PLAINTIFF'S EXHIBIT

WH-1097

8/9/40

TO JBW STEAM PRODUCTS

OPERATING DIVISION, ORDER SERVICE

EXTRA COPY FOR

8/9/40

REMIT TO

INVOICE NUMBER AND DATE

GO WG-34,000-1 7-29-40

CUST. ORDER NO. CTR.NOS-

DATE 7-23-40

NEG. NO. 29075 CODES T

REQ. NO.

P. & S. BY R.E.CAROTHERS 6/20 O.O. CORRES. C.E.SCHMIDT

SOLD TO U.S. OF AMERICA
NAVY DEPT. OF SUPPLIES & ACCOUNTS
WASHINGTON D.C.

CV-9 ESSEX

SHIP TO LATER CLASS

SHIPPING		CREDIT STAMP
PARTIAL SHIP'T: YES	PENALTY ORDER: NOTE#4	
WHEN TO SHIP: NOTE #10		
ROUTE		
P.P. ( )	PPD. (X)	
EXP. ( )	COLL. ( )	
FRT. (X)	C.O.D. S/D ( )	

NOTIFY

MARK

ACCTG. IND. NO. BUYER—USER OTHER LATER ULT. DEST. LATER F.O.B. DESTINATION CUST. FORMS ( )

SALESMAN WEBER WILSON-LUMBERS CHG FRT. AT COPIES OUR INV. (3*)

ORIG. B/L TO CONSIGNEE S/N TO *NOTE#6

ULT. USER INTERMEDIARY 416 CRAFT CARRIERS CV9-10-11 LOCATION TERMS SEE CONTRACT DAYS

PACKAGE NO.	WEIGHT	ITEM	QUANTITY	IDENTIFICATION AND DESCRIPTION	UNIT PRICE	TOTAL PRICE
NOTE #1-CONFIDENTIAL: THIS IS A CONFIDENTIAL AND RESTRICTED CONTRACT FOR DETAILS REFER TO PAGE # OF SCHEDULE						
NOTE #2-VINSON ACT: PURCHASED UNDER VINSON ACT, NAVY CONTRACT NO. NOS -						
NOTE #3-WALSH-HEALEY ACT: PURCHASED UNDER WALSH-HEALEY ACT, PUBLIC ACT 846, 74TH CONGRESS, NAVY CONTRACT NO. NOS						
NOTE #4-PENALTY ORDER: GREEN STICKER						

NOTE #1 CONTINUED ON PAGE 2

CONTI ( ) FINAL ( )

PACK. PR CEDLERK STAMP WILL SHIP DIV. ORDER CORRES.

STEAM PRODUCTS OPERATING DIVISION ORDER SERVICE EXTRA COPY FOR

TO U.S. OF A. GO WG-34,000-T 7-29-40

ORDER NO. CTR.NOS- CUST. REQ. NO.

WEIGHT	ITEM	QUANTITY	IDENTIFICATION AND DESCRIPTION	UNIT PRICE

NOTE#4-CONTINUED:

(A) LIQUIDATED DAMAGES OF 1/10 OF 1% NOT TO EXCEED 10% PER DAY FOR EACH DAY OF DELAY IN DELIVERY AFTER

( ) NOTIFY ORDER CORRESPONDENT WITHIN FIVE (5) DAYS UPON INDICATION THAT THERE WILL BE A DELAY GIVING THE REASONS AND EXTENT OF THE DELAY.

(C) TRAFFIC DEPARTMENT SHOULD ADVISE WASHINGTON OFFICE PROMPTLY THE EXACT DELIVERY DATE AT DESTINATION OF EACH SHIPMENT MADE.

(D) A PENALTY OF _____ PER LB. SHALL BE ASSESSED FOR EACH POUND IN EXCESS OF THE GUARANTEED WEIGHT OF EACH ITEM.

NOTE #5-REPORT OF SHIPMENTS:

SPECIAL ATTENTION IS INVITED TO PARAGRAPH 6 OF "GENERAL SPECIFICATIONS FOR INSPECTION OF MATERIAL". WITHIN 48 HOURS AFTER SHIPMENT CONTRACTOR WILL FURNISH TO THE INSPECTOR A REPORT OF MATERIAL SHIPPED. IN CASE THE INSPECTION IS BEING CONDUCTED BY A BRANCH INSPECTION OFFICE, THIS REPORT WILL BE FURNISHED TO THAT BRANCH OFFICE, UNLESS OTHERWISE DIRECTED.

NOTE #6-INVOICES:

STEAM DIVISION AUDITOR TO CERTIFY CUSTOMER'S INVOICE COPIES AND DELIVERY TO RESIDENT NAVY INSPECTOR. MAIL COPY OF INVOICE TO C.E.HASUE, WASHINGTON OFFICE.

NOTE #7-APPARATUS TO BE IN ACCORDANCE WITH:

(A) NAVY SCHEDULE _____, LOT #_____

(B) NAVY CONTRACT NOS _____.

CONTINUED: 2 FINAL

STEAM PRODUCTS OPERATING DIVISION ORDER SERVICE EXTRA COPY FOR A

U. S. OF A. GO WG-34,000-T DATE 7-29-40

CTR. NOS CUST. REQ. NO.

ITEM	QUANTITY	IDENTIFICATION AND DESCRIPTION	UNIT PRICE	TOTAL PRICE

NOTE #3 MANUFACTURE:
DO NOT PROCEED WITH MANUFACTURE OF THE APPARATUS SPECIFIED BELOW UNTIL DRAWINGS REQUESTED FOR APPROVAL, HAVE BEEN APPROVED AND RETURNED TO YOU.

NOTE #5 INSPECTION:
TO BE MADE AT WORKS BEFORE SHIPMENT BY INSPECTOR OF MACHINERY, U. S. N.

NOTE #10-DELIVERY AT DESTINATION:

NOTE #11-ULT. USER:
AIRCRAFT CARRIERS CV9-10-11-12.

GENERAL ORDER CONTINUED
[illegible] FORM 1-404 B SHEET 2

TO STEAM PRODUCTS OPERATING DIVISION ORDER SERVICE EXTRA COPY FOR A

SOLD TO U.S. OF A. GO WG-34,000-T DATE 7-29-40

CUST. ORDER NO. CTR.NOS CUST. REQ. NO.

PACKAGE NO.	WEIGHT	ITEM	QUANTITY	IDENTIFICATION AND DESCRIPTION	UNIT PRICE	TOTAL PRICE
		1	4 SETS	MAIN PROPULSION EQUIPMENT FOR AIR CRAFT CARRIERS CV-9-10-11-12 TO BE IN ACCORDANCE WITH SOUTH PHILA.'S PROPOSAL DATED JUNE 21, 1940, PAGES 1 TO 3, HECTOGRAPH COPY ATTACHED EXCEPT TO BE SUBJECT TO CHANGES AS MAY BE DECIDED UPON BY THE BUREAU OF SHIPS, NEWPORT NEWS S.B.& D.D.CO. AND OUR COMPANY.	2,183,000.00 EACH NET	8,732,000
				NAVY SCHEDULE, SPECIFICATIONS OR CONTRACT COVERING THIS AWARD WILL BE PREPARED BY THE GOVERNMENT AS SOON AS POSSIBLE AND FORWARDED TO YOU.		

CONTINUED (FINAL (4)

PROPOSAL

ON

150,000 SHP PROPULSION MACHINERY

FOR

FOUR-SCREW AIRCRAFT CARRIER CV-9 & CLASS

37,500 SHP PER SCREW

Westinghouse Electric & Manufacturing Company
6/21/40

PROPULSION TURBINES FOR AIRCRAFT CARRIER CV-9

The equipment herein proposed is in compliance with the General Specifications for Machinery.

BILL OF MATERIAL FOR ONE SHIP

Item #1 Four sets of turbines (two port and two starboard), each set 37,500 SHP and each consisting of:

(a) 1 - Cruising turbine.
(b) 1 - High pressure turbine.
(c) 1 - Low pressure turbine including astern elements in exhaust chambers.
(d) 1 - Throttle and governing valve including steam strain
(e) - Dummy leak-off (or equilibrium) pipes where require
(f) - Steam cross-over piping.
(g) - By-pass and nozzle control valves.

Note: No piping nor valves, except those listed above, are included, nor insulation and lagging.

Item #2 Turbine Accessories as follows:

(a) 1 - Submarine type thermometer and one oil sight flow indicator for each journal bearing.
(b) 1 - Bearing wear micrometer for each journal bearing.
(c) 1 - Rotor mircometer (used to determine the relative axial position of any of the rotors within their cylinders.
(d) - Necessary operating gauges.

Note: Valves and strainers for extraction and induction points are not included.

Item #3 Two port and two starboard cruising gears.

Item #4 Cruising gear accessories as follows:

(a) 1 - Submarine type thermometer and one pressure gauge for each journal bearing.
(b) 1 - Bearing wear micrometer for each journal bearing.

Item #5 Two port and two starboard, double reduction lock train, main reduction gear complete with thrust bearing, motor driven turning gear.

Item #6 Main reduction gear accessories as follows:

(a) 1 - Submarine type thermometer and one oil pressure gauge for each main shaft journal bearing and each thrust bearing.
(b) 1 - Bearing wear micrometer for each journal bearing.

Item #7 Port and starboard flexible couplings for connecting the cruising gear to the H.P. turbine and for connecting the H.P. and L.P. turbines to their respective pinions.

Item #8 4 - 14,500 Sq.Ft. single pass surface condensers - 5/8" - #18 BWG cupro nickel tubes, 12' active length.

Item #9 4 - Sets of main air ejectors, each consisting of 2 - two-stage ejectors mounted on combined intermediate and after condenser.

Item #10 4 - Gland exhaust condensers.

Item #11 8 - Motor driven gland exhauster fans.

Item #12 4 - Lube Oil coolers of suitable capacity to cool the lube oil approximately 1250 sq. ft. surface.

Item #13 1 - Set of spare parts for the apparatus listed above, in accordance with the General Specifications for Machiner

Item #14 1 - Set of special tools and checking gauges for the apparatus listed above, in accordance with the General Specifications for Machinery.

Item #15 1 - Set of finished plans (photo tracings) and one set of instruction books, in accordance with the General Specifications for Machinery.

Performance - Ahead

Steam conditions at throttle - 525 #/Sq.In.gauge
Total temperature at throttle - 825°F.

Knots	S.H.P.	Propeller RPM	Vacuum	Water Rate #/SHP/hour
15	12,000	118	28.5	7.4
Full Power	150,000	265	27.5	6.80

Performance - Astern

Steam Conditions 525 #/Sq.In. - 675° F.T.F.

Full Power	48,000	180	27.5	15 *

* This rate subject to operating conditions.

The above steam consumption figures are based on a 3 cylinder turbine unit.

Weight of Each Unit

1 -	High pressure turbine	-	28,200 pounds
1 -	Low pressure turbine	-	85,500 "
1 -	Cruising turbine	-	7,300 "
1 -	Cruising reduction gear	-	2,700 "
1 -	Cross-over piping including valve	-	6,300 "
1 -	Main reduction gear	-	181,000 "
-	Spares on board, per ship	-	39,100 "
-	Spares ashore, per ship	-	15,800 "
-	Tools aboard, per ship	-	2,800 "
-	Boxes aboard, per ship	-	9,000 "
1 -	Throttle valve	-	12,800 "

AJW-HP

Bureau Reqn: 260 Title 13-X-2
Bureau: Ships
Appn: 17X0603.001(1) Replacement of Naval Vessels (C&M)
Purpose: Propelling Machinery for CV9, CV10, CV11 and CV12.

The contractor, subject to the provisions hereinafter set forth, will in consideration of a payment or payments of the total sum, furnish propelling machinery for Aircraft Carriers CV9, 10, 11, and 12, as covered in the specifications herein.

To be delivered, all transportation charges paid to the Supervisor of Shipbuilding, Newport News Shipbuilding and Dry Dock Company, NEWPORT NEWS, VA. within the times specified after date of contract or bureau order as follows:

1 set under Item 1 WITHIN 570 DAYS

1 set under item 1 WITHIN 660 DAYS

1 set under Item 1 WITHIN 840 DAYS

1 set under Item 1 WITHIN 900 DAYS

Item 2 and 3 WITHIN 930 DAYS

Item 4 WITHIN 960 DAYS

Item 5 WITHIN 1080 DAYS.

If unable to make delivery within the times specified state actual time required. Bidder shall state what partial delivery he proposes for each vessel.

RIGHT TO DUPLICATE:

The Government reserves the right to make as many reproductions from the photographic tracings ordered under item 5 as may be necessary, and to manufacture or purchase additional equipment shown on these photographic tracings, without liability to the Government, for use on Navy Yard built vessels.

Item		Sets	Unit Price (per set)	Total
1	Units, main propulsion, complete for two (2) starboard and two (2) port shafts	4	$2,293,675.00	$9,174,700.00
2.	Spare parts for Item 1	4	100,600.00	402,400.00
3.	Tools and wrenches for item 1	4	12,000.00	48,000.00
4.	Instruction books	Number 54	(No price to be inserted under Items 4 and 5. Cost to be included in the cost of Item 1)	
5.	Finished plans type "D"	Set 1		

TOTAL..... $9,625,100.00

DELIVERY OF PRELIMINARY (NOT SAMPLE) INSTRUCTION BOOKS:

Five (5) preliminary instruction books will be submitted WITHIN 360 DAYS after award of contract, to the Bureau of Ships for approval.

NOTE: Bidders must fill in above blank space.
Finished Instruction Books, item 4, shall include five (5) Preliminary Instruction Books.
The Instruction Books shall NOT be copyrighted by the Contractor or in any other manner become public information.

CONFORMITY TO SPACE LIMITATIONS:

The equipment shall be suitable for installation in locations and within the space limitations as shown by the following Bureau of Engineering plans:

Plan	Title
CV9-S1-1	Arrangement of Machinery-plan, lower level and elevation.
CV9-S1-2	Arrangement of Machinery-plan upper level and elevation.
CV9-S1-3	Arrangement of Machinery-engine room sections.
CV9-S1-5	Arrangement of shafting.

These plans form a part of this schedule.

Adherence to space limitations shown is necessary to provide for proper accessibility, operation, and upkeep of the machinery and equipment to be installed in the spaces provided.

SPECIFICATIONS.

The design and materials of the equipment, together with spare parts, tools, wrenches, plans, etc., will be subject to the approval of the Bureau of Ships, Navy Department, and except as otherwise specified herein shall be in accordance with the various subsections of General Specifications for Machinery, as follows:

Subsections		Issued	Incl.Ch.Nos.
A1	General Requirements.	June 1,1940	
S1-1	Plans.	Sept 1,1938	79
S1-2	Materials, workmanship and welding. Particular attention is invited to par. S-1-2-3 (General Policy regarding material).	June 1,1938	79
S1-3	Bolts, studs, screws, nuts, etc.	May 1,1939	
S19-1	Painting and Preservation.	May 1,1938	
S28-1	Designating and Marking, Machinery Installations.	June 1,1940	
S28-2	Designating and Marking, Electrical Installations.	April 1,1938	74,75,79
S31-1	Spare parts.	June 1,1940	
S39-1	Heat Insulation and Lagging for Piping and Machinery.	June 1,1940	
S41-1	Turbines, Propulsion.	May 1,1938	
S42-1	Reduction Gears, Helical Tooth Type.	May 1,1938	57,59,74
S42-2	Flexible Couplings Propulsion.	May 1,1934	49
S42-3	Reduction Gears, Worm Type.	Feb 1,1934	54
S43-1	Shafting, Propulsion.	July 1,1939	79
S43-2	Bearings, Propulsion, Shafting.	Aug 1,1940	
S45-1	Lubricating Systems.	Oct 1,1939	81
S46-1	Condensers.	June 1,1938	75,78,81

Subsections		Issued	Incl.Ch.Nos.
S46-2	Air Ejectors.	Nov 1,1938	79,81
S47-2	Centrifugal and axial flow pumps.	Aug 1,1939	
S48-1	General Piping Systems.	Oct 1,1938	79
S48-2	Drain Systems, Steam and Water.	June 1,1938	79
S48-5	Valves and Cocks.	May 1,1938	77,79
S50-1	Horizontal Turbines, general auxiliary.	May 1,1938	
S50-2	Vertical Turbines, general auxiliary.	May 1,1934	
S60-1	General Requirements for Electrical Machinery.	Aug 1,1939	
S63-6	Alternating Current Motors, Controllers and their shipboard application.	June 1,1936	72
S87-3	Pressure and Vacuum Gauges.	July 1,1937	77
S87-4	Thermometers	May 1,1935	
S92-1	Lifting Gear and Misc. Repair Equipment.	June 1,1940	

"Gamma-Ray Radiographic Standards of the Bureau of Engineering for Steel Castings for Steam Pressure Service" are available to the contractor at the office of the Inspector of Machinery.

In general, the scope in the design and construction of the main propelling units shall be towards effecting reliable and durable machinery having maximum operating and maintenance economy. Each unit shall be designed with respect to the operation of its associated equipment, especially in connection with full power astern operating conditions.

Each set shall consist of all the machinery, fittings and apparatus necessary for driving four (4) propeller shafts. Machinery for each shaft shall, unless otherwise specified herein, consist of all parts from and including the quick-closing cutout valve, manifold and strainer ahead of the turbines to the coupling flange on the low-speed gear shaft. This includes the main condenser under the low-pressure turbine with its associated air ejector, main circulating pump, main condensate pumps, gland exhauster condenser, and oil cooler. It shall include by-pass and nozzle control valves, ~~quick-closing cutout valves~~, astern throttle valves, all cross-over piping and valves, reducing valves for gland sealing system, ~~thrust meters~~, for one ship only, and such other parts and fittings as may, in the judgment of the Navy Department, be considered an integral part of the main propelling machinery.

overspeed and [illegible] valves

Parts to be furnished by the shipbuilder to complete item 1:

Piping between inlet manifolds and turbines.

~~Extraction and induction valves~~ and piping with steam strainers, reach rods, and handwheels.

Reach rods and handwheels for turbine operation.

All gages and thermometers.

All lubricating oil, gland and drain piping and valves, excluding the gland sealing reducing valves. ~~[illegible]~~

~~gland [illegible] gauges~~

Gland exhauster system with the necessary valves and piping, but excluding the gland exhauster condensers and fans.

All insulation (and lagging.) out.

Main condenser piping and valves.

All foundation bolts and nuts.

Coupling bolts and nuts for bull gear to line shaft coupling.

For main condensate and circulating pump accessories, see specifications for pumps herein.

Parts or systems to be designed by the contractor in accordance with specifications, subject to approval of the shipbuilder and the Government, and for which the contractor assumes responsibility for satisfactory operation, providing such parts or systems are built, installed, and operated in accordance with approved design and operating instructions:

by the contractor

Design of piping between manifold and turbine.

Design of ~~hooks and~~ insulation with method of applying; but all hooks, pads, welding, tapping and drilling for attachment of such ~~lagging and~~ insulation will be furnished or accomplished by the contractor.

Diagrammatic arrangement of lubricating system, including the water circulation therefor.

Design of main condenser circulating system, including installation plan of main circulating pump and all manual and motor-operated valves, but excluding the motor operation thereof.

Diagrammatic arrangement of gland sealing system.

The mass elastic system of each propelling unit, consisting of propeller, shafting, gears and turbines, shall be calculated carefully for torsional vibration and these calculations submitted for Bureau approval. Frequencies of all units of shafting shall be made as nearly alike as practicable to obtain a so-called "modal drive" and the location of the resulting critical speeds within the operating range shall be satisfactory to the Bureau.

The design, construction, and workmanship of the units shall be such that a minimum practical noise level will result under all operating conditions. The noise level and noise characteristics under all conditions shall be such as to enable normal conversation in all operating spaces and also to cause no discomfort to operating personnel for protracted periods.

DETAIL REQUIREMENTS.

Main Turbines: Turbines for driving each propeller shaft under item 1 shall consist of a three-turbine arrangement, including a geared cruising turbine forward of the high-pressure

turbine for ahead operation, with suitable astern elements installed in each end of the low-pressure casing. The high-pressure and cruising turbines shall be of the impulse type having wheels integral with the rotor and diaphragms between the wheels. The distance between bearings shall be as short as practicable to reduce distortion and improve reliability, but accessibility of bearings and glands shall be maintained.

Cruising turbines shall be designed to give a speed of twenty (20) knots at trial displacement, without additional steam being admitted to the high-pressure turbine.

Turbines for each propeller shaft shall be designed to deliver 37,500 shaft horsepower continuously to the shaft under normal conditions. Following are the normal full-power conditions:

Propeller shaft revolutions per minute -	265
Steam pressure at the quick-closing cutout valve - - - - - - - - - - - -	620 lbs/sq.in. gage.
Steam temperature at quick-closing cutout valve - - - - - - - - - - - -	825° F.
Back pressure at the turbine exhaust flange to the main condenser - - - - -	1.88 lbs/sq.in. absolute.

The design shall provide for the best possible economy of operation at the following points, without undue sacrifice of

economy at other powers:

Speed	S.H.P. per shaft	Propeller RPM	
15 knots	2500	109	clean bottom
15 knots	3100	122	foul bottom
20 knots	5750	148	clean bottom
25 knots	11875	187	" "
30 knots	23500	229	" "
Full power	37500	265	" "
Astern	12000	186	" "

The turbines shall be designed to withstand a maximum steam pressure of 634 lbs. gage.

The astern elements in each low-pressure turbine casing shall be capable of delivering to the shaft not less than 12,000 S.H.P. (186 RPM) for a continuous period of one hour, with a steam temperature of 825° F. at the ~~quick-closing cutout~~ overspeed control valve during the first 15 minutes and with steam temperature reduced to 675° F. thereafter, when exhausting against a pressure of 1.25 lbs. per square inch absolute at the exhaust flange. The water rate under these conditions shall not exceed 15 lbs. per shaft horsepower hour.

Control of turbines shall be by means of cam-operated nozzle valves on the cruising and high-pressure turbines, with a conventional throttle valve for astern operation. A hydraulic and manually-operated, ~~quick-closing cutout~~ overspeed control valve shall be installed in the main steam line adjacent to each set of turbines to function as an overspeed protection for ~~both ahead and astern turbines~~ ahead operation. Immediately adjacent and ~~downstream~~ upstream from

this valve shall be installed a combined strainer and manifold. All of the above is included in item 1.

Each low-pressure turbine shall exhaust into an independent underneath condenser having not less than 14,750 ~~14,500~~ square feet of condensing ~~cooling~~ surface. The method of support of the condenser shall be as approved by the Bureau. The condenser shall have an active tube length of 18 feet. 6 inches. A welded plate will be permitted in the bulkheads for removal of tubes.

Each high-pressure turbine shall have four flanged connections, clear of insulation and lagging, to utilize excess auxiliary exhaust steam or from which steam may be extracted at pressures of 10 to 15 pounds per square inch gage. These connections shall be located so that under any condition of operation from five (5) percent to two-thirds (2/3) maximum power the pressure in the stage to which steam is admitted or from which steam is extracted shall be approximately the pressure in the auxiliary exhaust. No such connections shall be installed in the low-pressure turbines. The high-pressure turbines shall be designed for the extraction of 5000 pounds of steam per hour per turbine at five (5) percent full power. Each high-pressure turbine shall be suitable for the admission of auxiliary exhaust from seven (7) percent of full power to the power where the H.P.-L.P. crossover pressure reaches 15 pounds gage.

Consideration will be given to increasing the percent

of full power at which extraction may begin. The pressure in the auxiliary exhaust will normally be 10/15 pounds per square inch gage.

Suitable valves will be provided by the shipbuilder on bleeder connections for automatic and hand control of steam flow to or from the exhaust line.

Port units shall drive left hand propellers; starboard units shall drive right hand propellers.

All finished flanges subject to high steam pressure shall have fg finish. All horizontal and vertical joints on turbine casings shall have scraped finish for metal to metal contact.

The blading and root sections shall be of a design commonly used in the Naval service or obtainable commercially from more than one source.

Proprietary or patented material or methods of manufacture will not be approved.

Turbine blades secured by pins will not be approved. Welding will not be permitted on blades or shrouding.

Lubrication: Separate lubricating oil inlets and outlets shall be provided for all thrust bearings and their adjacent journal bearings.

All turbine and thrust bearings shall be equipped, where practicable, with a combined sight flow and thermometer fitting in the drain line. Where this is not practicable, a sight flow fitting shall be installed on the pressure side of each bearing with a thermometer in a well on each bearing.

located as near the discharge end of the shell as practicable.

All gear and pinion bearings shall be fitted with a thermometer in a well located as described above. A gage shall show oil pressure in each header supplying oil to bearings and sprays. The gages will be supplied by the shipbuilder.

Each turbine bearing and all thrust bearings shall be fitted with a needle valve in the oil supply line.

Each turbine journal bearing shall be fitted for a bearing wear micrometer. Special care shall be taken that the design of micrometer is such that it cannot touch the shaft when micrometer cover is in place. The readings of the micrometer shall increase as it is screwed down.

All micrometers, sight flow fittings, needle valves and thermometer wells shall be furnished by the contractor. The thermometers will be furnished by the shipbuilder.

Micrometers or other suitable means shall be provided for measuring the axial position of all turbine rotors. Means shall also be provided for measuring the reduction gear thrust clearance without disassembly of the bearings.

The contractor shall make the necessary arrangements for drainage from the turbines and shall provide flanged connections clear of insulation and lagging for attachment of the necessary valves and piping. Flanged connections shall also be provided for steam and oil connections.

PIPING DETAILS AND DRAINAGE OF TURBINES:

In the case of all drain connections from 1-inch and below, the connection will be formed by forged steel flanged fitting. This shall be accomplished by screwing into the casting a forged nipple, sealed with welding at the casting. The nipple will be screwed in a counterbored hole so that the welding will come above the last thread. The nipple shall be of an alloy similar to the casting. Drain connections above 1-inch shall be flanged and flanges preferably shall be cast integral with casing.

The material for all tubing above the 1-inch size, which may be subjected to steam exceeding a temperature of 650° F., shall be in accordance with "Specification 44T33(INT) issued by Bureau of Engineering and Bureau of Construction and Repair June 1, 1940, for "Tubing, Steal, Molybdenum Alloy, Seamless".

All silver brazing (soldering) on piping shall be performed by operators qualified in accordance with the Navy Department General Specifications for Inspection of Material, Appendix VII Welding, Sections E-1, E-2, and E-5, as applicable.

Gaskets shall conform to Bureau of Engineering Standard B-179, Alt. 5, or to type "A", class "a" gaskets in accordance with "BUREAU OF ENGINEERING SPECIFICATION 33G5(INT), dated June 1, 1933, for GASKETS, METALLIC-ENCASED", or better as approved.

CASTINGS:

Where General Specifications for Machinery or Navy Depart-

ment specifications reference in this schedule specify Class "D" cast steel, Class "B" steel (soft for welding) or carbon molybdenum steel shall be substituted. Class "B" steel is suitable for pressures up to 600 pounds gage and temperatures up to 650 degrees F. When the contractor so desires, carbon-molybdenum steel may be substituted in lieu of Class "B" steel.

The material for all castings which may be subjected to steam exceeding a temperature of 650 degrees F. shall be in accordance with "Specification 46S33", issued by the Navy Department September 1, 1939, for "Steel, Molybdenum Alloy; Castings".

FORGINGS:

The material for all forgings except turbine rotors which may be subjected to steam exceeding a temperature of 650° F., shall be in accordance with Navy Department Specification 46S34 issued November 1, 1936, for STEEL, MOLYBDENUM ALLOY, WROUGHT.

Material for turbine rotor forgings shall be in accordance with Navy Department Specification 46S39 issued May 1, 1940, for STEEL, FORGINGS FOR TURBINE ROTORS (HEAT TREATED).

GLANDS AND GLAND EXHAUSTER SYSTEM:

The turbine glands shall be steam sealed. When sealed from an external source the sealing steam shall be supplied from the auxiliary exhaust main, at 10/15 pounds gage.

Suitable manual steam needle valves on each gland shall be included in the gland sealing equipment supplied by the shipbuilder

A gland exhauster system shall be provided for each engine room (2 per ship). Each system shall include a gland exhauster condenser and one gland exhauster fan. Each system, including the condensers, shall have a capacity sufficient to handle the gland exhaust from all turbines driving two propeller shafts, plus such additional capacity as may be prescribed by the shipbuilder.

Each gland exhauster fan shall have sufficient capacity for operation of the equipment in one engine room at all powers, the other fan being used as a standby. Vents from the main turbine air ejector after condensers will be led direct to suction piping of gland exhauster fans beyond the gland exhaust condenser, and after the alarm bell actuating device installed in the suction piping.

The gland exhauster condensers shall be arranged for using condensate from the discharge from the main and dynamo air ejector assemblies in each machinery group.

Each gland exhaust condenser, when supplied with 70 g.p.m. condensate cooling water at an inlet temperature of about 140°F., shall be designed to effectively condense the main turbine gland leakoff steam, the steam vented from a fresh water drain collecting tank, and the steam vented from the vent condenser of a deaerating feed tank.

Preliminary estimates indicate that the quantity of steam air mixture to be vented from each deaerating feed tank vent condenser will be approximately 500 pounds per hour of steam and 10 pounds per hour of air, and that the quantity of steam

vented from the fresh water drain collecting tank will not normally exceed 150 pounds per hour, and the quantity of air vented will not exceed 35 pounds per hour.

The above preliminary estimates are subject to revision by the Bureau at the time of submission of type "B" plans for the gland exhaust condensers.

An alarm bell actuated in connection with the temperature of the vapor discharged from the gland exhaust condenser shall be furnished by the ~~contractor~~ shipbuilder. Details of the design, arrangement and setting of this device shall be made satisfactory to the Bureau.

The following specifications apply to the gland exhauster system, utilizing electric driven fan:

The fan casing shall be of Class 2 cast aluminum alloy, in strict accordance with Specification 46Al(INT) issued by the Bureau of Ships July 1, 1940, for Aluminum Alloy, Light; Castings (Resistant to Salt Water Corrosion).

A drain with petcock shall be furnished at the bottom of the fan casing.

The fan wheel shall be of steel plate, galvanized. The spider shall be of any one of the following materials:

Gunmetal in accordance with Specification 46M6g issued by the Navy Department June 1, 1938, for Metal, Gun (Composition "G"); Castings.

Naval Brass in accordance with Specification 46b10 dated March 1, 1940, for Brass, Naval (Composition N-1); Castings.

Manganese Bronze in accordance with Specification 42B2,

issued November 1, 1939, for Bronze, Manganese (Composition Mn-c); Castings.

The material for other parts shall be as approved when type "B" plans are submitted.

ELECTRICAL SPECIFICATIONS:

The motors shall be in strict accordance with "Specification 17M10a" issued by the Navy Department May 1, 1939, for Motors, Alternating Current (Shipboard Use) and shall have the following characteristics:

(1)	Ambient temperature of reference and Method of Temperature Measurement.	50° C., Table 1, Method 2.
(2)	Degree of enclosure and Method of Cooling.	Totally enclosed. Fan cooled. (See par. S63-6-X of General Specifications for Machinery).
(3)	Speed Classification.	Constant.
(4)	Duty Classification.	Continuous.
(5)	Number of phases.	Three.
(6)	Frequency.	60 Cycles.
(7)	Voltage.	440 volts.
(8)	Classification	Squirrel cage, induction motor.
(9)	Sub-classification.	Normal torque, normal starting current.
(10)	Type of bearing.	Ball.
(11)	Horsepower rating.	As required.

5 Copies

The controllers shall be in ~~strict~~ accordance with Specification 17C10(INT) issued by the Bureau of Engineering and Bureau of Construction and Repair May 1, 1940, and amendment pertaining thereto dated ~~May~~ 1, 19~~39~~40, for Controllers, Alternating-Current (Shipboard Use) and shall have the following characteristics:

controller spec

Plate issue

(1)	Ambient temperature of reference and method of temperature measurement	50° C. Table 1, Method 2
(2)	Service condition	Navy A
(3)	Degree of shockproofness	150 AI
(4)	Degree of enclosure	Protected, drippproof
(5)	Control functions	Starting and stopping
(6)	Type of Construction	Across-line starter
(7)	Operation of control circuit	Semi-automatic
(8)	Type of master switch	Push button (Provided with start and stop buttons and "emergency-run" feature so that motor may be operated momentarily independent of overload protective devices.)
(9)	Proximity of master switch	Remote
(10)	Kinds of protection	Overload, ~~Low Voltage release,~~ (Short Circuit, 3 fuses
(11)	Duty classification	Continuous
(12)	Current on indication	Motor controller shall b provided with a pair of terminals for connection to an external two wire 440 volt indicating ligh circuit to indicate by lamp burning that the motor is running. This circuit shall be separat ly fused (3 fuses) in th controller. White indic ing lamps and lamp trans formers in separately mounted enclosing cases will be furnished by the shipbuilder and shall be installed at locations where they are visible from operating stations.

FOR ALL THE ELECTRICAL EQUIPMENT COVERED BY THIS SCHEDULE:

Solderless terminal lugs of approved type shall be provided.

Openings covered by removable plates shall be provided in the top and bottom of the controller case, so that the plate may be removed and drilled for entrance of cables after the controller is installed in the ship. A suitable gasket shall be provided for upper plate. The upper plate shall be 4 inches by 4 inches and 1/4 inch. The lower plate shall be 8 inches by 3 inches by .0625 (or the thickness of metal used for the case). Drilling for cable entrance holes will be done by the shipbuilder.

The magnet coils on magnetically-operated switches of contactors shall operate on the same voltage supplied to the switch or contactor. The source of supply for the coils shall be taken from the switch or contactor they operate.

Motors of the same characteristics shall be of the same make and design. They shall be of such size that they will not be overloaded under any conditions of operation of the driven auxiliaries, within the limits specified herein. However, their horsepower rating shall be minimum comparable with the purpose intended as determined in accordance with subparagraph 363-6-d of subsection 363-6 of General Specifications for Machinery.

REDUCTION GEARS:

The reduction gears furnished as part of the equipment under Item 1 shall be of the main double reduction, double helical tooth type.

Each reduction gear shall be designed for the continuous transmission of 37,500 shaft horsepower under normal full power operation.

The bottom of the gear foundations shall form a lubricating oil drain tank of at least twice the maximum discharge capacity of one lubricating oil pump.

The gears shall be kept clear of the oil with the ship on an even keel or inclined up to 4½ degrees on either side by the use of a shield to be furnished by the contractor. Thrust bearings shall be of the pivoted segmental block type and shall be installed at the forward end of each main reduction gear case.

Operation of the reduction gears shall be without undue noise as defined by paragraph 542-1-C-2 of the General Specification for Machinery.

Suitable provision shall be made, as approved, for measuring the ahead and astern thrust on each main shaft of one vessel through the medium of a removable thrust meter of approved type, to be furnished and installed by the contractor. out

Thrust meters will be installed on CVs only. out

If single cell thrust meters are furnished for ahead and astern operation they shall be fitted with recording type gages of the dial type. out

Dental couplings incorporating fine internal teeth shall be provided.

The gears and pinions shall have a minimum helical angle of 40°.

All shaft-flange holes at the after end of each reduction gear shall be drilled to a diameter 1/8 inch smaller than the finished diameter. All the above holes will be finish-drilled and reamed by the shipbuilder.

TURNING GEAR:

The turning gear for each reduction gear unit shall be furnished complete and shall include a geared motor and controller. The turning gear shall be completely encased and arranged for driving a high-speed pinion by means of a clutch fitted with a positive locking-out device. The turning gear shall be capable of turning turbine rotors and main propeller shaft continuously at not less than one revolution of main shafting in 10 minutes without undue heating of the motor or bearings.

MOTOR FOR TURNING GEAR: [illegible]

The motors shall be in strict accordance with Specification 17M10a issued by the Navy Department May 1, 1959, for Motors, Alternating Current (Shipboard Use) and shall have the following characteristics:

(1)	Ambient temperature of reference and method of temperature measurement	50° C., Table 1, Method 2.
(2)	Degree of enclosure and method of cooling.	Totally enclosed, fan cooled.
(3)	Speed classification	Varying,
(4)	Duty classification	Continuous (see Note 1 below)
(5)	Number of phases	Three
(6)	Frequency	60 Cycles
(7)	Voltage	440 Volts A.C.
(8)	Classification	Squirrel cage, Induction motor.
(9)	Sub-classification	High torque/high-slip (see Note 2 below)
(10)	Type of bearing	Ball
(11)	Horsepower rating	As required

NOTES:

1. The turning gear shall be capable of turning turbine rotors and main propeller shafts continuously at a rate not less than one (1) revolution of main shafting in ten (10) minutes without undue heating of motor or bearings.

2. The starting torque of the motor shall be at least 250 percent of rated full-load torque.

CONTROLLER FOR TURNING-GEAR MOTOR:

The controllers shall be in strict accordance with Specification 17C10(INT) issued by the Bureau of Engineering and Bureau of Construction and Repair May 1, 1940, and amendment pertaining thereto dated May 1, 1940, for Controllers, Alternating-Current (Shipboard Use) and shall have the following characteristics:

(1)	Service condition	Navy B
(2)	Degree of shockproofness	Class H
(3)	Degree of enclosure	Protected, drippreof
(4)	Control functions	Motor starting and reversing.
(5)	Type of construction	Across-line starter
(6)	Operation of control circuit	Semi-automatic
(7)	Type of master switch	Pushbutton
(8)	Proximity of master switch	Remote
(9)	Kinds of protection	Overload, short circuit and low-voltage protection.
(10)	Duty classification	Continuous

LUBRICATING OIL SYSTEM:

There shall be an independent lubricating oil system for the main propelling machinery on each shaft. Each system will include two (2) lubricating oil pumps (furnished by the shipbuilder) and one lubricating oil cooler provided by the contractor. Each cooler shall be capable of cooling the lubricating oil for the propelling machinery on one shaft at full power.

Cooling water will be supplied to the lubricating oil coolers through a connection from the injection to the main condenser.

Each oil cooler shall have a minimum cooling surface of 1250 square feet.

The design of the lubricating oil coolers shall conform to the requirements specified in Bureau Specification 6601(INT) dated April 15, 1940.

MAIN LUBRICATING OIL PUMPS:

The following are the characteristics of the lubricating oil pumps which the shipbuilder intends to furnish. Bidder shall state whether these pumps are satisfactory for the equipment he proposes to furnish.

Two (2) Class O-1 pumps for each main ~~turbine assembly~~ lubrication system; one turbine, one motor, driven. Capacity 650 gallons per minute, discharge pressure 50 pounds per square inch gage, discharging to lubricating oil mains through coolers.

Under normal conditions one pump will be used with each shaft assembly at full power.

MAIN CONDENSERS:

The main condensers furnished as part of the equipment under item 1 shall be located under the low pressure turbines and shall be supported as necessary to prevent transmission of expansion and other strains liable to distort the turbines. Each main condenser shall contain not less than ~~1500 square~~ 14,750 square

feet of condensing surface using an effective tube length of 12' 6". and shall be capable of maintaining the following back pressures at the turbine exhaust flange:

Load per Shaft (horsepower)	Circulating Water Temperature (Degrees Fahrenheit)	Back Pressure (pounds per square inch absolute)
37,500	65	1-1/4 maximum
23,500	65	1 maximum
11,875	65	3/4 maximum
5,750	65	3/4 maximum
2,500	65	3/4 maximum
12,000 (Astern)	65	1-1/4 maximum

The main condensers shall be designed to operate with scoop injection capable of supplying ~~34,500~~ 35,500 gallons per minute of circulating water for steam condensing and lubricating oil cooling purposes under full load conditions. Of this total quantity ~~33,300~~ 34,300 gallons per minute shall be used for steam condensing purposes. The hot well shall have sufficient volume to contain all the condensation produced in a period of one minute under maximum steam load conditions. Circulating pumps shall be provided to insure an adequate supply of circulating water when the vessel is stopped, backing or going ahead at slow speeds.

MAIN CONDENSER CIRCULATING SYSTEM:

The design for the main injection, main overboard discharge and main circulating pump suction and discharge valves, fittings, piping, scoops and sea chests shall be furnished by the contractor. The shipbuilder will furnish the main injection, main overboard discharge and main circulating pump suction and discharge valves, piping, scoops and sea chests to the contractor's design as approved by the Bureau and also all gages and thermometers which

are required for these parts.

The sea suction for each circulating pump shall be independent of the scoop injection. The main circulating system sea chests shall be designed to produce the required flow of circulating water without the use of projecting lips on the injection scoops or on the overboard discharges. The non-return valves shall be of the "island type."

The material for the main condenser water chests shall be copper-nickel alloy in accordance with "Specifications 46-C-6," issued by the Navy Department, July 1, 1938, for "Copper-Nickel Alloy (70:30): Bars, Plates, Rods, Sheets and Strips." Nickel-copper in strict accordance with "Specification 46-N-7f" issued by the Navy Department, July 1, 1938, will be accepted provided the inside surface is solder wiped as described in paragraph 846-1-q-8 of the General Specifications for Machinery.

In connection with the design of the main condenser circulating system to be furnished by the contractor under item 1, and in consideration of the payments to be made under this item, the contractor grants to the Government a non-exclusive, irrevocable, royalty free license to make, have made and use for Naval Vessels, structures embodying all subject matter covered by United States patents 1, 862,282; 1,845,547; 1,884,282; 1,893,039; 2,106,961; 2,035,008; and 2,059,026.

AIR EJECTORS:

The main air ejectors furnished as part of the equipment under item 1 shall each consist of one type "A" air ejector assembly comprising two 2-stage units for each main condenser.

Each ejector unit shall be capable of maintaining the required vacuum under all operating conditions of the condenser. The other 2-stage ejector will serve as a spare or for abnormal air leakage conditions. Each two stage unit shall have the following minimum air removal capacities under specified operating conditions:

Air Conditions			Cooling Water Conditions	
Free dry air pounds/hour	Vacuum, inches Hg(30 In.Bar.)	Temperature of mixture	G.P.M.	Inlet Temp. of
40	29.0	70 degrees Fahrenheit	35	75
60	28.5	80 degrees Fahrenheit	40	85
75	28.0	85 degrees Fahrenheit	45	95

The main air ejectors shall be designed for operation with a steam pressure of 275 pounds per square inch gage.

For full power and for cruising speeds, where the steam condensed in the main condenser exceeds the amount of condensate required for cooling, the excess condensate may be by-passed to the deaerating feed tank by means of pressure unloading valves. Consideration will be given to elimination of the condensate bypass line provided that the air ejector inter and after condensers are designed for an acceptable condensate pressure drop under full power operating conditions.

For ships' speeds below 15 knots and maneuvering conditions when the normal flow of condensate is insufficient for the inter and after condensers, the condensate will be recirculated

from the discharge of the deaerating feed tank vent condenser back to the main condenser .

The pressure unloading valves, the recirculating control valves, pressure reducing valves, all steam stop valves, piping fittings and gages will be furnished by the shipbuilder except for valves (including relief valves), fittings and strainers comprising the air ejector assembly.

All connections shall be flanged, no cone union connections will be permitted.

Eyebolts or other attachments shall be provided to permit the handling of each ejector assembly without injury to any part.

PUMPS:

The pumps furnished as part of the equipment under item 1 shall be of an approved type in accordance with Subsection 547-2 of the General Specifications for Machinery.

MAIN CONDENSER CIRCULATING PUMPS:

One (1) main circulating pump shall be provided for each condenser. The pump shall be single-stage, mixed flow or propeller type, designed for class "B" service, driven by a steam turbine through reduction gears.

Each pump shall have a capacity of 30,000 gallons per minute at a total head of 13.5 pounds per square inch when operating with a suction lift of 4 inches mercury referred to centerline of pump. Pumps will be located in the ship so as to have about 10 feet static submergence.

Each pump shall also be capable of pumping engine room bilges at a capacity of 7500 gallons per minute against a total head of 25 20.7 pounds per square inch with a suction lift of 15 feet, as required by subparagraph S47-2-ff of referenced General Specifications for Machinery.

The pump shaft shall be separate from the reduction gear shaft, and connected thereto by a rigid coupling.

The pumps may be either vertical or horizontal, as agreed upon between the contractor and the shipbuilder and as approved by the Bureau of Ships.

MAIN CONDENSATE PUMPS:

Two (2) main condensate pumps shall be furnished for each condenser, one (1) driven by geared or direct-connected, horizontal or vertical steam turbine, and one (1) by a direct-connected electric motor through a flexible coupling.

Each pump shall be vertical, two-stage, single-inlet type, designed for class "D-2" service.

Each pump shall have a capacity of 385 gallons per minute at a total head of 70 pounds per square inch. Under rated con-

ditions the pump speed shall not exceed 1200 RPM. Each pump shall further be capable of handling 75 percent of the condensate from one main condenser when ship is operating at full power. The pumps will take suction from the main condenser and discharge to the deaerating feed tanks through inter and after corresponding ejector/condensers, gland exhaust/condenser and deaerating feed tank vent condensers. The design and arrangement of the vacuum system shall be such that the condensate pumps shall have the required suction submergence for satisfactory operation under all operating conditions, including roll, pitch, and list of vessel. Pumps shall not project into the inner bottom of the vessel.

The main condensate pumps shall have characteristics such that they will operate satisfactorily in parallel with the auxiliary condenser condensate pumps to be supplied by shipbuilder and the characteristics of the main condensate pump shall be satisfactory to the shipbuilder and approved by the Bureau of Ships.

AUXILIARY TURBINES:

The rated capacities and the total heads of the turbine-driven pumps specified above shall be obtained normally with dry-saturated steam at a pressure of 575 pounds per square inch gage at the inlet to turbine throttle valve, and 15 pounds per square inch gage back pressure.

The pumps shall also be capable of developing rated

(8)	Voltage	440 volts
(9)	Type classification	Squirrel cage, induction
(10)	Sub-classification	Normal torque, normal starting current
(11)	Type of bearings	Ball
(12)	Horsepower rating	See below.

Horsepower rating of motor shall be as required by paragraph 863-3-d of Subsection 863-6.

The controllers shall be in strict accordance with Bureau's Specification 17C10(INT) dated 1 May, 1940, amendment No. 1 thereto dated 1 May, 1940, and Bureau Specification 17E11(INT) dated 1 June, 1940, and shall have the following characteristics: To be latest issue

(1)	Service condition	Navy A
(2)	Ambient temperature of reference	50° C.
(3)	Degree of enclosure	Dripproof, protected
(4)	Degree of shockproofness	Class ~~100~~ H1
(5)	Control function	Starting & stopping
(6)	Type of construction	Across line starter
(7)	Duty rating	Continuous
(8)	Operation of control circuit	Semi-automatic
(9)	Type of master switch	Push button (Provided with start and stop buttons and "emergency-run" feature so that motor may be operated momentarily independent of overload protective devices.)
(10)	Proximity of master switch	Distant
(11)	Kinds of protection	Overload, short circuit, and low-voltage protection. out!
(12)	Current-on indication	See below

Pump controller shall be provided with a pair of terminals for connection to an external two-wire, 440-volt indicating light circuit to indicate by lamp burning that the pump motor is running. This circuit shall be separately fused (two fuses) in the controller. White indicating lamps and lamp transformers in separately mounted enclosing cases will be furnished by the shipbuilder and will be installed at locations where they are visible from operating stations.

PUMP ACCESSORIES AND EQUIPMENT:

The contractor shall furnish the following:

1. Drain and vent valves (except suction vent valves) for turbines and pumps.
2. Relief valves for turbines set at 25 pounds gage.
3. Thermometers, gages, coolers, filter and relief valves for self-contained lubricating system only.
4. Governors.

The following shall be furnished by the shipbuilder:

1. Steam inlet and exhaust valves for turbines.
2. Suction, suction vent, and discharge valves.
3. Thermometers and gages other than those specified above.
4. Excess back pressure valves in exhaust line.
5. Insulation and lagging.

NOTE: The plans submitted by the contractor shall show insulation and lagging in accordance with referenced Subsection S39-1 of General Specifications for Machinery.

The contractor shall provide suitable bosses for thermometers and gages furnished by the shipbuilder.

SPARE PARTS:

Any spare parts required by the General Specifications for Machinery which do not apply to the type of machinery being installed shall be omitted; any spare parts not listed but which, in the opinion of the Bureau of Ships, are necessary for the type of machinery installed shall be supplied by the contractor if so directed.

Each set of spare parts as called for herein under item 2

shall consist of all the spare parts in the quantity required to cover four (4) complete propulsion units per ship and shall be furnished by the contractor in accordance with the following paragraphs of the General Specifications for Machinery:

For turbines	S41-1-aa (See note)
For reduction gears	S42-1-q
For oil coolers	Bureau Specification 66-C-1(INT)
For condensers	S46-1-x
For air ejectors	S48-2-r
For pumps	S47-2-yy
For relief valves	S48-5-p
For auxiliary turbines	S50-1-gg

delete NOTE: 110% of all blading materials for one ship shall be furnished with CV9 as a total for the four (4) vessels. complete blading no spares

For electrical equipment furnished under this schedule, spare parts shall be furnished, as follows:

For motors - See Specification 17-M-10a
For controllers - See Specification 17-C-10 (INT)

Twenty-five percent spare manifold steam strainer baskets shall be furnished. One spare gland asbestos for complete shall be furnished for each ship

OPTIONAL SPARES: Two bull gear collars as above spares.

In addition to the spare parts for which there is quoted the lump sum price above, the bidder shall list and price all other spare parts considered necessary for one year's efficient operation of the particular make of equipment on which he is bidding. Such spare parts shall be separately itemized and priced, a copy of this itemized list to be securely attached to each copy of the proposal. The price of such additional spare parts shall not be included in the value of the spare parts priced under item 2. The Government reserves the right to order such items as may be

needed of additional spare parts on this list, at the itemized prices given and at any time prior to the time of the last delivery under the contract.

SPARE PARTS, COMPLETE LISTING:

Following award to the contractor and after approval of manufacturing plans, the contractor shall submit an itemized and priced list of all spare parts being furnished under the contract. This list is for Navy accounting and issue purposes only, and will not be used by the contractor for invoice or payment purposes. This list shall also include the number and overall dimensions of boxes, which data is required to provide stowage for spare parts and tools aboard ship, and shall be furnished to the following:

1 copy to the Inspector of Machinery concerned.
2 copies to the shipbuilder.
1 copy to the Supervisor of Shipbuilding.

Spare parts shall be plainly marked or tagged to permit of ready identification on receipt.

Changes in the above spare parts lists resulting from changes in drawings shall be made by the contractor as they occur.

TOOLS AND WRENCHES:

Each set of special tools and wrenches as called for herein under item 3 shall consist of all the special tools and wrenches in the quantity required to cover four complete main propulsion units per vessel.

No ordinary tools shall be included. Each tool and wrench shall be indelibly marked to indicate the service for which intended.

Special tools and wrenches shall be furnished in accordance with the following paragraphs of the General Specifications for Machinery, as applicable:

For turbines	S41-1-dd
For reduction gears	S42-1-r
For oil coolers	Bureau Specification 6601(INT)
For condensers	S43-1-y
For air ejectors	S43-2-s
For pumps	S47-2-zz
For auxiliary turbines	S50-1-hh

3 paragraphs on tools

SPARE PARTS BOXING:

Spare parts and tools shall be boxed and listed in accordance with Subsection S31-1 of General Specifications for Machinery. Where mechanical spare parts are few in quantity and small in size they may be placed in the same box with the electrical spares. The boxes shall be manufactured in accordance with "Specification 42B9", issued by the Navy Department, April 1, 1938, for "Boxes, Spare Parts, Electrical and Mechanical (Shipboard Use)".

DATA WITH BIDS:

In each case where ~~plans~~, curves, data sheets, etc., are requested with bids, these data are required in triplicate.

TURBINES AND REDUCTION GEARS:

Bidder must submit with his bid a statement in triplicate showing:

(a) Guaranteed steam consumption at the following loads (shaft horsepower per shaft). Guaranteed steam consumption shall include cooling steam and gland seal steam but shall not include any steam admitted to or extracted from the turbine.

37,500 S.H.P. clean bottom - - - - - - pounds/hour

23,500 S.H.P. " " - - - - - - pounds/hour

11,875 S.H.P. " " - - - - - - pounds/hour

5,750 S.H.P. " " - - - - - - pounds/hour

3,100 S.H.P. foul bottom - - - - - - pounds/hour

2,500 S.H.P. clean bottom - - - - - - pounds/hour

12,000 S.H.P. (astern) " - - - - - - pounds/hour

(b) Itemized weight per shaft of equipment covered by item 1. Guaranteed weight in excess of 450,000 pounds for all machinery for one shaft plus one set of tools and spares and one thrust meter but not including spares carried ashore may be cause for rejection.

(c) Itemized weight of all rotating parts and their radii of gyration (or WR^2) and all information on torsional flexibility of shaft elements.

Guaranteed steam consumption (clean bottom) in excess of
7.0 pounds per S.H.P.H. at 37,500 S.H.P. per shaft and/or
7.0 pounds per S.H.P.H. at 23,500 S.H.P. per shaft and/or
7.0 pounds per S.H.P.H. at 11,875 S.H.P. per shaft and/or
7.3 pounds per S.H.P.H. at 5,750 S.H.P. per shaft and/or
8.4 pounds per S.H.P.H. at 2,500 S.H.P. per shaft and/or
15 pounds per S.H.P.H. astern at 12,000 S.H.P. and/or
7.5 pounds per S.H.P.H. at 3100 S.H.P. ahead per shaft
(foul bottom) may be cause for rejection.

NOTE: Information requested under paragraph (c)

shall be forwarded by the contractor to the Bureau of Ships thirty (30) days after award of contract.

CONDENSERS:

Performance curves shall show the estimated vacuum obtainable within the range of the steam quantities condensed versus absolute pressure at the turbine exhaust flange at inlet circulating water temperature of 65 degrees, 75 degrees, and 85 degrees Fahrenheit.

BIDS WITHOUT THE ABOVE DATA MAY BE REJECTED AS BEING INCOMPLETE.

CORRESPONDENCE:

After award of contract, correspondence in connection with request for information or prints should be addressed to the Bureau of Ships, Navy Department, Washington, D. C., with copies thereof to Inspector of Machinery, Essington, Pennsylvania, Supervisor of Shipbuilding, Newport News, Virginia, and the Newport News Shipbuilding and D. D. Company, Newport News, Virginia.

BRAND APPROVAL:

The following equipment shall be of approved brand, type, or make:

1. Air ejectors. See Note
2. Controllers (Components). _____
3. Main circulating pumps. _____
4. Main condensate pumps. _____

(Bidder shall fill in the above blank spaces)

ACCEPTABLE MATERIAL:

The right is reserved to reject any bid on brands of main circulating pumps, main condensate pumps, air ejectors and controllers which have not been subject to the required tests and found satisfactory. The attention of the manufacturers is called to this requirement, and they are urged to forward samples of the equipment which they propose to offer the Navy in the future in order that tests may be made. These tests will be conducted at the expense of the manufacturers. Information with reference to the expense involved and as to where the samples should be sent will be supplied upon application to the Bureau of Supplies and Accounts. It is to be understood that the manufacturers shall pay all transportation charges to and from the point where tests are made. In the case of the failure of the sample or samples submitted to prove satisfactory, consideration will be given to the requests of the manufacturers for additional tests only after it has been clearly shown that changes have been made in the product with reference to design, method of manufacture, etc., which the Bureau concerned considers sufficient to warrant conducting such additional tests.

INSPECTION:

To be inspected at the place of manufacture by a Naval Inspector.

TESTS:

Tests after installation at shipbuilder's expense may be witnessed by qualified representatives of the contractor. Such

power determinations with condensate measured by flow meters furnished by the Government.

Ahead and astern tests of two (2) hours' duration each shall be conducted in the contractor's shop at no load to determine the windage loss. Such tests shall be run with vacuum conditions as near to the conditions specified herein as practicable.

Corrections shall be made on all tests for steam conditions, vacuum and circulating water temperatures if such test conditions vary from conditions specified herein.

TURBINES AND GEARS BEFORE ASSEMBLY - Turbine spindles shall be subjected by the contractor to heat indication tests and magnetic iron filings tests.

The following steel castings shall be subjected to radiographic examination to determine freedom from injurious defects as defined by Gamma-Ray Radiographic Standards of the Bureau of Ships for Steel Castings for Steam Pressure Service:

Main propulsion Turbine Casings.
Main Steam Chests.
Main Steam Valves.
Main Steam Line Fittings (integral and directly connected)

This radiographic examination of the first casting of each item submitted for inspection shall be made at those locations on the casting marked for radiographic examination on the approved drawing of the casting. The radiographic examination of other than the first casting of each item submitted for inspection may be reduced as determined by the Bureau of Ships after completion of the radiographic examination of the first casting. The right

is reserved, in considering requests to repair defects, to require X-ray, gamma-ray or other non-destructive tests to fully determine the extent of the defects, and the effectiveness of the repairs. The Government will furnish the radium and radiographic films for the required examinations.

TURBINES AND GEARS AFTER ASSEMBLY:

(a) One set of main reduction gears shall be assembled and operated in the contractor's shop at full load torque at full speed for a continuous period of at least 48 hours to check noise and tooth contact. Operation of the gears shall be without undue noise as defined by Sub-section S42-1 of the General Specifications for Machinery.

(b) Steam consumption tests will be conducted at the following shaft horsepowers per shaft: 37,500, 23,500, 11,875, 5,750 and 2,500 ahead and 12,000 astern.

In addition to the steam consumption trials referred to above, maneuvering trials as follows will be required:

(a) Quick reversal from full power ahead to full power astern, followed by one hour's continuous astern operation with a steam temperature of 825° Fahrenheit at the quick closing cut-out value during the first 15 minutes with this temperature reduced to 675° Fahrenheit thereafter, followed by quick reversal to full power ahead with rudder in midship position.

(b) Astern operation at the shaft horsepower and for the duration of time necessary to test the steering equipment, but no more than 15 minutes continuous operation at 12,000 S.H.P. and at a temperature of 825° Fahrenheit at the quick closing cut-out valve will be required.

SHIPMENT:

Turbines shall be shipped assembled as complete units. Cruising reduction gears shall be shipped assembled as complete units. Main reduction gears (may) shall be shipped in a disassembled condition. All other parts shall be shipped assembled.

ASSEMBLY:

The contractor shall completely assemble in his shop, drill, ~~xxxx~~, align and operate, all machinery for the first propeller shaft. For subsequent units the shipbuilder will align the units under supervision of the contractor's representative. The contractor shall drill all holes necessary for alignment and securing in the vessel and furnish the necessary gages for assembling and aligning turbines and gears. The shipbuilder will ream the holes. The contractor shall machine all turbine and reduction gear feet in accordance with instructions furnished by the shipbuilder. Foundation flanges shall not be tapered.

DRAWINGS FOR APPROVAL (TYPE "B"):

The contractor shall submit directly to the Bureau of Ships one blueprint copy of all drawings to be forwarded for approval

Extension of contract ~~for CV 9 & 19~~ #76587

(Type "B") with a copy of letter of transmittal and blueprint to the Inspector of Machinery, Essington, Pennsylvania, Supervisor of Shipbuilding, Newport News, Virginia, and the shipbuilder. All subsequent revisions of plans shall be similarly forwarded. Upon final approval of working plans the following shall be forwarded direct to their destination by the contractor:

(a) One set of blueprint copies of approved drawings to Inspector of Machinery, Supervisor of Shipbuilding and the shipbuilder.

(b) One set of blueprint copies of these drawings to the Bureau of Ships only when they have been altered from the copies previously forwarded to the Bureau.

Correct designations of materials, together with the Navy Department Specifications applying to each piece number, must be marked in the bill of material on drawings. Should the contractor desire to make any change or substitution in the material called for by the specification or in the specified or approved design such changes must be submitted for approval with full explanation as to the reason therefor, but must not be made until formally approved.

ANY WORK DONE PRIOR TO THE APPROVAL OF THESE PLANS IS AT THE CONTRACTOR'S RISK.

PLANS: The delivery date specified will be extended by the Government as provided for in the liquidated damage clause herein for any time in excess of thirty (30) calendar days required by the Government in acting on any plan or group of plans submitted. Time for action on plans will be the time between receipt of the plans by the Bureau, and the date of the Bureau's action letter to the contractor. When approved plans have been returned to the contractor by the Bureau, the contractor is at liberty to proceed with manufacture, making such modifications as are required, unless resubmission of plans is specifically requested before proceeding with manufacture. However, no extension of delivery date shall be granted where plans as submitted are not properly prepared in accordance with the specifications or are incomplete, necessitating return to the contractor for revision and resubmission. Where changes in design are required by the Government which were not specified in the contract specifications and which require resubmission of plans for approval, an extension in the delivery date will be granted provided that any excess time taken for approval of plans does necessarily delay delivery under the contract and provided further that the contractor notifies the Government of such delay within ten (10) days of the commencement thereof.

ALTERATIONS TO APPROVED PLANS:

THE GOVERNMENT RESERVES the right to make minor alterations in the final approved plans and to correct errors that may be discovered after the manufacture of the item listed has begun. The cost of

such changes will be considered developments in the same manner as is done between manufacturers in commercial practice. However, where major changes involving change in costs occur, the Government reserves the right to amend the contract. If any delay in manufacture is occasioned thereby, the contract time will be correspondingly increased; the contract price will not be changed except in the case of major alterations as noted above.

The contractor shall, within thirty (30) calendar days after date of the Bureau's action requiring changes or other modifications to any plan submitted, resubmit such plans with the required changes or modifications: PROVIDED, that in the event of the failure of the contractor to resubmit the plans within such time, there shall be deducted in the preliminary settlement from the stipulated contract price, in addition to the liquidated damages deductible for delay, liquidated damages at the rate of $10.00 per calendar day per plan for each day's delay beyond such thirty (30) calendar day period. Provided, that such deductions shall also be applicable for any subsequent resubmission of corrected or modified plan until the Department's final approval is obtained on each plan. Provided, that if such delay results from any one or more of the excusable causes for delay such as exceptionally complicated plans or extensive modifications, the Department may grant the contractor extension of time.

SEE LIQUIDATED DAMAGES, UNDER LIQUIDATED DAMAGES SECTION, FOR DELAYS IN PLAN PROCEDURE.

GUARANTEE: For all equipment under item 1 the contractor guarantees weight and performance data, such as steam consumption, vacuum, circulating water requirements, condensate depression, oxygen content of condensate, horsepower input to motors, efficiency, power factors of motors, etc., to be in accordance with specifications and as stated in the bid. the same as applying to NOs 7658

Approval of the design by the Government will not relieve the contractor of his responsibility for the satisfactory performance of the equipment in service. Any failure of the equipment to meet the specified performance or any defects in materials or workmanship that may develop during installation and test, or until the expiration of a period of six (6) months after the completion of the vessel, shall be made good by and at the expense of the contractor for the replacement material or equipment furnished. "Completion" shall mean the official "Date of Completion" as determined by the Navy Department.

Except as otherwise specified herein for steam consumption for the main turbines, no credit will be allowed for efficiencies greater than or weights less than those guaranteed.

GUARANTEES NOT MET: If the guarantees as to weight, performance, etc., herein specified shall not be satisfactorily met by test, the right is reserved to reject the material or to accept it at a reduced price based on evaluation rates as hereinafter specified. as Specification NOs 7658

There shall be no limiting amount regarding deduction for failure to meet contract guarantee.

(a) In case of rejection, the Government reserves the right to secure replacement from the contractor or

from other sources; if secured from the contractor, the contractor shall furnish same at the price specified in the contract; if obtained from other sources at higher price than specified in the contract, the contractor shall pay the difference in price and shall refund any part of the purchase price thereof that may have been paid to him. Apparatus furnished by the contractor and rejected for any cause after installation shall be removed from the vessel at the shipbuilder's expense and the contractor shall provide transportation for its removal. Replacement apparatus furnished by the contractor or purchased against his account will be delivered to the shipbuilder or dock alongside the vessel at the contractor's expense and installed in the vessel at the shipbuilder's expense.

(b) If the Government decides to accept the units at a reduced price due to failure to meet guarantee at any or all points, the amount of reduction in price will be determined on the basis of the evaluation rates hereinafter specified for evaluation of bids. NOS 76587 out

(c) Except as otherwise specified under "Data with Bids" credit will be allowed for turbine steam consumption under the guarantee computed in accordance with the evaluation formulae, and the contract price will be adjusted up to a total of out

$100,000.00 for four vessels.

(d) On trial, if the turbine installation of one propeller shaft, as tested, shall fail to develop the contract shaft horsepower ahead and/or astern as specified herein, there shall be a deduction from the contract price at the rate of two hundred dollars ($200.00) for each shaft horsepower below contract horsepower of one shaft only as a total for the 16 shafts.

WEIGHTS: The determination of the weights for the assessment of deductions as provided herein will be made at the factory by the inspector. The contractor will provide the necessary facilities for the determination of the weights. The net weight for evaluation purposes will be shown on the report of material shipped in addition to gross or other shipping weights.

PAYMENT:

Payment under item 1 shall be made in ten (10) equal installments, each installment being equal to one-tenth of 85 per cent of the total contract price of item 1. Payment of installments will be made upon notification by the Naval Inspector that item 1 is 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90% and 100% complete, provided that the last installment shall not be paid until item 1 is delivered to the shipbuilder. Payments for items 2 and 3 will be made upon delivery and acceptance of these items. Liquidated damages and/or other deduction for contract deficiencies shall be deducted from all payments noted above.

Ten (10) per cent of the contract price of item 1 will be paid upon delivery and acceptance of the following:

Finished Plans, Type "D"
Instruction Books

Five (5) per cent of the contract price will be paid upon passing a satisfactory test after installation aboard ship is completed.

The partial payments when made shall be secured by a lien in favor of the Government on all material covered by such partial payments; such lien is hereby established and made paramount to all other liens under the provisions of the Act of August 22, 1911 (37 Stat. 32).

It is agreed that in case of default by the contractor in the performance of this contract or of other termination thereof before completion, such default or other termination shall, ipso facto, (a) operate to vest in the Government title to all property acquired and/or produced by the contractor for the performance of this contract, the title to which has not been previously vested in the Government under provisions of this contract, or (b) at the option of the Government, give to the Government the right to require a refund in the amount of the progress payments, the Government to relinquish its interest in and/or title to the material on which the progress payments have been made when the amount thereof has been refunded; provided that the provisions of this clause shall not be operative unless at least one progress payment has been made under this contract.

A performance bond on any contract awarded on this schedule shall be in a sum equal to twenty-five (25) per cent (approximately) of the total contract price.

DEDUCTION: The deduction for overweight of finished equipment shall be $0.25 per pound for every pound over the guaranteed weight, to be deducted from the contract price when final payment is made.

PAYMENT, FINAL: If installation and final test shall not have been made within one year after delivery, final payment may be made; the contractor's guarantee, however, shall continue in full force and effect.

IDENTIFICATION:

Each item shall have the schedule number and schedule item number as given herein conspicuously and clearly painted or a tag securely wired thereon for identification.

PROTECTION:

All parts shall be protected against damage due to moisture by greasing or otherwise covering with an approved rust preventive. All handwheels, flange faces, threads, ground joints and projecting parts shall be adequately protected against damage in shipping.

EVALUATION:

For the purpose of establishing penalties and/or a bonus the bid will be avaluated as follows.

At the rates as shown in the table below for each pound of steam consumed by the main turbines at each of the horsepower capacities.

EVALUATION:

A Total bid price of all items $9,625,100.00

B Steam consumption evaluations

Guaranteed steam consumption of one unit

(1) At 37,500 S.H.P. 7.0 pounds/S.H.P.H. times $100,000.00 $700,000.00

(1) At 23,500 S.H.P. 6.9 pounds/S.H.P.H. times $150,000.00 $1,035,000.00

(1) At 11,875 S.H.P. 7.0 pounds/S.H.P.H. times $200,000.00 $1,400,000.00

(1) At 5,750 S.H.P. 7.2 pounds/S.H.P.H times $250,000.00 $1,800,000.00

(2) At 3100 S.H.P. 7.5 pounds/S.H.P.H. times $400,000.00 $3,000,000.00

(1) At 2,500 S.H.P. 8.35 pounds/S.H.P.H. times $350,000.00 $2,292,500.00

(1) At 12,000 S.H.P. (astern) 15.0 pounds/S.H.P.H times $150,000.00 $2,250,000.00

TOTAL B $13,107,500.00

Total evaluated bid (A plus B) $22,732,600.00

(1)=clean bottom
(2)=foul bottom

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LIQUIDATED DAMAGES:

The following article is substituted for Article 5 of contract (Standard Form No. 32):

Liquidated damages will be assessed at the rate of 1/10 of 1 per cent per diem of the contract price of each item delayed but not to exceed 10 per cent, provided that no liquidated damages shall be assessed for any delay in the delivery of the stipulated finished plans and/or instruction books required by the contract.

If the contractor refuses or fails to make delivery of the materials or supplies within the time specified in Article 1, or any extension thereof, the actual damage to the Government for the delay will be impossible to determine, and in lieu thereof the contractor shall pay to the Government, as fixed, agreed, and liquidated damages for each calendar day of delay in making delivery, the amount as set forth in the specifications or accompanying papers, and the contractor and his sureties shall be liable for the amount thereof: Provided, however, That the Government reserves the right to terminate the right of the contractor to proceed with deliveries or such part or parts thereof as to which there has been delay, and to purchase similar material or supplies in the open market or secure the manufacture and delivery thereof by contract or otherwise, charging against the contractor and his sureties any excess cost occasioned the Government thereby; together with liquidated damages accruing until such time as the Government may reasonably procure similar material or supplies elsewhere: Provided further, That the contractor shall not be charged with liquidated damages or any excess cost when the delay in delivery is due to unforeseeable causes beyond the control and without the fault or negligence of the contractor, including, but not restricted to, acts of God or the public enemy, acts of the Government, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, and delays of a subcontractor due to such causes unless the contracting officer shall determine that the materials or supplies to be furnished under the subcontract are procurable in the open market, if the contractor shall notify the contracting officer in writing of the cause of any such delay, within 10 days from the beginning thereof, or within such further period as the contracting officer shall, with the approval of the head of the department or his duly authorized representative, prior to the date of final settlement of the contract, grant for the giving of such notice. The contracting officer shall then ascertain the facts and extent of the delay and extend the time for making delivery when in his judgment the findings of fact justify such an extension and his findings of fact thereon shall be final and conclusive on the parties hereto, subject only to appeal, within 30 days by the contractor to the head of the department concerned or his duly authorized representative, whose decision on such appeal as to the facts of delay and the extension of time for making delivery shall be final and conclusive on the parties hereto.

The prices stated in this schedule are subject to adjustment for changes in labor and/or material costs, such changes involving an increase or decrease in the contract price to be determined in accordance with the following method:

1. Labor --

(a) The proportion of the contract price represented by labor subject to adjustment in price is accepted as 40 per cent of the contract price, or $~~3,850,040~~.00

(b) From the standard curve of labor costs, approved by the Contracting Officer, the labor cost determined in (a) is hereby divided into labor cost quotas for each quarterly period of the contract, as follows:

	Quota
First quarter	~~None~~
Second quarter	~~None~~
Third quarter	~~328,272~~.00
Fourth quarter	~~450,000~~.00
Fifth quarter	~~650,000~~.00
Sixth quarter	~~650,000~~.00
Seventh quarter	~~500,000~~.00
Eighth quarter	~~450,000~~.00
Ninth quarter	~~440,000~~.00
Tenth quarter	~~220,000~~.00
Eleventh quarter	~~101,768~~.00
Twelfth quarter	~~None~~

(c) Average hourly earnings in the durable goods manufacturing industry, complied monthly by the United States Department of Labor, Bureau of Statistics, will be obtained by the Department for each quarterly period of the contract period, and calculations will be made of the rates of change of such average hourly earnings for each month in comparison with the average hourly earnings for the month of September 1939, as a base. The average of the rate of change for each quarterly period will be applied to the labor cost quota for each quarterly period, as given in (b) and the results will be applied as an increase or decrease in the contract price.

(d) The quota for each quarterly period will be the predetermined value used as a basis for the determination of increases or decreases in labor cost for each quarterly period, whether or not the actual labor cost expended by the contractor is above or below the quota.

2. Material --

(e) The proportion of the contract price represented by material subject to adjustment in price is accepted as 30 per cent of the cont

(f) From the standard curve of value of material ordered, approved by the Contracting Officer, the material cost determined in (e) is hereby divided into material cost quotas for each quarterly period of the contract, as follows:

	Quota
First quarter	$ None
Second quarter	336,204.00
Third quarter	550,000.00
Fourth quarter	1,000,000.00
Fifth quarter	880,000.00
Sixth quarter	21,326.00
Seventh quarter	-
Eighth quarter	-
Ninth quarter	-
Tenth quarter	-
Eleventh quarter	-
Twelfth quarter	-

(g) The index number of wholesale prices for Group VI, Metals and Metal Products, compiled monthly by the United States Department of Labor, Bureau of Statistics will be obtained by the Department for each month of the contract period, and calculations will be made of the rates of change of such index numbers for each month in comparison with the index numbers for the month of September 1939, as a base. The average of the rate of change for each quarterly period will be applied to the material cost quota for each quarterly period as given in (f), and the result will be applied as an increase or decrease in the contract price.

(h) The quota for each quarterly period will be the predetermined value used as a basis for the determination of increases or decreases in cost of material for each quarterly period whether or not the actual value of material ordered by the contractor is above or below the quota.

It is expressly agreed that quotas for labor and material will not be altered on account of delays in the completion of the material unless extensions in the contract time are authorized by the Department, in which case revised quotas as determined by the Department will be used, based upon the contract time as extended. Such revised quotas will not include costs allowed in changes which are adjudicated in accordance with Article 2 of Standard Form No. 32, (Supply Contract Form)

For purposes of determining increases or decreases in contract prices, rates of change in average hourly earnings, and rates of change in the material index number will be calculated to the nearest one-tenth of 1 per cent. The statistical data upon which rates of change in labor and material costs are to be based are compiled by the Department of Labor by calendar months.

Payments for increases, or deductions for decreases in contract price, resulting from the above, will be deferred until preliminary settlement: Provided, however, That the Government may

precedent to such payments as the contracting officer may prescribe.

The Government reserves the right to substitute for the index for labor or material any other method or index should it appear at any time, in the judgment of the Contracting Officer, subject to an appeal to the Secretary of the Navy, that the specified indices do not reflect equitably the increases or decreases in costs of material or labor under the contract: Provided, That the Secretary of the Navy may appoint a board for the purpose of determining the revised adjustments for the increased or decreased amounts to be added to or subtracted from the contract price on account of changes in labor or material costs and the contractor will be bound by the findings of such board upon approval thereof by the Secretary of the Navy.

QUALIFICATION TESTS FOR SILVER BRAZING OPERATORS, GENERAL SPECIFICATIONS FOR INSPECTION OF MATERIAL, APPENDIX VII WELDING, Part E, Section E-5, March 1939, copies of which may be obtained upon application to the Bureau of Supplies and Accounts.

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LOSS OR DAMAGE AND INSURANCE.

(a) In the event of loss of or damage to material furnished by the Govern and/or to material on account of which the Government has made a payment to the co tractor, while in the possession of the contractor, its agent or agents, from what cause, the contractor shall make good such loss or damage by replacing the materia by paying the Government the cost of replacement.

(b) The contractor shall, at its own expense, keep all material furnished the Government and/or on account of which the Government has made a payment to the tractor or on account of which the contractor has applied for a progress payment, insured against the usual risks of loss or damage from fire or due to flight operat conducted by the contractor, its agent or agents.

(c) The insurance shall be in the name of the United States of America and the contractor, and it shall be effected with such domestic underwriters as may be proved by the Secretary of the Navy. The policies shall contain a loss payable cla making losses payable to the Secretary of the Navy, or order. Any payments thereun shall inure to the benefit of the United States to the extent of any loss suffered b the United States and not made good by the contractor, as hereinbefore provided, and to the contractor as to any remaining balance or otherwise.

(d) Insurance policies shall be filed with the Judge Advocate General of th Navy, who shall retain custody thereof so long as the contractor is responsible for subject matter thereof.

(e) In lieu of specific insurance policies hereunder the Secretary of the N may, in his discretion, accept coverage under shop or blanket insurance carried by t contractor where the contractor carries such shop or blanket insurance against loss damage from fire or due to flight operations conducted by the contractor, its agent agents, and will certify such fact, under corporate seal, to the Secretary of the Na Provided, that the Secretary of the Navy may, in his discretion, require the contrac to submit the policies of shop or blanket insurance for his inspection as to adequac of insurance, which policies will be returned to the contractor when such a fact is determined.

EMPLOY CITIZENS OF UNITED STATES.- The Contractor will employ on the work of preparing plans, the actual work of manufacture of ~~equipment~~ and the running of tests, citizens of the United States only, or, subject to the approval of the Department's representative, those who have taken out their first naturalization papers, unless the Secretary of the Navy shall give his consent expressly in writing to the employment of aliens specifically named; and with such exceptions, access to the plans, specifications, the equipment under manufacture, and the tests, trials, etc., shall be limited to citizens of the United States regularly employed upon or directly connected with the work on the contract, or designated by the order of the Secretary of the Navy for the examination, inspection, and test of the material, and the contractor in subcontracts will include a provision to prevent the employment by subcontractors of any but citizens of the United States in any position giving such employees access to the plans and specifications or to the work of assembling the material as a whole.

DISCLOSURE OF INFORMATION: In accepting this contract, the contractor specifically agrees that he, his representatives, agents or sub-contractors, shall not supply any material of the type covered by this contract, or any parts descriptions, details, drawings, or other information thereof to unauthorized persons, or to foreign Governments, or persons or agents who may supply them to such foreign Government, without the specific permission of the Secretary of the Navy in each case.