Maintenance Activities (IMA), and Ship's Force.

2.1.2 It is not intended that this standard be invoked in total on subcontractors. For subcontractor application, the applicable requirements of this standard shall be included in the procurement document.

2.1.3 Unless specifically invoked, requirements of this standard do not apply to the separate and independent quality control or material control programs of organizations under the cognizance of the Navy Nuclear Propulsion Directorate.

2.2 Program Administration

2.2.1 The activity's Level I material control program shall be established in written procedures that clearly identify the requirements of this standard and the responsibilities for carrying out these requirements.

2.2.2 Assignment of responsibility for implementing the requirements of this standard shall be made to personnel who are knowledgeable in and well-oriented with the requirements of this standard and the operation of the activity's Material Identification and Control (MIC) program within the areas for which they are responsible.

2.2.3 Activities shall perform inspections and periodic audits of their Level I material control program to assure compliance with the requirements of this standard.

2.2.4 Compliance by activities with the requirements of this standard does not, in any way, waive or modify Government specifications or contract requirements that contractors shall use correct material and shall supply the Government with the correct material.

2.2.5 Naval supply facilities, IMAs, and Ship's Force may obtain assistance from other qualified Navy activities in order to comply with the requirements of this standard.

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SECTION 3

PROCEDURES

3.1 The Level I MIC Program shall:

3.1.1 Specify in procurement documents the Level I material to be supplied and the requirements to certify conformance to the applicable specification or drawing requirements. The OQE required in support of product quality shall also be specified. Procurement requirements are specified in Appendix E.

3.1.2 Ensure that when production processes (e.g., segmenting, machining) will change or obliterate any marking, the marking shall be restored upon completion of processing to maintain traceability to the OQE. During a process or series of processes, traceability may be maintained by methods such as bagging and/or tagging. Consumable material identity shall be maintained by means of production or installation records as specified in paragraph 3.8.1.2.

3.1.3 Provide a system to assure that vendor documentation accurately certifies compliance with the specification requirements for chemical composition and mechanical properties and that Level I material is correctly identified and marked. This must be accomplished prior to release of an assembly or item to storage or to production shops. Verification testing shall be performed on Level I material and components in accordance with paragraph 3.3 to establish confidence that the chemical composition and mechanical properties are as specified.

3.2 Designation of MIC Level I on Documents

3.2.1 The "MIC Level" shall be specified for each item on Government approved drawings and material ordering documents. When Level I materials are shown in the lists of material, mark Roman numeral "I" adjacent to the item in the "MIC Level" column. For items which are not Level I, "NA" (not applicable), dash or other appropriate material control symbol shall be marked in the "MIC Level" column. All Government approved drawings which describe or list Level I material (e.g., diagrams, arrangements, detail, assembly drawings) shall reference this standard in the general notes and be stamped or labeled "Level I" in or near the title block. It is not the intent to modify any existing drawings to satisfy this requirement.

3.2.2 Job orders or similar work authorizing documents involving Level I materials shall be stamped or labeled "Level I" in letters that are legible and of sufficient size to be easily recognized.

3.2.3 The top sheet of purchase documents which include Level I material shall be identified "Level I" in letters that are legible and of sufficient size to be easily recognized.

3.3 Receipt Inspection

3.3.1 All Level I receipt inspection activities shall be approved by NAVSEA and assigned a Certifying Activity Designator (CAD) prior to being authorized to certify material for Level I use.

3.3.2 Receipt inspection activities shall work to formal inspection procedures that specify the attributes, inspections, and tests defined in this standard. The procedures shall specify accept and reject criteria for Level I material and provide instructions for performing inspections and tests and recording results. The inspection and test results shall be retained as part of the OQE for that item. Written procedures shall also be established for analyzing and verifying the chemical composition and mechanical properties of the material to determine conformance to the applicable specification, drawing, or purchase order requirement.

3.3.3 Level I material shall be receipt inspected in accordance with the material specification requirements of the applicable procurement contract and all contractually invoked waivers, deviations, and engineering changes thereto. Material verification shall be performed to the extent specified in tables 3-1, 3-2, and 3-3 (pages 9-13) to ensure chemical and mechanical property values reported on test documentation conform to the applicable contract requirements. Material awaiting or undergoing receipt inspection shall be physically segregated from accepted or rejected material.

3.3.4 Tables 3-1, 3-2, and 3-3 identify receipt inspection requirements for Level I material of the following types:

3.3.4.1 Mill products (plate, bar stock, tubing, pipe, etc.) and fasteners.

3.3.4.2 Assemblies/finished components (valves, fittings, hull penetrators, etc).

3.3.4.3 Welding and brazing filler material.

3.3.5 Pre-certified Level I Material:

3.3.5.1 When Level I material that has been certified by a NAVSEA authorized certifying activity is transferred to another activity the MIC mark shall serve as indication that the material is to be accepted "as is" (see paragraph 3.3.5.2), subject to the following verifications.

3.3.5.1.1 Inspection for shipping damage and completeness.

3.3.5.1.2 Visual verification that the MIC number marked on the material and that the stock number or part number called out on the ordering document agree with the shipping document. If a stock or part number does not apply or is not identified, verification shall include ensuring that the material designator part of the MIC number marked on the material correctly identifies the generic material identified on the shipping document.

3.3.5.1.3 Verification that the Level I CAD is traceable to a NAVSEA approved activity. See Appendix D.

A listing of all NAVSEA approved Level I certifying activities shall be periodically updated and distributed by NAVSEA. If the Level I CAD portion of the MIC number is not included on the NAVSEA approved list, NAVSEA should be contacted to determine the validity of the activity in question.

3.3.5.2 For material within SUBSAFE system and component boundaries, as defined by NAVSEA 0924-062-0010, only the certifying activities designated ~~in Section 3.4~~ therein are authorized to certify materials for another activity's use. ACN 1-3

3.3.5.3 For material that departs from the certification attributes of ~~either~~ this document ~~or NAVSEA 0924-062-0010~~, the following applies: ACN 1-3

3.3.5.3.1 Material conforming to modifications shown on the NAVSEA Approved Engineering Change List shall be accepted without further verification.

3.3.5.3.2 For non-conforming material not shown on the above list, a NAVSEA approved waiver or deviation shall be obtained.

3.3.6 Material Certified to Previous Revisions

Material certified and properly marked in accordance with previous revisions of this document does not require recertification and is considered acceptable.

3.4 Material Marking

3.4.1 Level I material shall be marked in accordance with Appendices C and D.

3.4.2 Altering of a MIC marking is prohibited except to make documented corrections. A new MIC marking shall be added ~~to manufactured Level I material in accordance with paragraph 1.3.1 of Appendix D and~~ whenever Level I material is heat treated or worked in such a way as to alter mechanical properties. The new MIC number shall provide traceability to the original MIC number and recertification test reports for mechanical properties. ACN 1-1

3.5 Material Handling

3.5.1 Material handling procedures shall provide methods for controlling Level I material from receipt through issue, fabrication, and installation.

3.5.1.1 Level I material that is awaiting or undergoing receipt inspection or is in storage shall be physically segregated from non-level material to prevent commingling and unauthorized use. Segregation may be accomplished by use of separate cages, racks, bins, shelves, boxes, or roped-off areas which are distinctly marked for Level I material. Segregation shall be maintained until the material is installed aboard ship or identified to a specific end-use.

3.5.1.2 Material control tags shall be used to positively identify Level I material in transit to avoid unauthorized movement, commingling, and improper use.

3.5.2 Staging of Level I material with other material is acceptable for a specific job or fabrication process involving more than one material, provided the material is clearly marked as required and the material for the specific job or fabrication process is grouped together, identified by the job or process number, and segregated from material grouped for other processes or jobs.

3.5.3 Level I materials of different material types, grades, or condition shall be segregated through physical separation unless readily differentiated by other attributes, such as size or physical appearance. When physical segregation cannot be practically accomplished an alternate positive system of control shall be used. The method used shall assure that different materials that appear to be similar are not mixed (unless such materials are approved alternates for each other as indicated by stock or part number).

3.6 Manufacture of Level I Items by Activity for its Own Use

3.6.1 Activities manufacturing items for their own use shall have an inspection system or quality program in operation that complies with MIL-I-45208, MIL-Q-9858, the Shipyard Quality Program Manual, or the appropriate Type Commander's Quality Assurance Manual, as applicable.

3.6.2 Manufactured items shall meet all the requirements of this document and the applicable specifications or drawings. Upon inspection and acceptance, a MIC marking shall be applied in accordance with Appendix D which provides traceability to test documentation resulting from the material verification inspections of paragraph 3.3.4 or to the raw stock MIC number, as applicable.

3.6.3 The testing requirements of tables 3-1, 3-2, and 3-3 can be performed during any stage of the processing evolution from receipt as raw material through final inspection providing the following is complied with:

3.6.3.1 The testing and associated OQE reflect the actual chemical and physical properties of the finished product (i.e., the material is not treated in any way following testing that would alter its mechanical properties).

3.6.3.2 Traceability to the base material OQE is maintained throughout the manufacturing process.

3.6.4 For items manufactured from Level I raw stock, testing need not be performed provided the requirements of paragraph 3.6.3.1 and 3.6.3.2 are complied with.

3.7 Nonconforming Level I Material

3.7.1 When Level I material is found to be incorrectly marked, tagged, or otherwise improperly identified, or does not comply with the requirements of this document or the applicable specifications or drawings, the material shall be placed in a hold or reject status and clearly identified (e.g., with tags) until the material is properly dispositioned. Upon determination that the material is nonconforming and unusable for Level I applications, the material shall be clearly identified as rejected and the MIC marking shall be removed or obliterated. For Government Furnished Material (GFM), this shall be performed only as authorized by the responsible Government representative. When it is suspected that other activities may have been supplied similarly deficient material, the user activity shall inform its designated Government representative or NAVSEA, who shall initiate or request corrective action from the cognizant activity (e.g., Navy Ships Parts Control Center, shipyard or SUPSHIP). Corrective action by the user activity shall include determining the cause and extent of the material error, searching out similar errors which might be reasonably expected based on the nature of the error

found, and, if directed by NAVSEA, identifying the location of all installed deficient material. If the error was caused by a vendor, the vendor shall be advised to take the necessary corrective action to prevent recurrence of the problem.

3.7.2 All waivers and deviations to the MIC requirements of this standard shall be processed in accordance with DOD-STD-480 or MIL-STD-481 or applicable contract requirements.

3.8 Upgrading Non-level Material

3.8.1 Upgrading non-level material to Level I, or procuring material with the intent to upgrade, is not permitted except in emergent situations where it is not possible to obtain certified Level I material in the time frame necessary to support ship schedules.

3.8.2 Upgrading shall be accomplished in accordance with the material verification requirements of Tables 3-1, 3-2 and 3-3 based on the starting condition of the material (homogeneous lot with OQE, homogeneous lot without OQE, or non-homogeneous material).

3.9 Installation of Level I Material

~~Note: For material intended for use within Submarine Safety Certification Boundaries additional testing and OQE may be required in accordance with NAVSEA 0924-062-0010.~~ ACN 1-3

3.9.1 New Material

3.9.1.1 At the time of or subsequent to installation of a piece of Level I material into a system subassembly or aboard ship, the permanent material designator markings, material type for fasteners, or grade/type for consumable material, inscribed on the piece of material shall be visually verified to be correct in accordance with the generic material requirements of the applicable drawing and/or NAVSEA approved departures and Engineering Changes. Disassembly of assembled components for this verification is not required or intended. MIC marking, when required, or some evidence of material acceptance (color coded fasteners) shall remain on each piece of material after installation, except ~~as allowed by paragraph 3.9.1.2~~ MIC markings subsequently covered over or obliterated (e.g., painted over, welded) need not be reapplied. Assemblies and subassemblies must be clearly identified to ensure that they are installed in their proper place in the ship. ACN 1-2

3.9.1.2 ~~An installation record shall be completed at the time of installation of Level I material into a subassembly or aboard ship, which indicates the location of the piece on the ship and the permanent Level I MIC marking of the piece. For consumable material, the material grade or type shall be recorded instead of a MIC marking, as applicable. A separate installation record is not required if existing manufacturing or fabrication records provide the above required information. Recording MIC markings on installation records must be done prior to performance of any fabrication step which will result in loss of identification markings. MIC markings subsequently covered over or obliterated (e.g., painted over, welded) need not be reapplied.~~ Installation Records: ACN 1-2

ACN 1-2

3.9.1.2.1 New Construction:

Shipbuilders shall maintain records for Level I material which document the end use of the material on the ship and the MIC number marked on the piece. This requirement may be met in accordance with paragraph 3.9.1.2.2 below or by the shipbuilder's quality program which generates records of manufacturing or fabrication, welding, quality control, material issue and process control.

3.9.1.2.2 Other than New Construction:

Records required by fabrication processes such as welding, brazing, mechanical joint assembly, etc. are acceptable Level I material installation records. When such documentation requirements do not exist, an installation record shall be completed at the time of installation of Level I material into a subassembly or aboard ship, which indicates the location of the piece on the ship and the permanent Level I MIC marking of the piece. For consumable material, the material grade or type shall be recorded instead of a MIC marking, as applicable. Recording MIC markings on installation records must be done prior to performance of any fabrication step which will result in loss of identification markings.

3.9.2 Existing Material

3.9.2.1 For previously installed material in a Level I system which is removed and is to be reinstalled, positive control and identification of the material shall be maintained from removal through reinstallation. The material shall be verified at the time of or subsequent to reinstallation to ensure that it is reinstalled in the correct location.

3.9.2.2 It is not required to verify or record as-received markings found on material to be reinstalled. However, if the material is obviously damaged or is identifiable as a generic material not compatible with the system application, disposition instructions for replacement or reinstallation shall be obtained.

3.10 Retention of Inspection Records

3.10.1 Records required by this document shall be retained as follows:

3.10.1.1 For submarine SUBSAFE applications, Level I records shall be maintained for the life of the ship. For all other application, Level I records shall be retained a minimum of seven years from the ship's delivery date for new construction or seven years from the availability completion date for repairs, overhauls, conversions, etc. Disposition instructions shall be requested at that time.

3.10.2 All records within the scope of this manual shall be maintained by installing and certifying activities and shall be made available for audit upon request. Forces afloat should make maximum use of existing records systems to record information required by this document. It is not intended that records generated or received by ships must be maintained on the ship. Storage of records ashore is acceptable.

3.10.3 Disposal of these records shall only be accomplished with the approval of NAVSEA.

TABLE 3-1. RECEIPT INSPECTION REQUIREMENTS FOR
LEVEL I MILL PRODUCTS AND LOOSE FASTENERS

MATERIAL CONDITION	VISUAL EXAMINATION	MATERIAL VERIFICATION TESTS		
		CHEMICAL COMPOSITION	MECHANICAL PROPERTIES	SEAMLESS TESTS FOR PIPE & TUBE
Homogeneous Lot with Objective Quality Evidence (OQE)	Each piece in Lot (100%) (See Note 1)	1. Generic test sample per Table 3-4, Col. A. 2. Semi-quantitative analysis one piece per lot	Tensile test one piece per lot. For internally threaded fasteners, proof load test one piece per lot in lieu of Tensile test (See Note 2.a.)	Test one piece per lot (See Note 4)
Homogeneous Lot without OQE (See Note 5)	Each piece in Lot (100%)	Quantitative analysis sample per Table 3-4, Col. A; (Col. B for fasteners) (See Note 6 for fasteners)	Tensile test sample per Table 3-4 Col. A (Col. B for fasteners) (See Note 2.b)	Test each Piece (100%) (See Note 4)
Non-homogeneous Material	Each piece (100%)	Quantitative analysis of each piece (See Note 6 for fasteners)	Tensile test each piece (100%) (See Note 2.b)	Test each piece (100%) (See Note 4)

TABLE 3-2. RECEIPT INSPECTION REQUIREMENTS FOR
LEVEL I ASSEMBLIES/FINISHED COMPONENTS

MATERIAL CONDITION	VISUAL EXAMINATION	MATERIAL VERIFICATION TESTS	
		CHEMICAL COMPOSITION	MECHANICAL PROPERTIES
Homogeneous Lot with Objective Quality Evidence (OQE)	Each piece in Lot (100%)	Generic test sample per Table 3-4, Col. A. Semi-quantitative analysis one piece per lot (See Note 10)	Test one piece per lot (See Note 3)
Homogeneous Lot without OQE (See Note 5)	Each piece in Lot (100%)	Quantitative analysis Sample per Table 3-4, Col. A (See Note 6)	Sample per Table 3-4 Col. A (See Note 6)
Non-homogeneous Material (See Note 7)	Each piece (100%)	Quantitative analysis of each piece (See Note 6)	Test each piece (100%) (See Note 6)

TABLE 3-3. RECEIPT INSPECTION REQUIREMENTS
FOR WELDING AND BRAZING FILLER MATERIALS

(BARE, COVERED, FLUX AND ALLOY COVERED ETC.)

MATERIAL CONDITION	VISUAL EXAMINATION	MATERIAL CHEMICAL COMPOSITION/ VERIFICATION TEST
Homogeneous Lot with Objective Quality Evidence (OQE) (See Note 8)	Each unit container (100%) (See Notes 1 and 11)	1. Perform quantitative analysis in accordance with material specifications on one sample from each lot. (See Note 9) 2. Perform generic testing on the lot using samples selected per Table 3-4, Col. A
Homogeneous Lot without Objective Quality Evidence (OQE) (See Notes 5 and 8)	Each unit container (100%) (See Note 11)	1. Perform all quality conformance tests required by the specification. 2. Perform generic testing on the lot using samples per Table 3-4, Col. A.
Non-homogeneous Material	Non-homogeneous welding or brazing filler material shall not be used in fabrication Level I piping systems or components.	

	NOTES FOR TABLE 3-1, 3-2, AND 3-3
NOTE	DESCRIPTION
1.	a. In accordance with applicable Table 3-1 through 3-3, check the identification marking (heat, lot, code, etc.) on assemblies and finished components or each piece of raw stock, or container of welding electrodes and filler material, to ensure that the marking provides traceability from the material received to the OQE. Do not disassemble items received in a homogeneous lot. b. Review the vendor's test and inspection reports provided with the material to ensure that they include all data required by the applicable material specification, drawing, or purchase order. Verify that the reported results for chemical composition and mechanical properties are in compliance with the material specification, as required.
2.	a. When tensile testing of fasteners is not possible based on size, configuration, or quantity required for end-use, a substitute test in accordance with ASTM F606 shall be performed. A hardness test may only be used as a substitute test if required by the applicable material specification and the above tests cannot be performed. In cases where the above substitute tests cannot be performed on fasteners or mill products without damage or destruction of the quantity required for end-use, the material shall be accepted based on OQE, as noted in the receipt inspection record. No waiver request is required. b. When tensile testing is not possible based on size or configuration, a substitute test (for fasteners see ASTM F606) shall be performed. In cases when the above tests cannot be performed for mill products and fasteners, waivers shall be processed in accordance with DOD-STD-480, MIL-STD-481, or applicable requirements and submitted to NAVSEA. Hardness test values should only be provided as supporting rationale if specified by the applicable material specification.
3.	For those materials having hardness values listed in material specifications, hardness testing shall be performed on the major pressure boundary part. Material that has no specified hardness value in the specification or that cannot be hardness tested due to size, configuration, material condition (e.g., surface finish) may be certified on the basis of OQE and local analysis.
4.	Seamless verification: For each lot of pipe or tube (ordered seamless), seamless verification shall be performed by the certifying activity in accordance with a local procedure.

	NOTES FOR TABLE 3-1, 3-2, AND 3-3 (CONT'D)
NOTE	DESCRIPTION
5.	a. The provisions of this note apply to special cases where lots of material, by virtue of a heat or similar traceability number marked on material, are considered to have homogeneity relative to their chemical composition and mechanical properties, where actual OQE is not available. b. In establishing a lot as homogeneous without the vendor's OQE, the certifying activity shall document the rationale used to determine that the material meets the criteria for homogeneity. c. The material shall be sorted by heat or similar traceability numbers marked on the material. If no markings exist, the material shall be determined to be non-homogeneous and controlled in accordance with the requirements of this standard. d. The grouping into one lot of all material under a given stock number, part number or other such identifier as a basis for establishing homogeneity is expressly prohibited.
6.	In cases where chemical analysis or mechanical property testing would result in destruction or damage to the assembly or component, the extent of testing shall be limited to testing for conformance to the procurement specifications as closely as possible without requiring destruction or damage to the material. Where required testing cannot be performed, a request for waiver shall be submitted in accordance with DOD-STD-480/MIL-STD-481, or applicable requirements.
7.	Components and assemblies comprised of more than one pressure boundary part (e.g., valve) shall be disassembled as necessary to conduct visual and material verification tests.
8.	The lot definition shall be in accordance with the applicable material specification.
9.	For covered welding electrodes or flux cored welding wire, the quantitative analysis shall be performed on a deposit of weld metal made with the sampled electrodes.
10.	Level I assemblies (excluding in-line unions and similar connectors) shall not be disassembled to perform receipt inspection or verification testing. For the purpose of performing material verification and assigning MIC numbers, a lot of assemblies is

	NOTES FOR TABLE 3-1, 3-2, AND 3-3 (CONT'D)
NOTE	DESCRIPTION
	defined as all assemblies with the same heat number for the major pressure boundary component received in a single shipment for a single purchase order line item. A log must be kept for each MIC number assigned to a lot of assemblies documenting the Level I components comprising the assembly, the heat numbers associated with each component, and the quantity of components from each heat. A semi-quantitative analysis and hardness test (see note 3) shall be performed on one major pressure boundary part in each lot. Generic testing is allowed if semi-quantitative analysis will cause destructive or damage to the item. All remaining accessible Level I parts of like configuration on assemblies within the sample (stems, bonnets, fasteners) shall be generically tested in accordance with Table 3-4, Col. A. For the purpose of material verification, components of in-line unions and similar connectors shall be grouped by like items and treated as finished components. Each part shall be marked with a MIC number.
11.	For hermetically sealed containers, the tests and inspections may be deferred until the container is opened for its intended use. The moisture content of the remaining electrodes in the open container(s) shall be maintained in accordance with the applicable material specification.

Table 3-4

SAMPLE PLANS

Samples shall be randomly drawn from each lot separately. The sample specimens shall be identified to show the lot from which they were drawn. Sampling shall be performed in accordance with Table 3-4. If one or more pieces of any sample do not conform to material composition specifications, none of the material in the lot shall be issued to the ship or placed in stock for issue. The entire lot shall be held for further inspection and testing or may be rejected (see paragraph 3.7). If the lot consists of fewer items than the required sample size, all items in the lot shall be inspected.

LOT SIZE (NOTE 1)	SAMPLE SIZE	
	COLUMN (See Note 2)	
	A	B
2 to 8	3	2
9 to 15	4	2
16 to 25	5	2
26 to 50	7	2
51 to 90	10	3
91 to 150	13	3
151 to 280	17	3
281 to 500	25	3
501 to 1,200	32	5
1,201 to 3,200	55	5
3,201 to 10,000	80	5
10,001 to 35,000	-	5
Over 35,000	-	8

ACN 1-1

NOTE 1 For generic testing of welding and brazing consumables, the lot size above shall be the total number of unit containers, packages, spools, etc. in the lot, and the sample size above shall be the number of electrodes, rods, rings, etc. to be generically tested. For hermetically sealed covered electrodes, select sample unit containers to permit taking no more than ten sample electrodes from any one unit container. For other filler materials, select each sample from a different unit container.

NOTE 2 For use of columns refer to Tables 3-1, 3-2, and 3-3.

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APPENDIX A

SYSTEMS REQUIRING LEVEL I
MATERIAL IDENTIFICATION AND CONTROL

1.1 Submarines Only

1.1.1 Air, ~~and~~ nitrogen and other gas systems, except oxygen and hydrogen, with ~~a~~ design pressures 1500 PSIG and ~~higher~~ above. Oxygen and hydrogen systems with a design pressure of 100 PSIG and above. ACN 1-3

1.1.2 Feedwater system with design pressure 600 PSIG and above.

1.1.3 Main steam system, and all branch piping from this system which is designed to the main steam system design pressure, up to and including the first valve downstream of pressure reducing valves and their by-pass valves. Included will be high pressure steam drains up to and including the first valve downstream of the trap or orifice.

1.1.4 Hydraulic systems for any steering or diving control surface, failure of which would cause loss of both the normal and emergency modes of operation for the control surface, except that internal wrenching bolts per MIL-B-7838 and NAS cap screws with NAS 1347, Type IV identification need not be to Level I requirements.

~~1.1.51.1.5 All sea water and sea connected systems or portions thereof, normally open the sea below 200 feet.~~

~~1.1.6 All sea water and sea connected systems which are normally closed below 200 feet, up to and including the inboard joint of the backup closure.~~

1.1.5 All circulating sea water systems (e.g., MSW, ASW, SSW) or portions thereof, continually open to the sea below 200 feet. ACN 1-5

1.1.5.1 The brine and seawater feed portion of the Distilling or Reverse Osmosis System which provides the through path of Shaft Seal Water to the Main or Auxiliary Sea Water System.

1.1.6 All sea water and sea connected systems or portions thereof, which are intermittently subject to submergence pressure below 200 ft and which are ithin the SUBSAFE Certification Boundary as defined by NAVSEA 0924-062-0010.

~~1.1.6 All sea water and sea connected systems which are normally closed below 200 feet, up to and including the inboard joint of the backup closure.~~

1.1.7 Torpedo, signal ejector/launcher and trash disposal unit tubes. Included are the breech and muzzle doors and associated piping system components installed between the breech and muzzle doors that form part of the pressure boundary up to and including the inboard joint of the backup closure.

~~1.1.8 Where applicable, specific systems within submarine safety certification boundaries as defined in sections 4.4, 4.5, and 4.6 of NAVSEA 0924-062-0010 and detailed in the applicable Material Control Boundary Book or Quality Assurance List.~~ ACN 1-3

1.2 Surface Ships Only

1.2.1 All Surface Ships

1.2.1.1 Gaseous oxygen systems above 100 PSIG design pressure except for both the diver's recompression chamber and the divers surface supplied oxygen systems, which are excluded from Level I unless specifically invoked by NAVSEA in writing.

ACN 1-4

1.2.1.2 ~~Liquid oxygen and liquid nitrogen (02N2) piping from the 02N2 plant producer to the storage tanks and from the storage tanks to the fill stations including storage tank vents and drains. Liquid 02N2 overboard drain piping from the plant equipment and all deck drains from the 02N2 plant, storage, pump and fill room/spaces to the overboard connections.~~ Gaseous oxygen (02) piping from the 02N2 producer plant, storage tanks and fill station above 100 PSIG design pressure, including low pressure gaseous oxygen vent piping which is or can be cross-connected with high pressure gaseous oxygen piping.

1.2.2 Fossil Fuel Powered Ships

ACN 1-1

1.2.2.1 Main steam and catapult steam systems and all branch piping designed for temperatures above 775°F. Included will be high pressure steam drains up to and including the ~~first~~ last valve downstream of the trap or orifice designed for temperatures above 775°F.

1.2.3 Nuclear Power Ships

1.2.3.1 Feed systems with design pressure 600 PSIG and above.

ACN 1-1

1.2.3.2 Main steam, catapult steam (including the trough heating system), and reboiler systems, and all branch piping connected to these systems designed for main steam system design pressure. Included will be high pressure steam drains up to and including the ~~first~~ last valve downstream of the trap or orifice designed for main steam system design pressure.

1.3 Both Submarine and Surface Ship Requirements

1.3.1 The above Level I boundary requirements apply to new construction, repairs, modifications, alterations and conversions for all submarines and surface ships regardless of the material identification and control requirements invoked, or not invoked, by the original shipbuilding specifications and/or system diagrams and component drawings. It is not the intent to remove non-level I material solely for the purpose of installing Level I material. Level I material shall be installed in new Level I systems or components or when replacing material incident to the repair or refurbishment of a Level I system component(s).

ACN 1-1

1.4 Level I Designated Systems

Cognizant NAVSEA technical codes are responsible for determining any additional scope and boundary of individual systems, including the components and parts of components, that are to be controlled as Level I material.

APPENDIX B

LEVEL I COMPONENTS

1.1 Pressure Boundary Parts - Pressure Boundary parts of components within Level I systems shall be controlled. Level I pressure boundary parts include piping, tubing and the following:

1.1.1 Bodies. In general, these are the parts of a component that are the pressure boundaries of the component, including end connections. Examples are:

1.1.1.1 Valve bodies.

1.1.1.2 Strainer bodies.

1.1.1.3 Cylinders (flasks, reservoirs, etc.)

1.1.1.4 Pipe fittings (elbows, tees, couplings, union assemblies, separately furnished union tail-pieces, etc.)

1.1.1.5 Trap bodies (housings).

1.1.1.6 Orifice plates.

1.1.2 Covers. In general, these are component parts which act as pressure boundaries for the bodies listed above and other items. Examples are:

1.1.2.1 Valve bonnets.

1.1.2.2 Valve caps.

1.1.2.3 Strainer caps.

1.1.2.4 Closure plates for cylinders.

1.1.2.5 Oxygen and nitrogen valve cartridges.

1.1.3 Plugs. All plugs, including submarine zinc anode plugs, set screws, adjusting screws and vent and drain plugs which form a part of the Level I pressure boundary, or otherwise opened to the sea below 200 feet.

1.1.4 Fasteners. Bolts, nuts, studs, stud-bolts, and screws used when joining two pressure boundary parts. All hull integrity fasteners shall be Level I. Fasteners used for joining non-Level I machinery or equipment to Level I material shall be Level I when the component is located within the Level I boundary.

1.1.5 Extension Pieces. In general, these are branch systems connecting to "bodies" and "covers" which are subject to piping system pressures and temperatures and in many cases are furnished with end-connections for installing into either main or branch system piping. Examples are:

1.1.5.1 Blowdown or drain nipples (e.g., pipe, including pipe fittings or flanges).

1.1.5.2 Union tail-pieces when part of a component end connection (including flange union connections).

1.1.5.3 Separate bosses (attached to "bodies" or "covers" and providing connections for external piping).

1.1.6 Miscellaneous

ACN 1-3

1.1.6.1 ~~Where applicable, specific components and related parts within submarine safety certification boundaries as defined in sections 4.4, 4.5, and 4.6 of NAVSEA 0924-062-0010 and detailed in the applicable Material Control Boundary Book or Quality Assurance List.~~ Portions of submarine pressure hull penetrations, excluding hull structure items, which isolate seawater from the submarine atmosphere. Examples of hull penetrations are: hull fittings (electrical and fiber optic), rodmeters, periscopes and periscope hoist cylinders, radar masts and antennas, main propulsion shaft seal housings, floating wire and towed array shear valve assemblies, lubrication distribution valves.

1.1.6.2 Brazing alloys and welding filler metals, including consumable inserts.

1.1.6.3 Union nuts (both bonnets and end-connection unions).

1.1.6.4 Hose assembly end fittings and the nipple, flange, and body of sound isolation couplings (e.g., rubber insert sound isolation couplings (RISIC)) which form a part of the pressure boundary.

ACN 1-1

1.1.6.5 ~~Level I valves for sea water and sea connected systems shall have Level I internals (i.e., balls, discs, seat rings, flappers, poppets, bushings and any other metallic pressure containing internal parts) when they are the last valve that could isolate sea water from the submarine atmosphere or a portion of the system not designed to withstand test depth pressure. All submarine hull and backup valve internal metallic pressure containing parts shall be Level I.~~ All submarine seawater or sea connected hull and backup valve internal metallic pressure containing parts that serve to directly isolate seawater from the atmosphere or downstream connected system(s) (e.g., balls, disks, flappers, and poppets).

ACN 1-1

1.1.6.6 Valve stems which penetrate the pressure boundary ~~in such a manner that failure of the stem will allow direct influx of the system fluid into the ship~~.

1.1.6.7 Oxygen charging lines and assemblies.

1.1.6.8 In-line instrumentation components and parts:

INSTRUMENTS	LEVEL I PARTS
Temperature	Thermowell (Welded and Flanged Bare Bulb)
Flow	Meter Casing
Liquid Level	Tank Penetration Fitting
Pressure	Root Valve of Pressure Instrument Piping
Gage Column (MIL-I-20037)	Isolation Valve

1.1.6.9 Propulsion shafts for submarines

1.1.6.10 Through hull operating shafts ~~2" diameter and larger~~ for submarines. ACN 1-3

1.1.6.11 ~~Repair parts for the components listed in Appendix B, Section 2.1.9 (and in Level I systems as defined in Appendix A) which are subject to material mix up due to similarities in form, fit and function (fasteners are a prime example), and which satisfy the above description of a Level I pressure boundary part.~~ Fasteners and plugs replaced on the assemblies identified in Appendix B, Section 2.1.9 which satisfy the above description of a Level I pressure boundary part. The applicable repair parts drawings and provisioning documents are to be marked for Level I Control. ACN 1-3

2.1 Exclusions. Items and components specifically excluded from the classification of Level I are:

2.1.1 Packing gland~~s~~ assemblies located in the systems and their components identified in Appendix A of this document and stuffing boxes. This includes their associated flanges, fasteners, ~~(~~followers and retainers~~, integral, flanged or separate)~~. ACN 1-1

2.1.2 Pressure seal rings, gaskets, "O" rings, packing and similar sealing members used in conjunction with joining two pressure boundary parts.

2.1.3 Silver braze flux.

2.1.4 Flexible hoses and rubber insert sound isolation coupling (RISIC) rubber elements.

2.1.5 Gages, gage valves, pressure indicators, measuring instruments, and their associated piping installed downstream of root valves in instrumentation piping or that which does not form a part of the pressure boundary.

~~2.1.6 Pipe, fittings, etc., continuously open to atmosphere (e.g., open-ended vents and drains) except O2N2 piping described in paragraph 1.2.1.2 of Appendix A.~~ ACN 1-5

ACN 1-5

2.1.6 Pipes, fittings, Mufflers and Quiet Pressure Release Devices (QPDRs) for the HP Air System, etc., continuously open to ambient conditions and only transiently subjected to pressures in excess of Appendix A criteria (e.g., open-ended ballast tank piping outboard of the pressure hull penetration, open-ended vents and drains).

2.1.7 Valve yokes and bonnet retainers restrained by the body inside diameter that do not directly form the pressure boundary but retain parts that do form the pressure boundary, unless otherwise specified.

2.1.8 Items not permanently installed (portable) and designated only for dockside use.

ACN 1-3
ACN 1-6

2.1.9 Pumps, distilling plants, compressors, heat exchangers, oxygen generators, steam turbines, condensers, hydraulic accumulators and dehydrators. ~~, except when specifically included by paragraph 1.1.6.1 of this appendix~~.

2.1.10 Washers.

2.1.11 Valve stem retaining nuts that do not come in direct contact with system fluid and serve no other function than to retain the stem.

ACN 1-1

2.1.12 Valve seat retainers and other internal parts that are totally enclosed within the pressure boundary except for those parts described in paragraph 1.1.6.5 of this appendix.

ACN 1-3

2.1.13 Non-consumable weld backing rings.

ACN 1-3

2.1.14 Piping system sleeves.

APPENDIX C

FASTENERS

1.1 Procurement of Fasteners

All fasteners to be used in Level I or submarine hull integrity applications shall be procured in accordance with MIL-S-1222 or as otherwise approved by NAVSEA. (e.g., NAVSEA approved drawing, NAVSEA Technical Manual, etc.).

1.2 Fastener Identification and Control

1.2.1 All Level I fasteners, 1/2 inch nominal diameter and larger, and all hull integrity fasteners regardless of size shall be marked as specified in Table C-1 with the kind of material, manufacturer's trademark or symbol, and traceability number (i.e., heat number, heat-treat number, and/or lot number, as applicable - see Appendix F, paragraph 1.8). All Level I fasteners less than 1/2 inch nominal diameter (excluding hull integrity) shall be marked in accordance with Appendix D, paragraph 1.4.4. Such markings shall be maintained on the fasteners through installation.

1.3 Fastener Color Coding

1.3.1 Level I fasteners marked by the manufacturer in accordance with the applicable specification shall be color coded after acceptance, as specified in Table C-1. Markings required by Table C-1 shall remain legible following color coding.

1.3.2 Material verification of loose (i.e., uninstalled) fasteners shall be performed in accordance with Table 3-1, Section 3, to assure compliance with the applicable specification requirements. All loose Level I fasteners shall be color coded in accordance with Table C-1 after satisfactory completion of the required material verification tests.

1.3.3 Color coding is not necessary for fasteners supplied as part of assemblies or for fasteners MIC marked in accordance with paragraph 1.5 of Appendix D.

SEE NEXT PAGE FOR FASTENER COLOR
CODING CHART, TABLE C-1

TABLE C-1 FASTENER COLOR CODING CHART

Material Type, Specification (Note 1)	Grade, Class, Condition	Marking	Color
Carbon or Alloy Steels MIL-S-1222	Nuts Grades 2H, 4 or 7	2H, 4 or 7 Vendor symbol Lot No.	Blue (NSN 8010-00-721-9746 or equal)
	Externally Threaded Fasteners Grades B-7, B-16 or 4340	B-7, B-16 or 4340 Vendor Symbol Lot No.	
Nickel C opper MIL-S-1222 (Note 2)	Grade 400	NC or NICU Vendor Symbol Lot No.	Green (NSN 8010-00-141-2951 or equal)
	Grade 405	NC-R or NICU-R Vendor Symbol Lot No.	
Nickel Copper Aluminum MIL-S-1222	Grade 500 AH Annealed 20% Min. Elongation	·K· Vendor Symbol Lot No.	Pink (NSN 8010-00-584-3155 or equal)
Nickel-Chromium-Molybdenum-Columbium Alloy (UNS N06625) MIL-S-1222	Grade 625 Annealed	625 Vendor Symbol Lot No.	Brown (NSN 8010-00-721-9742 or equal)

TABLE C-1 FASTENER COLOR CODING CHART (CONT'D)

Material Type, Specification (Note 1)	Grade, Class, Condition	Marking	Color
Other Materials/Types		Per Specification Vendor Symbol Lot No.	Orange (NSN 8010-00584-3148 or equal)

Notes:
1. FF-S-86 is an acceptable alternate specification for socket head cap screws
2. For self locking nuts, use MS-17828 and MIL-N-25027

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APPENDIX D

MATERIAL IDENTIFICATION AND CONTROL (MIC) MARKING

1.1 Marking Requirements

1.1.1 Material Identification and Control (MIC) markings are to be applied to the material only by those activities that have been authorized by NAVSEA and issued a Level I Certifying Activity Designator (CAD); except as allowed by paragraph 1.4 of Appendix E.

1.1.2 The MIC marking is in addition to the marking required by the applicable material specification, drawing, or procurement document.

1.1.3 Excluding fasteners, any manufacturer's markings that are removed during receipt inspection testing or production processes need not be maintained or restored after MIC marking has been applied. Markings (manufacturers) on fasteners shall be maintained in accordance with paragraph 1.3 below.

1.1.4 MIC marking is required on all parts that are designated Level I, except for fasteners (See Appendix C) and those items noted in paragraphs 1.4.5 and 1.4.6 of this appendix. Disassembly of a component shall not be performed for marking purposes (See paragraph 1.4.1 of this appendix). Additional marking, such as drawing piece number, etc., is optional.

1.1.5 A unique MIC marking shall be assigned for each homogeneous lot of material received. For non-homogeneous lots each piece or each assembly as applicable shall receive a unique MIC marking. Each accessible pressure boundary part of an assembly shall be marked with identical MIC markings upon receipt acceptance. The material designator portion of the MIC mark must correctly identify the material of the part marked. (See Appendix F for definition of homogeneous lot).

1.1.6 For the purpose of assigning MIC numbers to assemblies on a lot basis, a lot shall consist of those assemblies whose major pressure boundary part is of the same homogeneous lot.

1.2 Purpose of Marking

1.2.1 The purposes of MIC marking are:

1.2.1.1 To denote that Level I material has been inspected, verified, and accepted.

1.2.1.2 To provide a means of verifying the material in hand by comparing it to the applicable drawings, plans, ordering requirements, and installing documents.

1.2.1.3 To provide traceability from installed material to OQE.

1.2.1.4 To preclude complete re-inspection of material previously accepted by a NAVSEA approved activity.

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1.3 Continuity of MIC Markings and Fastener Markings

1.3.1 Marking that will be removed by a manufacturing, fabrication, or maintenance process shall be recorded prior to removal and immediately restored upon completion of the process. Responsibility shall be assigned for transfer and reapplication of marking. ~~For items manufactured to component or product specifications or drawings from raw stock, a new MIC number shall be assigned and applied in accordance with paragraph 3.6.2 (page 6) in lieu of reapplication of the raw stock MIC number.~~ Retesting of such material is not required if traceability is maintained to OQE attesting to actual chemical and mechanical property values of the end product. See ~~page 6, P~~paragraph 3.6.3.

1.3.2 When material is to be cut into multiple pieces or otherwise processed, all pieces shall be marked prior to cutting or processing. If this cannot be done or is impractical, the marking shall be added immediately after the cutting or processing operation or the appropriate material control procedure (such as bag and tag, tagging, and/or tote box control) must be employed, provided the material proceeds directly to the next manufacturing station. The material that is to be stored after the cutting operation must be marked prior to cutting, if practical, or immediately after the cutting operation.

1.3.3 Prior to restoring permanent marking on a piece from which material identification marking has been inadvertently removed or separated, a generic material identification check shall be performed on the piece to verify its correct identity. This check is only required on one piece if all pieces are of the same size, configuration and lot of material and are manufactured at the same time in accordance with a single work instruction.

1.4 Marking Method

1.4.1 Marking shall be applied in accordance with MIL-STD-792 and as stated herein. An alternate marking method is permissable provided it is an available option in the applicable specification or drawing. For items which cannot be marked without disassembly, oxygen clean items, welding and brazing filler material, plated parts, or hardened material (where the material finish condition precludes permanent marking), the marking information shall be on a tag or other temporary marking attached to each package, container, can, etc., up to installation. For thin wall material which might be damaged by permanent marking methods, temporary methods are permitted per MIL-STD-792 provided an installation record documents the marking.

1.4.2 Marking shall be legible.

1.4.3 Marking shall be located so as not to affect the form, fit, or function of the item and, whenever possible, should be visible following assembly or installation.

1.4.4 Marking shall be permanent whenever the type, size, and condition of material permits, except as stated in this appendix. If all of the marking on the item cannot be applied due to space limitations, the permanent marking shall be applied using the following order of precedence (abbreviations are permitted):

MANUFACTURER's MARKING-FASTENERS	MIC MARKING-NON-FASTENERS
(a) The kind of material. (mandatory)	(a) The kind of material (unless already correctly provided).
(b) The manufacturer's name, trademark or symbol.	(b) Level I Certifying Activity Designator (CAD)
(c) The traceability code number.	(c) The traceability number.

1.4.5 Permanent marking is not required for small, unassembled items whose type or condition preclude the use of permanent markings. However, such items shall be identified as follows:

1.4.5.1 Package or segregate small, unassembled items by homogeneous lot and label the package with the required marking.

1.4.5.2 All marking on labels shall be done with a substance that will not be obliterated by water, oil, sunlight, grease, etc. If material is packaged in see-through bags, the labels should be placed inside the bags. When labels are placed on the outside of material or packages, they shall be of a type that will remain attached during normal handling.

1.4.5.3 When issuing small quantities from a defined lot; small, unassembled items shall be repackaged with the required marking on an envelope, tag, label or tape, unless being removed from the package for immediate installation. This includes items that are maintained separately as stock or in a bin, etc.

1.4.6 Permanent marking is not required for small or inaccessible items which are required to be Level I and are included as part of the pressure boundary of a completed assembly. Certification statements relating these items and their OQE shall be provided and included in the records for the completed assembly.

1.4.7 Marking of materials, except fasteners, shall be as stated in paragraph 1.5 below. Fasteners shall be marked and controlled as stated in Appendix C.

1.4.8 Volume II of this document, the NAVSEA Material Designator Catalog, shall be used to assign material designators. Only those materials that are normally used in Level I applications will be assigned material designators. Volume II contains specific instructions for applying for a material designator when not listed in the catalog. Contractors shall make their requests via the cognizant government representative assigned to their activity.

1.4.8.1 Naval Sea Systems Command is responsible for administering the Material Designator Catalog.

1.5 Standard Marking System

1.5.1 The material control marking shall be as follows:

FIRST GROUP	SECOND GROUP	THIRD GROUP
ST or STG	87041-001	P

1.5.1.1 The first group of alpha identifiers shall be a two or three letter generic material designator. The purpose of this designator is to assure installation of correct generic material. Accordingly, two or three letter designators are required to maximize simplicity. Any instances where it is considered necessary to use more than three letter designators to assure a specific material attribute (e.g., heat treatment) shall be referred to NAVSEA for approval in writing and be incorporated into Volume II.

1.5.1.2 The second group of numeric identifiers shall be the traceability number. It consists of the last two digits of the year, Julian calendar date of inspection, a hyphen, and an assigned lot number (three-digit maximum). These identifiers provide traceability to records and data generated by the Material Control System required by this standard.

Note: The hyphen may be omitted due to space limitations.

1.5.1.3 The third group of alpha/numeric identifiers shall consist of the NAVSEA approved Level I CAD. This identifies the inspection activity responsible for the inspection, verification, acceptance and retention of the certification documentation for the Level I material.

1.5.1.4 Marking may be provided on two lines or in a vertical format where a single line format is not practicable.

1.6 Certified Activity Designator (CAD)

1.6.1 The Level I CAD completes the MIC marking and, when applied, designates acceptance of material for use. The Level I CAD shall not be marked on material until the material has been completely verified and accepted. The Level I CAD shall be applied only by those activities approved by NAVSEA. The Level I CAD shall not be delegated to subcontractors, suppliers, distributors or other activities, unless approved by NAVSEA.

1.6.2 Each certification activity must have documented procedures, adequate facilities and capable personnel. The personnel shall be trained (see paragraph 2.2.2, page 2) and have demonstrated ability to comply with the requirements of this document. After the activity's Level I program is determined acceptable by the Supervising Authority (Naval shipyards, SUPSHIPs, Type Commanders), NAVSEA shall assign an alpha or alpha/numeric Level I CAD. Unsatisfactory performance by certifying activities or noncompliance with the requirements of this standard (to the extent that Level I material certified by the respective activity is suspect) shall result in withdrawal of the Level I CAD approval by NAVSEA.

1.6.3 NAVSEA field activities and other Navy activities requiring a Level I CAD shall contact NAVSEA. Private shipyards shall make requests for the Level CAD via the cognizant Government representative assigned to their activity who, in turn, will contact NAVSEA. Fleet activities shall contact their respective Fleet Commander concerning the implementation of the requirements of this standard.

1.6.4 Administering Level I CADs is the responsibility of NAVSEA. For information regarding the NAVSEA policy for acquiring a Level I CAD and activities authorized to certify Level I material, contact NAVSEA or other NAVSEA authorized Government activity. A comprehensive listing of all activities authorized to certify Level I material is periodically updated and distributed by NAVSEA. For material within SUBSAFE system and component boundaries, as defined by NAVSEA 0924-062-0010, only the certifying activities designated ~~in Section 3.4~~ therein are authorized to certify materials for another activity's use.

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1.6.5 Following is a list of the most common CADs encountered and the applicable certifying activity:

Certifying Activity	CAD
Charleston Naval Shipyard	C
Long Beach Naval Shipyard	L
Mare Island Naval Shipyard	MS
Norfolk Naval Shipyard	N
Pearl Harbor Naval Shipyard	P
Philadelphia Naval Shipyard	H
Portsmouth Naval Shipyard	A
Puget Sound Naval Shipyard	S
Avondale Shipbuilding	E
General Dynamics (Electric Boat)	G
Ingalls Shipbuilding	M
Bath Iron Works	W
Newport News Shipbuilding	NN
Naval Weapons Station Yorktown	YT

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APPENDIX E

ACQUISITION OF LEVEL I MATERIAL

1.1 Control of Manufacturers of Level I Components

1.1.1 Procurement documents for Level I material shall include and invoke the applicable requirements of this standard on manufacturers and suppliers.

1.1.2 Manufacturers of Level I components shall be required by the shipbuilder, shipyard or procuring activity to have an effective quality system in operation that complies with the requirements of MIL-I-45208 or MIL-Q-9858, as applicable. Quality assurance programs shall be established and maintained to assure that these manufacturers have effective systems for controlling Level I material. The system utilized must assure that the OQE is established and controlled in accordance with the requirements of this document. Special quality provisions along with the applicable specifications and/or drawing requirements shall be included in the purchase order.

1.2 Ordering Data for Level I Material

1.2.1 Material markings shall be traceable to the OQE provided with the Level I material. The method of marking shall be controlled in accordance with Appendix D.

1.2.2 Procuring activities shall include in contracts and ordering data the minimum requirements of this document to be invoked on the vendor, supplier, or manufacturer. The development, control and delivery of OQE shall be described by the procuring activity in written procedures which comply with the requirements of this standard. Such procedures shall be provided to suppliers as an addendum to procurement contracts which involve Level I material. Traceability to chemical composition and mechanical properties shall be established for each piece of material designated as Level I. The vendor shall furnish quantitative certification data for each homogeneous lot of material supplied attesting to chemical composition and mechanical properties. Such data shall be reported in accordance with Data Item Description DI-MISC-80705 as required by federal acquisition regulations for government contracts or in accordance with the purchase document where not required by these regulations and for non-government procuring activities. The certification data report shall be identified through a unique traceability number, heat-lot number, or heat-treat number, as applicable, which shall also be marked on the material. This traceability number marked on the material shall provide direct traceability to the material's chemical composition and mechanical properties certification data.

1.2.2.1 Material certification data shall be recorded on the testing company's letterhead and shall bear the name, title and signature of the authorized company representative. The name and title shall be clearly legible. Certification data supplied to the government shall be either the original mill material certification, the original copy from the testing facility, or exact photocopies of these documents. The data forwarded by the manufacturer shall contain a signed certification that the reported results represent the actual attributes of the material furnished and indicate full compliance with all applicable specification and contract requirements.

Statements on material certification documents must be positive and unqualified. Words such as "to the best of our knowledge" or "we believe the information contained herein is true" are not acceptable.

1.2.2.2 If the starting material or raw stock is processed in a manner that will not affect it's chemical composition or mechanical properties, the original certifications for the chemical composition and mechanical properties, as required by the material specification, is acceptable. Re-certification of the mechanical properties is required if a metal working process is used during fabrication that alters the original properties of the material (e.g., heat treating or forming). In these instances, the mechanical properties of the material must be re-determined and documented to reflect the altered condition. The altered material shall be uniquely re-identified. The mechanical properties thus determined and documented, are required for final certification and shall conform to the material/procurement specification or purchase order requirements. Additionally, the original certification for chemical composition shall be annotated with the unique traceability marking used with the altered material (see para 1.2.2.5 below). Alternately, altered mechanical properties may be certified by a testing facility or laboratory and reported in accordance with paragraph 1.2.2.1 of this appendix. The altered mechanical properties report must be maintained with the chemical composition certification data.

1.2.2.3 In cases of foreign certification, conversion of foreign language units of measure into U.S. units of measure shall be annotated on the furnished foreign certifications, if space permits, or placed on an addendum in the same format as the foreign certification data. Such conversion shall be identified as to origin with name, title and signature of the authorized representative of the company making the conversion.

1.2.2.4 The certification data requirements contained in this appendix shall be invoked on the prime contractor who shall delegate these requirements to all sub-tier vendors supplying Level I material.

1.2.2.5 When the mechanical properties are altered, the original certification data report shall be overstamped and/or annotated to contain the following information:

Traceability No.
(marking on finished item)

is fabricated from raw material.

Heat No. _____ and

Heat-Treat No.
when applicable

_____ Date
(Name and Signature of Auth Co. Rep)

NOTE: When applying an overstamp or annotation to the certification data report, no pertinent data shall be obliterated or rendered illegible.

1.3 Except for fasteners (see Appendix C), the MIC mark shall be the only material marking that denotes a ready-for-use condition. Manufacturer's identification markings required by applicable specifications or drawings may be used to supplement material identification, but shall not be used in lieu of MIC marking to denote ready-for-use material.

1.4 When shipbuilder and/or NAVSEA field activities procure Level I material, the material designator, traceable serial number, and the CAD shall normally be applied to the material at the time of acceptance by the NAVSEA authorized certifying activity. When an approved certifying activity elects to have the material marking requirements of this document applied to material by the supplier at time of manufacture, the NAVSEA authorized certifying activity must preassign and validate the material designator and traceable serial numbers. In doing so, the certifying activity assumes full responsibility for the correctness of the material at the time of the application of the material designator and traceable serial numbers. However, under no circumstances shall the remaining part of the MIC number be applied until the material has been receipt inspected in accordance with Section 3.3 (page 4). Activities certifying Level I material whose CAD appears on the material shall be responsible for and must maintain the OQE on file at their activity. Departure from these requirements for applying Level I MIC numbers requires waiver approval from NAVSEA.

2.1 Control of Vendors

2.1.1 Activities shall perform periodic product-oriented technical visits or surveys of vendors from whom they procure Level I material. Each visit shall include, as a minimum, to review the vendor's material identification and control system and to ensure compliance with the applicable portions of MIL-I-45208 or MIL-Q-9858. The visiting activity shall follow-up or have the Defense Contract Administration Services (DCAS) follow-up on vendor corrective actions to ensure system deficiencies are corrected. In order to avoid unnecessary duplication of effort, visiting government activities shall send reports of these visits to the Navy Material Quality Assessment Office (NMQAO) for distribution or input into their data base per NAVSEAINST 4355.2. Private activities may also, at their option, participate in this exchange of information. The need to perform a visit to a vendor and the frequency of visits shall be based on the vendor's quality assurance history as measured by reports of previous vendor visits and the quality of previous material supplied by that vendor. Vendor visits by joining activity teams are encouraged. Arrangements for joint visits are the responsibility of the participating activities.

2.1.2 Activities shall have a vendor evaluation program, utilizing available inspection and defect data. Feedback from this program shall be used in the vendor selection process.

3.1 Government Source Inspection of Level I Material

3.1.1 NAVSEA field activities shall invoke Government Source Inspection (GSI) when procuring Level I materials.

3.1.2 Private shipbuilders and contractors procuring Level I material shall perform source inspection or periodic product oriented technical surveys to ensure adequate vendor controls.

3.1.3 Supervisors of shipbuilding conversion and repair shall use the criteria identified in Chapter 8-4 of the Ship Acquisition Contract Administration Manual or Chapter 12-4 of the Ship Repair Contracting Manual to invoke GSI at the subcontractor level.

3.1.4 Quality Assurance Letters of Instruction (QALIs) to the Contract Administration Services (CAS) offices for Product Verification Inspection (PVI) shall be prepared when specific government quality actions at source are considered necessary or as required by higher authority. QALIs cannot impose more stringent quality requirements than are included in the contract. QALIs are to include:

3.1.4.1 Specific inspection actions to be accomplished by CAS (e.g., selected characteristics from specifications, tests or inspections to be witnessed).

3.1.4.2 Description on how the inspection action is to be performed (e.g., perform or physically accomplish test, witness or observe suppliers' performance, verify or review suppliers' documented evidence).

3.1.4.3 Identification of the amount of inspection (sampling or 100% inspection).

3.1.4.4 Use of the Master List Inspection Attributes contained in NAVSEAINST 4355.2 for each specific inspection included in the letter of instruction to permit CAS inspection data to be inserted into the NAVSEA Unified Vendor Evaluation Program (NUVEP) data bank.

3.1.4.5 Requests for CAS offices to notify the shipyard or purchasing activity of the results of the PVIs or provide a statement that the results of the PVIs have been satisfactorily completed and are properly documented.

3.1.4.6 Requirements for CAS offices to acknowledge receipt of PVI requirements.

APPENDIX F

DEFINITIONS

1. The following definitions apply for Level I material identification and control (MIC):

1.1 Activity

Any organization, Government or private, that procures, accepts, or utilizes Level I material in the construction, overhaul, or repair of U.S. Naval ships.

1.2 Certification

Declaration by a certifying activity that receipt inspection and verification test results of the material are acceptable and within specified limits based on comparison with a standard.

1.3 Certifying Activity Designator (CAD)

An alpha or alpha/numerical designation assigned by NAVSEA to NAVSEA field activities, shipbuilders, Master Ship Repair and Commercial Industrial Services Contractors and others which authorizes these activities to certify Level I material for Navy use during ship construction, overhaul, or repair.

1.4 Chemical Composition

The constituent elements and their percentages that make a compound alloy.

1.5 Contractor

Any organization that furnishes material or services in accordance with an issued purchase document. This is not to include private shipyards, ship repair or overhaul activities. Wherever this word appears in this standard, it shall be considered synonymous with the word "vendor".

1.6 Fasteners

Male and female threaded type items such as bolts, socket head cap screws, studs, bolt studs and nuts.

1.7 Generic Material Verification/Generic Testing

A broad identification of materials by alloy families using simple, direct and rapid analysis methods or a combination of methods (e.g., color, magnetic properties test, acid spot tests, and metal comparator tests). These tests are designed for simple screening and identification of materials by alloy family (as opposed to classification of specific alloys within a family).

1.8 Heat Number

The numeric or alpha/numeric designator assigned to material produced in a common batch or under a continuous pour process by the activity that produces the material.

1.9 Heat Treat Number

The numeric or alpha/numeric designator assigned to material when a process (i.e., heat-treatment, hot forged, extrusion, etc.) alters the original mill source mechanical properties of the material.

1.10 Homogenous Lot

A group of like items that are produced in a common heat or batch, or are produced under continuous cast or pour process with the same vendor traceability numbers, are of the same nominal size, and are received in a single shipment. For batch or continuous cast/pour processes, samples for chemical and mechanical properties shall be taken no less than once in every eight hours of operation. If additional production processes are utilized that alter the mechanical properties of the material (e.g., heat-treat, cold or hot forge, extrusion), then all items of the same "Heat" number and additionally processed under the same conditions at the same time shall be considered as a homogeneous lot.

1.11 Identification

The ability to show the required characteristics of a material.

1.12 Material Composition

The composition and mechanical properties (see definitions 1.4 and 1.14) of an alloy as prescribed in the applicable specification, drawing, or procurement document.

1.13 Material Designator

A group of alpha identifiers (two or more letters) which represent a specific material or material type. The first two letters of the material designator indicates the generic material grouping and the last one or two letters identify the specific alloy and/or condition.

1.14 Mechanical Properties

The properties of a material that influence its strength and elastic behavior when force is applied, thereby indicating its suitability for mechanical applications (e.g., tensile or yield strength, elongation, hardness, etc.)

1.15 Mill Products

Various forms of raw stock (i.e., bar, rod, plate, sheet, pipe, etc.) that normally require further fabrication.

1.16 Non-Homogeneous Lot

A group of items that are not produced in a common heat or batch, or not produced under continuous pour or cast process, and do not have the same traceable markings.

1.17 Objective Quality Evidence (OQE)

Within the context of this document, objective quality evidence (OQE) refers to quantitative and qualitative data of all mechanical, chemical, and performance tests performed (as required by the applicable specification, drawing, or purchase document) to prove that the material supplied conforms to the specified requirements.

1.18 Procurement Document

A written agreement for the procurement of supplies or services that describes what is to be supplied and what requirements are to be met.

1.19 Quantitative Chemical Analysis

Assuring conformance to procurement or specification requirements by the determination of the exact concentration of all constituent elements present in a material based on the applicable specification requirements.

1.20 Segregated Material

Material that is kept separate from other material based on a specified condition or attribute.

1.21 Semi-Quantitative Analysis

The resolution of alloys by analysis methods (such as the emission spectrograph of X-ray spectrometer) designed to determine the approximate concentration of the alloy characterizing elements present, thereby, assuring conformance with the material procurement document.

1.22 Small Items

Items that have a marking surface areas less than 3/8 inches square.

1.23 Supervising Authority

The officer designated by the Commander Naval Sea Systems Command to represent the Navy Department at a shipyard; normally, a Supervisor of Shipbuilding or the Commander of a Naval Shipyard. For the fleet, this designated officer is the Type Commander.

1.24 Traceability

A positive means of identifying material to its OQE.

1.25 Verification

An examination performed to determine compliance with a specific requirement.

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