

***Section IX. Post Qualification, Inspection
and Test Memoranda***

I. Post Qualification Evaluation

The Post Qualification (PQ) Team shall conduct post qualification evaluation and tests (as may be practically necessary), in order to verify, validate, and ascertain whether all statements made and the documents submitted comply with the provisions set forth in this bidding documents.

Envelope 1 - Eligibility and Technical Requirements		Comply / Not Comply	Findings
TAB	CLASS "A" DOCUMENTS		
A	<p>PhilGEPS (under Platinum category) Certificate of Registration and Membership in accordance with Section 8.5.2 of the IRR, except for foreign bidders participating in the procurement by a Philippine Foreign Service Office or Post, which shall submit their eligibility documents under Section 23.1 of the IRR, provided, that the winning bidder shall register with the PhilGEPS in accordance with section 37.1.4 of the IRR.</p> <p>Or</p> <p>Following Class "A" Legal Documents:</p> <ol style="list-style-type: none"> Registration Certificate from the Securities and Exchange Commission (SEC), Department of Trade and Industry (DTI) for sole proprietorship, or Cooperative Development Authority (CDA) for cooperatives. Mayor's/Business permit issued by the city or municipality where the principal place of business of the prospective bidder is located, or the equivalent document for Exclusive Economic Zones or Areas. Tax clearance per E.O. 398, s. 2005, as finally reviewed and approved by the BIR. The prospective bidder's audited financial statements, showing, among others, the prospective bidder's total and current assets and liabilities, stamped "received" by the BIR or its duly accredited and authorized institutions, for the preceding calendar year which should not be earlier than two (2) years from the date of bid 		

	<p>submission. (GPPB Circular No. 03-2016 27 dated October 2016)</p> <p>In case of foreign bidders, the appropriate equivalent document issued by the country of foreign manufacturer concerned must be presented. If said document has no equivalent thereat, a Certificate of Non-Existence may be submitted. Provided that these documents were duly acknowledged or authenticated by the Philippine Consulate therein”.</p>		
B	<p>Statement of the prospective Bidder of all its ongoing government and private contracts within the last 5 years, including contracts awarded but not yet started, if any. The statement shall state for each contract whether said contract is: Ongoing or Awarded but not yet started within the relevant period, where applicable.</p>		
C	<p>Duly signed Statement of the Bidder’s Single Largest Completed Contract (SLCC) equivalent to at least 50% of this Project’s ABC or a Statement of two (2) similar completed Government and/or Private Contracts undertaken for the past Five (5) years from the opening of the bid with an aggregate amount of at least 50% of the total ABC.</p> <p>For this purpose, similar contracts shall refer to drydocking and other related repairs of vessels and ship construction.</p> <p>The bidder may make a reservation under oath in a notarized document not to disclose the name of its client on the ground of an existing confidentiality agreement but must disclose the amount, status, and name of the project for purposes of validating the contents of the statement of single largest similar completed contract, subject to the full disclosure during post-qualification. In this connection, the bidder may keep the name of the client from the statement of single or two largest similar completed contract.</p>		
III. FINANCIAL DOCUMENTS			
D	<p>Duly signed NFCC Computation in accordance with ITB Clause 5.5.</p>		

	A bidder may submit a committed Line of Credit from a local Universal or Commercial Bank, in lieu of its NFCC computation which must be at least equal to 10% of the ABC to be bid.		
	CLASS "B"		
E	<p>Valid Joint Venture Agreement (JVA), in case the joint venture is already in existence, if applicable.</p> <p style="text-align: center;">or</p> <p>Duly notarized undertaking or agreement from all potential joint venture partners to enter and abide by the provisions of the JVA in the instance that the bid is successful. Failure to enter into a joint venture in the event of a contract award shall be ground for the forfeiture of the bid security.</p> <p>In case JVA is not applicable, the bidder must submit a statement stating that JVA is not applicable in lieu of the foregoing.</p>		
TA B	TECHNICAL DOCUMENTS		
F.	<p>Duly notarized Affidavit of Bid Securing Declaration, or any form of Bid Security, in an amount not less than the required percentage of the ABC in accordance with the following schedule:</p> <ol style="list-style-type: none"> 1) Bank draft/guarantee or irrevocable letter of credit issued by a Universal or Commercial Bank: Provided, however, that it shall be confirmed or authenticated by a Universal or Commercial Bank, if issued by a foreign bank equivalent to two percent (2%) of the ABC; or 2) Surety bond callable upon demand issued by a surety or insurance company duly certified by the Insurance Commission as authorized to issue such security equivalent to five percent (5%) of the ABC. 		
G	Production Delivery Schedule		

H	<p>Duly signed Statement of Conformity with the Schedule of Requirements and Technical Specifications, as enumerated and specified in Section VI and Section VII of the Bidding Documents, with a copy of Manufacturer's Test Report of previous production, duly signed by the Manufacturer's Quality Assurance Supervisor.</p>		
I	<p>1. Project Requirements:</p> <ul style="list-style-type: none"> a. Organizational Chart b. List of Contractor's Personnel c. List of Contractor's Equipment d. Project Gantt Chart e. Manpower Deployment f. Current pictures and description of the Drydocking facility of the proponent to be utilized in the project. <p>2. Project Specific Eligibility Requirements:</p> <ul style="list-style-type: none"> a. MARINA License to engage in Shipbuilding and Ship Repair (SBSR) b. Certificate that the bidder is capable of providing tug services or other appropriate vessel/watercraft to tow the vessel during sea/TIAC trials c. Certificate of Shipboard Inspection to be issued by the Commanding Officer/ Engineering Officer of PS37 stating that the proponent has thoroughly inspected the vessel. d. Certificate that the drydocking facility to be used for the project is not more than 100 NM from the present position of PS37 at Naval Shipyard, Cavite City. If the contractor does not own the facility, the notarized agreement to subcontract/lease such facility for this Project must be included. e. Certificate that the bidder's Company is not blacklisted or undergoing blacklisting proceedings before foreign government and/or international institution. 		

	f. Notarized Certification from the Proponent that it will ensure that the items will be supplied by an Original Equipment Manufacturer (OEM) or its authorized distributorship.		
J	Notarized Omnibus Sworn Statement in accordance with Section 25.2(a)(viii) and Section 25.3 of the 2016 Revised IRR of RA 9184, and using the form prescribed in Section VIII (Bidding Forms).		
K	Duly notarized Secretary's Certificate or Board Resolution or Special Power of Attorney of the authorized Representative of the Bidder.		
L	Supplemental Bid Bulletin, if any.		
	FINANCIAL PROPOSAL DOCUMENTS		
A	Duly signed Financial Bid Form. Price Proposal. Bid Prices and Schedule of Requirements/Bill of Quantities with corresponding price for each item and the applicable Price Schedules.		
B	Duly signed itemized Price Proposal for Goods offered.		

POST QUALIFICATION ADDITIONAL REQUIREMENTS

Within Five (5) calendar days from receipt by the bidder of the Verbal or Written Notice from the DNDBAC that the bidder has the Lowest Calculated Bid, the bidder shall submit the following documentary requirements to the PNBAC Secretariat:

- i. Latest Income and Business Tax Returns filed through Electronic Filing and Payment System (EFPS);
- ii. Manufacturer's / Supplier's / Distributor's / Contractor's Profile;
- iii. When applicable, the proponent will submit a notarized deed of agreement/contract between the proponent and the Original Equipment Manufacturer and/or the OEM's authorized distributor stating that the latter will supply the proponent the necessary items/services for the completion of the Project in case the proponent is not the OEM or its authorized distributor.
- iv. In case there is/are subcontractor/s, current and valid Business/Mayor's Permit, Tax Clearance, Latest Audited Financial Statement BIR stamped "received" as well as other pertinent licenses

Failure to submit the above requirements on time or a finding against the veracity of such shall be grounds for disqualification of the bidder and the subsequent forfeiture of the bid security.



PHILIPPINE NAVY
NAVAL SEA SYSTEMS COMMAND
NAVAL SHIPYARD
QUALITY AND RELIABILITY ASSURANCE OFFICE
Naval Station Pascual Ledesma, Cavite City

TEST MEMORANDA

Test Memorandum No. 1

Subject: General Requirements

The general requirements together with all the Test Memorandum herein are intended to clarify the procedures in conducting test and inspection of all equipment and materials repaired and manufactured by the production shops to include the farm-out shop repair to ensure that plans, specifications and standards to workmanship, strength, capacity and satisfactory performance of operations are being met, and quality control of the work accomplished being reviewed and evaluated for subsequent improvements. All portion of the vessel and all repairs being made thereon, whether pertaining to Hull, Mechanical & Electrical (HME) systems or other installations shall be thoroughly tested as required herein and as called for the job orders.

Tests required herein fall into two general categories: first Hydrostatic and other Material Test, and second; Equipment operations tests. Hydrostatic (UT, air and kerosene test) and other material tests shall be made to ensure compliance with material specifications and to ensure inherent tests shall be performed to ensure suitability of design and fitness for service intended and to determine operating characteristics of the machinery. Operating test shall be given all operating parts including shipping and unshipping arrangements, lowering and hoisting devices, hinged stanchions, doors, hatches, etc., all materials and parts upon which the safety of the ship or life depend shall be tested to double the working load. Canvass and rigging shall be tested in place. All stowage arrangements shall be tested by trying various articles in place. Shop testing shall be performed on any item, before installation aboardship for final acceptance test in order to correct possible deficiency beforehand. These set of instructions shall not be followed if they conflict with specific instructions applicable to a particular item or equipment.

All tests shall be conducted in the presence of, and in matter satisfactory to the supervisor of production lead shop/contractor or his representatives. He shall make necessary preparations needed to conduct the test. A representative of the Quality and Reliability Assurance Office shall also be present to record all test data, see to it that instructions of these test memoranda are fully implemented as possible and make necessary recommendations to carry out a successful test. Representatives from the contractor / existing shop may be required to be present as necessary depending on the extent of their work on the job or to assist on the operational phase of the test. Representative of the vessel concerned may witness the test at the shop but should be present when test are conducted aboard for acceptance of work. The ship superintendent of the vessel shall be the coordinator of all representatives concerned and shall liaison with ship's force when on board test of job shall be conducted or assistance of ship's force is needed for the test such as dock and sea trials. In special

cases, when considered necessary by higher headquarters, tests shall be conducted in the presence of a representative of AC of NS for Naval Systems Engineering (N10).

The Ship's Superintendent of the repair activity shall notify in advance all concerned inspectors and representatives when any test is to take place at such time for the conduct of QRAO certification. No official tests shall be started without any permission of Quality and Reliability Assurance Officer.

In order to define work of testing and inspections, the contents of these test memoranda are divided into three parts namely:

<u>Memoranda No.</u>	<u>Title</u>
S-1 to S-6	Hull and Deck Fittings
M-1 to M-6	Mechanical
E-1 to E-21	Electrical

The following memoranda cover only tests of major and common repair works performed by our unit through our limited facilities, and in the future, peculiar job not covered by any test memoranda shall be tested as per instructions in the general requirements or additional memorandum shall be published for such as deemed essential.

Test Memorandum No.S-1
Subject: Bottom Hull Inspection

1. Purpose of Test:

This memorandum outlines the procedures for conducting inspection of bottom hull when the vessel is on dry-dock such that all repairs of underwater hull and appurtenances called for by job order/ technical specifications are properly accomplished before undocking and hence insure the watertight integrity of hull before the ship is waterborne.

2. Test procedure:

a) Preliminary Inspection:

At least one day before undocking, Production personnel will issue request to QRAO for a personnel to conduct a visual examination of the ship's bottom hull; checking that the renewal of butt joints are properly welded are all completed, all underwater appurtenances and appendages are called for repair by job orders are accomplished. Make sure that all bottom plugs are replaced; all drill test holes that were made should be completely covered and welded; all propellers and rudder posts are, properly installed; zinc plates are adequately placed based on the design plan with necessary jumpers not painted or greased, all paints on the zinc plates shall be removed; struts and strut bearings with their foundation bolts rigid on the hull, shaft packing glands are tightened enough with necessary packing; sea chest and sea chest valves are to be reinstalled and cleaned, double planking cemented on frame ends and item head and between all faying surface where water tightness is a must, etc. shop concerned should be notified by Ship Superintendent to make any correction on any deficiency discovered in due time.

Painting of bottom hull shall be thoroughly dry with proper paints and the number of coating called for by the job order accomplished. Make sure that boot topping area, load lines and draft marks are distinctly indicated.

b) Watertight Test:

After flooding has begun to undock the ship, joined close observations should be made by Project Officer, Ship Supt, shop concerned/yard and the ship's force stationed to observed leakage at various compartments. Particular attention shall be focused on welded seems of steel plating, packing glands of shafting and rudder posts, and portions of hull which are repaired. Any leaks that may develop shall be reported at once to the Docking Officer in sufficient time to stop flooding. If found necessary such that the leakage is beyond control; the Docking Officer shall pump up the vessel again. Minor leaks seepage should be corrected on the spot upon launching. After three days all bottom compartments shall again be inspected by ship force. Where seepage has not ceased, correction shall be made in workmanlike manner, including hauling out of ship, if required. Sea valves shall be operated and tested for fitness in the service when the ship is waterborne. Any deficiency noted shall be corrected on the spot by shop concerned.

c) Conduct bouncing operation prior undocking of the vessel:

VESSEL: _____
JO NO: _____
TITLE: _____

DATE: _____

BOTTOMHULL INSPECTION

1. Preliminary Inspection:

a) Steel Hull/Wood Hull

Keel	
Bilge Keel	
Sonar Dome	
Pit log Sword	
Fathometer Receiver & Exciter	
Bottomhull Plugs	
Skeg	
Shafting	
Fairwater	
Packing Glands	
Strut Bearing	
Zinc Plates	
Propeller	
Rudder	
Rudder Post	
Rope Guard	
Sea Chest	
Drill Holes	

Sheathing	
Keel	
Keel Shoes	
Zinc Plates	
Jumpers	
Shafting	
Fairwater	
Packing Gland	
Struts	
Strut Bearings	
Propellers	
Rudder	
Rudder Post	
Fathometer Receiver & Transmitter	
Ground Plates	
Sea Valves	
Drill Holes	

b) Paintings:

No. of coatings	
Kind of Paints	
Load Lines	

Dryness	
Draft Marks	

2. Water Tight Test/Kerosene test:

Remarks:

a. Upon undocking: _____

b. Three days later: _____

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum No. S-2

Subject: Deck, Bulkhead, Overhead, Free board and Superstructure

1. Purpose of Test:

This test memorandum outline the procedures for conducting on deck, overhead, compartments bulkheads and superstructures when they are renewed or any part is repaired to preserve the watertight integrity of vessel's hull as a whole.

2. Preliminary Inspection:

Test shall be conducted when the job is completed. All structures steel shall not be painted other than the prime coat which shall be thoroughly dry. Any paint in way of joints which interfere with satisfactory test shall be scrapped off. Permanent doors, hatches, manholes, fittings, etc., shall be in place during the test and same degree of tightness shall be realized for same as structural works.

3. Test procedures:

There are two (2) means of determining material condition of watertight boundaries and compartments when conducting 'tests and inspections.

a. Hose Test

All tests shall be made, with fresh water. Salt water is prohibited. Test shall be conducted under weather conditions other than freezing.

Hose diameter shall not be less than 1 ½ with nozzle of not less than one half 1/3 inch diameter. Hose shall be held not over ten (10) inches from the joint or portion repaired which is under test. Test pressure shall not be less the 50 psi at nozzle.

Leaks are frequently evident: at loose rivet heads, poorly welded or caulked plate laps or stiffeners and poorly bounding angles.

b. Kerosene Test

During production welding, personnel from steel hull shop shall provide and apply kerosene on newly welded portion of the hull structure to certify their completion of works. Let it stand for overnight. Leaks are frequently evident at loose rivet heads, poorly welded plate laps or stiffeners and poorly bounding angles.

Visible leaks or penetration either structural or through poor closures of dogs, bolts, fittings, etc shall be welded and made good and the test repeated until proven tight.

c. Chalk Test (Water tight enclosure/doors)

d. Air Test and Visual inspection

Note: No air test shall be made on compartments without any schedule or approval by the commanding officer, SRFC / GAS FREE ENGINEER-(Safety Officer).

All regular closures shall be secured if the bulkheads are pierced by any rotating shafts or other moving parts, the packing device provided shall be set up in order to hold the air test pressure. It shall be slackened after the air test. Test instruments such as manometer, relief valve and supply valves shall be checked prior to installation and seating properly adjusted. Turn supply air pressure on until the desired test pressure is obtained in the compartment as indicated on manometer. Note for any pressure drop. Leak of any size will be manifested by the hissing or whistling of escaping air, and are to be marked and reported for immediate repair. Should all allowable drops continue to be exceeded after such leaks are repaired, a soap solution is to be applied to the boundaries, joints, fittings and closures. When air pressure is again applied, bubbles will be formed by the escaping air indicating location of leaks. These shall be repaired when discovered and the test repeated until satisfactory.

Make certain that temporary closures are removed from overflows, air escapes, air vents, and other fittings when air test is completed.

VESSEL: _____ **DATE:** _____
JO NO: _____
TITLE: _____

DECK, OVERHEAD, SUPERSTRUCTURE, FREE BOARD AND BULKHEAD

1. Preliminary Inspection:

Condition

2. Kerosene Test:

ITEM	FRAME	DATE	REMARKS

3. Chalk Test:

ITEM	FRAME	DATE	REMARKS

General Remarks:

LEGEND: U – Unsatisfactory S – Satisfactory N - Not Tested

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum No. S-3

Subj: Storage Tanks (Pressure and Non-pressure)

1. Purpose:

To define procedures of conducting test and inspection of storage tanks whenever repaired or renewed/manufactured to insure that plans, specifications and standards as to workmanship, strength, capacity and satisfactory performance of operation are met.

2. Test procedure:

a. Preliminary inspection

1) During this stage, thorough visual inspection shall be conducted on the tank structure and fittings prior to testing. In order to check for the cleanliness of tank.

2) Ensure that all temporary caps, plugs or blank flanges shall be fitted to opening as required.

b. Conduct of Air Test

1) Steel hull shop personnel shall ensure that the tank for shop test shall be arranged such that all joints and fittings are visible and accessible for inspection. And insure that the instrument used shall be clean and dry for proving absolute tightness.

2) For tanks while installed aboardship, the test instrument/fixtures/equipment shall be as accessible and visible.

3) Each tank shall be air tested to the specified air pressure.

4) Air pressure shall be applied gradually on the tank, in order not to damage the tank.

No drop in pressure shall occur. In the event of pressure drop, evidence of leak shall be observed and located with the use of soap suds applied on the tanks seams, flanges and fittings. Where leaks occur through observation of bubbles, deficiency shall be corrected and test repeatedly. The tanks must be capable of maintaining specified pressure for duration of one (1) hours without drop.

d) Hydrostatic Test

1) Non-Pressure Tank

a) Non-pressure tank for hydrostatic test at shop shall be arranged such that fittings are visible and access for inspection shall be clean and dry for proving absolute tightness.

b) For tanks while installed aboardship, the test instrument/fixture/equipment shall be accessible and visible.

c) Tank shall be filled to full capacity and observe for leak as indicated by, reduction of water level and visible traces on surface seams, joints, flanges and fittings.

d) Decrease in static pressure on gage attached on lower most portion of tank.

e) Water level or corresponding pressure shall be maintained for two hours.

2) Pressure Tank:

a) Tank shall be arranged such that all surfaces, joints and fittings are visible and dry for proving absolute tightness.

b) Test instrument/fixture/equipment shall be as accessible and visible.

c) Tank shall be filled to full capacity and specified pressure head created by use of riser pipe or vertical hose extended or equivalent pump or air supplied gradually. No drop of pressure head must occurring event of drop in head, trace and locate evidence of leak and correct deficiency. Test shall be repeated until tank is capable of maintaining specified head without any drop for one (1) hour without any drop and to reach a stabilized state with a number of personnel in the vicinity of the tank and then lowered to a required minimum pressure.

STANDARD AIR TEST PRESSURE	
P/S RUDDER	3 - 5 PSI
L. O TANK (PORTABLE)	2 PSI
L O, F O, PEAK TANK	3 - 5 PSI
SUMP TANK (PORTABLE)	2 PSI
M. E. MUFFLER	2 PSI
F. O. DAY TANK	3-5 PSI
VOID & EXPANSION TANK	3-5 PSI
FLAG BULB	5 PSI
L. O. STORAGE TANK	2 PSI
REDUCTION GEAR (AIRFLEX)	3 - 5 PSI
F. W. & AIR TANK	3-5 PSI
PRESSURE TANK	3-5 PSI
F. O. F. W. & L. O. TANK (15 LST)	15 PSI

HYDRO TEST	
F. W. PUMP	40 - 45 PSI
EXHAUST MANIFOLD	50 - PSI
F. W. PIPE	100 - PSI
CYLINDER HEAD (HOT WATER)	45 - 80 PSI
PIPING SYSTEMS	100 - PSI
FLEXIBLE PIPE OF M.E.	30 - PSI
L. O. TRANSFER PUMP	60 - PSI
F. W. COOLER (NEW)	50 - 60 PSI
L. O. COOLER	80 - 90 PSI
ELBOW PIPE	50 - PSI
F. W. CIRCULATING PIPE	80 - PSI
L. O. PIPING SYSTEM	80 - PSI
SANITARY PIPINGS	100 - PSI
FIREMAIN PIPING SYSTEM	100 - PSI

VESSEL: _____ **DATE:** _____
JO NO: _____
TITLE: _____

STORAGE TANKS (Aboardship)

Ref: Test Memorandum Nr. S-3

A. Description and condition of Tanks

TYPE OF TANKS	LOCATION	CAPACITY	REMARKS

B. Preliminary Inspection

1. Prior to test, a thorough visual inspection shall be made on the pressure vessel structure and fittings to ensure that it is ready for test.

Satisfactory
 Unsatisfactory

2. Temporary caps, plugs and blank flanges shall be fitted to openings as required.

Satisfactory
 Unsatisfactory

C. Test Procedure

- Test air pressure or pressure head of ___ Psi equal to _____ time the designed working pressure shall be applied gradually on tank for a period of 30 minutes.
- At test pressure, no drop in pressure/head reading shall occur. Evidence of leaks shall be observed from the tank seams and fittings and/or bulging of the tank shall be observed carefully and recorded under "test result".
- The specified pressure shall be maintained without any drop.

D. Test Result:

Type of test () Air test () Hydrostatic Test

Tank No.	Designed Working Pressure (psi)	Test Pressure (psi) / Head (ft) Applied	Duration	Remarks

E. GENERAL REMARKS:

Satisfactory

Unsatisfactory

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum No.S-4

Subject: General Requirements Test of Piping

The general requirements, together with all the Test Memoranda herein, are intended to clarify the procedures of conducting test and inspection of piping systems to insure that plans, specifications and standards are to workmanship strength, capacity and satisfactory performance of operation are being met. Piping installation tests are conducted at shop and aboardship in general, to be performed prior to dock trial of the vessel and service test during dock and sea trials.

The sequence in which these tests are run will be governed by condition existing on the vessel. The Ship Superintendent shall notify the QRAO personnel in advance of any proposed tests to enable them to prepare and witness each test as deemed required.

All equipment such as coolers, strainers, etc., are to be tested individually and within the. In equipment such as coolers pressure should be applied to one system at a time so that the unit may be checked for internal leakage separately.

The pressure specified on the piping system shall be maintained for sufficient time to permit an adequate and detailed inspection of the system as well as repair the leaks that occur. In case where it is necessary to remove the pressure to effect repairs, the test pressure is applied again after the leaks have been repaired. The following are the tests to be conducted to the piping system.

A. Hydrostatic Test:

The piping shall be tested as with following condition:

1. Circulating water piping (Fresh and salt) shall be tested at 150% of working pressure or 50 lbs, whichever is greater.
2. Diesel oil piping shall be tested to 100% of Working pressure but not less than 100 psig.
3. Condensate piping shall be tested to 100% of working pressure.
4. Fire system, flushing and sanitary piping shall be tested at pressure of the fire system or if connected to the system, otherwise to 130 psig.
5. Lubricating oil piping shall be tested at 200% of the working pressure.
6. Hydraulic oil piping shall be tested to 150% of working pressure.
7. Main steam piping shall be tested at 150% of the working pressure.
8. Auxiliary steam piping shall be tested at 150% of working pressure, followed by steam test at 125% of the working pressure.
9. Boiler blower piping shall be tested to 100% of the working pressure or operationally with steam at 125% of boiler pressure.
10. Bleeder steam piping shall be tested at the maximum pressure under full load conditions.

B. Air Test:

The pressure will be observed and all leakages shall be corrected. The piping shall be tested as follows:

1. Air piping system shall be tested with an air pressure at 100% of the working pressure. Static drop shall be tested with air at 100% of working pressure for one (1) hour.
2. Bilge and ballast piping shall be tested with air at 100 lbs pressure.
3. Engine exhaust piping, auxiliary diesel engine is to be tested with air to a pressure of 50 psig.

C. On All others:

1. Sounding tubes & air escapes shall be tested with tanks.
2. Refrigerating plant pipings (Freon) shall be tested with a mixture of dry seal tube nitrogen or with suitable gas, Freon at 250 psig.

Test Memorandum Nr. S-5

Subject: Deck Fittings

1. Purpose of Test:

This test memorandum sets the standard of workmanship on various deck fittings repaired or renewed for satisfactory accomplishment of work.

2. Test Procedure:

a. Mast & Rigging

Running rigging shall be checked for free operation and standing rigging for proper adjustment. Ladder rungs, light and radar foundation shall be checked for proper location and secured fastenings. Sheaves, pins, shackles, etc., shall be inspected for proper fit and operation. Any obstruction, fittings, weld, burrs, wires, cotter pins along the mast shall be checked and corrected because they are hazardous to personnel, flags, etc.

b. Boat & Life Raft stowage:

The boat shall be stowed to demonstrate satisfactory design and functioning of all stowage fitting and facilities. Life raft shall be shipped and unshipped to demonstrate satisfactory operation of all stowage fittings and facilities.

c. Portable Davit:

Portable davit for boat, anchor, ammo, etc, shall be tested to twice the working load. The proof load shall be hoisted clear of all supports and held suspended for a period of at least 10 minutes to be followed by a rotating test under one and one-half (1 ½) times the working load. Davit shall be proven for interchangeability by fitting in each socket and shall be stowed to demonstrate satisfactory design and functioning of all stowage fittings.

d. Life Lines & Canvas:

All canvas of every description; both in the weather and below deck and all stanchions, lifelines are to be tried in place. All items shall be investigated for satisfactory workmanship and suitability; adequate strength and rigidity; watertightness, clearance, etc.

e. Watertight Doors, Hatches and Manholes:

In addition to test memorandum Nr. S-2 for tightness and strength, all closures shall be operated as necessary to demonstrate thorough reliability and effectiveness in every detail; all closures of whatever nature shall be tested by opening and closing or raising and lowering each door and hatch a sufficient number of times to demonstrate reliability and satisfactory operation and shall also demonstrate proper adjustment and suitable details for the purpose intended.

All operating gear of hatches, doors and scuttles should be clear of the opening when in the open position. The operating mechanism should be such that the dogs will not be released by gun blast or ship vibration.

f. Locks, Keys and Tags:

Inspection of all locks on doors, lockers, safers, etc., shall be made to insure proper tagging of keys, their fit in locks, proper operation of locks, etc., and installation in a tamper proof manner. Key locker must be inspected and proved adequate to accommodate all keys.

g. Miscellaneous Stowage:

Stowage of all spare parts, tools and loose articles of equipment, etc., shall be checked for possible interference and accessibility.

VESSEL: _____ DATE: _____
JO NO: _____
TITLE: _____

MAST, FLAG AND JACK STAFF

Ref: Test Memorandum No. S-5

1. Mast General:

- a. Does all running rigging operate fully? _____
- b. Is the standing rigging properly adjusted? _____
- c. Do all sheaves, pins, shackles, etc, fit and operate properly? _____
- d. Are all ladder rungs secured? _____
- e. Are there any obstructions, fittings, welds, burrs, wires, cotter pins, etc., which may be hazardous to personnel, flag etc? _____
- f. Any twisting of mast? _____
- g. Is the yard arm squarely aftwardship? _____
- h. Is the yard arm leveled aftwardship? _____
- i. Are there any loose bolts or fitting? _____

REMARKS:

2. Flag/Jack Staff:

- a. Is the staff erected vertically in the centerline plane of the ship? _____
- b. Are the braces secure and free of vibration? _____
- c. Is the stern light free of vibration? _____
- d. Are the staff ~ braces readily portable? _____
- e. Are there any obstructions, fittings, welds, burrs, wires, cotter pins, etc., which may be hazardous to personnel flags etc. _____

REMARKS:

3. Portable Davit:

Static Test:

- a) Does davit rotate fully? _____
- b) What safe working load is indicated on label plate? _____
- c) Load the davit tackle with twice the above load _____
- d) Does the deck pad shift? _____
- e) Upon removal of load, is there any permanent distortion? _____

REMARKS:

4. Lifelines & Canvas:

a) Canvas

- 1) Report all fitted canvas covers, lashings, lacings, hooks, poles; etc., not in order.
- 2) Is all exterior canvas sufficiently rigged to withstand weather?
- 3) Are there any inadequately supported areas which may trap water?
- 4) Are the sections of awnings in way of gun elevation, readily removable without disturbing the remaining sections?

REMARKS:

b) Life Lines

- 1) Report all life lines, rails, braces and stanchions not erected on a faired line.
- 2) Are they all secured and free of vibration?
- 3) Report all "portable" life lines, rails, stanchions, etc. that are not easily removed and reshipped.
- 4) Are all fittings, servings, wire etc •• fabricated in a neat in seamanlike manner?
- 5) Report any slack life lines:
- 6) Report any stiff life lines:
- 7) Report all fittings, welds, burrs, wires, cotter pins, etc, that may be hazardous to personnel.

REMARKS:

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum No.M-1

Subject: Post Repair Trial

1. Purpose of Test:

Post repair trial shall be performed whenever the machinery of a vessel as undergone extensive overhaul, repair or alteration, materially affecting the power or responsibilities of the vessel or the machinery; or whenever the machinery has undergone partial overhaul or repair to such extent and character, as to test the efficiency of the work or the resulting effect upon the power or capabilities of the parts repaired, upon the vessel or machinery as a whole which is necessary to make the vessel ready for use. Repairs such as undocking, re-balancing of propellers and rudders, realigning of steady rest bearings, inspection of reduction gear, overhaul of main engines, etc, materially affect the power or capabilities of the vessel.

2. Test Procedures

a) General:

A satisfactory dock trial shall be conducted before the post Repair run in which persons concerned on the efficiency of the repairs made when moored alongside a wharf or pier of considerable strength whose depth of water is sufficient enough not to foul the ship's propeller or engine cooling system. Mooring lines should be doubled, the adequate enough to check any way of the vessel. Proper procedures to start the engine should be followed and the engine should be thoroughly warmed up before applying the load. Load on the engine shall be applied in the reverse direction that is, if one engine shall be on ahead one-third speed the other shall be on astern one-third speed. This is to minimize the unnecessary strain on the lines and hence on the pier or wharf. Load on the engine shall be reversed every ten (10) minutes and the set of test data shall be recorded. Dock trial run shall be made in about one hour time and unsatisfactory condition such as unusual noise, vibration, overheating of bearings, smoky exhaust, etc., shall be recorded and corrected as necessary. The post repair trial shall be conducted by ship's force with all shops persons concern assisting. A thorough warming up of the main and auxiliary engines or whatever equipment that was repaired will be made to warm up before applying a load. Loads shall be gradually increased until full power load. Full power load on the unit that had been repaired shall construed 90% of the maximum noted load. The trial be carried out in the free route at sea, the water whose approximate minimum depth is seven times the maximum draft of the ship during the trial of four tenths times the length of the ship, whichever is greater. Test shall be conducted during the trial on the main propulsion engines, ship's service generators, steering gears, anchor windlass or all other units that have undergone overhaul or repair. Procedures peculiar to some particular machinery shall be followed when testing, not covered by general instructions that follow.

b) Main Propulsion Engines:

Upon reaching open water suitable to carrying out the trial, the engines shall be run at one-third ahead of speed. From one-third ahead of speed, engine speeds shall be gradually increased at increments of 100 RPM every half an hour until full power load. Next increment shall not be increased until the engine is operating satisfactory at the speed. Engine operating data shall be recorded at every increment of half an hour.

The main engines shall be run at full power for three and one half (3 ½) hour. Above test shall be made in ahead and astern operations. Particular note shall be paid to alignment, circulating water inlet and outlet temperature, lube oil temperature and pressure exhaust gas color and temperatures, overheating of shaft bearings and any unusual noise or vibrations.

When necessary to operation and setting of the governor, oil pressure alarm and all other automatic devices shall be checked. The adequacy of the mufflers and intake silencer shall also be noted. For proper operation, reversing engines shall be made to demonstrate twelve (12) consecutive starts without recharging air cylinders and non-reversing engine six (6) consecutive starts with no recharging of cylinders or batteries.

c) Other Units:

All other units repaired as specified by Job Orders shall be tested in accordance with the succeeding memoranda herein or by instruction manual applicable to the particular unit. Operating data and deficiencies shall be recorded and reported.

3. Duties and Responsibilities:

The Ship Superintendent of the vessel shall set the time of the trial; coordinate all shops and personnel concerned to be present during the trial and liaison on same with ship's force. Ship inspector shall record and compile all test data for individual equipment and machinery that had undergone trial.

VESSEL _____
JO NO: _____
TITLE _____

DATE: _____

MAIN ENGINES, DOCK AND SEA TRIALS

1. Preliminary Inspection:

a) Visual Examination:

Foundation bolts tight _____
Pipe Connection all completely installed _____
Cooling Water adequate and bled _____
L.O. system filled and primed _____
Turbo Charger oil level normal _____
F.O. system prime, filter clean _____
Starting and reversing air sufficient _____
Exhaust line opened _____
Engine jacked over one revolution _____
Other _____

b) Name Plate:

Mfr _____ Type /Model _____
Starting System _____ Reversing System _____
Bore x stroke _____ No. of cylinders _____
BHP _____ RPM _____
Latest overhauled _____

c) Operational Test:

Engine Knocking _____
Unusual noise or vibration _____
Clutch Satisfactory _____
Governor operating properly _____
Any overheating _____
Cooling water sufficient _____
Lubrication all right _____
Engine balanced _____
Any misfiring _____
Engine well timed _____
FO system _____
Exhaust Smoky _____
Others _____

LEGEND: U – Unsatisfactory S – Satisfactory N – Not Tested

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

VESSEL _____
JO NO: _____
TITLE _____

DATE: _____

GENERAL REQUIREMENTS, MACHINERY

This test has been performed under close observation to conform with the requirements regarding its performance and quality specifically not covered by any test memoranda about miscellaneous machineries and equipment.

The following data are the actual results of test, and the conclusions and recommendations below are made to correct the unacceptable characteristics re the subject installation.

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum No. M-1-A

Subject: Vibration Test

In here, all newly repaired moveable equipment done by any NSY or contractors' shop shall be subjected to test in order to find out its quality, reliability and assurance of continuous operations. Hence, following testing should be made to the said equipment and it should be based on the vibration severity chart per ISO 10816-1 below:

VIBRATION SEVERITY PER ISO 10816-1					
Machine		Class I small machines	Class II medium machines	Class III large rigid foundation	Class IV large soft foundation
in/s	mm/s				
Vibration Velocity Vrms	0.01	0.28			
	0.02	0.45			
	0.03	0.71		good	
	0.04	1.12			
	0.07	1.80			
	0.11	2.80		satisfactory	
	0.18	4.50			
	0.28	7.10		unsatisfactory	
	0.44	11.2			
	0.71	18.0			
	1.10	28.0		unacceptable	
1.77	45.0				

Source: Vibration Monitoring & Machine Protection Systems 1010 East Main Street, League City, TX 77573
www.stiweb.com/www.stiwebstore.com Tel 281.334.0766 /Toll Free 888.877.7213 / Fax 281.334.4255

Listed below are the Machinery class designations identified to be “Good”, “Satisfactory”, “Unsatisfactory” and “Unacceptable”:

Class I- Individual parts of engines and machines, integrally connected with the complete machine in its normal operating condition.(Production electrical motors of up to **20 HP (15KW)** are typical examples of machines in the category.

Class II - Medium-sized machine typically, electric motors **with 20 to 75HP (15 -75KW)** without special foundations, rigidly mounted engines, or machines on special foundation **up to 400 HP (300KW)**.

Class III - Large prime movers and other large machines with rotating masses mounted on **LARGE rigid and heavy foundations** which are relatively stiff in the direction of vibration

Class IV - Large prime movers and other large machines with rotating masses mounted on **LARGE soft foundations** which are relatively stiff in the direction of vibration measurement (for example, turbo-generator sets, especially those with lightweight sub-structures). This type of classification is commonly used in testing the PN vessels' engine foundation vibrations during sea trial.

Reference ISO 10816-6:1995 (E)

“A/B”- Machines with vibration velocity lower than 28.2 mm/s (rms) are normally considered” acceptable for long term operation”

“C” - Machine with vibration velocity of 28.2 and above but lower than 44.4 mm/s (rms) are normally considered” not acceptable for long term operation”

“D” – Machine with vibration velocity of 44.4mm/s (rms) and above are normally considered” to be sufficient severity to cause damage to the machine”

		VESSEL: PG- _____															
		Job Title: VIBRATION READING/SEA TRIAL dtid _____															
		STBD SIDE							PORT SIDE								
TIME	RPM	DIREC TION	POIN 1	POIN 2	POIN 3	POIN 4	POIN 5	POIN 6	POIN 7	POIN 8	POIN 9	POIN 10	POIN 11	POIN 12	POIN 13	POIN 14	POIN 15
		V															
		H															
		A															
		V															
		A															
		H															
		V															
		A															
		H															
		V															
		A															
		H															
		V															
		A															

Remarks:

1. Maximum speed attained was _____rpm and sea trial was satisfactory.
2.

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

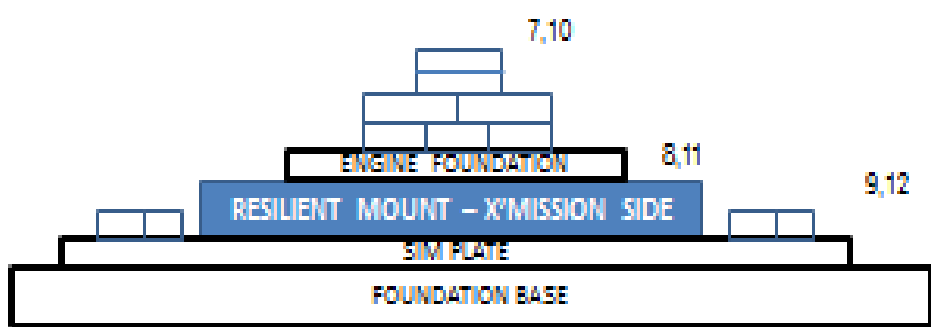
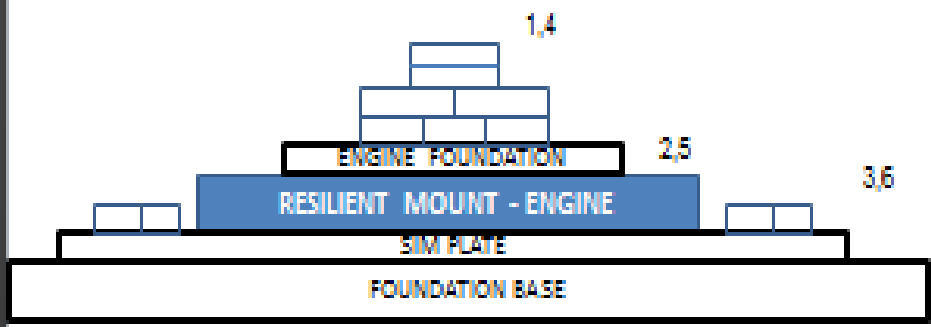
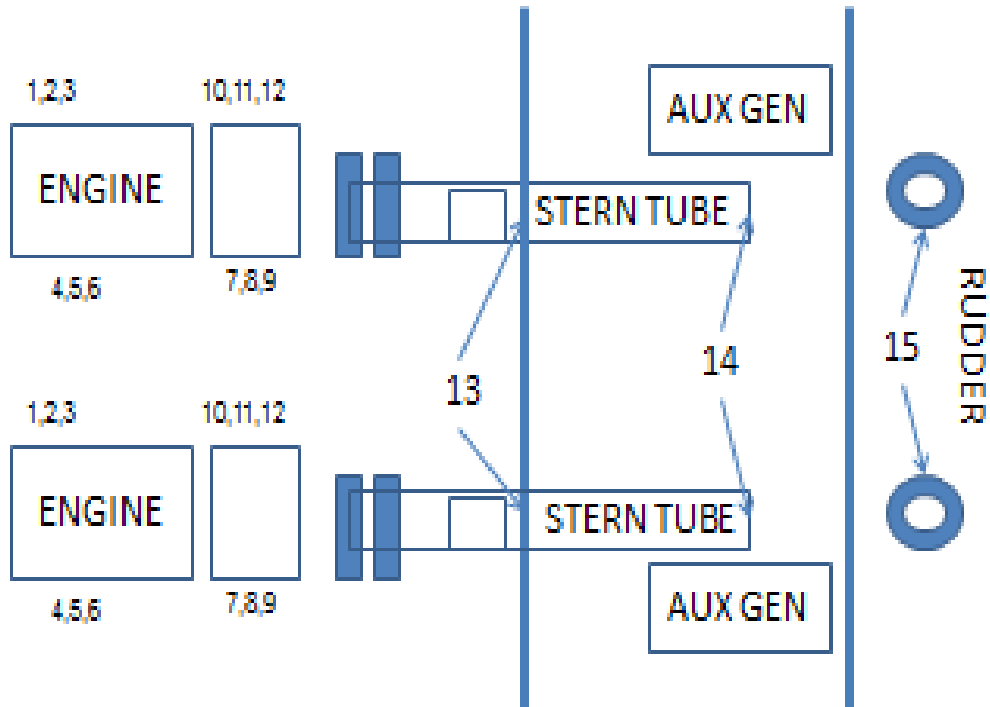
Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

VESSEL : 78 FOOTER PG
 TITLE : Vibration Points



VESSEL _____
 JO NR: _____
 TITLE: SEA TRIAL REPORT

SEA TRIAL REPORT

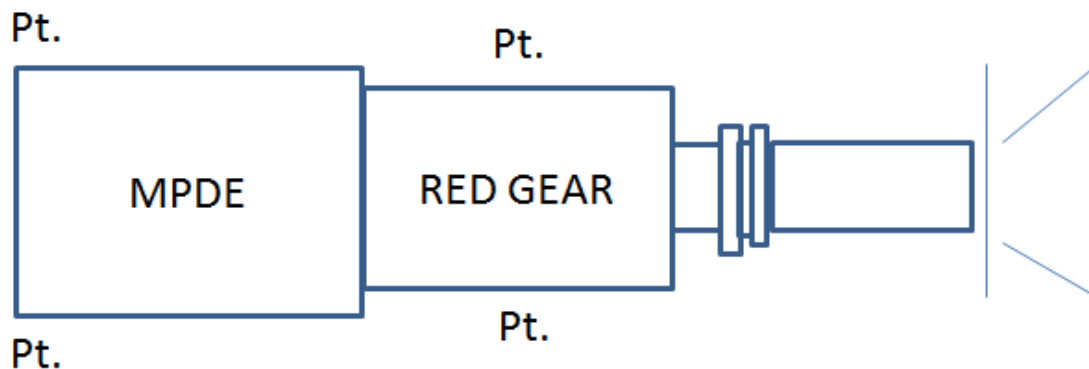
SHIP & HULL NO. / ACTIVITY	NAME OF EQMT OR SYSTEM	TYPE OF TEST
JOB ORDER NO./ AUTHORITY	LOCATION	DATE OF TEST

Vibration Data Taken

TIME	RPM	DIRECTION	MPDE			
			POINT 1	POINT 2	POINT 3	POINT 4
		V				
		H				
		A				
		V				
		H				
		A				
		V				
		H				
		A				

Note:

1. "A/B" – Machine with vibration velocity lower than 28.2 mm/s (rms) are normally considered "acceptable for long term operation."
2. "C" – Machines with vibration velocity of 28.2 and above but lower than 44.4 mm/s (rms) are normally considered "not acceptable for long term operation."
3. "D" – Machines with vibration velocity of 44.4 mm/s (rms) and above are normally considered "to be sufficient severity to cause damage to the machine."



Engine Data taken at engine room monitor panel during Sea trial Opearation

Time	Rpm	Temp	Pressure	Speed (Knots)
		FW	FO Bar	

Pilot House Monitoring gauge

Time	Rpm	Pressure	Temperature	Knots
		LO	FW °c	

RESULT/OBSERVATION:

- a)
- b)

RECOMMENDATION:

- a)
- b)

REMARKS:

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum No.M-1-B

Subject: Post Repair Run for Diesel Engine

1. Purpose of Test:

This test Memorandum outlines the procedure for conducting test and run-in of diesel engines to prepare the engine for durability and reliability during operations:

2. Procedure:

a) Starting Preparation (after cylinder overhaul)

If the engine has been for repairs and if any major replacements had being made, it is good practice to run the engine slowly for a short time from 5 to 10 minutes and with frequent inspection, to determine just how the replaced parts are functioning. If all indicators are registering normal operations, the engine RPM should be increased gradually up to 70% of the rated engine RPM.

When repairing the engine for operation after it has being overhauled or after a long period of idleness, the following major items of the installation should be inspected.

1) Check carefully the complete installation making sure that all foundation bolts are tight and all pipes connection are correctly made.

2) Check level of water in the FW expansion tank and see that it is correct.

3) Check level of LO in the sump tank and see that it is in the proper level. Prime LO system to ensure that all bearings etc., are well lubricated before the engine is started. Prime the system until a pressure is indicated on the upper header LO gauge

4) Rotate engine several revolutions with bearing device and make certain that all parts move freely and that there are no obstructions.

b) Starting and running instruction (after cylinder overhaul)

Pressure is indicated within approximately (10) seconds

1) As soon as the engine starts, check the LO pressure. If pressure is indicated within approximately (10) seconds stop the engine and determine the cause. Check the SW & FW pressures to make sure that water is being circulated.

2) After the engine has been brought up to speed, check the gauges for the following:

- a) LO Pressure
- b) FW pressure of engine
- c) SW pressure to cooler
- d) FO pressure in supply manifold
- e) Exhaust Temp. of all cylinders
- f) Scavenging air pressure

The temperature of the LO leaving the engine normally should be maintained between 140F and 180 F of all load and speed. The temperature of the circulating water leaving the engine should be maintained between 140 F and 170 F at all load and speed.

3) Check all pipings for leaks.

4) Be on alert for unusual sound and noises. If any will be heard, stop the engine immediately and investigate.

c) Run-in Procedures

The purpose of a run in schedule is to properly where in new install during overhaul or repair so that the engine is ready for rated for power operation in service.

1) Running in at no Load – primarily for the purpose of running In bearings and connecting rod bushing. No appreciable seating of new piston ring result from running in at no load.

Main LO temperature of engine at 120 °F or below during the entire run in period at no load in order to keep the temperature of the engine down so that all parts of the engine maybe felt by hand.

RPM	TIME	LOAD	CHECK
300	1 min.	No load	Any parts
300	1-15 min.	No load	Any parts

2) Running in under load- which gives higher cylinder and piston temperatures and pressures for the primary purpose of seating new piston rings. Some additional wearing of new bearings and connecting rod bearings are also accomplished when running under load.

Check the running in of bearing and connecting rod bushing by feeling for heat is by method for checking bearings and bushing.

d) Run in Schedule

The following run-in schedule set forth the requirements which showed the carried out when running in an engine following a complete overhaul of installation of new piston, piston pins or liners. When bearings only are replaced, the last eight hours of the run in maybe omitted.

1) Open for engines rated at other than 720 RPM, the same number of the reduced speed runs should made at proportional speed starting at 300 RPM.

SPEED	TIME	LOAD
300	1 min.	no load
300	5 min.	no load
350	10 min.	no load
450	10 min.	no load
550	20 min.	no load

650	30 min.	no load
720	1 hr	no load
720	1 hr	20% load
720	1 hr	30% load
720	2 hrs	50% load
720	2 hrs	70% load
720	3 hrs	90% load
720	3 hrs	100% load

a) Check the bearing for overheating after the no load and road runs also piston rings and cylinder liners thru the ports.

b) All checks are to be made the completion of the load run and after Operating for 10 – 15 minutes at the next higher load run.

c) Return to previous runs if the engine condition is doubtful.

d) Check all gages for normal pressures and temperatures and listen for abnormal sounds.

2) (For engines rated at other than 850 RPM, the same number of reduced speed runs should be made at proportional speed starting at 300 RPM)

SPEED	TIME	LOAD	CHECKS
300	1 min.	No load	As mentioned on a, b. c, & d above
300	5 mins.	- do -	
325	20 mins	- do -	
350	30 mins	- do -	
375	1 hr	- do -	
400	2 hrs	- do -	
425	2 hrs	- do -	
450	2 hrs	- do-	
500	2 hrs	10% load	
550	2 hrs	20% load	
600	2 hrs	50% load	
650	2 hrs	75% load	
720	2 hrs	90% load	
850	2 hrs	100% load	

3) Propulsion Units with Reverse/Reduction Gears rated at 850 RPM (for engines at other than 850 RPM at same number of runs should be made at proportional speed starting at 300 RPM).

SPEED	TIME	DRIVEN UNIT	CHECKS
300	1 min,	disengaged	As mentioned on a, b, c and d above
300	5 mins	- do -	
325	20mins.	- do -	
350	30 mins	- do -	
375	1 hr	- do -	
400	2 hrs.	- do -	
425	2 hrs	- do -	

450	2 hrs	- do -
500	2 hrs	- do -
500	2 hrs	- do -
600	2 hrs	- do -
650	2 hrs	- do -
720	2 hrs	- do -
850	2 hrs	- do -

After the run-in has being completed and final check of the engine made, the engine is ready for extended operation.

MAIN PROPULSION AND AUXILIARY EQUIPMENT

- a) NAVSHIP Technical Manual, Chapter 094 & 233
- b) NAVSHIP 0341-505-6100

Encl: Operating test data for Main Propulsion Engine

1. Purpose: To a certain satisfactory performance of the main engine after overhaul and satisfactory completion of dock trial.

2. General:

a) The sea trial shall be conducted after the satisfactory accomplishment of the dock trial. It shall be carried out at free route at sea with a minimum depth of 12 fathoms.

b) The ship superintendent shall coordinate the preparation of the ship for the accomplishment of the sea trial.

c) The ship's force shall conduct the trial with the assistance of the production shop designated by the job order.

d) The trial shall be conducted slowly on the main propulsion engine. The engines shall be observed for unusual noise, undue heating, objectionable vibration and other side of unsatisfactory operating condition.

3. Sea Trial Procedure:

a) Main propulsion machinery

1) After clearing traffic and reaching often water suitable for carrying out the sea trial, operate the propulsion machinery in accordance following schedule of run:

Observation	Engine RPM	Duration	Remarks
Ahead	350	15 mins.	Record one (1) set of data in Encl (1) every 15 mins.
Ahead	500	30 mins	- do -
Ahead	650	30 mins	- do -
Ahead	700	30 mins	- do -
Ahead	750	60 mins	Record one (1) set of data

			15 mins.Interval. Take vibration survey on main engines, red gears and underwater machinery.
Ahead	800	60 mins	- do -
Ahead	850	60 mins	- do -
N E U T R A L			No data required
Astern	450	1 min	- do -
Astern	550	1 min	No data required
Astern	650	1 min	- do -
Astern	750	1 min	Record one (1) set of data

Notes:

1) Acceleration and declaration shall be made in accordance with the Standard operating practice.

2) The speed and time duration is subject to charge at the discretion of ship's Commanding Officer.

b) During sea trial:

1) Observed the propulsion engine for unusual noise, on due heating objectionable vibration and any other unsatisfactory operating condition.

2) If as a result of the trial, any defect of maladjustment is discovered, such defect shall be directed and trial repeated until the condition of the propulsion engine is found to be in satisfactory operating condition.

SCHEDULE OF RUN

Operation/ Engine Order	Engine RPM	RPM	Duration	Remark
Ahead 1/3	500	201	15 mins	Record one (1) set of data In encl (1) every 15 mins.
Ahead - 2/3	575	231	30 mins.	- do -
Ahead - Std	650	262	30 mins.	
Ahead - full	700	282	60 mins.	
Ahead – flank	750	302	60 mins.	Record one (1) set of data in 15 min interval. Take vibration survey on main engines, red gears and under water machinery
NEUTRAL	400			
Astern – 1/3	400	158	1 min.	No data recorded
Astern – 2/3	500	198	1 min.	- do -
Astern – full	550	218	1 min.	- do -

Notes:

1) Acceleration and deceleration shall be made in accordance with the standard operating practice.

2) The speed and time duration is subject to change at the discretion of the ship's Commanding Officer.

c) If as a result of trial, any defect or maladjustment is discovered such shall be corrected and trial repeated until the condition of the machinery is found satisfactory for sea trial.

4. Result of Sea Trial

a) No. 1 Main Propulsion Engine

() Sat () Unsat

REMARKS:

b) No. 2 Propulsion Engine

() Sat () Unsat

REMARKS:

c) Fwd Reduction Gear

() Sat () Unsat

REMARKS:

d) Aft Reduction Gear

() Sat () Unsat

REMARKS:

e) Shafting and propeller

() Sat () Unsat

REMARKS:

f) Main Engine Control Mechanism

Port	<input type="checkbox"/> Sat	<input type="checkbox"/> Unsat
Stbd	<input type="checkbox"/> Sat	<input type="checkbox"/> Unsat

REMARKS:

h) Steering System

<input type="checkbox"/> Sat	<input type="checkbox"/> Unsat
------------------------------	--------------------------------

REMARKS:

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum Nr. M-2

Subject: Test of Low Powered Diesel and Gasoline Engine

1. Purpose of Test:

This memorandum outlines the procedures for conducting test of low powered diesel and gasoline engines with emphasis on auxiliary units.

2. Test Procedure:

a) Preliminary Inspection:

Before starting the engines a thorough inspection shall be made to insure that the lubricating, cooling and fuel systems are properly filled and primed.

The engine should be jacked normally at least ten complete revolutions to ensure freedom of moving parts.

Start engine by use of starter and idle the engine for at least 10 minutes. The engine should then be inspected carefully for imperfect or unsatisfactory operation such as faulty combustion, incorrect timing, insufficient cooling water, low pressure smoky exhaust knocking or successive vibration, unusual noise, sticking of valves or injectors, signs of laboring, etc. This should be corrected immediately before proceeding with test.

The engine shall be loaded gradually, and the loading shall be covered by the type of load the engine is carrying.

b) Operational Test.

– Auxiliary Engines

1) Preliminary inspection of the generator shall be as per memorandum on electrical test. Necessary air gap measurements, insulation resistance test and visual examination should be made.

2) Upon starting the generator, all control and safety devices shall be set and final settings checked five times, recording the results. Any periodic speed and voltage fluctuation with no load and 20% full load on the generator shall be noted. The maximum allowable periodic variation in speed when operating at no load and rated RPM $1 \frac{1}{2}$ on either side of mean speed. The periodic variation in the speed of the prime mover at no load shall not vary the generator voltage of 120 volts from the mean. The periodic variation in the speed of the prime mover under any constant load between 20% and 100% full load shall vary the generation of 120 volts from the means.

3) After warming up sufficiently, the engine shall be operated at full speed to attain steady operating condition. Test data shall be recorded at 15 minutes intervals. Bearing or lube oil temperature shall exceed 176 degrees F. Temperature of cooling salt water overboard shall exceed 176 degrees F to avoid salt precipitation. Run in period shall then be conducted from four (4) to eight (8) hours.

4) The generator load shall be increased from no load to 4 KW load in 24 seconds increments every 15 minutes. A four set of data for each load shall be recorded. The unit control shall be adjusted to rated speed and voltage for the initial condition and then left alone.

5) The generator shall be operated at full KW until three successive set of temperature at 15 minutes interval indicates that all temperature become constant.

6) A two or more generators are to be tested; they shall be operated in parallel, recording data as per data sheet. The unit control shall be adjusted to rated speed and voltage for initial condition and then left alone. Two or more generator of same rating operating in parallel under load 20% to 100% of full load of combined rating, the maximum difference in current of one machine shall not be more than 20% of rated current of one generator.

7) The voltage regulator, if installed, shall then be tested with a sufficient number of times to ensure satisfactory operation. This can be done by varying the connected load to stimulate variations. As in actual services, satisfactory regulation normally by use of field rheostat shall also be checked.

8) Insulation resistances shall than be made upon completion of above tests with generator and its accessories hot and then cold.

– Small Boat Engine

1) The engine should be started with gear shift lever in neutral position. After the engine has warmed up sufficiently engage the propeller and operate the boat on ahead slowly at first and gradually incoming to full speed at increase to 100 rpm every 15 minutes. Operate at full speed for sufficient length of time to permit steady operating conditions with test data recorded at 15 minute intervals.

2) Upon conclusion of ahead run, operate boat astern for a sufficient length of time. Bearing of low temperature shall not exceed 175 F. Overboard cooling water temperature shall not exceed 150 F to avoid salt precipitation.

– Gasoline Engine

1) After the engine has warmed up sufficiently, speed to about 75% of rated RPM, the engine shall be operated successive readings of lube oil and cooling temperature have leveled off. Data should be recorded every 15 minutes.

2) Gradually increased speed of engine to rated speed and run it for 5 minutes. One set of data shall then be recorded.

3) If the engine is equipped with a clutch and transmission, operate at slow, half and full speed for satisfactory performance.

4) Load test shall not be more than one (1) hour unless necessary to check satisfactory operation. Any overheating and any unusual noise shall be carefully checked and hence corrected. The unit shall be checked after it is secured, any unsatisfactory items noted and method to correct it lagged out.

– Dynamometer Test

Before the test, the following calculations for engine to be tested shall be made.

- 1) Dynamometer RPM
- 2) Engine RPM
- 3) Torque scale reading as found to “Basic run-in chart”

After warming up the engine sufficiently as before, place the engine gear in forward position and slowly open engine throttle until dynamometer speed as per run-in chart of the engine. No is applied at the dynamometer at this time. The torque scale should be set at “0” and dynamometer power absorption unit completely unloaded.

Engine load shall then be increased as in rune-in chart and a data be recorded every 15 minutes.

Dynamometer test is used to be sure the break in horse power (HP) of an engine

CNSY Form Nr. 150-10

VESSEL _____

DATE: _____

JO NO: _____

TITLE _____

SMALL BOAT ENGINE (DIESEL)

1. Preliminary Inspection

Condition: _____

a) Operational Test (3 hrs run at 15 minutes intervals)

Time	Engine Rpm	LO, Press PSI	FO, Press PSI	TEMPERATURE				BAT Chrg Amp.	LOAD
				LO ENG	SW fr ENG	FW fr ENG	Ambient		

Remarks on Operation:

Starting Operation Color of Exhaust Under load _____

Excessive Vibration Acceleration Satisfactory _____

Excessive Noise Gen. Charging Rate Satisfactory _____

Excessive Overheating Any Misfiring _____

Idling Speed-RPM Any Clutch Slippage _____

Governor Operation Satisfactory _____

Governor Maximum Speed _____

Lube Oil Level: Before Test _____ After Test _____

Engine Nameplate Date _____

General Remarks: _____

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum Nr. M-3

Subject: Steering Gear

1. Purpose of Test

This test memorandum outlines the procedure for conducting test of and associated equipment in characteristics its efficient operation and reliability in service.

2. Test Procedure

a) Preliminary Inspection:

For manually operated type of steering gear, all mechanical service shall be inspected for proper installation, noting particularly the cleanliness, alignment, lubrications, fastening and foundation bolts. The steering wheel shall be turned from hard cover and all sheaves, cables, gear parts and etc. are properly working without any objectionable noise. The hole and rudder angle indicators should also be synchronized and make sure that angle indicated is the same as the angle of the rudder.

Test of emergency steering gear shall also be performed for satisfactory operation.

On the all-electric type of steering gear after inspecting the mechanics I futures as above the electric side of the system shall be visually inspected as per general (inspection) instruction of electrical equipment. Necessary lubrication shall be checked, insulation resistance test measured and after the test the various electrical units on motor, controllers, various transfer and interlock switches, etc, shall be observed for any objectionable noise, vibration or overheating.

In addition to the above, the hydraulic portion of electro hydraulic system of steering engine shall be visually inspected. The gears, hydraulic transmission, sump tanks and belts motor system shall be filled with approved clean oil free from dirt, scale or any foreign matter. Make sure that the hydraulic lines and associated units are purged of air and free of any leakage. The ran crosshead should be adjusted as accessory so as to bare against the copper stops at 35-1/2 degrees rudder right or right or left. The variable stroke pump (Holes-show) shall be checked for proper operation such that if can be give the desire variables capacity as needed.

b) Operational Test

– Dock Trial:

With the diesel afloat at the dock, the steering wheel shall be tested by running its main power unit from hard over to hard over (35 degree to 35 degree) for a continuous. Until completion of satisfactory test, the rate of operation of this test shall not be less than with the complete cycles per hour. Necessary electrical and temperature readings shall be taken until temperature level off on 3 consecutive readings. The steering gear shall be operated from all steering stations. Insufficient number of time to demonstrate satisfactory operation. The number of turns at each

steering wheel to put from hard over, maximum force needed to turn the wheel at its run and maximum rate of rudder travel shall be recorded.

– Sea Trial:

When the sea is proceeding ahead at full speed, the steering gear shall be tested by placing the rudder from hardover to hardover at the fastest possible rate. An average of 30 seconds is required. All pressure of hydraulic system should not exceed 1500 PSI.

When the sea is proceeding astern at 60% of full speed, the time required to put from hardover shall be observed. An average time of one (1) minutes is required.

The capability of steering gear to hold and stop rudder of any angle with vessel going fully speed ahead and stern shall also be observed.

The turning circle of ship shall be determined with the rudder hardover both to port and starboard while the ship is normal speed ahead.

VESSEL _____
 JO NO: _____
 TITLE _____

DATE: _____

STEERING GEAR ALL ELECTRIC

1. Preliminary Inspection

a) Visual Examination:

Cleanliness: _____ Alignment: _____
 Setting of Tiller Stops: Port _____ Stbd _____
 Adjustments of Controls and Indicators: _____
 Time required from 35 degree to 35 degree:
 R to L _____ L to R _____
 Maximum rudder angle:
 R to L _____ L to R _____
 No. of turns of wheel from hard over to hard over: _____

b) Nameplate Data:

MOTOR

Mfr: _____ Date of Mfr: _____
 Deck: _____ Frame _____ Side: _____ Ser. No: _____
 Volts: _____ Amps: _____ Type: _____ H P: _____
 Winding: _____ Speed: _____ Duty: _____ Encl: _____
 Additional: _____

MAIN CONTROLLER

Mfr: _____ Date of Mfr: _____
 Deck: _____ Frame _____ Side: _____ Ser, No. _____
 Volt: _____ Amps: _____ Encl: _____
 No. of Main Fuse: _____ Rating _____ Amps. _____
 No. of Control fuse: _____ Rating _____ Amps. _____
 Additional _____

2. Operational Test:

Trial	Rudder Direction	No. of Steering Wheel Rev.	Time Required
Dock Trial			
1	0 to 35 R		
2	35 R to 25 L		
3	35 L to 0		

4	35 L to 35 R		
5	35 R to 35 L		
6	35 L to 35 R		
7	35 R to 35 L		
Sea Trial, Ahead Full Speed (30 sec)			
1	35 L to 35 R		
2	35 R to 35 L		
3	35 L to 35 R		
4	35 R to 35 L		
Sea Trial, Aster 2/3 Full Speed (One minute)			
1	35 L to 35 R		
2	35 R to 35 L		
3	35 L to 35 R		
4	35 R to 35 L		

Pounds pull on steering wheel to start it to turn _____ lbs
 Capability of steering gear to hold rudder at various angles. _____
 Turning circle of ship: _____
 Additional Nameplate Data _____

Test Witnessed and Found Satisfactory:

 Contractor's Representative

 TIAC Inspector

 Project Officer/Ship Supt.

 Ship's Representative

APPROVED:

 QRA Officer, NSY

VESSEL _____
 JO NO: _____
 TITLE _____

DATE: _____

STEERING GEAR (MECHANICAL)

1. Preliminary Inspection:

a) Visual Examination:

Is steering wheel satisfactory? _____ Dia _____ in.
 Is steering wheel shaft satisfactory? _____ Dia _____ in.
 Are wheel shaft bearings well lubricated? _____
 Alignment satisfactory? _____
 Is sprocket chain lubricated satisfactorily? _____
 Tension enough? _____ Alignment good? _____
 Are sprocket wheels satisfactory? _____
 Satisfactory alignment with other sprocket wheels? _____
 Are universal joints satisfactory and well lubricated? _____
 Are gearing satisfactory? _____
 Are steering shaft bearings satisfactory and well lubricated? _____
 Is steering cable satisfactory? _____
 No kink? _____ No abrasion? _____
 Right tension _____
 Are steering cable sheaves properly aligned? _____
 Properly installed? _____
 Condition of pins _____ lubrication _____
 Conditions of quadrant _____
 Remarks: _____

b) Rudder Indicator Check:

Is rudder indicator installed at the steering stand? _____
 What is the initial position error with respect to the rudder? _____
 degrees. Was the error corrected? _____
 What is the condition of rudder indicator mechanism? _____

B. Operational Test:

Trial	Rudder Direction	No. of Steering Wheel Rev.	Time Required
Dock Trial			
1	0 to 35 R		
2	35 R to 25 L		
3	35 L to 0		
4	35 L to 35 R		
5	35 R to 35 L		
6	35 L to 35 R		

7	35 R to 35 L		
Sea Trial, Ahead Full Speed (30 sec)			
1	35 L to 35 R		
2	35 R to 35 L		
3	35 L to 35 R		
4	35 R to 35 L		
Sea Trial, Aster 2/3 Full Speed (One minute)			
1	35 L to 35 R		
2	35 R to 35 L		
3	35 L to 35 R		
4	35 R to 35 L		

Pounds pull on steering wheel to start it to turn _____ lbs
 Capability of steering gear to hold rudder at various angles. _____
 Turning circle of ship. _____
 Remarks: _____

Test Witnessed and Found Satisfactory:

 Contractor's Representative

 TIAC Inspector

 Project Officer/Ship Supt.

 Ship's Representative

APPROVED:

 QRA Officer, NSY

CNSY Test Form Nr. 150-42

VESSEL _____
 JO NO: _____
 TITLE _____

DATE: _____

C A P S T A N

1. Preliminary Inspection:
 Visual Examination:

1. Bolts _____ 2. Alignment: _____
 3. Lubrication: _____ 4. Moving Parts Free: _____
 5. Others: _____

2. Operational Test

Motor		Amperes			PF	KW	Remarks
Time	Rpm	Volt	1	2			
No-Load Test							
1							
2							
3							
4							
5							
Normal Load Test							
1							
2							
3							
4							
5							

Normal Load Test, Capstan:

Length of test, Hoisting: _____ Lowering: _____
 No. of times, Hoisted: _____ Lowered: _____
 Ave. rate of speed, Hoist: _____ Lower: _____

Normal Load Test, Wildcat:

Length of test, Hoisting: _____ Lowering: _____
 No. of times, Hoisted: _____ Lowered: _____
 Ave. rate of speed, Hoist: _____ Lower: _____

Hand Brake:

Travel of chain after applying hand brake: _____
 Action of chain on wildcat: _____

Static Load Test:

Static test load applied: _____ lbs.
Size of manila rope: _____ inch.
Size of wire rope: _____ inch.
Length of time weight was held _____ mins.

Remarks: _____

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum M-4

Subject: Deck Machineries

1. Purpose of Test:

This test memorandum outlines the procedure for conducting of various deck machineries to demonstrate their satisfactory performance in service

2. Test Procedures

a) Preliminary Inspection

A visual inspection of the unit shall be conducted to a certain smile proper installation, suitability for operation and any evidence of damage or deterioration. All moving parts should be checked for proper lubrication and assure that all control operate freely. For motor driven unit necessary electrical test as cold and hot insulation test starting current and other electrical test as Test Memorandum No.11 shall be followed. For unit with on an engine prime mover necessary worn out and preliminary checked up as per Test Memorandum No. 9 shall be conducted

b) Operation Test

– Anchor Windlass

1) No load-test the anchor windlass seating of port and stbd clutch limit switched shall be checked and adjusted as necessary to make sure that clutch jaws are not partially engaged.

With the wild disconnected, the windlass shall be operated for 30 minutes in its direction at all speeds without load. During the test, the motor RPM, line current and voltage shall be recorded. Any undue noise or vibration, overheating or other unsatisfactory condition shall be noted.

2) Load/test the anchor windlass shall be tested by hoisting and lowering the anchor and chain at its wildcat in 30 fathoms of water for four continuous cycles. An average rate of not less than 6 fathom per minute should be attained. For test conducted in less than 30 fathom of water sufficient weight should be, to the anchor to stimulate the anchor 30 fathom of chain and number of cycles increased in proportion to decreased in depth of water. A careful observation of action of chain in wildcat shall be made in other satisfactory condition as over 18 freedom of moving parts, etc.

The anchor shall then be dropped on the run to check break performance. Operation of speed control by hoisting and lowering anchor at different controller points shall be checked in any unsatisfactory condition shall be noted.

– Capstan

1) No-load-test-with the wildcat disconnected, its capstan shall be operated for an hours in its direction without load to insure prime mover and other rotating parts shall be free to rotate. Take readings at 10 minutes interval of necessary data.

2) Static-load-test-Its capstan shall be given a static load equal to twice load, clear of other support, for a period of ten minute period. A suitable length of wire whose breaking strength is at least 3 ½ times that of the static test load shall be need. Suitable materials shall be provided on capstan head to prevent damage by wire rope. A suitable preventer should be rigged from the yard crane in order to hold the load in the event of failure of capstan. No damage of permanent distortion of the equipment or creeping shall occur.

3) Normal-load-test – The capstan shall be operated continuously one half (1/2) hours while and hoisting its rated load. Take reading at 5 minutes intervals. The wildcat should be tested similarly at each rated capacity and speed. During test, the action of chain in the wildcat shall be carefully observed.

The speed control of the capstan shall be testing by hoisting the full working load on its controller point for each gear arrangement. The capstan must be capable to full corresponding to full load of prime mover at the following rope speed:

- a) 125 ft/min – capstan installed on shaft separate from wildcat.
- b) 50 ft/min – capstan installed in same shop as wildcat.

: The handbrake shall be operated to demonstrate operation by stopping anchor and chain on the run for about 20 ft of travel. The time it takes for anchor to stop when brake set in shall be recorded.

– Winches:

1) No load test – the winch shall be operated without load in all control position for at least 30 in each direction (15 minutes at low speed & 15 mins at high speed). The unit shall be observed for noise, vibration and undue heating of bearings or any parts.

2). Static load test – Static load test equal to twice the rated capacity shall be conducted to similar arrangements on capstan. Load shall be sustained for at least 10 minutes. All parts subject to stress shall be observed during and after test. No cracks or deformation should occur.

3) Operational test – When load equal to each rated capacity, the winch is operated in its duration at all operating speeds or 5 complete cycle. During the operation, the unit shall be observed for overheating, abnormal noise and vibration. The brake shall be tested by lowering and stopping the load.

On test of both winches, the both shall be hoisted in loaded condition from water edge to both cradle. The ability of brake to stop and hold the loaded boat while lowering shall be proven. The speed at winch both hoisted shall be noted.

For cargo winches, the ability of each winch to handle mechanical overloads of 25% shall be demonstrated for load up to 20 tons. For over 20 tons, the overload shall 20 tons. The effectiveness of dynamic brake and ability to land loads without jarring and inching shall also be demonstrated. The adequacy of the control shall be checked. Whenever load is specified for the normal, rope load at the drum shall be raised and lowered continuously for ½ hour with a maximum speed as be raised and lowered continuously ½ near as 0.6 maximum possible speed. The load shall be stopped in the hold 20 seconds each time to stimulate service condition.

Test Memorandum Nr. M-5

Subject: Air Compressor

1. Purpose of Test

This test memorandum outlines the procedure of conducting test of air compressor to demonstrate compliance with all specified requirements:

2. Test Procedure:

a) Preliminary Inspection:

1) Prior to performing test. Record complete nameplate data of compressor.

2) Prior to starting air compressor:

a) Rotate compressor manually several times to ascertain that all moving parts freely and are ready for starting.

b) Fill all reservoir to proper level with correct grade of oil. Record the navy symbol of the lube oil placed in the crankcase. Excessive lubrication or oils of high viscosity or low flash point any cause carbonization, faulty valve action and plugged passage and explosion.

c) Inspect a clean exterior of compressor, tightening any loose nuts, including foundation bolts.

d) Inspect intake filter and see that all essential parts are in place.

e) Adjust bolt torsion and adjust if necessary.

f) Check that bolt guard is in place before starting.

g) Check that relief valves are in place and in working conditions.

h) Set the compressor automatic control to stop and starts. The compressor at its specified pressure.

Note: For making inspection and test of the prime mover, refer to test form No. 14 and Test form No. 9 for engine.

b) Operation Test:

1) Applying driving power momentarily and lathe machine cause to rest. (Close observation during the casting period will prevail any excessive tightness in the moving parts).

2) Cautiously start the compressor, standing by to secure if operation is not normal.

3) Operate the compressor for one hour with pressures held between cut-in and cut-out pressure, throttle compressed and into atmosphere to keep full on compressor.

- 4) During operation, the unit shall be examine for any sign of misalign, excessive vibration noise or other undesirable characteristics.
- 5) Upon conclusion of above run, record the time required to charge the storage tank.

- b) Relief Valve Setting: _____ lbs
 Operation: Satisfactory _____ Unsatisfactory _____
- c) Compressor
 Operation: Satisfactory _____ Unsatisfactory _____
- d) Any excessive vibration: Yes _____ No. _____
 Any excessive heating: Yes _____ No. _____
- e) Is lubrication satisfactory? Yes _____ No. _____
 Lube oil Navy symbol: _____
- f) Time required to charge storage tanks: _____ mins. _____ psi
- g) General operation and operating conditions:
 Satisfactory: _____ Unsatisfactory _____

Test Witnessed and Found Satisfactory:

 Contractor's Representative

 TIAC Inspector

 Project Officer/Ship Supt.

 Ship's Representative

APPROVED:

 QRA Officer, NSY

Test Memorandum Nr. M-6

Subject: Pumps

1. Purpose of the test:

This Memorandum outlines the procedures conducting test on all types of pumps to assure their satisfactory operating performances.

2. Test Procedure:

a) Preliminary Inspection:

1) Before the test, check lubrication and general condition of pump for safe operation. Rotate its shaft manually and make sure that is free. Purge air out of unit and check that no air is allowed to enter the suction side of the pump. For centrifugal pumps prime unit properly before starting. Gages and instrument should be properly calibrated.

2) Pump shall be operated at rated head and RPM until three successive 15 minutes readings indicate temperature of pump bearing head reach the maximum period. ALL data should be recorded at 15 minutes intervals for at least 2 hours depending on the side of the units. If any unsatisfactory condition develops, secured the unit and correct the defect before proceeding further. Bearing temperature should not exceed 176 degrees F (50 degrees Centigrade) at the hottest accessible parts.

Lbs (FW) x 2.31-1 ft head

Ft Head (water) x 0, 433 – lbs pressure

As constant speed capacity decrease at head increase

As head is reduced, capacity & power increase

Capacity varies as load

Head varies as speed squared

Power light as cube of speed

Capacity varies as impeller diameter

Head varies as diameter of impeller squared

Power varies as impeller diameter squared

Eff. Rpm X head (ft)

3960 X bhp

Given: 1750 rpm, 300 kgs, 100 ft head

At 2,000 rpm capacity will be $\frac{2,000}{1750} \times 300 = 343$ rpm

As 2000 rpm capacity will be $\frac{2000 \times 100}{1750} = 131$ ft

Rpm X head = 343 x 131

3960 X 0 ft 3960 X 0.71 = 15.9 HP

Even though the shaft may run turn in a slow speed, it tremble and whip at

high speed owing to imbalance at the coupling or the shaft being too tight too something inside the pump pushing the shaft off the center about which it would normally rotate.

A loose impeller or one that that is rubbing on the diffusion rings may also cause the shaft to vibrate.

Pump shaft must run true to within 0.002".

Turbine Pumps:

Small capacity of high heads

Ideal for high suction lift

Power input increases with operating head even though the discharge decreases rapidly.

Power increases as discharge head increase reaching a maximum at shut off pressure.

For centrifugal pump used a good grade of braided, graphite & lubricated asbestos packing.

CNSY Test Form Nr. 150-09
 VESSEL _____
 JO NO: _____
 TITLE _____

DATE: _____

Pumps (Motor Driven)

1. Preliminary Inspection:

- a) Kind of liquid pump on test: _____
- b) Is rotation of pump rotation correct? _____
- c) Is there excessive noise in pump? _____ Vibration? _____
- d) Is priming of pump satisfactory? _____
- e) Is suction lift of pump satisfactory? _____
- f) Is gland sealing of pump satisfactory? _____
- g) How is pump coupled to prime mover? _____
- h) Is piping satisfactory and free from air pockets? _____
- i) Is piping suspension satisfactory? _____
- j) Any overheating of bearing? _____

2. Operational Test (15 minutes intervals for two hours)

Time	Motor						Pump				Room Temp	GPM	Remarks
	Rpm	Volt	Amp	Temp °F			Pressure PSIG		Temp °F				
				Drive	End	Frame	Suct	Disch	Drive	Other			

a) For centrifugal pumps only, record above with one set of data with discharge valve closed.

b) Pump discharge relief valve set at _____ psi

c) General Remarks: _____

3. Nameplate Data:

Type of Pump _____ Mfr: _____ Model/SN: _____
 Stages _____ Capacity _____ RPM _____
 Discharge pressure _____ Horizontal/Vertical _____

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum Nr. E-1

Subject: General Instruction (Electrical)

Electrical

1. Purpose of Test:

This memorandum is a summary instruction relative to all ship and shop test of all electrical equipment and their fitness to their particular applications. All test shall be conducted in accordance with the following memoranda of electrical test and data from all the test shall be recorded on specified form hereunder for each particular unit.

2. Test of all electrical apparatus:

a) All electrical apparatus shall be subjected to careful visual examination and to insulation resistance (cold) test before installation on board ship in order to determine whether any damage or deterioration has occurred during handling or the period of storage. Any part that have been lost, broken, bent, cracked, loosened or damaged in any other way shall be detected during the visual examination. This examination shall include a careful check of all windings, coil terminals, soldered connections, panels, insulators, resistors, contacts, brushes, gauges, oil caps, with proper grease lubrications, etc. Make sure that the equipment has not been unduly exposed to or damaged by weather, dirt, oil, moisture or any other deleterious substance. Movable parts should be checked for proper alignment and can be rotated or operated freely to ascertain that those do not bind or stick.

b) The insulation resistance test is to determine whether insulation has suffered any deterioration. Measurements shall be made with apparatus cold and results compared with original value as per manufacturer's specifications. If the result is materially lower than its original value, hot steps should be taken to raise resulting insulation by baking and drying out the apparatus. The value for electrical machinery at normal operating temperatures shall not be less than result computed by following formula:

$$\text{Insulation (In Mega Ohm)} = \frac{\text{Terminal V x 3}}{\text{Kw Rating plus 1000}}$$

c) Test of Motors and Controllers:

A preliminary inspection of the motor shall be made to insure that it is properly lubricated and safe to operate. Before applying power, the motor shall be rotated manually to ascertain that moving parts work freely. Each motor and its controller shall be operated a sufficient length of time to demonstrate its satisfactory operation at rated load and speed. Record data required by the forms of this report at 15 minutes intervals. This test shall be of shorter duration than two hours. If temperature fails to indicate leveling, the test shall be continued until 3 successive reading indicate that the motor has reached the maximum working temperature for the prevailing conditions. Under no circumstances shall any bearing temperature be allowed to exceed 176° F (80° C).

Specific instructions for other particular unit are given under the name of driven auxiliary. All test data shall be taken and recorded on test terms and shall be accompanied by suitable performance curves practical. Information concerning the operation of the unit may be obtained from instruction books, nameplate data of the latest plans available.

Insulation resistance measurements shall again be made under both hot and cold conditions. The values obtained shall be compared with those original values previously recorded and if result is materially below, steps should be taken to improve them by cleaning, heating and drying. If the insulation cannot be restored, the matter shall be reported to proper authority.

d) Electrical strength:

Equipment and machinery shall be designed and constructed to withstand for a period of one minute, a dielectric test voltage of twice normal voltage of circuit to which equipment or machine is connected plus 1000 volts. The source of test potential shall have a rating of at least one KW.

VESSEL _____
 JO NO: _____
 TITLE _____

DATE: _____

GENERAL INSTRUCTION, ELECTRICAL
 Insulation Resistance Test

	Before Test Cond to Grnd	After Test Hot Cond to Grnd	After Test Cold Cond to Grnd	Remarks
Armature				
Field				
Controller				
Rheostat				
Starter				

Test Witnessed and Found Satisfactory:

 Contractor's Representative

 TIAC Inspector

 Project Officer/Ship Supt.

 Ship's Representative

APPROVED:

 QRA Officer, NSY

CNSY Test Form Nr. 150-23

JO#: _____

Title: _____

Date: _____

ELECTRIC MOTOR

1. Preliminary Inspection:

a) Visual Examination

- 1) Moving parts free: _____ 2) Lubrication: _____
- 3) Alignment _____ 4) Installation: _____
- 5) General Condition _____

b) Name Plate Date:

MOTOR	CONTROLLER
Manufacture _____	_____
Date Mfr _____	_____
Type _____	_____
H. P, _____	_____
Volts _____	_____
Amperes _____	_____
Phase _____	_____
Cycle _____	_____
RPM _____	_____
Enclosure _____	_____
Additional _____	_____

2. Operational Test (Two hours run at 15 minutes interval)

Time	Volt	Ampere			RPK	Temperature			Remarks

How was the motor loaded? _____

What was the load? _____

Were commutator& armature winding in satisfactory condition at the conclusion of the test? _____

Is the operation of all features of controller satisfactory? _____

(If variable space) is the operation satisfactory at all speeds? _____

Is lubrication satisfactory? _____

Direction of rotation? _____

Remarks: _____

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

CNSY Test Form Nr. E-8-2

VESSEL _____

DATE: _____

JO NO: _____

TITLE _____

ELECTRIC MOTOR

Name of Equipment

1. Motor	2. Controller
Mfr: _____	_____
Date of Mfr: _____	_____
Type: _____	_____
H.P.: _____	_____
Volts: _____	_____
Amps: _____	_____
Phase: _____	_____
Cycle: _____	_____
RPM: _____	_____
Encl: _____	_____
Additional: _____	_____

Check of List

1. Check the general condition of the motor to ensure safe operating condition.
Test Conductor/Initial _____ Sat _____ Unsat _____
Remarks: _____

2. Before applying power, manually rotate motor to ascertain that all moving parts work freely;
Test Conductor/Initial _____ Sat _____ Unsat _____
Remarks: _____

3. Check if proper shop test was conducted prior to assembly on board ship.
Test Conductor/Initial _____ Sat _____ Unsat _____
Remarks: _____

4. Measure the insulation resistance of the motor and controller.
Test Conductor/Initial _____ Sat _____ Unsat _____
Remarks: _____

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum Nr. E-2

Subject: Lighting and Power Circuit

1. Purpose of Test:

This memorandum outlines the procedure for conducting test to demonstrate the satisfactory operation of lighting and/ or power circuits.

2. Test Procedure:

a) Visual examination and test of insulation resistance (cold).

1) Lighting Circuit:

The insulation resistance test shall be made on each feeder. Each feeder should include all connected thereto. The wiring alone shall have an insulation resistance of not less than one (1) megohm and the motor and controller (or other appliance) shall have an insulation resistance of not less than one - half (1/2) megohm. The entire circuit including motor and controller shall first be tested as a unit. If the insulation resistance is one (1) megohm or higher, no further test need be made. If the indicated value is one (1) and one-half (1/2) megohm, the motor and controller shall be disconnected and the wiring tested separately. In case the insulating resistance of the entire circuit is less than one-half (1/2) megohm in the first test, the cause shall be determined and remedied, and the test repeated.

2) Power Circuit:

The insulation resistance test shall be made on each feeder. Its feeder shall include all circuits connected there to. The wiring alone shall have an insulation resistance of not less than one (1) megohm and the motor and the controller (of or other appliance) shall have all insulation resistance of not less than one-half (1/2) megohm. The entire circuit including motor and controller shall first be tested as a unit. If the insulation resistance is 1 megohm or higher, no further test need be made. If the indicated value is between one (1) megohm and one-half (1/2) the motor and controller shall be disconnected and the wiring tested separately. In case the insulation that the insulation resistance of the entire circuit is less than ½ megohm in the first test, the fuse shall be determined and remedied, and the test repeated. The following readings indicate the minimum considered satisfactory with 500 volt megohm.

- a) Motor and generator with motor or gen. and control appliance disconnected – 5 Meg.
- b) Motor and generator with motor or gen, and control appliances connected – 0.20 Meg.
- c) Checked wiring with all wiring accessories and appliances connected test instruments disconnected – 5 Meg.
- d) Circuit complete with instruments connected – 0.30 Meg.

- e) Electrical measuring and indicating instruments such as Voltage. Ampere, wattmeter, etc – 5.
- f) Electrical audible signals such as bells, buzzers horns siren – 5 Megs.
- g) Local circuit wiring on switchboard – 0.20 Megs.

CNSY Form Nr. 150-43

VESSEL _____

DATE: _____

JO NO: _____

TITLE _____

LIGHTING POWER CIRCUIT

1. Visual Examination:
State whether or not the materials, workmanship, and methods of installation are satisfactory in any respect.

2. Load Test:

a) Lighting Circuits:

Test mains and branches with lights on an all portable appliance outlets connected and loaded to their designed ampere value (or appliance connected).

b) Power Circuits:

All circuit should be loaded to possible maximum load under existing conditions.

Feeder No.	Service	Ampere		Megger		Remark

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum Nr. E-3

Subject: Interior Communication System

1. Purpose of the Test

This memorandum outlines the procedure for conducting test to demonstrate the satisfactory operation of interior communication system.

2. Test Procedure

A. Visual examination and test of insulation resistance (cold).

The Insulation resistance test shall be made on each load wire. The wiring and permanent fixtures shall have an insulation resistance of not less than one (1) megohm with the power off. If indicated value is less than one (1) megohm, the cause shall be determined and remedied and the test repeated.

B. Voltage Drop Test

The voltage drop in any circuit when carrying full rated load shall not exceed five (5) percent measured from distribution panel bus to the most remote load.

Test Memorandum Nr. E-4

Subject: Switchboard and Distribution Power Panels

1. Purpose of Test:

This memorandum outlines the procedures for conducting test to demonstrate the satisfactory operation of switchboard and its associated equipment.

2. Test Procedures:

a) Preliminary Inspection:

1) Examine the condition of all instruments, circuit breakers, switches, indicating lights and other components and report any evidence of damage or deterioration.

2) Measure and record the cold insulation resistance.

3) Record circuit bearings with element rating and fuse rating.

4) Record nameplate data of manufacturers.

b) Operational Test:

1) Test instrument on the switchboard and check their calibration with the help of standard meters.

2) After the repair the switchboard and its associated parts are completed, the switchboard, power panel and their equipment shall be tested and the result recorded.

3) Reverse current test:

When the two (2) ships service generators operating in parallel, shut down the prime mover of one generator and check operation of the reverse current trip on the type ACB circuit breaker which causes the circuit breaker to open automatically. Repeat by shutting down the alternate generator using the above procedure.

CNSY Test Form Nr. 44

VESSEL _____

DATE: _____

JO NO: _____

TITLE _____

SWITCHBOARD AND DISTRIBUTION POWER PANEL

1. Preliminary Inspection:

a) Visual Examination:

Condition: _____

b) Nameplate Data:

Manufacturer	Serial Number

2. Insulation Resistance and Operation Test:

Circuit No.	Service	Conn Load	Tripping Ele Fuse Rating	Mess To Grd Cold	Operation

Does selective tripping scheme function properly? _____

Does reverse current trip operate satisfactory for Gen #1 _____

Gen #2 _____

Gen #3 _____

Remarks: _____

3. Ship's service switchboard instrument calibration:

Instrument	Volt Swbd	Volt Std	Ampere Swbd	Ampere Std	Operation

4. Standard meters used for meter calibration:

Unit	Manufacturer	Type	Serial No.	Range

5. Switchboard Instrument Nameplate Data:

Unit	Manufacturer	Type	Serial No.	Range

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

CNSY Test Form Nr. 150-25

VESSEL _____

DATE: _____

JO NO: _____

TITLE _____

AC Generator with Exciter

1. Preliminary Inspection:

a) Visual Examination:

Condition: _____

b) Air Gap Measurement:

Alternator

Exciter

c) Insulation Resistance Test:

Item	Before Test			After Test				
	Ins Res. Megs	Temp °F	Condition	Ins Res. Megs	Temp °F	Ins Res. Megs	Temp °F	Condition
Gen. Rotor								
Gen. Stator								
Exc. Field								
Rheostat								
Start, Motor								
Controller								
Exc. Arm								

d) Nameplate Data:

Generator

Starter

Voltage Regulator

Mfr: _____

SN: _____

Type: _____

Volts: _____

RPM: _____

Temp Rise: _____

2. Operational Test:

a) Starting Tests:

Starter	Starting Maximum	Current Average	Battery Prior	Voltage DUR. Test	Starting Time (sec)	C.W. Temp °F

b) Hunt (At load and 20% load)

No Load

20% Load

Voltage Variation (Volts)

Speed Variation (RPM)

c) Field Rheostat Control

Setting	Generator Volts	Gen. Field Volts	Exciter Voltage
Maximum			
Normal			
Minimum			

d) Load Test (Four hrs run at 15 minutes interval)

Time	Load	RPM	A.C. Generator (Amperes)							Gen. F.D.		Temp °F (Frame/Bearing)						
			Freq	1	2	3	Volt	Pf	Kw	Amp	Volt	Gen	Exc	Fwd	Gen	Aft	Amb	

e) Parallel Operation Test (One hour run at 5 minutes interval)

Time	Load %	Bus		Generator #1			Generator #2		
		Freq	Volts	Pf	Amp	Kw	Pf	Amp	Kw

Does field rheostat operate satisfactorily? _____
 Does voltage regular operate satisfactorily? _____
 Any unsatisfactory items? _____
 Remarks: _____

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum Nr. E-7

Subject: Storage Batteries

1. Purpose of Test:

This memorandum outlines the procedure for conducting test to determine that the battery is functioning properly and that it is performing its required service.

2. Preliminary inspection

Examine condition of battery trays, terminals, connectors etc., for evidence of damage or deterioration. Make sure that the connections are tight.

3. Operational Test:

a) Prior to and during the test, read the electrolyte temperature, room temperature and the specific gravity of the cell. Record the diesel RPM as per nameplate data.

b) Use each sets of batteries for cranking the appropriate diesel for a total of five (5) starting cycle.

c) The batteries shall be capable of cranking the engine at starting speeds at ambience temperature of 35 C for a period of thirty (30) seconds, end off two (2) minutes for five (5) minutes starting cycle.

d) Test the charging facilities to assure adequate charging and place the battery on charge upon conclusion of the test.

CNSY Test Form Nr. 150-28

JO# : _____

Title: _____

Date: _____

STORAGE BATTERIES

1. Preliminary Inspection:

a) Visual Inspection:

Condition: _____

b) Battery Data:

Mfr: _____ Battery Voltage (series) _____

Use: _____ Total Current Output: _____

Date of initial charge _____ Date installed in ship: _____

No. of Trays: _____ Cells per tray: _____

2. Operating Test:

Cycle	Cycle Period	Temp °C	Sp Gr	Volt	Diesel Rpm	Room Temp °C	Remarks
1	Start (30 sec) Finish 2 min rest period						
2	Start (30 sec) Finish 2 min rest period						
3	Start (30 sec) Finish 2 min period						
4	Start (30 sec) Finish 2 min period						
5	Start (30 sec) Finish 2 min period						

Is battery satisfactory for engine starting? _____

charging connection adequate? _____

Did starting motor show any signs of deterioration? _____

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum Nr. E-9

Subject: Electric Refrigerating Plant

1. Purpose of Test:

This memorandum outlines the procedure for conducting test on main refrigerating plants, refrigerator, freeze box, and accessories to demonstrate satisfactory operation under normal conditions:

2. Test Procedure:

a. Preliminary Inspection:

- 1) Nameplate data of the equipment shall be recorded.
- 2) Cold insulation resistance test of motor and controller shall then be made.
- 3) Lubricating oil level of compressor, motor lubrication and evidence of refrigerant leaks on the system shall be checked.
- 4) The motor and compressor shall be rotated by hand to ascertain that all moving parts are moving freely. Alignment of motor to compressor shall be checked and also bolt tension.
- 5) The unit as a whole shall be examined visually for any sign of damage or deterioration noted.
- 6) The instruments shall be checked that they are properly calibrated and control system shall be adjusted and operative.
- 7) Hydrostatic test of circulating water piping system shall be conducted when any part shall be repaired or as when necessary.

b. Test for Leaks and Strength Test of System:

- 1) The refrigerant piping shall be tested for leaks by charging the system with Freon #12 to a pressure of 10 psig. The system then shall be tested with ballade torch and any leak found should be repaired. Another method is to operate the system for at least 1 ½ hours and after the operation with entire refrigerant circuit under refrigerant pressure, ballade test shall be conducted.
- 2) The system shall be charged with CO₂ or nitrogen in addition to the original refrigerant charge to a pressure of 150 psig for test. Any leaks shall be detected by ballade test and hence connected.

c. Operational Test:

- 1) Upon starting, the unit shall be checked for overheating, misalignment, excessive noise, vibration etc. The storage compartment and ice maker shall then be set to compartment temperature as follows:

Fruits and Vegetables-----	40 degrees F
Meat Room-----	15 degrees F
Ice Maker -----	15 degrees F
Vegetable -----	40 degrees F

- 2) Box shall be thoroughly chilled prior to test and door shall be kept close. Lights shall be turned on during the test. The quantity of ice made for specified time shall be recorded.
- 3) Test shall be conducted for about six (6) hours and a set of data recorded at cut-in and cut-out points.

CNSY Test Form Nr. 150-24

JO#: _____
 Title: _____
 Date: _____

REFRIGERATING PLANT

1. Preliminary Inspection:

a) Nameplate Data:

	MOTOR	COTROLLER	COMPRESSOR
Mfr:	_____	_____	_____
Serial No.	_____	_____	_____
Type:	_____	_____	_____
H.P.	_____	_____	_____
Amperes:	_____	_____	_____
H.P.	_____	_____	_____
R P M:	_____	_____	_____

b) Insulation resistance Test:

	Armature	Field	Controller
Cold	_____	_____	_____
Hot	_____	_____	_____

c) Visual Examination:

Condition: _____

d) Hydrostatic Test (Circulating water piping)

Test pressure applied: _____ psig
 Time Held: _____: _____ mins
 Remarks: _____

2. Tightness and Strength Test (Refrigerant Piping):

a) Test for Leaks:

Initial Test pressure applied: _____ psig
 Time Held: _____: _____ mins
 Remarks: _____

b) Strength test pressure applied:

Initial Test pressure applied: _____ psig
 Time Held: _____: _____ mins
 Remarks: _____

3. Ice Maker Operation:

Supply water temperature ° F _____ time Water inserted: _____
 Time ice removed: _____ Quantity of Water: _____

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY

Test Memorandum Nr. E-11

Subject: Ventilation System

1. Purpose of Test:

This test outlines the procedure for satisfactory operation of ship ventilation system such that supply or exhaust blower units are properly operating, vent duck properly air tight and its fittings properly functioning and to determine that ventilation of compartments are adequate.

2. Test Procedure:

The systems shall be inspected visually and determine any damage of deterioration in any parts of the ventilation system. Insulation of vent duck were provided shall be checked. Any corroded portion of possible holes on the trunks shall be noted. Usual insulation resistance or motor and electric accessories and other necessary test shall be accomplished as per instruction procedure on electrical equipment. Movable parts shall be rotated manually to make sure that they are free.

The blower shall be operated for at least two hours at various speed if speed control is provided. Unusual noise, overheating of motor and bearings, misalignment, excessive vibration, air leaks from air passages, and other undesirable characteristics should be noted. Motor input, speed, temperature, air pressure and volumetric capacity shall be recorded every 15 minutes.

Air vents fittings as shut-off numbers, shields and other shall be checked and should be operable. Adequacy of ventilation inside the ship's compartments shall also be noted, observing such factors as noise, vibration, excessive drafts, odors, heating and excessive temperature rise. Ventilation fans should be able to provide 25% excessive air delivery.

CNSY Test Form Nr. 150-38

VESSEL _____

DATE: _____

JO NO: _____

TITLE _____

VENTILATION SYSTEM

1. Preliminary Inspection:

a) Visual Examination:

Before operation of unit visual inspect for proper installation, readiness for test evidence of damage or deterioration.

Condition: _____

b) Nameplate Data:

	MOTOR	CONTROLLER	BLOWER
Mfr:	_____	_____	Mfr: _____
Model/type:	_____	_____	Type: _____
H P:	_____	_____	CFM: _____
Volts:	_____	_____	RPM: _____
Amperes:	_____	_____	
R P M	_____	_____	

	Armature	Field	Controller
Cold			
Hot			

Starting Current: _____

2. Operational Test: (Two hours run at 15 – minutes interval)

Time	Motor			Air Pressure	CFM	Temp °F				Remarks	
	Rpm	Volt	Amps			Drive Brg	End Brg	Motor Frame	Room		

- a) Any Excessive vibration? _____
- b) Any overheating of any bearing? _____
- c) Any unusual noise? _____
- d) Ventilation adequate? _____
- e) General operating condition. _____
- f) General Remarks _____

Test Witnessed and Found Satisfactory:

Contractor's Representative

TIAC Inspector

Project Officer/Ship Supt.

Ship's Representative

APPROVED:

QRA Officer, NSY