# CANADIAN COAST GUARD
# NHQ LIB PROJECT


# MV MANGYSTAU-2
# PRESCOTT ALONGSIDE REFIT SPECIFICATION
# SEP 20, 2022- NOV 20, 2022

# CCGS MANGYSTAU-2
## 2022 , ALONGSIDE REFIT

GENERAL NOTES

**G 1.1 Background:**

The LIB (Mangystau 2) is a shallow draught icebreaking tug built in 2010 at STX RO Offshore Braila Shipyard for work in the Caspian Sea. The vessel was purchased and delivered to Canada in January 2022. The LIB was purchased as a replacement vessel for the Great Lakes area to cover the periods when the CCGS Griffon and the CCGS Samuel Risley are scheduled for Vessel Life Extension (VLE) refits. Mangystau 2 is classed with Bureau Veritas Classification society. The vessel will be located at CCG base Prescott, Ontario for this alongside refit.

# CCGS MANGYSTAU-2
## 2022 , ALONGSIDE REFIT

**G 1.2** **Vessel Particulars**

| | |
|---|---|
| Name: | CCG Mangystau- 2 |
| Type: | Light Icebreaker Tug |
| Class: | Tug with icebreaking capability up to 0.6 m level ice thickness<br>✠AUT-UMS, ICE CLASS IA SUPER<br>✠MACH ✠HULL |
| Year Built: | 2010 |
| | |
| Principle Dimensions: | |
| Length: | 62.02 m |
| Breadth, molded: | 16.4 m |
| Loaded Draft: | 3 m |
| Tonnage, displacement: | Gross Tonnage 1828, Net Tonnage 548 |
| | |
| Propulsion | *Propelling type:* Electrical<br>*Total power:* 4800 kW (6522 HP)<br>*Propelling machinery:* 3 INDAR ACP-500-S/6<br>1201 rpm<br>*Builder:* INDAR ELECTRIC SL<br>*Date of build:* 05 Jul 2010<br>*Propeller:* 3 Solid Azimuth Thrusters , 300 rpm<br>*Elec. installation:* 1 Generator<br>2125 kVA (1700 kW), 690 V, 60 Hz<br>3 Generators<br>2125 kVA (1700 kW), 690 V, 60 Hz<br>1 Emergency generator<br>294 kVA (235 kW), 440 V, 60 Hz<br>*Thruster(s):* 2 forward thrusters 550 kW<br>*Survey Type:* Normal |
| | |

Mangystau- 2 complete 3D Imaging link and password is given below:
https://mpembed.com/show/?m=Wv8u8A82ZL9&mpu=71&mpv=3Dportal
Password : mangystau

## G 1.3 References

### G 1.3.1 Regulations

G 1.3.1.1 The applicable Acts, Regulations, Rules, Codes and Standards for this specification are contained in Annex A 'Acts, Regulations and Rules Applicable to CCGS Mangystau-2' attached. Additional Standards and Codes that are applicable for individual specification items are listed in Annex –B. Both Annexes will be provided in a separate document.

G 1.3.1.2 The Contractor will ensure all work completed in the specification are done to all applicable federal and territorial regulations and standards. CCG procedures are to be followed if no other regulation takes precedence

### G 1.3.2 Guidance Drawings

G 1.3.2.1 The following Drawings as defined in the Drawings section of the General Notes will be available on FTP site.

| Drawing Number | DRAWING TITLE | Electronic File Name |
|---|---|---|
| 740-731-100_B | Compressed Air System Scheme | 740-731-100_B |
| 740-581-010_B | Freshwater System Diagram | 740-581-010_B |
| 740-101-001_H | General Arrangement Rev. H | 740-101-001_H |
| 740-503-001_2 | Fire and Safety Plan Rev.2 | 740-503-001_2 |
| 740-814-110_A | FIFI System Diagram, Rev. A | 740-814-110_A |
| N740-452-100-106 | Lifting Lugs outside of Mach Space | N740-452-100-106 |
| N740-452-100-104_A | Lifting Lugs in Bow Thruster Room | N740-452-100-104_A |
| 740-600-001_E | Machinery Arrangement | 740-600-001_E |
| N740-452-100-101_D | Lifting Lugs in Engine Room | N740-452-100-101_D |
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G 1.3.2 Tanks

G 1.3.1.1 Listed are the tanks found on board, their Location by frame number and capacity (Where available). These are to be used as reference only and will not supersede any specification.

| Description | Location | Particulars | Coating |
|---|---|---|---|
| SEE TANK ARRANGEMENT PLAN | | | |
| | | | |
| | | | |

G 1.3.3 Abbreviations

| | |
|---|---|
| ACM: Asbestos Containing Material | MCA: Matériaux contenant de l'amiante |
| CA: Contracting Authority - Public Works and Government Services Canada | AC: Authorité Contractuelle - Travaux publics et Services gouvernementaux Canada |
| CFM: Contractor Furnished Material and/or Equipment | MFE: Matériaux ou équipements fournis par l'Entrepreneur |
| CLC: Canada Labour Code | CCT: Code canadien du travail |
| Class: Classification Society Approved by Transport Canada | Classe : Société de classification approuvée par Transports Canada |
| CSA: Canadian Standards Association | CSA: Association canadienne de normalisation - ACNOR |
| CWB: Canadian Welding Bureau | BCS: Bureau canadien du soudage |
| DSIP: Delegated Statutory Inspection Program | PDIO : Programme de délégation des inspections obligatoires |
| DFO/CCG: Department of Fisheries and Oceans, Canadian Coast Guard | MPO/ GCC: Ministère des Pêches et des Océans, Garde côtière canadienne |
| FRC: Fast Rescue Craft | ERS : Embarcation rapide de sauvetage |
| FSR: Manufacturer's Field Service Representative | RSF: Représentant de service du fabricant |
| FSSM or FSM: Fleet Safety and Security Manual | MSSF: Fleet Safety and Security Manual |
| GSM: Government Supplied Material and/or Equipment | MFG: Matériel fourni par le Gouvernement |

| | |
|---|---|
| HC: Health Canada | SC: Santé Canada |
| IEEE: The Institute of Electrical & Electronic Engineers Inc. | IEEE: Institute of Electrical and Electronic Engineers |
| LT: Long Tonnes | LT: Tonnes anglaises |
| MSDS: Material Safety Data Sheet | FS: Fiche signalétique |
| NDT: Non-Destructive Testing | END: Essais non destructifs |
| OEM: Original Equipment Manufacturer | FEO: Fabricant d'équipement d'origine |
| OHS: Occupational Health and Safety | SST: Santé et sécurité au travail |
| PWGSC: Public Works and Government Services Canada | TPSGC: Travaux publics et Services gouvernementaux Canada |
| RO: Recognized Organization as defined by Canada Shipping Act. | OR: organismes reconnus par la Loi sur la marine marchande du Canada |
| SSMS: Safety and Security Management System | SGSS: Système de gestion de la sécurité et de la sureté |
| TBS: Treasury Board of Canada Secretariat | SCT: Secrétariat du Conseil du Trésor du Canada |
| TA: Technical Authority –LIB Project Manager or designate | AT: Autorité technique – Représentant du propriétaire (GCC) |
| TCMS: Transport Canada Marine Safety | SMTC: Sécurité Maritime de Transports Canada |
| IA: Inspection Authority – CCG delegated. | AI: Autorité de l'Inspection – Inspecteur technique (GCC) |
| WCB: Workers' Compensation Board | CNESST: Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST) |
| WHMIS Workplace Hazardous Materials Information System | SIMDUT: Système d'information sur les matières dangereuses utilisées au travail |

## G 1.4 Conditions and Definitions

G 1.4.1 The following conditions and definitions are applicable to all work contained in the Specifications and are intended to outline the quality of workmanship and practice that is the minimum acceptable level:

a) Additional Work Procedures The words "Addition Work Procedures" means the procedures as defined in ANNEX F - PROCEDURE FOR PROCESSING UNSCHEDULED WORK and includes any additional work required on a system, sub-system or equipment which the original specification did not specify;

b) Calibrate The word "calibrate" means the adjustment of readings and measurements to a known standard;

c) Disconnect The word "disconnect" means the Contractor must mechanically and electrically disconnect the piece of equipment of all piping, wiring, seatings and other attachments permitting the removal of the unit as a whole;

d) Disassemble The word "disassemble" means that the Contractor must provide all labour to take apart, piece by piece, the equipment, machinery or system to be examined or repaired;

e) Examine The word "examine" means that the Contractor must provide labour for the process of systematically examining, checking and testing equipment, records or administrative procedures to detect actual or potential defects or errors;

f) Install The word "install" means that the Contractor must connect mechanically and electrically and provide the labour and materiel to complete the installation;

g) New The term "new" means manufactured recently (less than 3 years). The Contractor must provide the TA with proof of recent manufacture of the equipment or materials if requested. Canada will not accept equipment refurbished, reworked or rebuilt.

h) Or equivalent The term "or equivalent" means a substitute which has equal characteristics i.e. (size, materiel type, life, weight, input, and output) as approved by the TA. A comparison of the general specifications must be provided to the TA for the equipment specified and the "or equivalent" (i.e. old compared to the new);

i) Overhaul The term "overhaul" as applied to any mechanical equipment, structure or system comprises: disassembly into component parts; cleaning examination of parts for defects; gauging of parts for wear; reporting of parts worn

beyond specification limits or otherwise defective and reassembly followed by specification adjustments; tests; and functional trials;

j) Reassemble The word "reassemble" means that the Contractor must provide all labour and material to put together, piece by piece, the equipment, machinery or system on completion of examination or repair;

k) Reinstall The word "reinstall" means a piece of equipment that the Contractor has effected repairs on and is to be returned/installed in its original location and be mechanically and electrically connected. The Contractor must provide the labour and materiel to complete the reinstallation;

l) Remove The word "remove" means that the Contractor must provide all labour and materiel to remove the unit, equipment, materiel, or system in its entirety. Part of the removal process is to blank openings, restore insulation and paint;

m) Set-to-work The words "set-to-work" means the tuning, alignment and adjustment of equipment/systems required subsequent to satisfactory installation. Inspection to make the equipment/systems ready for technical acceptance trials;

n) Test The word "test" means that the Contractor must provide labour to conduct the operation of a unit in relation to a stated standard or procedure;

o) Trials The word "trials" is an element of QA that means an action(s) by which the Contractor proves by a visual or instrumental presentation that the equipment or system satisfies the requirements of the specified trials agenda; and the term "functional test" means operation of a piece of equipment in all its normal operating modes and throughout its operating range to establish that it will perform its designed function within normal operating parameters as indicated in the manufacturer's documentation.

## G 1.5 Miscellaneous Provisions

### G 1.5.1 Occupational Health and Safety

G 1.5.1.1 The Contractor and all sub-contractors must follow Occupational Health and Safety (OHS) procedures in accordance with applicable federal and provincial OHS regulations ensuring that Contractor activities are carried out in a safe manner and do not endanger the safety of any personnel.

G 1.5.1.2 When the Contractor works on the vessel while in the Care and Custody of the Canadian Coast Guard, the Fleet Safety and Security Manual, DFO/5737 must be followed:

a) Contractor and all its representatives must attend an orientation session on vessel safety before beginning any work to familiarize the Contractor's employees with the dangers specific to the vessel and with its permit systems for work protocols as well as with the procedures for safety, risk prevention, hazard response and pre-work safety assessments. The Contractor will have access to an uncontrolled copy of the Fleet Safety and Security Manual.

b) The Contractor must comply with the Fleet Safety and Security Manual, DFO/5737, as well as with the instructions for working on board the vessel, in addition to the relevant requirements of the Canada Labour Code during performance of the following types of work:

i) Work at heights (working aloft);

ii) Entry into enclosed spaces;

iii) Degassing (gas free) before entering into confined spaces and for hot work;

iv) Lockout and Tagout;

v) Electrical work on energized circuits;

vi) Hot Work;

vii) Pre-work safety assessments (PJSA).

c) For the purpose of the Lockout and identification procedure, the Contractor must provide the padlocks and locking devices for the Contractor's employees in addition to those provided by the Chief Engineer for the vessel's crew.

d) The Contractor must adhere to applicable regulations and safety procedures.

G 1.5.1.3 The Contractor must identify a specified person that is responsible for the safety management of the work site. The Safety Manager must insure that daily safety rounds are carried out and that safety issues are identified and safety precautions are maintained.

G 1.5.1.4 Areas that pose a hazard as a result of the specification work are to be secured and clearly identified by the Contractor with signage to advise and protect all personnel from the hazard in accordance with applicable regulations.

G 1.5.2 **Lead Paint and Paint Coatings**

G 1.5.2.1 The Contractor must not use lead based paints.

G 1.5.2.2 CCG ships have been painted with lead based paints in the past and as a result some of the Contractor's processes such as grinding, welding and burning may release this lead from the coatings. Canadian Coast Guard will provide copies of all available lead testing results.

G 1.5.3 **Touch-up / Disturbed Paint**

G 1.5.3.1 The Contractor, at a minimum, must repair coating systems disturbed as a result of the specified work. Coating systems must be in accordance with the coating system of the vessel, and be applied in accordance with the paint manufacturer's recommended procedures.

G 1.5.4 **Asbestos Containing Materials (ACM)**

G 1.5.4.1 The Contractor must use insulation that contains 0% ACM.

G 1.5.4.2 The Contractor will be supplied with the most recent Asbestos Risk Assessment Report by CCG.

G 1.5.4.3 Handling of any asbestos containing materials must be performed by trained personnel and/or a company certified in the removal of asbestos in accordance with Federal, Provincial/Territorial and Municipal regulations.

G 1.5.4.4 The Contractor must provide the TA with disposal certificates for all asbestos containing material removed from the vessel indicating that the disposal was in accordance with Federal, Provincial and Municipal regulations in effect.

G 1.5.4.5 The Contractor must provide an "Observation Report (OR)" with reference to any concerns or intentions in regard to asbestos containing materials not already specified. The Contractor is to identify any materials that are suspected to contain asbestos prior to any work being completed. Any approved work resulting from the OR will follow the Additional Work Procedures.

G 1.5.5 **Confined Spaces**

G 1.5.5.1 Entry into any confined space onboard the vessel during the contract period must be conducted in accordance with the Fleet Safety Manual as determined in the Pre-Work Meeting. In addition to those requirements, the Contractor must also conduct the following:

a) Have a qualified person issues a “Gas Free Certificate” for spaces that will be entered and post the certificate outside the entrance to the space. Certificates must specify, "Safe for persons" or "safe for hot work" as appropriate.

b) Provide copies of all certificates generated to the TA in accordance with the Documentation section of the General Notes.

G 1.5.6 **Hot Work**

G 1.5.6.1 All hot work conducted during the contract must be in accordance with the FSM. In addition to the requirements of the FSM the Contractor must as a minimum also:

a) Certify confined spaces affected by hot work as “safe for hot work” in accordance with the Confined Spaces section of the General Notes.

b) Remove all portable combustible materials from the vicinity, to a safe distance not less than two meters away;

c) Supply and install protective material to prevent the spread of sparks, protect electrical cables and other services;

d) Supply and post fire sentries in each space and in the adjacent space where welding, grinding, or burning is being carried out on bulkheads, deckheads or decks;

e) Supply and provide appropriate fire extinguisher(s) to the fire sentries and ensure each sentry is trained in the extinguisher’s use. The fire sentry must maintain a watch in his designated area for a minimum of thirty (30) minutes after any hot work has been completed. The Contractor must record the sentry attendance time on all hot work permits indicating when hot work stopped, and time sentry left post;

f) Provide a copy of the site generated hot work permits to the TA in accordance with the Documentation section of the General Notes; Named in accordance with the specification item generating the required work.

G 1.5.7 **Work Aloft**

G 1.5.7.1 Any work aloft onboard the vessel during the maintenance/refit period must be conducted in accordance with the FSM. Notices must be placed to prevent operation of Radars while personnel are working aloft on the mast or on the wheelhouse top.

G 1.5.8 **Electrical Equipment**

G 1.5.8.1 When working on electrically operated equipment, the Contractor must lock-out equipment in accordance with the FSM, and as a minimum conduct the following:

a) Isolate the main power source and any alternative power source to the equipment;

b) Install Electrical lock-outs and place electrical caution tags on the main power source and any alternate power sources for the switches/disconnects supplying the equipment under maintenance;

c) Verify at the terminals to ensure power is not present.

d) Ensure the lock-outs and electrical caution tags remain in place until completion of all work.

G 1.5.8.2 The TA must be notified of all such ongoing work.

G 1.5.9 **Workplace Hazardous Materials Information System (WHIMS)**

G 1.5.9.1 The Contractor must provide the TA with Material Safety Data Sheets (MSDS) for all Contractor and sub-contractor supplied WHIMS controlled products. MSDS sheets are to be the formats requested in the Documentation section of the General Notes.

G 1.5.9.2 All MSDS sheets must be maintained in accordance with OHS procedures.

G 1.5.9.3 The TA will provide the Contractor with access to MSDS sheets for all controlled products on the ship for all specified work items on request.

G 1.5.10 **Smoking in the Work Space**

G 1.5.10.1 The Contractor must ensure compliance with the Non-Smokers' Health Act. The Contractor must ensure that there is absolutely no smoking onboard the vessel by their employees, sub-contractors, including the employees of any sub-contractor.

G 1.5.11 **Contractor Furnished/Supplied Materials (CFM/CSM) and Tools**

G 1.5.11.1 The Contractor must ensure replacement material such as jointing, packing, insulation, small hardware, oils, lubricants, cleaning solvents, preservatives, paints, coatings etc. are in accordance with the equipment manufacturer's drawings, manuals and/or instructions.

G 1.5.11.2 Where no particular item is specified or where substitution must be made, the Contractor must submit an Observation Report indicating the substitution or item not specified to the TA. The Contractor must provide information about materials used, certificate of grade and quality of various materials to the TA prior to use.

G 1.5.11.3 The Contractor must provide all equipment, devices, tools and machinery such as cranage, staging, scaffolding, hoarding, and rigging necessary for the completion of the work in this specification.

G 1.5.11.4 The Contractor must deliver and store all new CFM equipment at their facility until the start of the work period. The Contractor must transport all new CFM equipment to the work location of the Contract for the beginning of the work period. The Contractor must store on site, in a temporary Contractor supplied storage facility located in the vicinity of the vessel, all new CFM equipment. The CFM must be stored in a secure, environmentally controlled space in accordance with the equipment storage section of this specification.

G 1.5.11.5 All tools are Contractor supplied unless otherwise stated in the technical specifications.

G 1.5.12 **Government Supplied Materials (GSM) & Tools**

G 1.5.12.1 Where tools are supplied by the TA they must be returned by the Contractor in the same condition as when they were borrowed. Borrowed tools must be inventoried and signed for by the Contractor on receipt and return to the TA.

G 1.5.13 **Storage**

G 1.5.13.1 Equipment (i.e. covers, cowling and other items that may need to be removed and stored) must be stored in accordance with the equipment manufacturer's or equipment vendor's specific storage instructions. The Contractor must make these instructions available to the TA.

G 1.5.13.2 All equipment and items must be stored in such a manner so as to be easily accessible for inspection. No items are to be stored directly on floors.

G 1.5.14 **Regulatory Inspections and/or Class Surveys**

G 1.5.14.1 The Contractor must contact, coordinate, schedule, and be completely prepared for all regulatory inspections and surveys by the applicable authority: i.e. Bureau Veritas, TCMS, HC, Environment Canada or others as indicated by individual specifications.

G 1.5.14.2 Documentation generated by the above inspections and/or surveys indicating that the inspections and/or surveys were conducted (i.e. original signed and dated certificates) must be provided to the TA in accordance with the Documentation Section of these General Notes.

G 1.5.14.3 The Contractor must not substitute inspection by the TA for the required regulatory inspections.

G 1.5.14.4 The Contractor must provide timely advance notification (minimum of 2 working days) of scheduled regulatory inspections to the TA so they may witness the inspection.

G 1.5.14.5 Fees associated with TCMS, HC, Environment Canada, or any other Inspection required by the specification will be invoiced directly to CCG unless otherwise indicated in a specific specification item.

G 1.5.15 **Contractor Inspections**

G 1.5.15.1 The Contractor must afford the opportunity for the TA to conduct an inspection with the contractor on the condition and location of items to be removed prior to either carrying out the specified work or gaining access to a location to carry out the work.

G 1.5.15.2 Prior to the application of a water pressure test to any section of the system the contractor must advise the TA or designate that the applicable sections are ready for inspection. Pressure testing is not to take place without prior inspection of the system and authority to proceed from the TA or designate. Contactor is to demonstrate the integrity of replaced potable water piping via pressure testing to system working pressure. Contractor is responsible to supply and configure all required pressure test equipment to carry out and demonstrate the test. Contractor is also responsible for system drainage and corresponding water collection and disposal, removal of test equipment and system reconnection following testing.

Testing is to be carried out on a section by section or deck by deck basis as determined by the TA or designate. Contractor shall arrange for the TA or designate to witness and sign off satisfactory completion of each pressure test. Although work will proceed on a section by section basis, task will conclude with a full system test at working pressure for a minimum of 2 hours. Insulation of new piping shall only proceed following a satisfactory pressure test and prior authority from the TA or designate

G 1.5.15.3 The Contractor must take pre-work pictures prior to removal of any items. These photographs are to be in accordance with the Documentation section of the General Notes, named according to the specification section that prompted removal of those items.

G 1.5.15.4 Prior to the close out of any item under this specification, the Contractor must afford the TA the opportunity to verify the work has been completed in accordance with the specification. At that time the Contractor must have available all photographs, documents, reports, and trials in relation to the item being closed out as completed.

G 1.5.16 **Recording of Work in Progress**

G 1.5.16.1 The TA may record any work in progress using various means including, but not limited to, photography and video, digital or film.

G 1.5.17 **Access for Maintenance, Installation, and Removal.**

G 1.5.17.1 The Contractor must determine best routes for installing and removing equipment and include in their bid the requirements for all removal and reinstatement of all interference items to complete the applicable statement of work. All lifting points currently fitted on the ship must be considered uncertified and must be certified before use by the Contractor. The contractor shall be responsible for including in their bid all costs associated with lifting point load testing and certification required to complete work.

G 1.5.17.2 After equipment installation and/or removal the Contractor must make good all equipment relocations, blemishes, and penetrations and must return the ship to the As-Delivered working condition.

G 1.5.18 **Assembly of Components**

G 1.5.18.1 The Contractor must ensure that during installation of specified equipment, that parts and assembled equipment are cleaned of smudges, spatter or excess solder,

weld metal and metal chips or any other foreign material which might detract from the intended operation, function, or appearance of the equipment. (This would include any particles that could loosen or become dislodged during the normal expected life of the equipment). All corrosive material must be removed. This cleaning must take place before the parts are assembled into the equipment.

G 1.5.18.2 Covers, cowlings and components damaged by the Contractor must be replaced with a new CFM cover, cowling, or component.

G 1.5.18.3 Where torque specifications are not provided by the manufacturer, the applicable SAE, ANSI, or BS1083 nut and bolt standard torque must be used.

G 1.5.19 **Protection of Equipment**

G 1.5.19.1 The Contractor is to supply and install a protective material on the internal decks to avoid damages that may be caused by dropped objects during the work scope. The contractor is to supply and install 1/8-inch masonite sheeting on all interior decks in the superstructure where the work is to take place. Overhead soldering and parts, tool droppage could damage flooring. This material is to be contractor supplied installed (cut to fit a and securely taped down) and removed and disposed of following completion of work. Contractor to provide 1/8 inch masonite sheeting covering 2000 square feet and any additional requirement through PSPC 1379 action.

G 1.5.19.2 All electrical and electronic equipment and components must be protected during the contract against physical damage, internal damage, and by the effects of adverse temperatures or other environmental conditions.

G 1.5.19.3 The Contractor must protect equipment that could be damaged as a result of movement of materials and equipment nearby. The Contractor must also protect equipment from nearby sources of contamination including but not limited to burning, welding, media (sand) blasting, grinding and painting.

G 1.5.19.4 Any damage to surfaces, equipment, furnishings or decor incurred prior to acceptance must be returned to As-Delivered condition by the Contractor.

G 1.5.19.5 All openings in machinery and/or systems prior to connections being made must be kept covered by fitted secure solid inserts or covers at all times.

G 1.5.19.6 The Contractor must obtain and follow instructions from its sub-Contractors for any special protection required for their equipment during the project work. Such instructions must be made available to the TA.

G 1.5.19.7 Physical protection including but not limited to plastic sheets, fireproof covers, heavy weight material covers, wood plugs, wood encasements and heaters must be used as required. Contractor is responsible to identify, supply, deploy and remove following work all necessary protective materials required.

G 1.5.20 **Halocarbon containing Systems**

G 1.5.20.1 All work conducted on Halocarbon containing systems, must be in accordance with the Federal Halocarbon Regulations, 2003 (SOR/2003-289).

G 1.5.21 **Welding**

G 1.5.21.1 In addition to section 7.29 Welding Certification – Contract; All welding and weld inspection must be in accordance with the CCG Welding Specification CT-043-eq-eg-001. This document will be provided to the Contractor within 48 hours of written request to the TA.

G 1.5.21.2 The governing standards for welding of materials less than 3 mm in thickness must be in accordance with the requirements of the CCG Welding Specification CT-043-eq-eg-001. For materials greater than 3 mm in thickness, the Contractor must meet the following:

a) For structural steels greater than 3 mm in thickness, welding must meet the requirements of CSA Standards W47.1 and W59, except as modified by the CCG Welding Specification CT-043- eq-eg-001..

b) For structural aluminum greater than 3 mm in thickness, welding must meet the requirements of CSA Standards W47.2 and W59.2, except as modified by the CCG Welding Specification CT-043-eq-eg-001.

c) For structural stainless steels greater than 3mm in thickness, welding must meet the requirements of CSA Standard W47.1 and AWS D1.6, and of the CCG Welding Specification CT-043- eq-eg-001.

## G 1.6 Documentation

### G 1.6.1 Text Documentation

G 1.6.1.1 All text deliverables must be accompanied by a PDF file that must contain the complete document. The Contractor must check the quality to verify that the content reflects the same content/formatting as the Master Document file. In the case of changes, a second PDF file that contains only the changed sheets must be supplied.

### G 1.6.2 Data Book

G 1.6.2.1 The Contractor must provide all documentation generated as a result of specified deliverables, in both electronic and paper formats. There must be 2 paper copies of each document, in two separate binders, as part of the contractors QA program. An electronic copy of all documentation must also be provided to the TA in accordance with the formats described in this specification section.

G 1.6.2.2 All copies of documents generated as a result of specified deliverables will be referred to as the “Data Book”.

G 1.6.2.3 The Contractor must provide to the TA all the files generated as part of the Data Book prior to the contract being considered complete. The files must be in hard format (Flash Drive / Memory Stick). Each specification item is to have its own folder named according to the specification item. For example “G1.0 General Notes”.

G 1.6.2.4 Any documentation, media, and reports that are the result of Additional Work must be included as part of the Data Book.

### G 1.6.3 File Naming

G 1.6.3.1 File naming must include the Contract number and the specification they are relevant to.

### G 1.6.4 E-mails

G 1.6.4.1 Any files sent to the CA/TA by e-mail must be named as per the “File Naming” section of this specification. All files that are e-mailed must have the Contract number in the subject name

G 1.6.5 **File Formatting**

G 1.6.5.1 All documentation, reports, test results, certificates, or data obtained by the contractor in paper form must be scanned into unprotected, searchable, Adobe PDF formatted files and named according to the File Naming section of this specification.

G 1.6.5.2 All reports, test results, certificates, or raw data obtained by the contractor in electronic format must be converted to unprotected Adobe PDF formatted files and named according to the "File Naming" section of this specification. Both the original and the converted copy must be provided as part of the Data Book.

G 1.6.6 **Photographs**

G 1.6.6.1 All photographs obtained by the contractor as requested in the specification must be provided in .JPG formatted files at a resolution of at least 640 x 480 and named according to the "File Naming" section of this specification.

G 1.6.7 **Measurements, Calibrations, and Readings.**

G 1.6.7.1 All measurements, calibrations and readings recorded, must be signed by the person taking the measurements, dated and scanned into electronic format as part of the Data Book.

G 1.6.7.2 Unless otherwise specified the Contractor must record dimensions to a precision of three significant digits in imperial along with the metric equivalent.

G 1.6.7.3 The Contractor must provide to the TA current and valid calibration certificates, and control values for all instrumentation used in the Test and Trials Plan, showing that the instruments have been calibrated in accordance with the manufacturer's instructions. These copies are to be provided as part of the Data Book, under any specification where measurements are required.

G 1.6.8 **Test/Inspection Records and Certificates**

G 1.6.8.1 Test and/or Inspection Records and Certificates are identified as a deliverable in the individual specification item requesting them.

G 1.6.8.2 Test and/or Inspection Records and Certificates, must be included as a separate section in the Databook and indexed/arranged in numeric order by specification number.

G 1.6.8.3 The Contractor is responsible for maintaining a complete and accurate record of all tests and trials conducted on the vessel and on each piece of equipment. Prior to the commencement of a trial, all relevant documentation and associated test sheets, including shop test data, must be complete and attached to the trials agenda.

G 1.6.8.4 All tests and trials data must be legible both in hard copy and electronic format. If necessary, handwritten records may require transcription into electronic format in order to be acceptable. The original must be signed by the regulatory body, the TA, the Contractor and, where necessary, by the sub-Contractors and/or FSR's who witnessed the tests. All the data must be submitted to the TA in accordance with the Documentation section of these General Notes.

G 1.6.8.5 The Contractor must, in addition, provide originals of each certificate document to the TA in an envelope marked with the vessel's name and the works "Original Certificates"

## G 1.7 Drawings

G 1.7.1 This section is to be referred to as the Drawing Section of the General Notes, is intended to be used as reference for the minimum standards when specified deliverables are drawings.

G 1.7.2 The Contractor must use ASME Y14.100 for guidance for drawing deliverables.

G 1.7.3 The Contractor must have on staff or provide through a subcontractor a person qualified and experienced in the use of AutoCAD who will create or modify drawings that result from the work.

G 1.7.4 The Contractor must comply with the Canadian Coast Guard National CAD Standards titled "CT-014-000-ES-TD-001Computer Aided Design (CAD) using AUTOCAD" provided. Also provided is a compressed file including the CAD templates required to meet the CCG standard.

G 1.7.5 Drawing recording media (thumb drive) must be clearly labeled with the Contract Number, file names and drawing numbers. If a complete listing exceeds the label size/space, a "readme.txt" file in ASCII format must be provided with each drive. A printed copy of the Readme file must accompany each drive. Drives must be

labeled As-Fitted drawings for those drawings that have been approved and finalized.

G 1.7.6 Final As-Fitted prints/plots must not contain markings or corrections by hand (i.e. marker, pen, pencil, etc.). Drawings containing mark-ups must be revised and re-printed/plotted.

G 1.7.7 The Contractor must prepare all the working drawings necessary to complete specified work.

G 1.7.8 The Contractor must furnish all drawings required by sub-Contractors, trades and other consultants.

G 1.7.9 The Contractor must have in place a complete system of documenting and controlling all drawing revisions affected by the work. Drawing numbering system and titles must match the original drawings for clarity and include a revision number with date.

G 1.7.10 **Guidance Drawings – Set Number**

G 1.7.10.1 All technical guidance drawings are issued to the Contractor for guidance purposes only. The Contractor must develop working drawings and to ensure that all such drawings receive applicable regulatory approval. Not all technical guidance drawings supplied are As-Fitted drawings; therefore the Contractor must physically verify affected items.

G 1.7.10.2 The Contractor must communicate to the TA all departures from the provided guidance drawings and project specifications and obtain written acceptance from the TA before carrying out such alterations or departures.

G 1.7.11 **As Fitted Drawings**

G 1.7.11.1 The As-Fitted Drawings are identified as a deliverable in the specification item requesting them.

G 1.7.11.2 Upon completion of specified work, the Contractor must transfer the mark-ups from any working drawings where installation changes were made to drawings affected by the work; these drawings become the As-Fitted drawings.

G 1.7.11.3 The As-Fitted Drawings must be in accordance with the Canadian Coast Guard National CAD Standards titled “CT-014-000-ES-TD-001Computer Aided Design (CAD) using AUTOCAD” provided.

G 1.7.11.4 The Contractor must provide As-Fitted Drawings to the TA prior to completion of the Contract. The drawings must be submitted in the following formats:

a) 2 Plotted Copies of the latest revision of each of the As-Fitted Drawings.

b) 1 Electronic Copy of the latest revision of each of the As-Fitted Drawings.

G 1.7.11.5 Plotted drawings must be on standard ANSI paper sizes.

G 1.7.11.6 "Marked up drawings are to be AutoCAD drawings where original AutoCAD drawings are provided. If no AutoCAD drawings were provided then scanned files (raster format) must be supplied to CCG in one of the following formats:

a) DXF format;

b) TIFF format.

## G 1.8 Manuals

G 1.8.1 This section, to be referred to as the Manuals section of the General Notes, is intended to be used as reference for the minimum standards when specified deliverables are to be manuals.

G 1.8.2 The Contractor will be provided access to the vessel's manuals. If a manual provided is the vessel's physical copy, the Contractor must make a copy for themselves and return the original to the TA.

G 1.8.3 **General – Set Number**

G 1.8.3.1 Instruction Manuals must be individually bound in a hard cover 3 ring book format with a page size of 8 1/2" x 11". Drawings of a larger size must be concertina folded to suit. The covers must have the following information printed thereon:

a) "Vessel Name

b) Equipment ID

c) Equipment Manufacturer

d) Date"

G 1.8.3.2 Plastic tabbed indices must be provided for all sections of the manuals. Major equipment components must be subdivided into separate sections of the manuals.

G 1.8.3.3 A master index must be provided at the beginning of each binder indicating all items included in each section.

G 1.8.3.4 A list of names, addresses and telephone numbers of contacts associated with the equipment manufacturers must be provided that can be used after the project completion for maintenance and information data purposes.

G 1.8.3.5 A copy of the final reviewed and approved As-Fitted drawing(s) must be provided within the maintenance manual.

G 1.8.3.6 One (1) electronic copy of each manual must be provided in accordance with the Data Book section of this specification.

G 1.8.3.7 Two (2) paper copies of manuals and data sheets must be supplied in English for all Contractor Furnished Equipment items.

G 1.8.4 **Operation Manuals – As-Fitted**

G 1.8.4.1 Operation manuals must include the following items:

a) General description of equipment operating sequence;

b) Step by step procedures to follow in commissioning the equipment;

c) Schematic wiring diagram for the fitted equipment; and

d) All pertinent equipment performance criteria.

G 1.8.5 **Maintenance Manuals – As-Fitted**

G 1.8.5.1 Maintenance manuals must include:

a) Manufacturer's maintenance instructions for each item of the equipment requiring maintenance activity;

b) Instructions are to include installation instructions, part numbers, part lists, master drawings and exploded views with part identification for all mechanical, electrical and electronic parts, name of suppliers;

c) Summary list of each item of the equipment requiring lubrication, indicating the name of the equipment item, location of all points of lubrication, type of lubricant recommended, and frequency of lubrication; and

d) Troubleshooting sections must be included for all equipment in the maintenance manual under a separate heading.

**G 1.9 Identification**

G 1.9.1 **Nameplates**

G 1.9.1.1 Nameplates are identified as a deliverable in the individual specification item requesting them.

G 1.9.1.2 All nameplates must be in English, except where required in English and French by TCMS for reasons of emergency operation.

G 1.9.1.3 Lettering must be clear and concise with the minimum use of abbreviations. Primary information must be given in larger size lettering than secondary information.

G 1.9.1.4 The type of nameplates must suit the location in the vessel as specified below:

a) Plastic:

i) Laminated plastic nameplates, black with white core engraved through to the center core, must be provided for all devices located on the exterior surfaces of switchboards, MCC's, or local control panels. Nameplates must be secured to the equipment with machine screws.

ii) New nameplates to be fitted on the existing equipment must be consistent in size and lettering with those already fitted or those being replaced.

iii) Nameplates indicating feeder circuits must identify each circuit by name and number and the fuse size or trip element rating.

iv) The Following Labels must be of laminated plastic, red with white core engraved through to the center core:

v) Safe Working Loads,

vi) Warning/Caution labels,

vii) Circuit Breakers with shunt trips requiring completion of remote circuits prior to being operated,

viii) Equipment with multiple power sources,

ix) Circuit breaks having a potential power source connected to both sides

x) Indication of any other potentially hazardous condition.

b) Engraved on Metal:

i) Must be used in machinery spaces and where exposed to the weather or susceptible to covering by paint, oil or grease. Nameplates exposed to weather must be stainless steel or brass. Engraved metal nameplates must be of stainless steel or brass with lettering accentuated by means of black wax unless otherwise noted, and secured with stainless steel or brass machine screws.

ii) A complete list of nameplates, detailing size of plate, size of lettering and inscription must be submitted to the TA for review prior to ordering and/or manufacturing.

G 1.9.2 **Wire Labelling**

G 1.9.2.1 Wire Labelling is identified as a deliverable in the individual specification item requesting them.

G 1.9.2.2 All permanently installed cables must be tagged with the circuit designation at all points of connection and on both sides of bulkheads, decks, etc. Tags must be of metal compatible with the armor or cable sheathing. Both ends of the tags must be strapped to the cable with compatible metal strap after all painting has been completed. Straps must pass through holes in the tags so that tags are positively secured. Strap ends must be permanently folded and crimped. Adhesives of any kind will not be acceptable.

G 1.9.2.3 All wiring in panels specified to be labelled must be labelled with the Cable Number and their conductor # unless otherwise specified in equipment installation drawings.

# S 1.0 SERVICES

## S 1.1 GENERAL

**S 1.1.1** The Contractor must note that the vessel is mostly wired 240 V 60 HZ, supplied through European 2-prong receptacles. Contractor is responsible to supply their own 120 V 60 HZ supply for operating their equipment. The contractor is to include in their bid all costs associated with the supply and running/maintenance costs associated with this requirement.

**S 1.1.2** All staging, cranage, screens, lighting, and any other support service, equipment, and material necessary to carry out the work identified in these specifications must be Contractor supplied, installed and removed following completion of work.

**S 1.1.3** The Contractor and Contractor's employees will not have access to the vessel's washrooms and crew mess facilities. The Contractor must provide the necessary amenities as required.

## S 1.2 WORKSITE INSPECTIONS

**S 1.2.1** Before the Contractor starts any work on the vessel the Contractor's Quality Assurance Representative and the TA must walk through each space and area where work is to take place, including access and removal routes and areas adjacent to those where the work is to be done as a result of this specification. The Walk-through must occur during vessel demobilization and the Contractor's Quality Assurance Representative must identify all items that are to be removed/secured.

**S 1.2.2** The Contractor's Quality Assurance Representative must take digital pictures of each area showing the outfit therein. Each picture must be dated and named as to the location on the vessel and that it represents As-Delivered conditions. These photos must be in the format; as well as named, in accordance with the Documentation section of the General Notes. A Copy of these photos must be provided to the TA within 48 hours of the start of contract on a memory stick.

**S 1.2.3** During the work period, the Contractor must maintain work areas in the vessel, in a clean condition, free from debris and remove garbage daily. The Contractor is responsible for storage in a suitable Contractor supplied garbage container and disposal of all debris and garbage related to this contract.

**S 1.2.4** Upon completion of the contract, the Contractor must ensure that all waste generated from the work of this SOW is disposed of and must return the vessel to the As-Delivered state of cleanliness.

**S 1.2.5** Prior to the completion of the Acceptance Document, the Contractor's QA Representative and the TA must perform an inspection of the vessel to view all areas where work was performed by the Contractor. Any deficiencies or damage noted must be recorded and compared to the photos and if deemed to have been caused by the Contractor as a result of the work the damage must be repaired by the Contractor at no cost to and to the satisfaction of the TA.

**S 1.2.6** Copies of all photos, documentation, and inspection sign off sheets must be provided in accordance with the Documentation section of the General Notes.

**S 1.3 FIRE PROTECTION**

**S 1.3.1** The Contractor must ensure protection against fire throughout the contract period.

**S 1.3.2** The Contractor must ensure the isolation, removal, installation and reactivation of the shipboard fire detection and suppression systems or any components thereof, is performed by a qualified technician. When the shipboard fire detection or fire suppression system is deactivated or disabled by the Contractor during the contract period, the system must be recertified by a qualified technician prior to the end of the work period, as fully functional. A signed and dated original copy of the certificate must be delivered according to the Documentation section of the General Notes.

**S 1.3.3** The Contractor must note that failure to take the necessary precautions while performing work on the vessel's fire suppression system(s) could result in the accidental discharge of the fire suppression agent(s). The Contractor will be responsible for recharge and recertification at his cost, container(s) or systems that are discharged as a result of the contractor's or subcontractor's activities.

**S 1.3.4** The ships portable fire extinguishers are only to be used in the event of an emergency and not for any hot work tools. Any and all that are so used must be Contractor refilled and recertified by an authorized fire equipment service company that has marine experience.

**S 1.3.5** The vessel is equipped with fixed firefighting systems in the listed spaces below. In the event that the Contractor wishes to isolate, deactivate, or temporarily remove any part of the system, the work must be performed by a qualified technician from an authorized fire equipment service company that has marine experience. Any system worked on must be reactivated by the qualified

technician. A signed and dated original copy of the certificate must be delivered according to the Documentation section of the General Notes. All spaces must be fully operational prior to resumption of custody by CCG.

**S 1.3.6** List of locations protected with a fixed fire system

| System | Location | Type | Capacity |
|---|---|---|---|
| | | | |
| Refer to Fire and Safety Plan | | | |
| | | | |

**S 1.3.7** The vessel is fitted with ELTEK Honeywell Fire Detection System and detector heads throughout the vessel. In the event that any system component is disturbed by the Contractor to facilitate contract work, the Contractor must:

b) Recertify the system using a technician certified to work on systems from this manufacturer.

c) Provide a copy of the Technician's certificate in accordance with the Documentation section of the General Notes.

d) Provide a copy of the system's recertification in accordance with the Documentation section of the General Notes.

# GR 01 GENERAL REQUIREMENTS

## 1.1.B GR 01 Weight Management

1.1.B.1 The intent of this requirement is to have the Contractor to be responsible for providing an accurate and strict Weight Control Program during the course of this contract.

1.1.B.2 The weights of the components removed and/or installed as per the work specified in items 2, 4, 6, and 11 must be recorded.

1.1.B.3 Weight may be obtained either from suppliers, by calculation from working drawings, by weighing items, or by a combination of the above. The weight of piping, insulation, structural components etc., may be calculated. These items must be weighed on a selective or sampling basis, as determined by the Contractor, to establish the accuracy of calculated weights.

1.1.B.4 Calibrated and certified scales must be used for weighing items. Copies of the scales calibration certificate(s) are to be provided to the CCG TA.

1.1.B.5 The Contractor must measure and record the location of each piece of equipment removed and replaced in comparison to a vertical and horizontal baseline reference point.

1.1.B.6 Three (3) hard copies and one electronic copy (PDF) of the final “as-delivered” Weight Control report must be submitted to the CCG TA at the end of the Contract.

# 2.0 Potable Hot & Cold Water Piping Replacement

## 2.1.A Identification

2.1.A.1 The objective of the specification is to replace all piping for both the hot and cold potable water systems throughout the Main Deck, Bridge Deck and Forecastle Deck. The materials to complete this work scope will be contractor supplied materials. Contractor supplied materials will be compensated upon supply of applicable invoices through PSPC 1379 action. Contractor will be responsible to ensure all supplied materials are free of internal debris or other foreign materials prior to installation.

**2.1.B** **Drawing-** DWG# 740-581-010 FRESH WATER-SYSTEM DIAGRAM MANGYSTAU-2 MAIN DECK POTABLE WATER PIPING- As Fitted Dimensions

## 2.1.C Regulations and standards

The applicable Acts, Regulations, Rules, Codes and Standards for this specification are contained in Annex A 'Acts, Regulations and Rules Applicable to CCGS Mangystau-2' attached. Additional Standards and Codes that are applicable for individual specification items are listed in Annex –B. Both Annexes will be provided in a separate document. The following Standards and Regulations in particular but not limited to apply;

| | **Title** | **Included Yes/No** |
|---|---|---|
| Regulations | Maritime Occupational Health and Safety Regulations | No |
| | Vessel Fire Safety Regulations | No |
| | SOLAS, II-1 & II-2 | No |
| Rules | BV Rules for Classification of Steel Ships Updated January 2022 (NR467) | No |
| | BV Rules on materials and welding for the classification of marine units (NR216) | No |
| **Standards** | | |
| ASTM B88, | Seamless Copper Tubes - Dimensions | No |
| ASTM F 1155 | Standard Practice for Selection and Application of Piping System Materials | No |

**2.1.D Scope of work**

2.1.D.1 The Contractor shall isolate the main deck system supply at hot water valves 581V054, 581V057, and cold-water valves 581V055 and 581V058 (Fresh Water Dwg # 740-581-010). Piping replacement will begin from outlet of these valves and continue throughout the main deck until they terminate at fixtures or loop back to system supply. All fixture isolation valves to be replaced with new like for like valves.

2.1.D.2 The Contractor shall isolate the forecastle deck system supply will be isolated at valves 581V060, 581V063 (Cold water) and valves 581V061 and 581V059 (Hot water). Copper piping replacement will be completed from the outlet side of these valves throughout the forecastle deck up to the isolation valves for each modular bathroom unit.

2.1.D.3 The contractor shall isolate the bridge deck system supply at valves 581V064 (Cold water), valve 581V065 (Hot water) and valve 581067 (return hot water). Copper piping replacement will be completed from the outlet side of these valves throughout the forecastle deck up to the isolation valves for each modular bathroom unit.

2.1.D.4 The Contractor Material requirement is Copper Type K, SMLS ASTM B88 Half Hard / Annealed reference (Fresh Water Dwg # 740-581-010)

2.1.D.5 The Contractor shall remove the ceiling panels and stamp them for clarity for re-installation.

2.1.D.6 Panels supporting lights, smoke detectors, speakers or any other electrical equipment will only be removed at the discretion of the Chief Engineer

2.1.D.7 The Contractor shall remove Insulation and piping in stages to allow like for like replacement.

2.1.D.8 Contractor shall be responsible for disposal of all unusable, original material

2.1.D.9 Contractor is to provide rigid support from the deckhead either using the original pipe hangers or replacements of the same type and quality spaced at same intervals as original

2.1.D.10 Contractor is to include in their quote supply and replacement of 30 hangers complete for each pipe size and additional hangers shall be addressed through PSPC 1379 action.

2.1.D.11 The Cu22 line that supplies the three toilets in the CHANGE ROOM and. Contractor shall supply and install appropriate backflow prevention device such as Watts 719 double check valve assembly, or equivalent. The backflow preventer will be located so free access can be achieved for maintenance.

2.1.D.12 The cold water Cu22 line that supplies the three laundry machines and Contractor shall supply and install appropriate backflow prevention device such as Watts 719 double check valve assembly, or equivalent. The backflow preventer will be located so free access can be achieved for maintenance.

2.1.D.13 Contractor is to terminate lines extending outboard from the lower recovery area loop towards the thermostatic valves port and star-board with removable end caps.

2.1.D.14 Contractor is to supply and install pipes/ fittings and back flow preventers (Watts 719 or equivalent) per Annex D Potable Water and Annex- D PW and backflow preventors (Watts 715 or equivalent) spec rev-1 .xlsx.

2.1.D.15 Contractor is to terminate supply for public main deck washroom showers (2) with removable end caps.

2.1.D.16 Contractor is to terminate supply for main deck change room showers (4) and sinks adjacent to showers (2) with removable end plugs.

2.1.D.17 Contractor to remove supply for main deck Engineers change room showers and install 5inch Cu22 hot and cold supply lines on port side of change area and terminate with brass ball valves for Engineer' washing machine

2.1.D.18 Contractor to terminate hot and cold water supply to all Forecastle deck recovery area public washroom fixtures. The hot water circuit will continue to valve V581059.

2.1.D.19 The Contractor shall isolate the potable water distribution system for the each level. The contractor must ensure any / all residual pressure is safely released and verified prior to pipe replacement. Contractor shall carry out replacement on a section-by-section progression basis in consultation and coordination with the TA.

2.1.D.20 The Contractor shall remove the ceiling panels and mark/map them as to space and position for re-installation in their corresponding original positions. Contractor shall be responsible for safe, protected stowage and any associated transport of all

removed panels to and from a contractor supplied or other agreed secure storage location until work is complete.

2.1.D.21 The Contractor is to remove and dispose of all pipe insulation for access to system pipe work. Pipe removed is to be replaced with like for like materials. Contractor must follow the same pipe routing as the old piping and reuse the original piping brackets/hangars wherever possible. Replacement of broken or corroded brackets/hangars will be Contractor responsibility and will be carried out via PSPC 1379 action. Damaged or Missing bulkhead transit seals will be replaced as required with Slipsil-CSD sealing systems (csdsealingsystems.com). Estimated 3 or 4 transits and to be compensated using the 1379 action.

2.1.D.22 Where piping sections are inaccessible and extend behind bulkhead panels to fixtures and connections within the panel. Contractor is to cut the old pipe at a point before and closest to the bulkhead and join the new pipe to the old pipe section running behind the bulkhead.

2.1.D.23 The Contractor shall be responsible to remove the old pipe work and fittings. Contractor is to retain all removed copper and brass fittings to a location aboard the vessel as directed by the TA. Contractor shall be responsible to remove and dispose of all other removed materials.

2.1.D.24 The contractor shall be required to leak & pressure test the each replaced section before proceeding to isolate the next section. Pressure test will be to system working pressure for 2 hours and is to be witnessed by the TA prior to new piping being placed in service.

2.1.D.25 Upon completion of pressure test all potable water pipes and fittings, excluding valve handles and service fittings, will be completely covered with Armaflex AF type or equivalent closed cell rubber foam insulation. Substitution must meet fire rating and approvals of original insulation. All seams completely sealed and taped to maintain complete coverage

# 3.0 Air Receiver Cleaning, Inspection & Testing

## 3.1.A Identification

The objective of this scope this to carry out the inspection, testing and recertification as per manufactures specifications of the two main air receivers. Capacity of each air receiver is 500 liters. See below, lower air receiver bottle name plate.


## 3.1.B References

3.1.B.1 **Drawings** 740-731-100 Rev. B Compressed Air System Scheme

## 3.1.C Regulations and standards

3.1.C.1 The applicable Acts, Regulations, Rules, Codes and Standards for this specification are contained in Annex A ‘Acts, Regulations and Rules Applicable to MV Mangystau-2 attached. Additional Standards and Codes that are applicable for individual specification items are listed in Annex –B. Both Annexes will be provided in a separate document. The following Regulations and Standards apply to work carried out in this section in particular:

| | Title | Included Yes/No |
|---|---|---|
| **Regulations** | SOLAS II-1 | No |
| **Rules** | BV Rules for the Classification of Steel Ships (NR 467), Pt A, Ch 3, sec 3 & Pt C, Ch. 1, sec 3 | No |
| **Codes** | Harmonized System of Survey and Certification (HSSC) | |
| **Standards** | | |
| ASTM F 1155 | Standard Practice for Selection and Application of Piping System Materials | No |
| TP15456E | Annex 1, 5.4 | No |

## 3.1.D Statement of Work

3.1.D.1 TA shall arrange for air receiver drainage and isolation. Contractor shall verify drainage and depressurization in coordination with the TA and apply and maintain all applicable system safety lockouts during the work.

3.1.D.2 Contractor shall be responsible to open both receivers and thoroughly clean interior surfaces to prepare them for internal inspection. Contractor is to advise TA once the receivers are ready for inspection.

3.1.D.3 Contractor shall remove Air Receiver relief valves for inspection and testing. Relief valve(s) set to 33 bar pressure, certificates to be provided. All gaskets to be replaced with new ones and contractor supplied spacer/adaptors installed between valve block and relief valve on receiver end cap.

3.1.D.4 The contractor will supply spacer/adaptors installed between valve block and relief valve on receiver end cap to raise relief valve connection to an appropriate height so the relief valve may be removed with valve block in place. Adaptor must be SS construction and rated to 45 Bar pressure.

3.1.D.5 Both air receiver valve blocks will be fully serviced, all valve sealing surfaces to be renewed with OEM materials, and tested to rated pressure. This service may be completed offsite if necessary. See below photo of lower receiver bottle valve block.

3.1.D.6 Contractor shall perform a pressure test (1.1 times the working pressure= 33bar) on complete assembly with all valves in place and in a closed condition. (drain gate valve, inlet gate valve, air outlet gate valve and a plug installed in Relief valve). Contractor is to notify TA on the condition and requirement for any additional service.

3.1.D.7 Contractor is to carry out MP NDT test on each air Receiver outlet manifold block, 2 pieces. Contractor is to provide NDT test reports.

## 3.1.E Documentation

3.1.E.1 Contractor to provide copies of the certificates for air receiver relief valves.

3.1.E.2 Contractor to provide copies of NDT and pressure test reports for both air receiver manifold blocks.

# 4.0 FiFi And Deluge System Exterior Piping & Component Removals

4.1.A.1 **Identification**

The objective of this scope is for contractor to remove the exterior Fifi and deluge piping and attached components from the vessel to an approved disposal location.

**4.1.B References**

4.1.B.1 **Drawings** 740-101-001 FiFi System Diagram

4.1.B.2 **Regulations and Standards**

The applicable Acts, Regulations, Rules, Codes and Standards for this specification are contained in Annex A 'Acts, Regulations and Rules Applicable to CCGS Mangystau-2' attached. Additional Standards and Codes that are applicable for individual specification items are listed in Annex –B. Both Annexes will be provided in a separate document.

**4.1.C Scope of Work**

4.1.C.1 Contractor is to follow CCG Hot work policy and must provide required personnel for hot work and permits for cut, torch or grind off piping and brackets. Contractor is to provide protections to any windows or adjacent equipment that can be damaged by these processes.

4.1.C.2 Lock-out Tag-out

Prior to commencing any work the Contractor must install /remove locks and tags accordingly during the scope of work. The vessel's TA will assist the Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. The Contractor/FSR must supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the TA must be in attendance when all locks/tags are removed.

4.1.C.3 Contractor shall be responsible to remove all exterior deluge piping and components and FIFI system piping and components as described below. All exterior piping and components are to be removed in their entirety from the outlet ends to the flange nearest the section of piping extending from the vessel interior through the corresponding welded pipe transit. Contractor is responsible to cut off/remove and grind smooth all corresponding component securing brackets. The various pipe sizes are DN300, DN 200, DN 80 and DN50 and associated size

valves and fittings. Refer to FiFi system diagram. Approximate total pipe lengths are DN 300- 40 feet, DN 80 – 120 feet, DN –50 –60 feet, and DN 250- 60 feet.

4.1.C.4 Contractor shall be responsible for the providing the mobile crane suitable to reach above the wheelhouse and facilitate removal of FiFi monitors, pedestal / support to deck level. Contractor is responsible for transport of removed components to an approved location for proper disposal. Contractor is to provide the disposal certificates to TA, if required.

4.1.C.5 Contractor shall be responsible to identify type and number and supply and install blank flanges (including new bolts, nuts washers and gaskets) on the flanged pipe ends closest to sections of piping passing through welded pipe transits to the vessel interior. Contractor to use non compressible gasket material for blanking the pipes.

4.1.C.6 Contractor shall remove both fire monitors from the current pedestal support and leave on ship for CG disposal.

4.1.C.7 Contractor to remove and disconnect electrical connections for the fire monitors and terminate in contractor supplied junction box.

4.1.C.8 Contractor shall supply and install and following completion of work remove all certified scaffolding required to complete this work.

4.1.C.9 Contractor must apply 2 coats of marine exterior primer per International paint specification in each location where brackets or other welded components have

been cut from and ground to bare metal by the contractor during piping and component removals. Paint is GSM.

4.1.C.10 The weight of the components removed and installed associated with this work must be obtained and recorded as per specification item GR.01.

# 5.0 HVAC System Cleaning

## 5.1.A Identification

**5.1.B** The objective of this specification is to perform complete cleaning of the HVAC ventilation ducts in accommodation space. This work is to be carried out in conjunction/coordination with specification item number 9.0 HVAC Heating Flexible Duct Replacement.

## 5.1.C References

5.1.C.1 **Drawings -Reference to HVAC manual**

5.1.C.2 **Regulations and Standards –**

The applicable Acts, Regulations, Rules, Codes and Standards for this specification are contained in Annex A 'Acts, Regulations and Rules Applicable to CCGS Mangystau-2' attached. Additional Standards and Codes that are applicable for individual specification items are listed in Annex –B. Both Annexes will be provided in a separate document.

## 5.1.D Scope of Work

5.1.D.1 Lock-out Tag-out

Prior to commencing any work the Contractor must install /remove locks and tags accordingly during the scope of work. The vessel's TA will assist the Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. The Contractor/FSR must supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the TA must be in attendance when all locks/tags are removed.

5.1.D.2 Contractor must take caution for the presence of electrical reheat units and connected wiring located in each HVAC diffuser. Contractor shall be responsible to isolate the HVAC system to perform cleaning of the ventilation ducting in accommodations on all deck levels. Where necessary the contractor shall make additional access openings to access otherwise unreachable sections of ductwork. The size and location of such openings shall be determined in consultation and under the authority of the TA. The contractor shall supply and install removable and full sealing covers and/or plugs to all such new openings as applicable. All work required for additional openings and applicable covers will be managed through 1379 action.

5.1.D.3 Contractor shall perform thorough cleaning and vacuuming of all HVAC ducting and connected diffusers and louvres. Contractor shall be responsible for the supply of all necessary equipment and materials to carry out the work.

5.1.D.4 Contractor is to advise the TA upon completion of cleaning. Prior to system close-up and demobilization of cleaning personnel and equipment TA shall inspect the HVAC ducting and air distribution components.

5.1.D.5 Contractor shall supply any required certified scaffolding to carry out the work. Contractor shall assemble and install all such scaffolding and following completion of work disassemble and remove it from the vessel.

5.1.D.6 Upon satisfactory completion of the work the contractor shall reinstall all removed diffusers.

5.1.D.7 Contractor shall be responsible for the collection, removal and disposable of all dirt and waste generated or accumulated during the work. Contractor must ensure that all specific areas accessed during the work are thoroughly clean and returned to “as found condition” upon completion of the work.

# 6.0 Potable Water System Modifications And UV Treatment Sterilizer Installation

## 6.1.A Identification

The objective of this specification to add back flow preventors in the potable water system in accordance with FSM. The UV Sterilizers for potable water system to be replaced with new one and tested for satisfactory operation

## 6.1.B References

6.1.B.1 **Drawings -** 740-581-010 Rev B Fresh water piping system

6.1.B.2 **Regulations and Standards**

The applicable Acts, Regulations, Rules, Codes and Standards for this specification are contained in Annex A 'Acts, Regulations and Rules Applicable to CCGS Mangystau-2' attached. Additional Standards and Codes that are applicable for individual specification items are listed in Annex –B. Both Annexes will be provided in a separate document. The following Regulations and Standards apply in Particular to work carried out in this section.

| **Document** | **Title** | **Included Yes/No** |
|---|---|---|
| Regulations | Maritime Occupational Health and Safety Regulations, section 73 | No |
| **Standards** | | |
| Department of Health | Guidelines for Canadian Drinking Water Quality, prepared by the Federal-Provincial-Territorial Committee on Drinking Water and published by the Department of Health. | No |
| CSA Code B64.10.17 | Selection and installation of backflow preventers | No |
| ASTM F 1155 | Standard Practice for Selection and Application of Piping System Materials | No |
| Fleet Safety Manual | FSM 7.A.12 Potable Water Quality, | Yes |

## 6.1.C Scope of Work

6.1.C.1 Lock-out Tag-out

Prior to commencing any work the Contractor must install /remove locks and tags accordingly during the scope of work. The vessel's TA will assist the Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. The Contractor/FSR must supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the TA must be in attendance when all locks/tags are removed.

6.1.C.2 Contractor shall remove existing sterilizer units, procure and install 2 new UV sterilizer units approved for potable water and operate on a 230 V 60 HZ power supply.

6.1.C.3 UV sterilizers should be installed in parallel with isolation valves so each unit can be worked on without affecting the operation of the other unit. The UV sterilizer must have a indication of intensity and have an alarm function that sounds when the UV intensity drops below a set value. UV sterilizer must each be able to handle the system designed flow rate each 3 m3/hr @ 5 bar. Reference Fresh Water Drawing 740-581-010_B.

6.1.C.4 UV Sterilizer must be mounted in such a way to allow removal of the bulbs and quartz tube assembly without obstruction by other equipment or objects.

6.1.C.5 **Performance requirements**

6.1.C.5.1 Prior to acceptance, the UV sterilizer system shall be verified satisfactorily functional and operational by the CCG TA and Chief Engineer upon completion of work. The Contractor will be responsible for any necessary corrections.

## 6.1.D Documentation

6.1.D.1 The contractor must provide an approval certificate meeting the requirements referenced in subsection 6.1.B.2 specifically the guidelines for Canadian drinking water.

6.1.D.2 The contractor shall provide copies of the manufacturer's product information sheets to the CCG TA as per standards in subsection 6.1.B.2.

# 7.0 Public Address System Modifications

## 7.1.A Identification

7.1.A.1 The objective of this item is to have contractor assess the existing Vingtor Integrated Communications System and make changes necessary to comply with the applicable Regulations as per Annex A. The following Regulations and Standards apply in particular to work carried out in this section:

## 7.1.B References

### 7.1.B.1 Equipment Data

7.1.B.1.1 Contractor Supplied Material (CSM)

a) The Contractor must supply all materials, equipment, and parts required to perform the specified work unless otherwise stated.

7.1.B.1.2 Government Supplied Material (GSM)

| Description | Make and Model | Quantity |
|---|---|---|
| Loudspeaker | Vingtor VML-1520 | 8 |
| White PA Strobe Flashing Indicator | Vingtor TBD | 7 |
| Relay Box | Vingtor IRR-3 | 3 |

### 7.1.B.2 Drawings and Documents

The following Drawings are to be considered as Guidance Drawings as defined in the Drawings section of the General Notes.

| Drawing Number | DRAWING TITLE |
|---|---|
| 740-425-001_D | Mangystau II – Intercom PA-System Cable Diagram As-Built |
| 740-894-085_D | Mangystau II – Location of Internal Communication Equipment's GA As-Built |
| **Document Number** | **DOCUMENT TITLE** |
| N/A | Loudspeakers-microphones.pdf |
| N/A | Public Address Amplifier System.pdf |
| | |

## 7.1.C Regulations and Standards

The applicable Acts, Regulations, Rules, Codes and Standards for this specification are contained in Annex A 'Acts, Regulations and Rules Applicable to CCGS Mangystau -2' attached. The following standards apply in addition to those of Annex A (as also summarized in Annex B 'Additional Codes and Standards')

| | Title | Supplied by: |
|---|---|---|
| **Regulation** | Vessel Fire Safety Regulations, Section 145 (1) | Contractor |
| | SOLAS, Chapter II-2/12.3 | Contractor |
| **Rules** | BV Rules for the Classification of Steel Ships (NR 467) | Contractor |
| **Codes** | IMO Resolution A.1021 (26), Code on Alerts and Indicators | Contractor |

## 7.1.D Statement of Work

### 7.1.D.1 Lock-out Tag-out

Prior to commencing any work the Contractor must install /remove locks and tags accordingly during the scope of work. The vessel's TA will assist the Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. The Contractor/FSR must supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the TA must be in attendance when all locks/tags are removed.

### 7.1.D.2 General

7.1.D.2.1 All cabling, once installed, must be marked with a stamped stainless steel metal tag for all outside cabling and an appropriate label type for all inside cabling. The labels must be securely affixed to the cable at each end and through any deck, deck heads, and/or gland penetrations with the designation for each cable as provided in this specification.

7.1.D.2.2 All cabling which has been deemed surplus as a result of this specification item must be disposed of at the Contractor's expense.

7.1.D.2.3 The Contractor must be responsible for ensuring that all areas have been thoroughly cleaned and free of any debris resulting from the performance of this specification item.

7.1.D.2.4 The Contractor must use all stainless steel mounting hardware for the mounting of all equipment within this specification unless provided with the equipment.

7.1.D.2.5 Contractor must be responsible for unpacking/repacking all cable transits/glands.

7.1.D.2.6 The Contractor must follow existing cable trays throughout the vessel where fitted. Once installed, all cabling must be properly secured.

7.1.D.2.7 Equipment which have been removed as part of the performance of this specification must be returned to Canada in operational condition. They must be packaged properly. Shipping will be dealt with the 1379 Work arising process.

7.1.D.2.8 The contractor must ground all equipment as per OEM documentation.

7.1.D.3 **PA Updates**

7.1.D.3.1 The contractor must remove the existing speaker at the following Telephone stations:

| Location | Speaker Type |
|---|---|
| Windlass Area Forecastle Deck | DSP-15EExeN |
| Aft Mooring Helicopter Winch Area | DSP-15EExeN |
| Rescue & FRC SB – Main Deck | DSP-15EExeN |
| Rescue & FRC PS – Main Deck | DSP-15EExeN |

7.1.D.3.2 The Contractor must remove the existing PA speaker on Bridge Deck FWD Outdoor and replace it with a new Vingtor VML-1520 **(GSM).**

7.1.D.3.3 The Contractor must install a new loudspeaker **(GSM)** at the following telephone stations. The Contractor must supply and install a new 1 Pair 18AWG cable **(CSM)** between the speaker and the telephone station.

| Location | Loudspeaker Make and Model |
|---|---|
| Windlass Area Forecastle Deck | Vingtor VML-1520 |
| Aft Mooring Helicopter Winch Area | Vingtor VML-1520 |
| Rescue & FRC SB – Main Deck | Vingtor VML-1520 |
| Rescue & FRC PS – Main Deck | Vingtor VML-1520 |
| Propulsion Room | Vingtor VML-1520 |

| Location | Loudspeaker Make and Model |
|---|---|
| Engine Work Shop Room | Vingtor VML-1520 |
| Bow Thruster Room | Vingtor VML-1520 |

7.1.D.3.4 The Contractor must install a new PA Light indicator **(GSM)** in the following locations. Exact location to be determined with the TA on site at the time of installation.

| Location | Indicator Make and Model |
|---|---|
| Propulsion Room | Vingtor TBD |
| Propulsion Room | Vingtor TBD |
| Bow Thruster | Vingtor TBD |
| Engine Room PS AFT | Vingtor TBD |
| Engine Room SB AFT | Vingtor TBD |
| Engine Room PS FWD | Vingtor TBD |
| Engine Room SB FWD | Vingtor TBD |

7.1.D.3.5 The Contractor must install a new relay box Vingtor IRR-3 **(GSM)** at the following telephone stations. The newly installed IRR-3 must be powered from the same source of power as the existing IRR-3.

| Location |
|---|
| Propulsion Room |
| Engine Work Shop Room |
| Bow Thruster Room |

7.1.D.3.6 The Contractor must supply and install the following new cables **(CSM):**

| Cable ID<br>Cable Type | Source | Destination |
|---|---|---|
| TBD<br>1 Pair 18AWG | Propulsion Room<br>Telephone station | Propulsion Room<br>Relay Box |
| TBD<br>1 Pair 18AWG | Bow Thruster<br>Telephone station | Bow Thruster<br>Relay Box |
| TBD<br>1 Pair 18AWG | Engine Workshop<br>Telephone Station | Engine Workshop<br>Relay Box |
| TBD<br>1 Pair 16AWG | Propulsion Room<br>Relay Box | Propulsion Room<br>PA Light #1 |
| TBD<br>1 Pair 16AWG | Propulsion Room<br>PA Light #1 | Propulsion Room<br>PA Light #2 |
| TBD<br>1 Pair 16AWG | Bow Thruster<br>Relay Box | Bow Thruster<br>PA Light |
| TBD<br>1 Pair 16AWG | Engine Workshop<br>Relay Box | Engine Room PS AFT<br>PA Light |
| TBD<br>1 Pair 16AWG | Engine Room PS AFT<br>PA Light | Engine Room SB AFT<br>PA Light |
| TBD<br>1 Pair 16AWG | Engine Room SB AFT<br>PA Light | Engine Room SB FWD<br>PA Light |
| TBD<br>1 Pair 16AWG | Engine Room SB FWD<br>PA Light | Engine Room PS FWD<br>PA Light |

7.1.D.4 **FSR Services**

7.1.D.4.1 The Contractor must obtain the services of Seacoast Marine Electronics to conduct the new programming of the PA and PBX system as well as all set-to-work activities. The Contractor must include an allowance of $10,000.00 to cover the cost of services to be provided by the Seacoast Marine Electronics FSR. Reasonable cost of travel, living expenses, and potential Covid-19 related expenses must be billed at cost

without added overhead or profit. The $10,000.00 allowance must form part of the overall bid and must be adjusted up or down by means of PSPC 1379 process upon receipt of the final FSR invoice supported by copies of all related documentation and invoices to verify actual expenses.

7.1.D.4.2 The FSR Contact information are:

Seacoast Marine Electronics

110 Chain Lake Drive, Unit 3A

Halifax, NS B3S 1A9

service@seacoastmarine.ca

7.1.D.5 **Locations**

7.1.D.5.1 Electronics Room

7.1.D.5.2 Propulsion Room

7.1.D.5.3 Engine Workshop

7.1.D.5.4 Engine Room

7.1.D.5.5 Bow Thruster Room

7.1.D.5.6 Outdoor Decks

7.1.D.6 **Interferences**

7.1.D.1 The Contractor is responsible for the identification of interference items, their temporary removal, storage, and refitting to the vessel.

## 7.1.E Proof of Performance

7.1.E.1 **Inspection Points**

7.1.E.1.1 HOLD POINT : The contractor must provide the TA with the opportunity to inspect that the PA system was modified in accordance with the statement of work.

7.1.E.1.2 There are no cables continuity test requirement, however, all cables which have been installed by the Contractor that are found defective (fail continuity test) or damaged must be replaced at the Contractor's expense (material and labour).

7.1.E.2 **Testing / Trials**

7.1.E.2.1 The TA and Chief Engineer will perform an Installation Check (IC) of all work specified herein to ensure conformity with this specification. The Contractor will be responsible for any necessary corrections.

7.1.E.2.2 All Testing and Commissioning activities related to the affected system(s) will be conducted by the FSR.

7.1.E.2.3 The FSR must demonstrate functionality of the newly installed PA light indicators, and speakers.

7.1.E.3 **Documentation**

7.1.E.3.4 The contractor must provide all associated manuals related to this specification.

7.1.E.4 **Training**

7.1.E.4.5 Not used.

# 8.0 Lifting Lug Testing & Recertification

## 8.1.A Identification

**8.1.B** The objective of this specification is to recertify lifting lugs testing and recertification as per the attached lifting lugs test sheet (N741).

## 8.1.C References

**Drawings** **N**740-452-100-106 Lifting Lugs outside of Mach Spaces

N740-452-100-104_A Lifting Lugs in Bow Thruster Room

N740-452-100-101_D Lifting Lugs in Engine Room

N740-452-100-103_B Lifting Lugs in Prop Room

Testing of Lifting Lugs locations as per Mangystau 2 Lifting Lug.xlsx excel sheet.

## 8.1.D Regulations and Standards

The applicable Acts, Regulations, Rules, Codes and Standards for this specification are contained in Annex A 'Acts, Regulations and Rules Applicable to CCGS Mangystau-2' attached. Additional Standards and Codes that are applicable for individual specification items are listed in Annex –B. Both Annexes will be provided in a separate document.

The following Regulations and standards apply to this item in particular:

| **Document** | **Title** | **Included Yes/No** |
|---|---|---|
| **Regulation** | Cargo Fumigation and Tackle Regulations | No |
| | Maritime Occupational Health and Safety Regulations | |
| | Safe Working Practices Regulations | No |
| **Rules** | Rules for the Classification of Steel Ships (NR 467) | No |
| ISO 9712:2005 | Non-destructive testing — Qualification and certification of personnel | No |
| ILO 152 | Convention Concerning Occupational Safety and Health in Dock Work, adopted by the International Labour Conference on June 25, 1979. (Convention 152) Article 25(2) Occupational Safety regarding lifting appliances and loose tackle | No |

## 8.1.E Scope of Work

8.1.E.1 Work at heights (working aloft)

The Contractor must comply with the Fleet Safety and Security Manual, DFO/5737, as well as with the instructions for working on board the vessel, in addition to the relevant requirements of the Canada Labour Code during working aloft.

**8.1.F** The Contractor must provide all materials and equipment required to complete this specification as per ILO 152 with reference drawing list section 8.1.C

## 8.1.G Documentation

8.1.G.1 The contractor is to provide the test certificate documentation with identification tag to each lifting lug.

# 9.0 HVAC Heating Flexible Duct Replacement

## 9.1.A Identification

9.1.A.1 The objective of this specification is to replace the short flexible ducting segments of the vessels HVAC ventilation system to individual accommodation, service and control spaces and supply and install new compliant sections of ducting. This work is to be carried out in conjunction/coordination with specification item number 5 Ventilation duct cleaning.

## 9.1.B References

9.1.B.1 **Drawings**

| # | System | Plan # | Notes |
|---|---|---|---|
| a | Air Conditioning Plan, Forecastle Deck | 740-571-011 r.e | RS-25 from PR100 (total 10)<br>RS-35 from PR100 (total 4)<br>Note electronics room unit |
| b | Air Conditioning Plan, Bridge Deck | 740-571-012 r.b | RS-25 from PR100 (total 8) |
| c | Air Conditioning Plan, Wheelhouse | 740-571-013 r.b | MS-35 from PR100 (total 4) |
| d | Air Conditioning Plan, Main Deck | 740-571-010 r.a | RS-25 from PR100 (total 8)<br>RS-35 from PR100 (total 9)<br>MS-25 from PR100 (total 3) |
| e | Novenko HVAC Engineering Manual,<br>Novenco Hi-Pres Cabin Units<br>MS-25, (80 mm), RS-25 (80 mm),<br>MS-35 (100 mm), RS-35 (100 mm | MS25-C00-08<br>(Dwg 50600)<br>RS35-C01-08<br>(Dwg 50026) | |
| | Photos of existing ducting | | |

## 9.1.C Regulations and Standards

The applicable Acts, Regulations, Rules, Codes and Standards for this specification are contained in Annex A 'Acts, Regulations and Rules Applicable to CCGS Mangystau -2' attached. The following standards apply in addition to those of Annex A (as also summarized in Annex B 'Additional Codes and Standards'). The following Regulations and Codes in particular apply:

| | **Title** | **Included Yes/No** |
|---|---|---|
| **Regulations** | Vessel Fire Safety Regulations, Sections in general and 2(1), 3(1) | No |
| **Convention** | SOLAS II-2/9.7.1.1 | No |
| **Standard** | ISO 1716:2002 Reaction to the fire tests for Building Products – Determination of the Heat of Combustion (As referenced in SOLAS II-2/9.7.1.1.1) | No |
| **TP 14612** | Procedures for approval of life-saving appliances and fire safety systems, equipment and products – | No |
| **Information Letter** | Letter to Industry from Transport Canada Marine Safety, (TCMSS) - Type Approval Certification to the Marine Equipment Directive (MED) on Canadian Vessels | Yes |

## 9.1.D **Contractor Supplied** Material

9.1.D.1 All materials and parts for the new flexible ducting will be supplied by Canadian Coast Guard. All equipment required to perform the work must be contractor supply.

9.1.D.2 The current flexible duct sections consist of an inner section (non lined) and an outer insulated section. The replacement ducting may be of similar design or a single flexible duct of equivalent insulated value.

9.1.D.3 Photos Existing Ducting

## 9.1.E Statement of Work

9.1.E.1 Lock-out Tag-out

Prior to commencing any work the Contractor must install /remove locks and tags accordingly during the scope of work. The vessel's TA will assist the Contractor in identifying the locations to perform the lock outs, but will not perform the actual lock out. The Contractor/FSR must supply and install their own locking devices and retain all keys during the scope of this work. Upon completion of all work the TA must be in attendance when all locks/tags are removed.

## 9.1.F General

9.1.F.1 This work must be coordinated with specification 5 HVAC System Cleaning, as well as other specifications requiring removal of the ceiling panels in accommodation, control station and service areas.

9.1.F.2 The Contractor shall remove the ceiling panels and mark/map them for identification for re-installation in original locations**.**

9.1.F.3 Panels supporting lights, smoke detectors, speakers or any other electrical equipment will only be removed at the discretion of the CCG TA.

9.1.F.4 Contractor shall be responsible for disposal of all unusable, original material.

9.1.F.5 Reference the drawings provided 9.1.B.1 (a to d), a total of 46 sections of flexible ducting are to be replaced in the HVAC ventilation system to individual accommodation, service and control spaces. Each section of flexible ducting connects from the existing rigid duct (PR100) to a heating and diffuser unit (Novenko MS-25 or RS 35). The contractor must ensure the existing flexible ducting is removed and replaced without damaging the existing components.

9.1.F.6 The flexible ducting sections are less than 2 metres in length for each location.

9.1.F.7 The flexible ducting must be secured at both ends with clamps and aluminium tape.

9.1.F.8 The Contractor must be responsible for ensuring that all areas have been thoroughly cleaned and free of any debris resulting from the performance of this specification item.

9.1.F.9 The Contractor is responsible for the identification of interference items, their temporary removal, storage, and refitting to the vessel.

## 9.1.G Proof of Performance

9.1.G.1.1 The contractor must provide the CCG TA with the opportunity to verify that each section of the flexible ducting has been satisfactorily replaced prior to the ceiling panels being re-installed.

9.1.G.1.2 Prior to acceptance, the HVAC system shall be verified satisfactorily functional and operational by the CCG TA and Chief Engineer upon completion of work. The Contractor will be responsible for any necessary corrections.

# 10.0 Arc Flash Study

## 10.1.A Identification

10.1.A.1 The Objective of this specification is to produce and deliver an electrical arc flash study, one-line diagram software model used in the calculations and install electrical hazards labels for the vessel.

## 10.1.B References

10.1.B.1 **Drawing**

Electrical One Line Dwg 740-870-070_B

Electrical Load Analysis 740-890-045_A

Short Circuit Report 75086-871-071 and 75086-871-070

Selectivity Report 75086-871-072

## 10.1.C Regulations and Standards

The applicable Acts, Regulations, Rules, Codes and Standards for this specification are contained in Annex A 'Acts, Regulations and Rules Applicable to CCGS Mangystau-2' attached. Additional Standards and Codes that are applicable for individual specification items are listed in Annex –B. Both Annexes will be provided in a separate document.

| FSSM Procedures | Title | Included Yes/No |
|---|---|---|
| FSM | CCG Fleet Safety Manual | Yes |
| **Standards** | IEEE 1584 Guide for performing Arc Flash Hazard Calculations | Yes |
| | NFPA 70E Standard for Electrical safety in work place | Yes |
| **Regulations** | CSA 2001 | No |
| | CSA Z462 Workplace Electrical Safety | Yes |

## 10.1.D Scope of Work

10.1.D.1.1 Contractor must collect and list in the report the major equipment actual input data and source from where they were obtained.

10.1.D.1.2 Contractor must list all the assumptions used for equipment for which the actual technical data is not available.

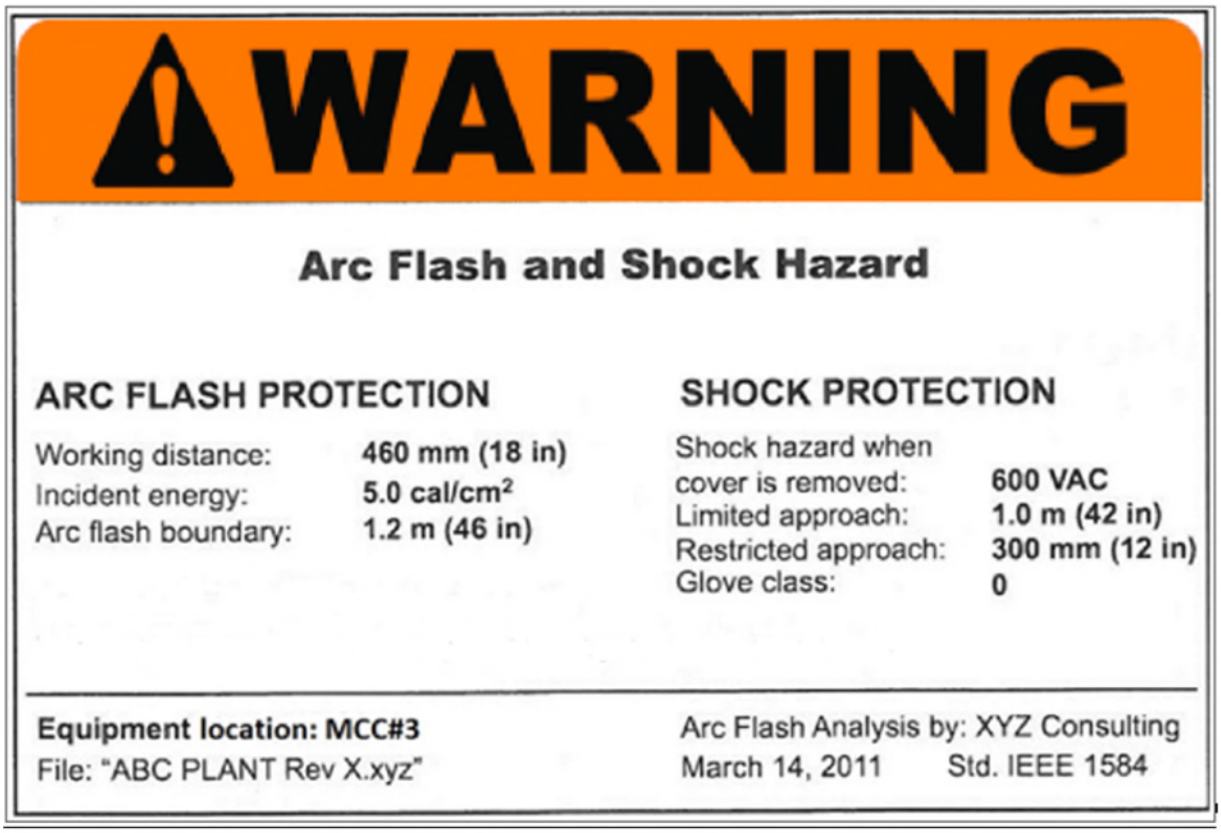
10.1.D.1.3 Contractor must, based on ship's operation scenarios listed in Electrical Load Analysis, calculate the incident energies for the switchboards, MCCs and panels as they are identified on Electrical One-Line Drawing based on the maximum and the minimum short circuit conditions. To be noted that FiFi (fire-fighting) operation scenario is not applicable and must not be used for calculations. Shore power supply scenario must be added for calculations..

10.1.D.1.4 Contractor must summarize in a separate table the maximum incident energy at switchboards, transformers, MCCs and panels and indicate scenario at which it is achieved. The table must list all the calculated incident energies in cal/cm2 at working distance, arc flash boundaries, the arcing current, breaker trip time, the bolted three phase short circuit currents and equipment location. The method of calculating the bolted three phase short circuit current must be in accordance with IEC 61363-1, Electrical Installations of Ships and Mobile fixed Offshore Units. The bolted three phase short circuit current must be of ½ cycle time period as typical for ships installations. Contractor must provide explanations if other time period is used..

10.1.D.1.5 When "2 seconds rule" from IEEE 1584 is used, the Contractor must also provide calculated incident energy based on circuit breaker actual trip settings. Attention must be paid to construction of draw-out circuit breakers (whether or not they are fitted with insulated safety shutters) and availability of differential protection for ship's generators.

10.1.D.1.6 Contractor must maintain naming convention of electrical distribution system components and operation scenarios in accordance with referenced ship's drawings and calculations. Standards IEEE 1584 and CSA Z462 used for the study must be of the most recent edition.

10.1.D.1.7 Contractor must provide combined Arc Flash and Shock Warning Labels in accordance with the following template:




The label must have an orange header with the wording “WARNING” and must include the following information:

a) Working distance’

b) Incident energy;

c) Arc flash boundary;

d) Nominal voltage of Shock Hazard;

e) Limited approach boundary;

f) Restricted approach boundary;

g) Gloves class;

h) Equipment location;

i) File name (One-Line Diagram Model file name)

j) Contractor company name;

k) Date of completion;

l) Standards used.

10.1.D.1.8 Contractor must deliver two sets of labels. One set must be in English, the second set is in French. Each label must be of at least 3.5” x 5” size made of high adhesion polyester. Contractor must install one set of labels as chosen by Chief Engineer on the front doors of relevant equipment for arc electrical hazards notification.

10.1.D.1.9 Contractor must deliver the draft report to the TA for review and comments, in English. Contractor must not produce any warning labels until the final report has been approved by TA.

10.1.D.1.10 The report must include a summary, collected input data, methodology used, evaluated operation scenarios, assumptions, analysis of results, specify any concerns and provide recommendations. As much as practicable, the report must provide recommendations for available engineering options to reduce the incident energy levels on energized equipment to the level below 12 cal/cm2 based on CSA Z462 “simplified two-categories PPE system”.

# 11.0 Lathe Supply & Workshop Installation

## 11.1.A IDENTIFICATION

11.1.A.1.1 The objective of this specification is to supply and install a metal working lathe as specified in section 11.1.F of this SOW.

11.1.A.1.2 Contractor is responsible for the safe storage and handling of the lathe. The contractor is responsible to ensure that the manufacturer's recommended climate controlled storage parameters for the lathe and accessories are met and maintained until transport to the vessel engine room has taken place.

11.1.A.1.3 The contractor must provide all materials, labour, and equipment required to complete the installation in the dedicated area on the vessel in consultation with the TA and OEM recommendations

## 11.1.B REFERENCES

## 11.1.C Drawing

**11.1.D** 740-101-001_H General Arrangement drawing

**11.1.E** **Regulations and Standards -** The applicable Acts, Regulations, Rules, Codes and Standards for this specification are contained in Annex A 'Acts, Regulations and Rules Applicable to CCGS Mangystau-2' attached. Additional Standards and Codes that are applicable for individual specification items are listed in Annex –B. Both Annexes will be provided in a separate document.

| FSSM Procedures | Title | Included Yes/No |
|---|---|---|
| FSM | CCG Fleet Safety Manual | Yes |
| **Regulations** | CSA 2001 | No |
| | CSA Z462 Workplace Electrical Safety | No |

## 11.1.F Scope of Work

11.1.F.1.1 Contractor shall supply and install one new, unused 440V 3-phase 60Hz Standard Modern 1440 lathe, including Telescopic Taper Attachment.

11.1.F.1.2 Contractor shall supply all Lathe accessories listed in Annex C.

11.1.F.1.3 Contractor shall carefully transport the lathe to the engine room workshop for installation as per manufacturer's instructions. Lathe may ship in separate parts and require assembly. Contractor is responsible for all transportation to, rigging for and assembly of the lathe in the engine room workshop.

11.1.F.1.4 Contractor is to install the lathe in a location at deck level next to the port bulkhead. Contractor shall be responsible to verify support structure "trueness/flatness" and to identify and implement required structural adjustments necessary to achieve the required mounting parameters as per the manufacturer's installation/mounting instructions. Installation shall include all labour and CSMs to properly secure/mount the lathe in the workshop and agreed precise position. Precise positioning will be determined in consultation with the TA and referencing the vessel machinery arrangement drawing 740-600-001_E.

11.1.F.1.5 Contractor is responsible for electrical power supply connection and testing and shall be verified satisfactorily functional and operational by the CCG TA and Chief Engineer upon completion of work. The Contractor will be responsible for any necessary corrections.

11.1.F.1.6 **Deliverables**

Equipment operation installation and maintenance Manuals

Manufacturer's warranty documentation.