HULL SPECIFICATIONS

for the

CONSTRUCTION

of a

SINGLE SCREW TANKER

DESIGN T2-SE-A1

TURBO-ELECTRIC PROPULSION

UNITED STATES MARITIME COMMISSION

1. GENERAL CLAUSE

In the following clauses of these specifications, the terms used to designate the "Contract Parties" of the "First" and "Second" parts, are the terms "Builder" and "Owner," which terms are to be understood as respectively meaning the "Shipyard" and the U. S. Maritime Commission.

The following Contract Plans are issued with, and form a part of, these specifications:

General Arrangement	T2-SE-A1-S9-0-1
Midship Section	T2-SE-A1-S11-11-1
Typical O. T. Bulkhead	T2-SE-A1-S11-5-1

It is the understanding, intention and spirit of these specifications and the accompanying contract plans, to show and require the construction and completion ready for service, of a steel hulled, single screw, tank vessel, arranged and constructed for the carriage (in bulk—under deck) of petroleum and/or its liquid products.

All material, equipment, items, outfit, spare parts, articles, labor and work of every description (except the Steward's, Deck Department's and Engineers' Department Portable Inventory as hereinafter is definitely stipulated to be furnished by the Owner and be to the Owner's account) required to design, construct, equip, conduct trials and tests, and complete the vessel in every respect —ready for service—shall be furnished and done by the Builder, for and to the satisfaction of the Owner's Representatives.

These specifications and the accompanying "Contract Plans" are to be the basis for the design; construction and equipment of the vessel.

The Builder is, however, to be responsible for the obtaining of the requisite deadweight capacity, trim, speed, steering qualities, seaworthiness, freedom from vibration, minimum Panama Canal and United States net tonnages, and a minimum tanker freeboard, of the completed vessel.

It is not the intention of these specifications and the "Contract Plans" to cover every minor detail of construction or equipment, therefore, any discrepancy in the description or the omission of any material or parts, the omission of which from the construction or equipment would be weakening, or detrimental to the seaworthiness or serviceability of the vessel must be rectified or furnished by the Contractor to the entire satisfaction of the Owner's Representatives, without the incurring of any additional cost to the Owner.

The names of certain manufacturers and of items and articles, where mentioned in these specifications are a means of describing the general character of the quality, design and construction of the various items and articles. As these items and articles are generally of a staple character and produced by a number of manufacturers in the U. S. A., it is not the intention of the Owners to restrict the supplying of such items and articles to the manufacturers or makes so named, but all items and articles substituted therefor are to be of a character similar in quality, design and construction to those specified, be especially adapted for marine use, and be—in the opinion of the Owner's Representatives—equal to the make named, and as suitable for the duty

required; all hull fittings and details to be of Builder's standard.

2. GENERAL DIMENSIONS AND PARTICULARS

The basic design dimensions and particulars of the vessel are to be:

(a) Length between perpendiculars at (d) moulded draft (lbp)	503'0"
(b) Breadth, moulded (B)..	68'0"
(c) Depth, moulded — to Upper (Freeboard) Deck, at side, at half length between perpendiculars (D)	39'3"
(d) Draft, moulded, to Summer Freeboard Mark (d)	29'11½"
(e) Sheer at forward perpendicular	17"
(f) Sheer at after perpendicular	17"
(g) Round of Beam of Upper Deck for Breadth (B)	17" (or equivalent broken pitch camber)
(h) Height (moulded) between Upper and Forecastle Decks	10'0" to 13'0"
Height (moulded) between Upper and Bridge Decks	8'0"

Height (moulded) between Upper and Poop Decks	8'0" to 9'0"
(i) Height (moulded) between decks for all superstructure houses .	8'0"
(j) Displacement, moulded for (lbp) (B) and (d) dimensions, even keel, and in sea water at 35 cu. ft. per ton of 2,240 lbs.	21,670 tons
(k) Deadweight Capacity, to the (d) moulded draft even level keel, and in sea water at 35 cu. ft. per ton of 2,240 lbs. ..	16,460 tons
(l) Capacity of Cargo Oil Tanks a 100% full—about	141,158 bbls. (42 gal.)
(m) Capacity of After Fuel Oil Tanks, a 100% full	4,995 bbls. (42 gal.)
(n) Propulsive Shaft Horsepower normal	6,000
(o) Speed of vessel, on measured mile trial course, vessel ballasted with sea water to draft (d)....	14½ knots

GOVERNMENTAL, ETC., INSPECTIONS, SURVEYS AND CERTIFICATIONS

The vessel, with its machinery, boilers, equipment, appurtenances and outfit, shall be in strict conformity with existing:

Regulations of the U. S. Coast Guard—Bureau of Marine Inspection and Navigation,
Regulations of the U. S. Public Health Service,
Suez Canal Tonnage Rules of Navigation,
Navigation Regulations—the Panama Canal.

for bulk petroleum and/or its liquid products carrying vessels, and for the transport and handling of all categories and grades of special hazardous and dangerous petroleum products.

The Builder is to furnish (prior to delivery of the vessel) duplicate copies of all requisite Governmental Certificates and documents, including "Carpenter's Certificate."

INSPECTIONS, ETC., BY OWNER'S REPRESENTATIVES

During the entire time the Builder is engaged in designing, constructing, equipping and outfitting the vessel, and conducting trials, the Owner will be represented by designated Owner's Representatives. The Owner's Representatives shall have authority to reject any workmanship, material, item or article that is defective, unsuitable or out of keeping with practice or construction embodied in contemporary vessels of this class, or if not in conformity with the approved plans or requirements of these specifications.

CLASSIFICATION

The vessel, with its machinery, boilers, equipment, appurtenances and outfit, is to be built under the special survey of, and is to be classed and certified by the American Bureau of Shipping "✠A1-E Oil Carrier," ✠ "AMS" and "EAC."

PLANS

The Builder shall prepare all necessary plans for the proper and successful building of the ship. Drawings and all plans are to be approved by Owners, and will be to Builder's standard in accordance with modern tanker practice. Upon the completion of the ship the Owner is to be supplied with two complete sets of blue prints of all drawings as listed below. Blueprints of General Arrangement, Capacity Plan and Deadweight Scale, Cargo Piping, Engine Room Piping, Bilge and Ballast Systems, Heating and Sanitary Systems and Electric Wiring and cable work to be mounted and framed and fastened to bulkheads in suitable locations as directed by Owner. Capacity tables on Builder's standard forms shall be provided for all tanks including peaks, double bottoms, cofferdams, bunkers and culinary as well as cargo tanks.

There shall also be placed aboard the ship, but not framed, blueprints of the stern frame, rudder, stern tube, tail shaft and propeller. Deadweight and trim calculations for various conditions of loading for the vessel, as may be requested by the Owner, shall be supplied previous to delivery.

There will also be provided blueprints of the following plans:

Midship Section
Outboard Profile
General Arrangement, inboard and decks
Deck Plans of all decks and holds
Shell expansion
Construction profile and decks
Capacity plan of Fuel, Water and Cargo capacity with Deadweight Scale
Bonjean Curves
Hydrostatic Curves
Docking Plan
Stern Frame
Stem
Rudder
Rigging Arrgt. and Rope and Block List
Body Plan
Deck Plating Plans
Inner Bottom Plating
Tank Calibrations
General Arrangement and Details of Gun Foundations
Arrgt. of Bilge and Ballast
Arrgt. of Fuel Oil
Arrgt. of Lubricating Oil
Arrgt. of Fresh and Salt Water
Arrgt. of Ventilation System
Arrgt. of Machinery (Sections) (Plain View) (Elevations)
Arrgt. of Shafting
Arrgt. of Fire System
Arrgt. of Steam Piping Aux. and Main

Arrgt. of Exhaust Piping
Arrgt. of Sanitary System
Arrgt. of Sounding Tubes and Vents
Arrgt. of Scuppers and Drains
Arrgt. of Compressed Air System
Arrgt. of Refrigeration System
Arrgt. of Cargo Oil Piping
Propeller
Elementary Wiring Diagrams of Light and Power Sys.
Complete Set of All Lighting Deck Arrgt.
Complete Set of All Power Deck Arrgt.
Elementary Wiring Diagram of Emergency Lighting Sys.
Wiring Diagram of All Switchboards
One Set of Arrgt. Plans and Elementary Wiring Diagram of I.C. Systems
Isometric Wiring Diagram of Lighting, Emergency Lighting, Power and I.C. Systems
Heat Balance Diagram of Normal SHP

TRIM

The trim characteristics and longitudinal center of buoyancy of the hull form, at the summer freeboard draft, are to be jointly determined and agreed upon between the Contractor and the Purchaser's Representatives, and the lines of the vessel as prepared by the Contractor, are to embody these features of form.

FREEBOARD

All structural arrangements, vessel form characteristics, etc., are to be made to obtain the

minimum tanker freeboard under the International Load Line regulations, with flat sheer.

LINES AND MODEL TESTS

The Builder is to prepare hull form lines and propeller design of high efficiency and economy in propulsion. The hull is to have a cruiser form stern, stream-lined shaft bossing, rudder and stern frame, raked, full dead-wood type stem, well rounded bilge, rise of floor, flare of bow and such other form characteristics as are conducive to obtaining an economically propelled, easily maneuvered and steered, readily trimmed under load, and entirely seaworthy vessel. The hull form model (bare—with shaft bossings rudder, stern frame and bilge keels, and with propellers) has been tested in the Washington Model Testing Tank—including self-propulsion tests and these data will be furnished to those requiring it upon request for the same.

EQUIPMENT

The contractor shall, at his own expense receive, transport after receipt, inspect, check as to agreement with Bill of Lading, store, insure, and protect during construction, and provide stowage for and install aboard ship before delivery, all of the equipment furnished to the contractor. Hardware for airport curtains shall (if black-out conditions do not preclude use of such curtains) be furnished to the contractor and when so furnished shall be installed *by* the contractor. Built-in furniture is that furniture which employs a part of the ship for its completion.

The following will be furnished, without cost to the contractor, delivery being made f.o.b. the freight siding named by the contractor:

I. Navigation Equipment

A. Glasses
   1. 2 pr. Binoculars 7x50
   2. 1 Compass reading glass
   3. Chart reading glass

B. Instruments, Chart
   1. 1 pr. Dividers 10" (Navigating)
   2. 1 pr. Divider Compasses, 8"
   3. 2 pr. Parallel Rules, 18"
   4. 1 Course Protractor, 3 arm

C. Instruments
   1. 1 Stop Watch
   2. 1 Certified Chronometer with case and 1 Chronometer Watch
   3. 3 Aneroid Barometers
   4. 2 Thermometers, Copper Frame
   5. 1 Wet and Dry Bulb Thermometer

D. Flags
   1. 1 Set Int. Code Flags and Code Book
   2. 1 Set Ships Numbers Flags
   3. Other Flags and Bunting

II. Furniture and Furnishings, Exclusive of Beds, Built-in Furniture and Dining Saloon Tables

A. Rugs
B. Curtains, Draperies and their Hardware
C. Waste Baskets

III. Hotel and Galley Equipment

A. Linens
   1. Messing
      a. Table Linens
         1. Cloths and Napkins
      b. Table pads
      c. Towels
         1. Linen
         2. Cotton
      d. Coats, Aprons, etc.
   2. Berthing
      a. Sheets and pillow cases
      b. Spreads
      c. Blankets
      d. Mattress Covers and Pads
      e. Hand, Face and Bath towels and mats
      f. Shower curtains

B. Mattresses

C. Messing Equipment
   1. Galley equipment
      a. Mechanical equipment (portable, including miscellaneous equipment, such as manually-operated food choppers, mincers, egg beaters, grinders, etc.)
      b. Pantry utensils
      c. Pots and Pans
         1. Cast Iron
         2. Aluminum
         3. Stainless steel
         4. Miscellaneous

2. Crockery
3. Glassware
4. Silverware
5. Thermos bottles and jugs, and fixtures

IV. Office Equipment

A. Typewriters

V. Library Supplies and Equipment (Exclusive of Furniture and Fittings)

A. Library and Miscellaneous Books
B. Magazine Binders

VI. Miscellaneous Furnishings

VII. Spare Rope and Cordage

A. Steel wire rope and reels (exclusive of Classification requirements)
B. Rope, manila

VIII. Oils

A. Lubricating
B. Fuel

STORES

Consumable or "voyage" stores will not be furnished by the contractor, and will be placed on board by the owner after delivery.

TRIALS

Builder shall conduct satisfactory trials and shall bear all costs of trials. The dock trial will be of *six hours' duration* with main engines operating at maximum power available and all auxili-

aries including cargo pumps, in operation, at full capacity. The engines must operate without any parts heating excessively.

Vessel will be dry docked and bottom painted immediately before proceeding on trial trip, if in water more than 60 days.

An endurance trial of at least six consecutive hours at sea with vessel loaded to summer freeboard mark will be made. During this trial, the main propulsion motor will develop 6000 S.H.P.

A standardization trial of one of the ships will be made over the Delaware Breakwater measured course with vessel on even keel at summer freeboard draft. A sufficient number of runs (not less than 4 runs at highest speed and 3 runs for lower speeds) will be made to establish 4 points on speed-revolution curve; the lowest speed at approximately one-half the rated horsepower.

A thorough trial will be made of all pumps and auxiliaries, anchor gear, also steering and maneuvering.

Compasses and radio direction finder will be tested and adjusted.

Cargo pump certified test curves to be furnished. Pumps to be tested with fresh water and capacities and heads to be computed for petroleum products.

All parts of main engine, auxiliaries and pumps must operate for duration of these trials without excessive vibration, noise or heating of any parts and to the complete satisfaction of Owner's Representatives. Readings will be taken at intervals and data of trials furnished to Owner.

After the above-mentioned sea trials have been completed, the Vessel shall be returned to the Shipyard, and in cases where the performance is in question, the machinery shall be opened up for post inspection and examination. Any defect, or deficiencies that appear shall be corrected, as directed by the Commission, after which the machinery shall be closed and connected ready for service. If the requirements and conditions of this contract shall have been fully fulfilled and the Vessel shall have met successfully the trials prescribed herein, it shall be accepted.

GENERAL HULL CONSTRUCTION

Vessel will be constructed on the longitudinal framing system, with shell and deck longitudinals bracketed through the transverse bulkheads, with two transverses in each main tank; brackets connecting shell and deck longitudinals to pump room bulkheads are to be welded to bulkhead on both sides instead of passing through bulkheads.

The main transverse and longitudinal bulkheads will be stiffened by horizontal corrugations.

The seams of side shell and upper deck, and side shell and upper deck longitudinals, and framing at ends, will be welded; all other structure shall be electric arc welded, where practicable at Builder's option.

End connections for deck and shell longitudinals to consist of heavy brackets carried through the transverse bulkheads and welded to bulkheads and longitudinals; except as specified otherwise for pump room bulkheads.

All inverted angle and flanged plate longtitudinals and stiffeners to have vent holes and drains punched on faying edge.

Transverse framing will be adopted in double bottom under machinery, at after end of machinery space and in accordance with Builder's practice. Structural material to be open hearth medium steel throughout, scantlings as shown on midship section plan and as approved by Classification Society and Owner. Changes in scantlings from midship section or substitution to facilitate obtaining material will be approved in like manner. Bulb angle sections are preferred where excess weight for equivalent channel strength is not prohibitive.

Plates worked in fire will be 2# per sq. ft. heavier than specified.

All steel castings to be thoroughly annealed.

All fittings will be of approved design.

Swash plates as required in wing Bunkers and Cargo Tank No. 1.

STEM

To be all welded round plate construction with forefoot suitable for paravane operation.

STERN FRAME

Of cast steel having streamline section. If composed of several parts, sections to be scarphed, riveted together with body-bound rivets and effectively welded. Webs and palms cast on all sections for attachment to transom and floors and on lower section for attachment to floors and center keel-

son. Stern frame arranged to take stern tube and welded steel rudder trunk which will extend through second deck to support rudder carrier. Rudder gudgeons cast on solid and fitted with "Micarta" bushings. Zinc plates ½" thick will be fitted around aperture, fastened with stainless steel studs.

RUDDER AND CARRIER

Rudder to be approved double plate, contra type, having cast steel frame, rudder plates welded to frame. Rudder stock to be of forged steel, connected to rudder by horizontal coupling with fitted bolts and fitted key. Pintles to have ½" thick brass sleeves fitted. Stock to be ½" larger in diameter than required by rules and increased ½" more in diameter in way of deck bearing. Side plates to be watertight and tested with a 6' head of water, after which the interior shall be coated with an approved protective compound by filling and draining. Eye cast on top of rudder frame and pad eyes fitted under counter for lifting rudder. Rudder and stock arranged to ship and unship afloat. Upper pintle fitted as lock pintle; rudder stops to be provided on deck at steering gear, fair water to be fitted in way of pintles. A cast steel rudder carrier in halves will be fitted on steering gear flat; weight of rudder to be carried on composition bearing ring in two halves. Carrier to be provided with lip to retain oil and to have deep brass bushing in halves.