NOTE: Changes to this document require the new document revision to be uploaded to the TDGO website, www.teledynemarine.com/dgo, to replace the obsolete version located under the SUPPLIERS Tab.

1.0 PURPOSE

The purpose of this document is to define Teledyne DGO (TDGO) Purchase Order Quality Assurance (QA) clause requirements when procuring outside services, purchased commodities and/or custom fabricated machined parts.

2.0 POLICY

2.1 Required certifications and test data shall accompany shipments of material.

2.2 Shipments will not be accepted by TDGO without compliance to quality control requirements as noted on the Purchase Order (PO).

2.3 Suppliers are required to flow down TDGO Purchase Order QA clause requirements to its sub-tier suppliers, who must also comply with the requirements of these clauses, as called out on TDGO Purchase Orders.

2.4 Suppliers are required to visit the http://www.teledynemarine.com/dgo “Suppliers” tab to access the latest revision of this QA-308 Quality Assurance Clause document.

3.0 SCOPE

This document applies to TDGO suppliers of services and product, and their sub-tier suppliers with whom they engage in business in the fulfillment of a TDGO PO.

4.0 REFERENCES

4.1 SQH-001 Supplier Quality Handbook

4.2 QA-703 Supplier Procedure Approval Request

4.3 QA-683 Quality Clause Matrix

4.4 QA-791 Purchase Order/Drawing Concessions/Deviations and Non-Conformance Form

5.0 DEFINITIONS

5.1 CMTR - Certified Material Test Report

5.2 OCM – Original Component Manufacturer (Reference AS5553)

5.3 OEM – Original Equipment Manufacturer

5.4 MPMA – Various Manufacturing procedures such as pin patterns, drilling, reaming etc.

6.0 ROLES & RESPONSIBILITIES

It is the responsibility of the supplier to review and ensure flow-down of, and compliance to QA clause requirements applied to and reflected on TDGO Purchase Order parts/materials/services in acceptance of said Purchase Order.

7.0 MANDATORY CHANGE ORDER REQUIREMENTS (TDGO INTERNAL)

7.1 Changes to this document require the approval of the Quality Manager, or designee.

7.2 When changes to this document effect a necessary change in QA-683, the QA-683 shall also be updated to incorporate those changes, and released with a new revision, as appropriate.

7.3 When making any changes to this document, the associated QA Spec description and parts affected must be updated in the ERP system, as appropriate.

7.4 When appropriate, at the discretion of the Quality Manager, a Supplier Alert may be distributed notifying Suppliers when a QA clause change affects an open TDGO PO.

8.0 QUALITY ASSURANCE CLAUSE LISTING

1. CERTIFICATION OF CONFORMANCE (C of C) REQUIRED

C of C is required, stating that material and services supplied are in accordance with the Purchase Order. The certification shall identify as a minimum:

- Company Letterhead / logo including name and address
- Date
- Purchase Order Number
- Actual drawing, part number or specification
- Quantity
- A positive statement: "Material and / or services supplied are in accordance with all Purchase Order requirements."
- Where applicable, list serial numbers and/or heat/lot numbers.
- Title and signature of authorized representative of the company is required

2. Packing List Only

Packing list to include, at a minimum, TDGO Purchase Order Number, TDGO Part Number, Part Description, and Quantity.

3. SUPPLIER FURNISHED RAW MATERIAL CERTIFICATION & SUBSEQUENT MARKING

(If TDGO furnishes raw material disregard this clause.)

The supplier is required to furnish a Certified Material Test Report (CMTR) with detailed analysis traceable to the material by heat, melt, or lot number. The report shall list the material specification and applicable revision, class, grade, temper designation and/or condition, size, and actual chemical and physical test data as required by the material specification.

Material certification data (chemical analysis, mechanical and physical testing) must be recorded on the testing company's letterhead and shall bear the name, title, and signature of the authorized representative. Certification data supplied to the Purchaser shall be either the original mill certification, original certification from the testing facility or an exact photocopy of the original certification.

Suppliers may provide a test report under their letterhead listing the results of all tests performed provided that copies of the original testing results on the testing activities letterhead are also included. In such cases, the supplier's report shall clearly denote that the data is transcribed data. If applicable, it shall also list any tests performed as a requirement of certifying to the specification.

The test reports for chemical and mechanical properties required elsewhere in the Purchase Order shall be those issued by the original producer of the material which certify conformance to the specification(s) invoked. In cases where the producer or melt source is not a domestic source, the country of origin shall be indicated on the test report, or if not identified, annotated on the test report by the supplier. If the producer or melt source is a domestic source, the test report shall be clearly indicated as such, or annotated on the test report by the supplier as produced or melted by a domestic source (United States of America or its outlying areas).

If the material receives subsequent processing (i.e. heat treat, hot or cold forming/working etc.) by the supplier or its sub-tier supplier(s) to make it conform to the required specification, the test reports for the material in its final condition (as supplied to the buyer) shall be accompanied by a copy of the original producer's certification(s). When heat treatment is required or performed, a record of the heat treatment is required.

Records of heat treatment shall include as a minimum:

A. Specific times and temperatures.
B. Quantity of items and item name.
C. Date of heat treatment.
D. Name of the activity performing heat treatment.
E. The material identification that provides positive traceability to Objective Quality Evidence.

Where the number of test specimens is dependent upon the original total lot size, the supplier shall identify the original total lot size in addition to the quantity shipped to allow verification during independent review that the appropriate number of tests were performed.

Certifications shall be reproducible and completely legible. Marking of raw material shall be permanently marked with the unique identifying number (i.e. heat, melt, lot, etc.). When material is 3/4" diameter or less and plate is ½" or less, then the unique identifying number shall be marked on a tag affixed to the material.

Permanent Marking shall be one of the following: Die Stamping, Vibro Etching, Electrochemical Etching, Laser Marking or Engraving.

The certification shall bear the name (typed or printed), signature, and title of an authorized agent of the company and shall not contain phrases such as "to the best of our knowledge and belief". The documents containing this certification shall accompany the shipment, unless previously satisfied by Quality Clause 66 (QA-66).

In cases of foreign certifications, the 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 translation/conversion shall be identified as to origin with name, title, and signature of the authorized representative of the company making the translation/conversion.

NOTE: If raw material is furnished by TDGO, a certification note should be added to the Certificate of Conformance, indicating that material has been furnished by TDGO, and list the actual heat/lot number used.

4. MERCURY EXCLUSION REQUIREMENTS

1) Mercury or mercury containing compounds shall not be intentionally added or come in direct contact with hardware or supplies furnished under this order.
2) Material furnished under this Purchase Order shall not contain functional mercury in any form without the specific written approval of TDGO.
3) Mercury-bearing instruments and/or equipment which might cause contamination to equipment shall not be used in the manufacture, fabrication, assembly, or testing of any material furnished under this Purchase Order.

4) In the event of any accident involving mercury contamination of the material being furnished on this Purchase Order or suspicion of such contamination, TDGO shall be notified immediately.
5) Your subcontractors must be notified of, and must comply with, the requirements of this notice.

6. NON-DESTRUCTIVE TESTING (NDT) REPORTS PER APPLICABLE SPECIFICATION(S)

Only procedures listed shall be used. To use a procedure not listed, prior approval must be requested and approved through Form QA-703. (See NDT Procedure Approval Section in SQH-001).

A. RADIOGRAPHIC

B. MAGNETIC PARTICLE

Testing shall be performed in accordance with one of the following procedures:

Mistras; 100-MT-201 Revision 1

C. PENETRANT

Testing shall be performed in accordance with one of the following procedures:

Quality Assurance Labs; 0948 Revision 06 with Addendums 01 through 07

Element Newtown; SOP 41.13 Rev. 12 with Addendum 41.13.15 Rev. 0

D. ULTRASONIC

NOTE: THE FOLLOWING PROCEDURES APPLY TO K500 (UNS N05500) MATERIAL ONLY:

Testing shall be performed in accordance with one of the following procedures:

- Electralloy;
  - UT-3 Revision 4 or 10
- Inco Alloys;
  - International QCP No. 252 Revision 2
  - International QCP No. 253 Revision 8 or 10
  - International QCP No. 298 Revision 3 or 4
- Orbit Industries;
  - 03.05.355 dated 02/24/2003 (for 5.5-inch diameter round bar only)

NOTE: THE FOLLOWING PROCEDURE APPLIES TO HY-80 (UNS K31820) AND HY-100 (UNS K32045) MATERIALS ONLY:

- Ocean State Testing Incorporated; UT-03 Revision 5

NOTE: THE FOLLOWING PROCEDURE APPLIES TO C63200 ALUMINUM BRONZE Per ASTM-B150 MATERIALS ONLY:

Testing shall be performed in accordance with one of the following procedures:

- Electralloy;
  - UT-3 Revision 3 VPAR# QE# F52950 Acceptance to General Dynamics EB SC 76-22K
- Bolton Aerospace
  - NDT UT 02 Issue 2 dated 02/23/2016 VPAR# SVC055-040 Acceptance to General Dynamics EB SC 76-22K
  - N.F.W. Inspection Co. U/S NFW1061 Rev. O dated 06JAN2003 VPAR# QE# F50489A Acceptance to General Dynamics EB SC 76-22K

E. HYDROSTATIC PRESSURE

F. HELIUM LEAK

G. PERSONNEL QUALIFICATIONS

H. X-RAY FILM

J. HARDNESS TEST PER DRAWING

K. Bar, rod, and forgings with a diameter or minimum distance between parallel surfaces of 4 inches or greater shall be ultrasonically inspected in accordance with QQ-N-286 Revision G, paragraph 4.3.3.2.1 (longitudinal wave end scan)

Testing shall be performed in accordance with one of the following procedures:

- Electralloy;
  - UT-3 Revision 4 or 10
- Integri Testing;
  - U5256 Rev 1 approved on EB VPAR# SVG295-063

L. THE FOLLOWING PROCEDURE APPLIES TO HY-80 (UNS K31820) AND HY-100 (UNS K32045) MATERIALS

- Thielsch Engineering, Inc. procedure OSTI-UT-03 Revision 14 with acceptance to T9074-BD-GIB-010/0300 approved on SVF345-030

7. EXPIRATION DATES

Material with a limited shelf life (i.e. silicone, epoxy, primer, etc.) must be listed on certifications and/or containers sent with the material. If shelf life changes once opened, this shelf life shall also be listed.

8. CERTIFICATION OF SERIALIZED PRODUCTS SHALL REFLECT THE APPLICABLE SERIAL NUMBERS FOR THE PRODUCT

9. CURE DATES

Material with a limited shelf life, such as O-rings, must be listed on certifications and packages. This shall be the date (quarter and year) that O-rings were produced.

10. TEST DATA SHALL BE SUPPLIED FOR ALL PRODUCTS TESTED

The supplier shall perform testing in accordance with the drawing specifications and provide complete test data for each item tested. The report must be traceable to the serial number(s) of each part(s).

12. CALIBRATION STICKERS REQUIRED ON CALIBRATED EQUIPMENT

13. CERTIFICATION OF CALIBRATION

Must be traceable to National Standards and list any out-of-tolerance conditions noted prior to calibration, actual readings versus the standard, and any adjustments made in accordance with ISO-10012-1.

14. SOURCE INSPECTION

A. TDGO and/or the Government, or End User, hereby reserve the right to perform inspection of items deliverable to TDGO at supplier's facility before shipment to TDGO for all items in accordance with this Purchase Order. Such inspection shall be referred to as "source inspection" should TDGO and/or the Government, or End User, perform "source inspection" on items identified in this Purchase Order, the supplier shall provide such personnel, equipment and facilities that may be necessary to assist the authorized representative(s) in performance of source inspection.

B. Government inspection is required prior to shipment from your facility. Upon receipt of this order, promptly notify the Government Representative who normally services your facility so that appropriate planning for Government inspection can be accomplished. On receipt of this order, promptly furnish a copy to the Government Representative who normally services your facility or, if none, to the nearest Army, Navy, Air Force, or Defense Supply Agency inspection office. In the event the representative or office cannot be located, our purchasing agent should be notified immediately.

16. SPECIFICATION EFFECTIVITY

At the time of Purchase Order issuance, hardware supplied shall comply with the latest revision of the following specifications:

- FI-1165
- FI-1710 Class A1
- CCR-0391

These items are considered ‘Priority Items’ and are maintained under document change control. The supplier shall not incorporate a change to an item placed under change control without prior written approval from Honeywell Project Engineering. Administrative changes that do not affect the design may be incorporated without Honeywell approval, however, the change documentation must still be provided with the indication that the change is for notification purposes only.

17. FIRST ARTICLE INSPECTION REPORT (QUALIFICATION)

A First Article Inspection Report shall be prepared and submitted by the Supplier. The report shall show the results and completion of inspection procedures performed for or by the Supplier to demonstrate that units conform to First Article Inspection requirements invoked in the Purchase Order or equipment specifications. The report must detail the specific inspection procedure, the results obtained, and any exceptions or deviations noted during the tests. Inspection results shall be quantitative data in the form of instrument or meter data, recordings, and written observations.

First Article Inspection need not be accomplished provided the Supplier certifies that the material has previously been successfully tested and test reports have been supplied to Teledyne DGO (TDGO). Certification must reference the Purchase Order number under which the reports were resubmitted. This information must be forwarded with complete or partial shipments of material under this order.

If the material has been QPL approved, the Supplier shall certify on their C of C that the product being furnished has been QPL approved and is listed on the applicable QPL. This document is to be furnished with the material shipment.

In the event that First Article Inspection has been completed for and approved by agencies of the U.S. Government or others, but results and approvals were not transmitted to TDGO, the Supplier must furnish copies to TDGO for engineering review and approval.

All other tests and inspections required by drawings and/or specifications must be completed and copies of the results forwarded with the material as specified in the Purchase Order. Material will be rejected if the certification and/or inspection report are not received by TDGO.

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA) 1000 SPECIFICATION

This clause requires certification of deliverables to "NEMA-MW16-C". This requirement includes actual test data reports that shall include measurements and inspection results to the specification.

20. LEVEL 1 MATERIAL IDENTIFICATION, SEGREGATION & TRACEABILITY REQUIREMENTS

The material covered in this Purchase Order will be used in a crucial surface ship or submarine application. The use of incorrect or defective material would create a high probability of failure resulting in serious personnel injury, loss of life, loss of vital shipboard systems, or loss of the ship itself.

In addition to the requirements in this clause, Electric Boat Specification 2678 (latest revision) applies: http://www.gdeb.com/suppliers/10_quality/

All shipments of Level 1 parts/material to TDGO require the following:

1) PRODUCT MARKING:
    a. Raw material shall be permanently marked with the heat/lot number. If the material diameter is too small, then the heat/lot number shall be marked on a tag affixed to the material.
    b. Machined Components shall be marked with TDGO-Supplied Serial Numbers or TDGO-Approved Supplier Serial Numbers in accordance with SQH-001 using one of two methods of temporary marking; Indelible Black Ink or Durable Hang Tag.
2) Shipping containers shall be marked with red letters, 1-2 inches high on two sides and two ends as follows: “LEVEL 1”.
3) If material is shipped without a container (on a pallet, skid, etc.), the parts/material shall be individually tagged with red letters, 1-2 inches high as “LEVEL 1”

Material which is designated Level 1 shall be segregated from all other material

It is imperative that traceability be maintained from the material to the Certification Material Test Report (CMTR) and other required Objective Quality Evidence (OQE). The CMTR shall be 100% inspected for accuracy, completeness and legibility in compliance to the specified requirements for the material supplied.

All data concerning material verification (chemical and mechanical properties), traceability and non-destructive test (NDT) certification for material shall be 100% inspected.

CMTR’s must be the original, unaltered electronic file. The expectation is that there are absolutely no modifications made to the original electronic document, including notes, annotations, and signatures.

All data lines of all-inclusive reports (2nd & 3rd-tier suppliers included), shall be populated with applicable data or “N/A”. Omissions of data or empty form fields will not be accepted.

Failure to provide a compliant, legible, unaltered CMTR will result in rejection of the material. Quantitative chemical and mechanical analysis of material traceable to heat/lot identification is required.

CMTR's shall include the class, form, condition, grade, type, finish, and composition, as applicable, of the material supplied.

These test reports must originate from the actual physical location and company where the test results were obtained. No transcribed data is allowed. Statements on material certification documents must be positive and unqualified.

A statement such as, "We hereby certify that the above test data are in accordance with the specification requirements", must appear on all supplier, and sub-tier supplier material certification documents. Disclaimers are not acceptable.

In addition to the above, the following is required on the material certification:

1) Cert must be on the testing company letterhead
2) Test date
3) Typed or printed name and title
4) Signature

100% Inspection of ACTUAL measurements are required for the following categories:

a) Dimensions with a tolerance envelope of .010" or less (e.g. ± .005)
b) Straightness of .010" per foot or less
c) Geometric characteristics (forms, profile, orientation, location, run out, etc.) with a tolerance of .010" or less
d) Surface Finishes of 32 or less
e) Angles ± ½ a degree or less
f) Class 2 threads shall be inspected in accordance with the latest revision of ASME B1.3, System 21 requirements
g) Class 3 threads or higher shall be inspected in accordance with the latest revision of ASME B1.3 System 22 requirements.

21. COMMINGLING

Visually identify each different material heat/lot. Package each different material heat/lot separately to avoid commingling of like parts.

Supplier must notify TDGO prior to shipment if a Purchase Order line Item cannot be satisfied using one heat/lot of material.

22. QUALITY SYSTEM REQUIREMENTS

The Supplier furnishing items under this Purchase Order shall maintain quality and calibration systems in accordance with the Supplier Quality Handbook (SQH-001).

23. TRANSMISSION ABROAD OF EQUIPMENT OR TECHNICAL DATA RELATING TO THE NUCLEAR PROPULSION OF NAVAL SHIPS (NOV 1996) (MODIFIED)

(a) Equipment and technical data defined as Naval Nuclear Propulsion Information (NNPI) under SECNAVINST 5511.32B shall not be disclosed to foreign nationals.

(b) For other than equipment and technical data defined as NNPI in paragraph (a) above, except with the prior written consent of TDGO, the Supplier shall not, at any time during or after the performance of this Purchase Order, transmit, or authorize the transmittal of any equipment or technical data, as defined below, (1) outside the United States, or (2) irrespective of location, (i) to any foreign national not working on this Purchase Order

or on a subcontract hereunder, (ii) to any foreign organization (including foreign subsidiaries and affiliates of the Supplier), (iii) to any foreign Government, or (iv) to any international organization.

(1) "United States" means the States, the District of Columbia, Puerto Rico, American Samoa, the Virgin Islands, Guam, and any area subject to the complete sovereignty of the United States.

(2) "Equipment" means all supplies of the kind specified to be delivered under this Purchase Order, all component parts thereof, and all models or such supplies and component parts, and models thereof.

"Technical data" means all professional, scientific, or technical information and data produced or prepared for the performance of this Purchase Order, or on or for the operation, maintenance, evaluation, or testing of any Purchase Order item, whether or not the information and data were specified to be delivered under this Purchase Order, including, without limitation, all writings, sound recordings, pictorial reproductions and drawings or other graphical representations.

"Technical data" does not include such information and data on standard commercial supplies and component parts to the extent that the information and data do not relate to the use, operation, maintenance, evaluation and testing of such supplies and component parts in or in connection with any item, or component part thereof, specified to be delivered under this Purchase Order.

(c) The Supplier agrees to insert in all sub-tier contracts under this Purchase Order, provisions which shall conform substantially to the language of this requirement, including this paragraph (c).

(d) Notwithstanding any other provisions of this requirement, this requirement shall not apply (1) where the transmittal or authorization for the transmittal of equipment or technical data is to be made pursuant to a contract or agreement to which the United States is a party; and (2) where the transmittal is to be equipment or technical data which TDGO and the U.S. Government, or their designated representatives, have declared in writing to the Supplier to be thereafter exempt from this requirement.

24. RESTRICTION ON ACQUISITION OF SPECIALTY METALS (MAR 2013) (252.225-7008) & RESTRICTION ON ACQUISITION OF CERTAIN ARTICLES CONTAINING SPECIALTY METALS (OCT 2014) (252.225-7009)

This link shall be used for the latest requirements:
http://www.acq.osd.mil/dpap/dars/dfars/html/current/252225.htm

NOTE: The “Qualifying Country” list directed by 252.225-7009 obtained from 225.003 is acceptable excluding Austria. This exclusion is being implemented to also comply with DFARs 225.872.

25. SPECIAL REQUIREMENTS FOR NICU, NICUAL, AND CUNI ALLOY PARTS
(If TDGO furnishes raw material, disregard this clause.)

The sulfur content of the gas and oil fuels used in firing furnaces for forging, extruding, or other hot working processes and for heat treatment of NiCu (N04400), NiCuAl (N05500), CuNi (C70600 and C71500), and other nickel or nickel base alloys shall be limited as follows:

1. Gas: 30 Grains per 100 cu. ft. maximum
2. Oil: 0.5 percent by weight maximum

26. NON-CONDUCTIVE COATING (NCC)

Requires certification from the company applying the coating, coating shall be applied by a company that has been approved in writing by NAVSEA. Certifications shall be in accordance with the latest revision of NAVSEA S9320-AM-PRO-030 List of Approved Vendors.

28. MAGNIFICATION

Perform 100 percent visual inspection under 10 power magnification for proper surface finishes, removal of burrs, sharp edges, and foreign contamination. Special care should be given to the starts and stops of threads.

29. SUPPLIER DELEGATED INSPECTION PROGRAM

(If the Supplier is not certified for the Delegated Inspection Program, disregard this clause.)

This product/part has met the requirements in accordance with the Supplier Quality Handbook (SQH-001) for the Supplier Delegated Inspection Program. In order to exercise this clause, the Supplier must be certified in writing by the TDGO Quality Manager as qualified for the Supplier Delegated Inspection Program.

31. O-RING SAMPLING, PACKAGING AND INSPECTION

a. Unless otherwise specified in applicable O-ring specification, O-rings shall be inspected on a sample basis in accordance with inspection Level II of ANSI Z1.4 (latest revision) at an AQL of 1.5 percent defective.

b. O-rings shall be individually packaged sealed opaque bags in accordance with SAE AMS-2817 and marked as a minimum with:

- Applicable rubber specification
- Size designation
- Bar Code (size designation)
- Batch number
- Cure and/or Expiration date
- Manufacturer's name
- Teledyne DGO part number (if applicable)
- Bar Code (TDGO part number when applicable)

c. O-rings surface finish shall be inspected to the following requirements in accordance with SAE AS5752. The following defects are cause for rejection regardless of defect size:

- Cuts
- Tears resulting in flaps of separated material
- Linear defects oriented around the cross section of the O-ring
- The nominal size of the O-rings shall be verified using standard inspection equipment, typically a cone shaped gage designed for this purpose.

32. MODIFICATIONS TO QQ-N-286

(If TDGO furnishes raw material, disregard this clause.)

If any NICUAL (K-Monel) material is utilized in this order, it must be in accordance with Revision G, with the following modifications:

Revise paragraph 4.2.2.2 of QQ-N-286G as follows:

4.2.2.2 Slow Strain Rate Tensile Tests. Three specimens shall be prepared and tested per lot. Specimens shall be taken after the final heat treatment. When material is shipped in the annealed condition, specimens may be taken after the final anneal and shall be heat treated in accordance with 4.3.6.1.

4.2.2.2.1 Bar, Rod, and Forgings. Slow Strain Rate Tensile Test specimens shall be taken from one end of a bar, rod, or forging at the quarter diameter (half radius) and in the longitudinal direction. Bars, Rods or Forgings too small to have a Slow Strain Rate Test specimen taken from the quarter diameter that are taken from a lot (see 4.2.1.3) that does not have any larger sizes shall have the specimens taken from the center and in the longitudinal direction. Bars, Rods or Forgings too small to have a Slow Strain Rate Test specimen taken from the center that are taken from a lot (see 4.2.1.3) that does not have any larger sizes shall be taken from the heat at the latest intermediate rolling or forging step that a Slow Strain Rate Test specimen can be taken from the mid-radius and heat treated using the same heat treatment procedures used on the production heat.

Revise Paragraph 4.3.6.4.4 of QQ-N-286G as Follows:

4.3.6.4.4 Testing Laboratory. Slow Strain Rate Tensile Testing shall be performed by a NAVSEA approved test laboratory. The following is a listing of the currently approved test laboratories, any one of which may be used at the supplier's discretion.

Huntington Alloys, a Special Metals Company
Attn: Frank Veltry
3200 Riverside Drive
Huntington, WV 25705

Metallurgical Consultants, Inc.
Attn: W. M. Buehler
4820 Caroline
P.O. Box 88046
Houston, TX 77288-0046

Naval Surface Warfare Center, Carderock Div.
Attn: Charles Roe
Code 614
9500 MacArthur Blvd.
West Bethesda, MD 20817-5700

Teledyne Allvac
Attn: Dr. W. D. Cao
2020 Ashcraft Ave.
Monroe, NC 28110

Mannesmann Rohrenwerke
Mannesmann Forschungsinstitut (Mfi)
Attn: Dr. Weiss
Postfach 251160
47251 Duisburg
Germany

Westmoreland Mechanical Testing & Research, Inc.
Old Route 30, Westmorland Drive
P.O. Box 388 Westmoreland Drive
Youngstown, PA 15696-0388

ThyssenKrupp VDM USA, Inc.
Attn: D. C. Agarwal
11210 Steeplecrest Drive
Suite 120
Houston, TX, 77065-4939.
Revise Paragraph 6.2 as follows:

s) The laboratory conducting the slow strain rate testing shall be one approved by NAVSEA (see 4.3.6.4.4).

33. DESTRUCTIVE TESTING

A. CHARPY TESTING AND REPORT REQUIRED

Raw bar stock material associated with this clause require 'Charpy' specimens be made, in addition to the parts stated on the TDGO Purchase Order. Unless otherwise specified, these specimens shall be made and tested in accordance with ASTM A370 & E23, type 'standard specimen'.

As per ASTM A370, three (3) specimens shall be made and tested from the same **'heat'** of raw material from which the parts are manufactured. The dimensions, temperature, and marking requirements are defined on a TDGO 'Charpy' impact specimen drawing 921-011-5XX.

The 'Charpy' specimens and test certificate shall be tested and supplied by the supplier's laboratory and sent to TDGO documenting the test results and shipped with the ordered parts.

In the event a TDGO Purchase Order requests the parts where 'Charpy' specimens of a specific **'heat'** of raw material have already been manufactured and tested, the supplier is not required to make additional specimens; rather they shall supply only the 'Charpy' certificate relating to that **'heat'** of raw material.

B. DESTRUCTIVE TESTING AND REPORT REQUIRED.

Destructive testing shall be conducted in accordance with TDGO approved test plans and test procedures, except as otherwise specified in the Purchase Order.

The Supplier may use his or other facilities suitable for performance of the testing, unless disapproved by TDGO. The absence of any testing required in the specification shall not relieve the Supplier of the responsibility of assuring that products or supplies submitted to TDGO for acceptance comply with requirements of the Purchase Order.

34. ASBESTOS FREE

Materials furnished under this Purchase Order must be free of asbestos in any form without the specific written approval of TDGO.

35. INSPECTION AND TEST PLAN SUBMITTAL REQUIRED FOR APPROVAL WITHIN 30 DAYS AFTER RECEIPT OF ORDER

The Inspection and test plan will document the details of the Inspection System, tests and inspections to be performed on the product being procured. It will provide evidence of the Supplier's methods for complying with the inspection aspects of the Purchase Order and applicable specifications to substantiate product conformance.

36. WELDING PROCEDURE AND QUALIFICATION APPROVAL REQUIRED

Prior to performing any welding (production or repair), the applicable welding procedure, procedure qualification data and welding operator(s) certificate(s) to the applicable weld procedure shall be submitted for approval using Form QA-703. (See NDT Procedure Approval Section in SQH-001).

37. NON-DESTRUCTIVE TESTING (NDT) PROCEDURES REQUIRED

Non-destructive testing procedures (Visual Testing, Magnetic Particle, Liquid Penetrant Testing, Ultrasonic Testing and Radiography Testing) shall be conducted in accordance with TDGO approved test plans and test procedures.

Procedures shall be submitted for approval using Form QA-703 within thirty (30) days of the Supplier's receipt of order. Procedures shall be approved prior to the performance of any test or inspection. The performing activities cognizant Level III Test Examiner, denoting approval, shall sign for NDT Procedures submitted to the buyer.

NDT procedures submitted to the buyer for approval must contain detailed acceptance criteria as required by this Purchase Order and applicable specifications and drawings. General reference to the applicable acceptance specification will not be accepted by TDGO.

NDT Inspector Certification/Qualifications shall be submitted to TDGO for approval prior to inspections.

The following additional information must be contained in supplier and sub-tier supplier NDT procedures:

- Magnetic particle Testing
- Lighting requirements
- Final Cleaning
- Liquid Penetrant Testing
- Material to be tested (e.g. Welds, Weld Repairs, Castings, Forgings, etc.)
- Surface preparation
- Lighting requirements
- Ultrasonic Testing
- Equipment used for testing
- Equipment qualification method or procedure
- Visual Testing
- Type of welds or surfaces to be inspected

Note: unless otherwise stated in the ordering data or document(s) invoked, this requirement can be satisfied by offering an opening statement to the effect that "This procedure specifies the requirements for performing the visual inspection of completed fabrication weldments in accordance with (enter applicable specification).

39. WELD FILLER MATERIAL CERTIFICATION REQUIRED

Supplier furnished materials must be procured to and meet the requirements of the material specifications invoked by the drawings referenced in the Purchase Order. The supplier shall obtain certifications from his supplier(s) which contain objective quality evidence of compliance to the material specification requirements (i.e., chemical properties, mechanical properties, or other tests as required by the applicable material specification). For welding filler materials, this objective quality evidence shall consist of certifications of lot quality conformance testing by the manufacturer. In addition, the supplier shall maintain records which provide traceability to end use in the assembly (part) furnished.

The Supplier is responsible for and required to furnish a Certified Material Test Report with detailed analysis traceable to the material by heat, melt, or lot number. The report shall list the material specification and applicable revision, the class, grade and/or condition, size, and actual chemical and physical test date as required by the material specification. Certifications shall be reproducible and completely legible. Welding and brazing filler metals shall have individual markings and be maintained to the point of consumption to assure use of the correct type and grade.

40. DELETED WITHOUT REPLACEMENT

41. POSITIVE MATERIAL IDENTIFICATION (PMI) PROCEDURE REQUIRED

Metals and welded surfaces that will be exposed to seawater shall be positively identified using a suitable means of determining PMI. PMI testing shall be conducted utilizing an approved procedure and method suitable for determining PMI. Procedures shall be submitted within thirty (30) days of the supplier's receipt of order. Procedures shall be approved prior to the performance of any test or inspection. Supplier procedures should be submitted on QA-703.

Except as otherwise specified in the Purchase Order, the Supplier may use his or other facilities suitable for performance of the inspections specified herein, unless disapproved by Teledyne DGO (TDGO). The absence of any inspection required in the specification shall not relieve the Supplier of the responsibility of assuring that all products or supplies submitted to TDGO for acceptance comply with all requirements of the Purchase Order. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit TDGO to accept defective material.

42. DELETED WITHOUT REPLACEMENT

43. MATERIAL DIMENSIONAL REPORT REQUIRED

Record all critical dimensions. The report must be traceable to the serial number(s) of each part(s). "Critical Dimensions" shall be defined as those with the following characteristics:

- .006" total tolerance envelope or less
- Angles of ½ degree total tolerance envelope or less
- Finishes of 32 RMS or less
- Threads
- Any dimension that is outlined 

All other dimensions are considered non-critical.

44. DELETED WITHOUT REPLACEMENT

45. NON-DESTRUCTIVE TESTING (NDT) AND REPORT REQUIRED

A. Magnetic Particle
B. Penetrant
C. Radiographic
D. Ultrasonic
E. Visual (Weld)
F. Helium
G. Gas
H. X-ray
J. Hardness

Test reports for performance of NDT

Reports showing the results of each test performed within the specified nondestructive test method are required. Guidelines for proper test report requirements are as detailed in applicable specifications. Where guidance is not provided, the supplier shall record the following listed information, as a minimum:

- The NDT method(s) used
- Description or unique Identification of the Item Inspected
- Procedure Identification
- The performing activity, whether it be a prime/sub-tier supplier or test lab
- Quantity Inspected
- Acceptance standard used
- Quantity Accepted/Rejected
- Date of Initial Inspection and Inspector Identification

47. NON-DESTRUCTIVE TESTING (NDT) PERSONNEL QUALIFICATIONS REQUIRED

NDT personnel Certification/Qualifications shall be submitted within thirty (30) days of the supplier's receipt of order to TDGO for approval prior to any test or inspection via QA-703.

48. ULTRASONIC TESTING & CERTIFICATE OF COMPLIANCE FOR OIL & GAS RAW MATERIAL

The supplier shall comply and certify to the requirements of TPUT-102, including reporting requirements to the latest Industry codes, other Customer specifications, and/or guiding documents (latest revision). Supplier shall submit UT testing procedures to TDGO for approval via QA-703

49. DELETED WITHOUT REPLACEMENT

52. DELETED WITHOUT REPLACEMENT

53. RADIOGRAPHIC SAMPLING & EXAMINATION

a) Sampling

100% of pressure-containing welds shall be examined by radiographic methods after welding, post-weld heat treatment and machining operations. Repair welds where the repair is greater than 25% of the original wall thickness or 1"(25mm), whichever is less, shall be examined by radiographic methods after welding and post-weld heat treatment. Examinations shall include at least ½" (13mm) of adjacent base metal on all sides of the weld.

b) Test Method-Radiographic Examination

Radiographic examinations shall be performed in accordance with procedures specified in ASTM E 94, to a minimum equivalent sensitivity of 2%.

Both X-ray and gamma-ray radiation sources are acceptable within the inherent thickness range limitations of each. Real-time imaging and recording/enhancement methods may be used if the manufacturer has documented proof that these methods will result in a minimum equivalent sensitivity of 2%. Wire-type image quality indicators are acceptable for use in accordance with ASTM E 747.

54. RADIOGRAPHIC ACCEPTANCE CRITERIA

The following acceptance criteria apply:

- No type of crack, zone of incomplete fusion or penetration;
- No elongated slag inclusion which has a length equal to or greater than the following;

Weld thickness, *T*	**Inclusion length**
Inches	**Inches**
<0.75	**0.25**
0.75 to 2.25	**0.33*T***
>2.25	***0.75***

- No group of slag inclusions in a line having an aggregated length greater than the weld thickness, T , in any total weld length of 12T, except where the distance between successive inclusions exceeds six times the length of the longest inclusion;
- No rounded indications in excess of that specified in ASME, Section VIII, Div. 1, Appendix 4.

55. ISPM-15 – WOOD MATERIALS

ISPM-15 – Wood Materials (e.g. pallets, crates, dunnage, etc.) with a thickness greater than 6mm, used to ship products between countries must conform to the requirements of ISPM-15. See ISPM15.com for requirement details.

56. QUALIFIED PRODUCTS LIST (QPL)

This product must be procured from a supplier who is listed on the associated QPL for the product. The Supplier shall make available to Teledyne DGO (TDGO), upon request, documentation that authenticates and provides traceability of the parts to the applicable QPL. The purchase of parts from independent or unauthorized sources is not permitted under this Purchase Order without the prior written approval from TDGO. An authorized Supplier is an OCM or OEM, or an Authorized Distributor of an OCM or OEM, with the express **written** authority of the OCM or OEM or current design activity, who obtains the parts exclusively from one or more of these sources.

57. NUCLEAR CALIBRATION

Calibration shall be performed by a laboratory accredited to ISO 17025 by one of the following accreditation bodies: A2LA, NVLAP, LAB, ACLASS, IAS.

59. WELDING RECORDS REQUIRED

The Quality control system shall include preparing and maintaining written records of at least the following items for each weld joint that undergoes nondestructive test (NDT) inspection. The records shall be traceable to the hardware or weld joint and from the hardware or weld joint to the records.

(a) Joint identification

(b) Joint design

(c) Base material type including Heat# or Lot# or Identification#

(d) Filler material type including Heat# or Lot# or Identification#

(e) Fit-up

(f) Welding procedure identification

(g) Heat treatments (including preheat, interpass, and post-weld heat treatment temperatures)

(h) Welder identification

(i) NDT methods and results

(j) Disposition of welds

(k) Cycles of repairs to weld

(l) Inspection procedures

(m) NDT personnel identification

A record form shall be prepared prior to the commencement of the operation which it covers. Items (i), (j), (l), and (m) shall be signed or stamped by the activity's qualified NDT personnel and dated except that 5X magnification visual inspections of root layers may be performed by qualified production personnel. All other items shall be signed and dated by production or inspection personnel.

When a specific item on the record form is not applicable, the letters N/A shall be entered. Final acceptance of a weldment shall not be permitted until all items on the record formats are marked as above.

60. ISO 17025 MATERIAL TEST LABORATOIRIES

Material testing performed on this order must be performed by a laboratory certified to ISO 17025. A copy of the laboratories ISO 17025 shall be supplied with the order.

61. DIRECTIVE 2002/95/EC ROHS – RESTRICTIONS OF HAZARDOUS SUBSTANCES

Material delivered on this order shall comply with RoHS directive 2002/95/EC.

63. TOP-LEVEL DRAWING AND PARTS LIST REQUIRED

The supplier shall furnish a complete top-level drawing and parts list for each item.

64. NO SUBSTITUTIONS

Where specific materials, part numbers or suppliers are identified, no substitutions are allowed without prior written authorization from TDGO via form QA-791 (Purchase Order/Drawing Concession Deviation Form).

65. SUPPLY RAW MATERIAL TEST RESULTS

Test results of testing required by the applicable specifications invoked in Purchase Order is required to accompany shipment. The results must include actual data as required for delivered wire and cable and actual data required for the production lot from which the delivered wire and cable is selected. When two or more lots are shipped at one time against one item of the Purchase Order, the packing list or test reports must indicate the quantities shipped against each lot. Test reports must be traceable to the delivered material.

Test reports and/or other verification of conformance documents shall be signed and dated by the Supplier's authorized representative. Test reports shall be attached to the packing list. Where more than one container or package is included in the shipment, the test reports shall be attached securely to or placed in one container or package and clearly identified on the outside.

66. PRE-APPROVAL OF RAW MATERIAL CERTIFICATION (K-500 & Monel 400)

Supplier shall submit certified material test reports to TDGO prior to shipment of material. Certifications shall be e-mailed to "SEA_SupplierMail@teledyne.com". TDGO will e-mail the supplier with certification approval within three working days.

If heat/lot has been previously submitted and approved, and the approved certification has not been subsequently revised, the supplier does not need to resubmit and shall attach copy of previous approval to the pack slip with the shipment.

67. HARDNESS TEST IAW PPD-6335720 REV B & NAVSEA PUB T9074-AD-GIB-010/1688

One (1) copy of test reports showing the results of the specified Brinell hardness test is required. Bars and shapes shall have hardness measurements made at each end. These measurements shall fall within the range of 200-260 BHN for HY80 and 230-290 BHN for HY100.

Castings and forgings shall have hardness measurements made at area of minimum and maximum thickness. These measurements shall fall within the range of 200-260 BHN for HY80 and 230-290 BHN for HY100. Test reports shall indicate the Brinell hardness measurement values and the general location where the measurements were taken (i.e. "measurement at end", "measurement at minimum thickness" or "measurement at maximum thickness").

Test reports and/or other verification of conformance documents shall be signed and dated by the Supplier's authorized representative and must include the specification/drawing revision to which the specified test was performed. Evidence of all tests and inspections performed as required by the specification must be maintained by the supplier. However, records for only those tests requested above shall be forwarded with the shipment.

70. CONTROL OF GOVERNMENT-OWNED MATERIAL/PROPERTY

The requirements of FAR 52.245-1 apply to this order.

72. PRE-APPROVAL OF QUALITY CONFORMANCE TEST REPORTS/INSPECTION REPORTS

Supplier shall submit the results of quality conformance testing and/or inspection prior to shipment of material to TDGO. Test and inspection reports shall be e-mailed to "POR_TestRecords@teledyne.com". TDGO will e-mail the supplier with the results of report review. Failure to obtain pre-approval of test/inspection reports will result in rejection of material upon arrival at TDGO.

73. BULK O-RING SAMPLING, PACKAGING AND INSPECTION

a. Unless otherwise specified in applicable O-ring specification, O-rings shall be inspected on a sample basis in accordance with inspection Level II of ANSI Z1.4 (latest revision) at an AQL of 1.5 percent defective.

b. O-rings shall be marked as a minimum with:

- Applicable rubber specification
- Size designation
- Bar Code (size designation)
- Batch number
- Cure and/or Expiration date
- Manufacturer's name
- TDGO part number (if applicable)
- Bar Code (TDGO part number when applicable)

c. O-rings surface finish shall be inspected to the following requirements in accordance with SAE AS5752. The following defects are cause for rejection regardless of defect size:

- Cuts
- Tears resulting in flaps of separated material
- Linear defects oriented around the cross section of the O-ring
- The nominal size of the O-rings shall be verified using standard inspection equipment, typically a cone shaped gage designed for this purpose.

74. POSITIVE MATERIAL IDENTIFICATION (PMI) REPORT REQUIRED

A Positive Material Identification (PMI) Report shall be provided. The PMI report shall indicate:

- The alloy tested
- The test method, criteria and results
- The date of the test; the name of the test technician
- The serial number of the test equipment (XRF Serial Number)
- The Material Code / Lot / Batch Number

Additionally, a Certificate of Compliance shall be provided that provides traceability to the PMI report Material Code / Lot / Batch Number.

75. SILVER PLATING Per Drawing requirements to QQ-S-365 Federal Specification

A. Certification Report Required listing, Drawing/Rev, Qty, Specification, Type, Grade, thickness results. If applicable, Adhesion test results, Solderability results.

B. Perform Alternate Adhesion Test Per 4.5.2.1 (Oven Test)
C. Perform Solderability Test Per 4.5.4

76. CYBER SECURITY VERIFICATION FORM (252.204-7012)

This link shall be used for the latest requirements:

DFARS 252.204-7012

NOTE: All contractors that provide goods and/or services in connection with U.S. Department of Defense (DoD) programs are required by law to comply with Defense Federal Acquisition Regulation Supplement (DFARS) 252.204-7012, which mandates the protection of all Covered Defense Information (CDI) that are "collected, developed, received, transmitted, used, or stored by or on behalf of the contractor in support of the performance" of a DoD contract. This obligation is required to be flowed down to all subcontractors (including commercial

items suppliers) at every tier.

9.0 REVISION HISTORY

Revision	Originator	ECO #	Release Date
CT	M. Hudson	E348	06/30/2011
CV	S. Blake	E479	08/11/2011
CW	M. Hudson	E637	10/06/2011
CY	M. Hudson	E822	12/06/2011
DA	M. Hudson	E847	12/13/2011
DB	M. Hudson	E1117	03/19/2012
DC	P. Lemelin	E1146	03/27/2012
DD	M. Hudson	E1308	05/03/2012
DE	B. Peavey	E3509	01/14/2014
DF	R. Peters	E4096	05/09/2014
DG	A. Powis	E4130	06/24/2014
DH	K. Peek	E4427	07/17/2014
DJ	S. Blake	E4444	07/21/2014
DK	K. Peek	E4615	09/15/2014
DL	P. Lemelin	E4683	09/23/2014
DM	S. Blake	E4740	10/03/2014
DN	K. Peek	E5513	03/05/2015
DP	S. Blake	E5709	04/13/2015
DR	A. Powis	E6047	07/13/2015
DT	M. Mitchell	N/A	11/17/2016
DV	M. Mitchell	N/A	01/10/2017
DW	M. Mitchell	N/A	02/14/2017
DY	M. Mitchell	N/A	03/30/2017
EA	J. Gross	N/A	10/31/2017
EB	S. Blake	CO 44764	02/09/2018
EC	R. Mills	CO 45057	03/19/2018
ED	M Mitchell	CO 50070	03/21/2019
EE	E. Gendreau	CO 51516	07/17/2019
EF	M Mitchell	CO 51894	08/14/2019
EG	P. Lemelin	CO 54194	03/02/2020
EH	S. Blake	CO 54404	03/11/2020
EJ	M. Dickson	CO 55096	05/14/2020
EK	M. Dickson	CO 55319	06/22/2020
EL	S. Blake	CO 55604	06/24/2020
EM	R. Mills	CO 57982	02/17/2021
EN	R. Mills	CO 59600	08/12/2021
EP	S. Blake	CO 60179	10/20/2021
ER	R. Barnett	CO 61032	01/11/2022
ET	E. Gendreau	CO 61552	03/28/2022
EV	E. Gendreau	CO 64815	02/21/2023