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**SOLICITATION AMENDMENT  
MODIFICATION DE L'INVITATION**

The referenced document is hereby revised; unless otherwise  
indicated, all other terms and conditions of the Solicitation  
remain the same.

Ce document est par la présente révisé; sauf indication contraire,  
les modalités de l'invitation demeurent les mêmes.

**Comments - Commentaires**

**Vendor/Firm Name and Address**

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G1J 0C7

<b>Title - Sujet</b> Winter work (S-Iles) 2018	
<b>Solicitation No. - N° de l'invitation</b> F3774-17N515/A	<b>Amendment No. - N° modif.</b> 001
<b>Client Reference No. - N° de référence du client</b> F3774-17N515	<b>Date</b> 2018-02-12
<b>GETS Reference No. - N° de référence de SEAG</b> PW-\$QCL-037-17339	
<b>File No. - N° de dossier</b> QCL-7-40294 (037)	<b>CCC No./N° CCC - FMS No./N° VME</b>
<b>Solicitation Closes - L'invitation prend fin</b> <b>at - à 02:00 PM</b> <b>on - le 2018-02-20</b>	<b>Time Zone</b> <b>Fuseau horaire</b> Heure Normale du l'Est HNE
<b>F.O.B. - F.A.B.</b> <b>Plant-Usine:</b> <input type="checkbox"/> <b>Destination:</b> <input checked="" type="checkbox"/> <b>Other-Autre:</b> <input type="checkbox"/>	
<b>Address Enquiries to: - Adresser toutes questions à:</b> Woods, Michael	<b>Buyer Id - Id de l'acheteur</b> qcl037
<b>Telephone No. - N° de téléphone</b> (418) 649-2715 ( )	<b>FAX No. - N° de FAX</b> (418) 648-2209
<b>Destination - of Goods, Services, and Construction:</b> <b>Destination - des biens, services et construction:</b>	

**Instructions: See Herein**

**Instructions: Voir aux présentes**

<b>Delivery Required - Livraison exigée</b>	<b>Delivery Offered - Livraison proposée</b>
<b>Vendor/Firm Name and Address</b> <b>Raison sociale et adresse du fournisseur/de l'entrepreneur</b>	
<b>Telephone No. - N° de téléphone</b> <b>Facsimile No. - N° de télécopieur</b>	
<b>Name and title of person authorized to sign on behalf of Vendor/Firm</b> <b>(type or print)</b> <b>Nom et titre de la personne autorisée à signer au nom du fournisseur/</b> <b>de l'entrepreneur (taper ou écrire en caractères d'imprimerie)</b>	
<b>Signature</b>	<b>Date</b>

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**Please amend the above mentioned bidding solicitation with the changes below:**

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**Remove Annex A and insert the attached Annex A rev.1. The numbering is now the same as the French Annex A.**

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**At Annex A, Remove Kb10.3.E.3 and insert the following Kb10.3.E.3:**

**Kb10.3.E.3** The contractor retains the services of a company accredited by Lloyd's Register to conduct the annual inspection and certification of the davit and its integral lifting device or [1]the manufacturer of the equipment. The Contractor must provide the Lloyd's approval of service supplier indicating the company certify to perform work on this unit to the chief engineer before the beginning of the work

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**At Annex A, Remove Kb10.6.F**

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**At Annex A, Remove Kb17.2.C.5 and insert the following Kb17.2.C.5:**

**Kb17.2.C.5** The Contractor must coordinate a Lloyd's register visit to demonstrate a load test of the crane. The Contractor must provide the weights for the load test and a certified dynamometer to prove the weight.

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**Questions and Answers:**

**Question 1:**

In References to Annex A, page 48, Kb17.2.B, we did not find the technical manual for marine crane model Tb-10-23 in the technical documents provided, is it possible to obtain it?

**Answer 1:**

Go to: F3774\_Documents techniques\_12\_Technical documents.

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**All other clauses and conditions from the bidding solicitation remain the same.**

# **Annex A**

## **CCGS Caporal Kaeble V.C. Winter work Sept-îles 2018**

Spec number: 3774-17IN515

Date 2018-02-12

Revision No: 1

Prepared by : technical services

Canadian Coast guard

Central and Arctic

101, Boul. Champlain

Québec (QC), G1K 7Y7

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Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
G 1.0		
LIST OF ACRONYMS		

## **G 1.0 LIST OF ACRONYMS**

<b>CCGS</b>	Canadian Coast Guard Ship
<b>AMR</b>	Auxiliary Machinery Room
<b>CA</b>	Contracting Authority (PWGSC)
<b>CCG</b>	Canadian Coast Guard
<b>CLC</b>	Canadian Labour Code
<b>CPM</b>	Contractor Provided Material
<b>CSA</b>	Canadian Standards Association - CSA
<b>CSM</b>	Contractor Supplied Material
<b>CWB</b>	Canadian Welding Bureau
<b>DFO</b>	Fisheries and Oceans Canada
<b>FSR</b>	Field Service Representative
<b>FSSM</b>	Fleet Safety and Security Manual
<b>GSM</b>	Government Supplied Material
<b>HC</b>	Health Canada
<b>IEEE</b>	Institute of Electrical and Electronic Engineers
<b>IMO</b>	International Maritime Organisation
<b>LR</b>	Lloyd's Register of Shipping
<b>MMR</b>	Main Machinery Room
<b>MSDS</b>	Material Safety Data Sheet
<b>OAL</b>	Overall length
<b>OHS</b>	Occupational Health and Safety
<b>PWGSC</b>	Public Works and Government Services Canada
<b>SSC</b>	The Rules and Regulations for the Design and Construction of Special Service Craft, produced by LR
<b>SSMS</b>	Safety and Security Management System
<b>TA</b>	Technical Authority - Owner's Representative (CCG)
<b>TBS</b>	Treasury Board Secretariat of Canada
<b>TCMS</b>	Transport Canada and Marine Safety and Security
<b>TCMS</b>	Transport Canada Marine Safety
<b>TP</b>	Transport Canada Publication
<b>TSR</b>	Technical Services Representative
<b>WHMIS</b>	Workplace Hazardous Materials Information System

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
G 2.0		
General Notes		

## **G 2.0 GENERAL NOTES**

### **G 2.1 Identification**

**G 2.1.1** These general notes specify CCG requirements applicable to all the following technical specifications.

### **G 2.2 References**

**G 2.2.1** Applicable regulations and documentation:

FSSM procedures	Title	Attached Yes/No
7.B.2.	Work at height and on walls	No
7.B.3	Entry into confined spaces	
7.B.4	Hot work	Yes
7.B.5	Lockout and identification	Yes
7.E.5	Handling, storage and disposal of hazardous materials	No
10.A.6	Paint and other coatings	No
7.E.8	Controlling the use of halocarbons on board vessels	No
7.A.12	Quality of drinking water	No
10.A.7	Contractor Safety and Security	No
Specific to the vessel	Specific to the vessel - Asbestos management plan	No
Publications		
TP3177E	Standards for the Control of Gas Hazards on Vessels Being Repaired or Altered	No
TP127E	Electrical standards for ships	No
IEEE 45	Recommended practise for electrical installations on board ships	No
70-000-000-EU-JA-001	Specification for installation of electronic equipment on board ships	Available at: CCG/ITS
CSA W47.1	Certification of Companies for Fusion Welding of Steel	Yes
CSA W47. 2	Certification of Companies for Fusion Welding of Aluminum	No
CSA W59	Welded Steel Construction (Metal Arc Welding)	No

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G 2.0		
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CSA W59.2	Welded Aluminum Construction	No
Legislation		
CSA	Canada Shipping Act	No
CLC	Canada Labour Code	No
Regulations		
SSTN	MOSH Marine Occupational Safety and Health Regulations	

### **G 2.3 Occupational Health and Safety**

**G 2.3.1 The contractor and all subcontractors shall follow occupational health and safety (OHS) instructions in accordance with relevant federal and provincial OHS regulations to ensure that the activities of the contractor are conducted safely and without compromising the safety of a staff member.**

**G 2.3.2 The contractor and the contractor's employees, including all subcontractors, shall attend an orientation session on vessel safety before the beginning 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, intervention in case of dangers and safety assessments before beginning work. The contractor will have access to an uncontrolled copy of the Fleet Safety and Security Manual.**

**G 2.3.3 The contractor shall 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 Canadian Labour Code during performance of work on the following:**

Hot work;

Work at heights;

Entry into enclosed spaces;

Degassing before entering into confined spaces and for hot work;

Lockout and identification;

Safety assessments before beginning work.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
G 2.0		
General Notes		

**G 2.3.4** For the purpose of the Lockout and identification procedure, the contractor shall provide the padlocks and locking devices for the contractor's employees as well as those provided by the Chief Engineer for the vessel's crew.

**G 2.3.5** The contractor and its employees will not have access to the crew's washrooms or lounges. The contractor shall provide the necessary facilities for its employees and subcontractors as needed.

**G 2.4** **Access to the workplace**

**G 2.4.1** The contractor shall ensure that TA and CCG personnel have unlimited access to the workplace at all times during the contract.

**G 2.5** **Workplace Hazardous Materials Information System (WHMIS)**

**G 2.5.1** The contractor shall provide the TA with the material data safety sheets (MSDS) for any product subject to WHMIS control that it will supply.

**G 2.5.2** The TA will provide the contractor with access to the Material Data Safety Sheets for all controlled products on board the vessel which could be used in any work item of the specification.

**G 2.6** **Smoking in the workplace**

**G 2.6.1** The contractor shall ensure compliance with the Non-smokers' Health Act. The contractor will ensure that each employer and any person acting on behalf of an employer ensures that they refrain from smoking in any workplace under the employer's control. The contractor shall ensure that there is absolutely no use of tobacco on board the vessel.

**G 2.7** **Work area clean and free of danger**

**G 2.7.1** During the work period, the contractor shall maintain in a clean and debris-free state the parts of the vessel used by its personnel to access places where it must perform work and dispose of waste daily.

**G 2.7.2** Areas that are hazardous due to work done according to the specification shall be secured and clearly identified by the contractor, including posting to warn and protect all personnel of the existing danger in accordance with the relevant requirements of the Canadian Labour Code.

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G 2.0		
General Notes		

**G 2.7.3 At the end of the contract, the contractor shall rid the vessel of all waste created by performance of the work and return the vessel to a state of cleanliness equal to that which existed at the beginning of the contract period.**

**G 2.7.4 Once all predetermined work has been achieved and a final cleaning done, the contractor's quality guarantee representative (QG), the TA will make a joint inspection tour of the vessel to visit all places where work was done by the contractor. All deficiencies or damage noted will be recorded and compared with the digital images captured in advance. The contractor shall fully correct**

**G 2.8 Fire protection**

**G 2.8.1 The contractor shall ensure that isolation, removal and installation of fire detection and extinguishing systems, or of any component of such systems, are done by a qualified technician. When a fire detection or extinguishing system is deactivated by the contractor during the contract, it shall then be recertified as being fully functional by a qualified technician. A signed and dated copy of the original certificate shall be delivered to the TA before the end of the contract.**

**G 2.8.2 The contractor shall notify the TA and obtain written approval from the TA before disturbing, isolating, deactivating, interrupting or excluding any part of the fire detection and/or extinguishing systems, including smoke and heat detectors.**

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G 2.0		
General Notes		

**G 2.8.3 The contractor shall ensure protection against fire at all times, including when anyone is working on the vessel's fire detection and/or extinguishing systems. This may be accomplished as suggested below and only with written approval from the TA:**

by deactivation of only one part of the system at a time;  
by maintaining the system with spare parts while the work is in process;  
by other means acceptable and approved by the TA.

**G 2.8.4 The contractor shall not the if it does not take the necessary precautions while performing the work, both on th vessel's fire extinguishing systems and those close to it, it could cause accidental discharge of the extinguishing agent. The contractor shall at its own expense refill and recertify the containers or system so emptied during its work.**

**G 2.9 Retouching/Painting affected**

**G 2.9.1 Unless otherwise indicated, all new steel and/or all affected steel shall receive two coats of marine primer, compatible with the vessel's paint coating scheme.**

**G 2.9.2 The contractor shall prepare all new or affected steel in accordance with the paint manufacturer's standards before painting.**

**G 2.10 Employees of CCG and others on the vessel**

**G 2.10.1CCG or DFO employees and other workers such as manufacturer's agents and/or TCMS or classification society experts may perform work other than those included in those included in this statement of work on board the vessel for the duration of this contract. The TA will do everything necessary to ensure that such work and/or inspections/examinations taking place do not interfere with the contractor's work. The contractor is not responsible to arrange the related inspections or to pay for them, unless otherwise indicated.**

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G 2.0		
General Notes		

#### **G 2.11 Regulatory inspections and/or classification examinations**

**G 2.11.1**The contractor shall make the calls and set the schedule for any regulatory inspections and/or classification visit by the responsible authority: that is, TCMS, HC, Environment Canada or other persons required by the specifications.

**G 2.11.2**Any documentation generated by the inspections/visits referred to above and which demonstrates they have taken place (i.e., signed and dated originals of certificates) shall be provided to the TA.

**G 2.11.3**The contractor shall not substitute regulatory inspections or classification visits by inspections done by the TA.

**G 2.11.4**The contractor shall in a timely manner provide prior notice (at least 24 hours) for regulatory inspections/classification visits to the TA so he or she can attend the inspection/visit.

#### **G 2.12 Results of tests and data collection**

**G 2.12.1**The contractor shall prepare a plan of tests and trials which shall include at least all the tests and trials set out in the specifications. This plan shall be offered to the TA for their approval one week before the beginning of the tests and trials originally planned.

**G 2.12.2**All tests, measurements, calibrations and readings shall be recorded, signed by the person taking the measurements, dated and provided in electronic and paper report format – to the TA and TCMS.

**G 2.12.3**Dimensions recorded in the register shall have an accuracy of three (3) decimal places (unless otherwise specified) in the measurement system in use on board the vessel.

**G 2.12.4**The contractor shall provide the TA with recent calibration certificates in force for all instrumentation used in the plan of tests and trials demonstrating that the measurement instruments concerned have been calibrated in accordance with the manufacturer's instructions.

**G 2.12.5**Printed reports will be bound in standard three-ring binders, typed on letter sized stationery and indexed in accordance with the specification's numbering system. Electronic copies will be saved in "Adobe PDF" format without password protection and provided on CD-ROM. The contractor will supply three paper copies and one electronic copy of each report.

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G 2.0		
General Notes		

**G 2.12.6** All documentation from the contract period shall be incorporated in the collection of data to be remitted to the TA at the end of the contract period.

**G 2.13 Tools and materials provided by the Contractor**

**G 2.13.1** The contractor shall ensure that all material are new and have never been used.

**G 2.13.2** The contractor shall ensure that alternative materials such as glands, packaging, insulation, small hardware, oil, lubricants, cleaning solvents, preservatives, paints, coatings, etc., comply with the drawings, guides and instructions of the equipment manufacturer.

**G 2.13.3** Where no particular article is specified or where a substitute must be used, the TA shall provide written approval for the substituted article. The contractor shall provide information on the materials used – certificate of classification and quality of various materials – to the TA before use.

**G 2.13.4** The contractor shall provide all the equipment, machinery, material and tools such as cranes, scaffolding, platforms and rigging necessary to carry out the work described in this specification.

**G 2.13.5** The contractor shall provide a waste disposal service for any oil, oily waste, any other hazardous material and any garbage subject to control, resulting from the work described by this specification. It will also provide the garbage disposal certificates for any waste mentioned above and these certificates shall show that the disposal has been done in accordance with the federal, provincial and municipal directives in force.

**G 2.14 Tools and materials provided by the government**

**G 2.14.1** All the tools will be provided by the contractor unless otherwise indicated in the technical specification.

**G 2.14.2** Where the tools are provided by the TA they will be returned by the contractor in the same condition as when they were borrowed. Borrowed tools shall be inventoried and the contractor shall sign an acknowledgement of receipt and return them to the TA.

**G 2.14.3** Any Government Supplied Material (GSM) shall be received by the contractor and stored in a secure warehouse or stores having a controlled environment appropriate to the equipment according to the manufacturer's instructions.

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## **G 2.15 Familiarisation to Contractor**

### **G 2.15.1 (N/A)**

## **G 2.16 Restricted access areas**

**G 2.16.1** Neither the Contractor nor any person assigned to work on the Contract or Agreement shall have unescorted access to the restricted areas of Fisheries and Oceans Canada facilities or Canadian Coast Guard vessels.

**G 2.16.2** The contractor shall notify the TA at least 24 hours in advance before undertaking work in inhabited spaces or offices. These delays will give the CG the time needed to evacuate its personnel and ensure safety in these rooms.

## **G 2.17 Inspections by the contractor and protection of the workplace and equipment**

**G 2.17.1** The contractor shall coordinate an inspection of the condition and location of items to be removed with the TA before performing the specified work or accessing a location to work in it.

**G 2.17.2** The contractor shall repair, at its own expense, any damage resulting from its actions during performance of its work and which may be attributed to its performance. All material used in a replacement or repair shall comply with the criteria for the material supplied by the contractor as indicated above in the Materials and Tools Supplied by the Contractor section.

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**G 2.17.3** The contractor shall protect all equipment and all neighbouring areas against damage. Work areas shall be protected against flooding and water leaks, debris from sandblasting, welding, etc. Temporary tarpaulins shall be installed above the work areas.

**G 2.18 Records of work in progress**

**G 2.18.1** The TA may record the work in progress by various means including, but not limited to, photographs and video, whether digital or film.

**G 2.19 List of confined spaces**

**G 2.19.1** The contractor may ask for a list of the vessel's confined spaces during the meeting preceding the refit.

**G 2.20 Lead based paints and paint coatings**

**G 2.20.1** The contractor will not use lead-based paints.

**G 2.20.2** CCG vessels were coated in lead based paints in the past and there may therefore be certain work done by the contractor such as grinding, welding or hot work that could extract the lead from this paint. The contractor shall ensure that places in affected work areas are examined for any lead content and ensure that the work is done in accordance with the applicable federal and provincial regulations.

**G 2.20.3** The contractor shall demonstrate the product's approval by HC for hull paints controlled by HC and the **Pest Management Regulatory Agency**.

**G 2.21 Materials containing asbestos**

**G 2.21.1** The contractor will not use any material that contains asbestos.

**G 2.21.2** Handling of any material containing asbestos will be done by persons trained and qualified in asbestos disposal in accordance with the regulations in force of the federal, provincial and municipal governments as well as in accordance with the FSSM. The contractor shall provide the TA with certificates showing that removal from the vessel of any material containing asbestos has been done in

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
0		

accordance with the regulations in force from the federal, provincial and municipal governments.

**G 2.22 Removed materials and equipment**

**G 2.22.1**All material removed under this specification remains the property of the CCG, unless instructions to the contrary are in the specifications section.

**G 2.23 Welding certification**

**G 2.23.1**For all work requiring the use of fusion welding for steel structures, the contractor and/or the welders of subcontractors shall be certified by the Canadian Welding Bureau in accordance with CSA Standard W47.1-03, latest revision – Certification of companies for fusion welding of steel, Division Certification level 2 minimum. Copies of certifications (including those of the welders) will be submitted to the TA .

**G 2.24 Electrical facilities**

**G 2.24.1**All electrical facilities and repairs shall be done in accordance with the latest revisions of TP127E - Electrical Standards of Transport Canada Marine Safety and of standard 45- Recommended Practice for electrical installation on ships – of the IEEE.

**G 2.25 Electrical power supply**

**G 2.25.1**The CCG will allow the contractor to use a limited number of 115 VAC, 1 phase, 15 amp outlets for the duration of the contract, depending on the network's capacity.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
G 3.0		
Report of weight added and removed		

## **G 3.0 REPORT OF WEIGHT ADDED AND REMOVED**

### **G 3.1 Scope**

**G 3.1.1** Ships of the MSPV type are sensitive to weight additions. Materials added must be marked as well as the elements removed

### **G 3.2 Technical Description**

**G 3.2.1** The Contractor must weigh all the equipment that is added to the ship and this by specification item. The Contractor must also weigh all items that are removed from the vessel

### **G 3.3 Deliverable**

**G 3.3.1** A report including the weight per quote item that has been added and the weight per quote item that has been removed must be delivered to the Technical Authority prior to the completion of the work.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
<b>Kb10.1</b>		
<b>SAFETY AND SECURITY EQUIPMENT Annual Inspection of Rescue Zodiac</b>		

N.G.C.C. Caporal Kaeble V.C.		
Agent de projet :	Courriel :	Bur. : 418-648-5440
Isabelle Couillard-Desjardins	Isabelle.couillard-desjardins@dfo-mpo.gc.ca	

## **KB10      SAFETY AND SECURITY EQUIPMENT**

### **KB10.1      ANNUAL INSPECTION OF RESCUE ZODIAC**

#### **Kb10.1.A      Scope**

**Kb10.1.A.1**      Have an authorized Zodiac representative complete the annual certification of the Zodiac lifeboat.

#### **Kb10.1.B      Technical Description**

**Kb10.1.B.1**      The transport of the Zodiac must be arranged by the Contractor, the ship doesn't have a transport trailer.

**Kb10.1.B.2**      The cost of repair services and parts will be adjusted up or down on form PWGSC-SPAC 1379.

#### **Kb10.1.C      Boat description :**

Ribo 420 : FRXBC210FB212
Serial no. 234006
Date of manufacture:02-12
Out board motor :M000TA5071
Engine Serial no.: 6BC-81800-00

#### **Kb10.1.D      Deliverable**

**Kb10.1.D.1**      Provide the certificate and a full report on the inspection and repairs. These documents must be submitted to the Chief Engineer before the end of the work period.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb10.2		
SAFETY AND SECURITY EQUIPMENT FUEL HOSE CERTIFICATION		

## **KB10.2**      **FUEL HOSE CERTIFICATION**

**Kb10.2.A.1**    Supply the materials and labour to perform hydrostatic verification and test of both GOODYEAR FLEXSTEEL FUTURA brand fuel transfer hoses, one of 1 inch by (12) meters length and the second of 1 in. by 5 meters length.

**Kb10.2.A.2**    The Contractor is responsible to decontaminate the 2 hoses and dispose of the water used to hydrotest the hoses. The Contractor must give back the hoses dry and free of residue.

**Kb10.2.A.3**    Operating pressure of the hoses is 2 bars.

**Kb10.2.A.4**    Each hose must have a stainless steel plate indicating the test date, working pressure, test pressure, hose serial number, and Contractor's name.

**Kb10.2.A.5**    The Contractor must provide the Chief Engineer with a certificate for each hose and a copy to the technical authority. These documents must be submitted to the Chief Engineer before the end of the work period.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb10.3		
SAFETY AND SECURITY EQUIPMENT Annual inspection of the lifeboat davit		

## **KB10.3**      **ANNUAL INSPECTION OF THE LIFEBOAT DAVIT**

### **Kb10.3.A**      **Scope**

**Kb10.3.A.1** With this specification it is intended that the Contractor retains the services of a company accredited by Wellin Lambie, the manufacturer of the equipment to conduct the 60 month inspection and certification of the lifeboat davit and its lifting apparatus.

### **Kb10.3.B**      **RefeRENCES**

Document	Title	Included Yes/No
Plan		
Publications		
Maintenance and Operation Manual	Welin Lambie Maintenance and Operation Manual	
Standards		
Regulations	Canada Shipping Act, 2001	

### **Kb10.3.C**      **Equipment supplied by owner**

**KB10.3.C.1** Unless otherwise indicated, the Contractor must supply all the material, equipment and parts necessary to perform the work in the specifications

### **Kb10.3.D**      **Parts to provide for the inspection**

**Kb10.3.D.1** The following parts must be provided to the ship. Any part not used during the inspection must be given to the chief engineer.

item no	part number	part description	details	Qty
1	2520-3001	clutch shoe assembly		4
2	2520-3401	centrifugal brake shoe assy	modified 6oz shoe	6
3	2702-0011	tension spring		8

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb10.3		
SAFETY AND SECURITY EQUIPMENT Annual inspection of the lifeboat davit		

4	2702-0411	tension spring	dia 16 x 58 O/all length	6
5	5427-2411	inspection cover gasket	380 x 155 x 3 thk	1
6	5726-6901	pressure hose assembly	3/8" x 585 LG	1
7	5726-7001	pressure hose assembly	3/8" x 700 LG	1
8	609-08020	Hex hd setscrew	M8 x 20 LG	12
9	647-00308	plain washer	M8	12
10	647-00808	plain washer	M8	12
11	651-10025	external circlip	dia 25 x 1.2 thk	1
12	651-10030	external circlip	dia 30 x 1.5 thk	1
13	651-10040	external circlip	dia 40 x 1.75 thk	1
14	679-40025	split cotter pin	dia 5 x 25LG	6
15	679-40045	split cotter pin	dia 5 x 45 LG	6
16	7967-0401	oil seal	I/D40 O/D 52 x 7 thk	3
17	7967-0551	oil seal	I/D55 O/D 70 x 8 thk	1
18	7980-044530	o-ring	I/D 44.5 x 3.0 cross section	1
19	800-02070	main rope	dia 9 x 21.6m LG	1
20	850-01003	hylomar	100 gm tube (blue)	1
21	894-00849	air breather	3 micron: 3/4 BSPT spin on type	1
22	894-00858	air breather	1/2" BSP (15 to 25 micron)GR b	1
23	894-00938	suction element	1/2" BSP: 25 micron	1
24	894-00939	return filter	size 030	1
25	891-05570	brake lever overhaul kit	size 030	1
26	891-05593	friction disc overhaul kit		1
27	859-01960	emergency stop	push pull 1 contact block n/O-N/C	1
28	859-01961	contact block	single pole single throw N/C	1
29	859-03151	contactor	38 Amp 24 VDC coil 3 pole	1
30	851-01070	Limit switch	2 N/C snap action, metal case	1

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb10.3		
SAFETY AND SECURITY EQUIPMENT Annual inspection of the lifeboat davit		

### Kb10.3.E **Technical Description**

#### **Kb10.3.E.1** General

Supplier: Wellin Lambie LTD

Supplier ref: 7773/7

Davit type: PIV1.0A

Assy no: 5601-1701

SWI: 1080 KG

**Kb10.3.E.2** Annual maintenance in accordance with the manufacturer's manual for the period relating to the system's age, the 60th month. In addition, it will be imperative to pay special attention and inspect the brake, which has been damaged due to corrosion on another MSPV.

**Kb10.3.E.3** The contractor retains the services of a company accredited by Lloyd's Register to conduct the annual inspection and certification of the davit and its integral lifting device. The Contractor must provide the Lloyd's approval of service supplier indicating the company certify to perform work on this unit to the chief engineer before the beginning of the work.

#### **Kb10.3.E.4**

10.3.E.4.1 Adjust limit switches

10.3.E.4.2 Conduct verification of the centrifugal brake

10.3.E.4.3 Adjust and verify the luff out cable levers

10.3.E.4.4 Oil changes the Contractor must provide oil according to the user manual

#### **Kb10.3.E.5** Location

10.3.E.5.1 The davit is located to starboard on the wheelhouse deck.

### Kb10.3.F **Proof of Performance**

#### **Kb10.3.F.1** Inspection

10.3.F.1.1 All work shall be completed to the satisfaction of the Chief Engineer and the Lloyd's Register inspector.

#### **Kb10.3.F.2** Certification

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb10.3		
SAFETY AND SECURITY EQUIPMENT Annual inspection of the lifeboat davit		

10.3.F.2.1 The Contractor must provide, before the end of the work period, the Chief Engineer with two (2) paper copies of maintenance certificates along with the original. The Contractor shall also send an electronic copy of certificates to the person responsible for the vessel's maintenance.

### **Kb10.3.F.3 DELIVERABLES**

10.3.F.3.1 Drawings/reports

10.3.F.3.2 The Contractor shall submit to the Chief Engineer a hard copy of the typed report, detailing the inspections, modifications and repairs made, prior to acceptance of this item. The Contractor shall also send an electronic copy of the report to the person responsible for the vessel's maintenance.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
<b>Kb10.4</b>		
<b>SAFETY AND SECURITY EQUIPMENT PORTABLE FIRE EXTINGUISHERS INSPECTION</b>		

## **KB10.4** **PORTABLE FIRE EXTINGUISHERS INSPECTION**

### **Kb10.4.A** **Scope**

**Kb10.4.A.1** The Contractor shall remove the fire extinguishers from the vessel and transport them to an authorized service centre, where maintenance and testing will be performed. They shall then be brought back to the vessel and reinstalled.

### **Kb10.4.B** **References**

**Kb10.4.B.1** Reference drawings/data plate information

10.4.B.1.1 NFPA10 Standard for Portable Fire Extinguisher

### **Kb10.4.C** **List of types of vessel fire extinguishers to be inspected**

	Navigation bridge
	Main deck
	Lower deck
	Boating equipment
	Supplementary

No.	Emplacement	Marque & Modèle	Type	No. Série	Poids min (lbs)	Inspection annuelle	Dernière recharge	Maintenace 6ans	Dernier test hydro. 5/12 ans
1	Local GRC	Amerex	Poudre ABC	AV92926	16lb10oz	03/2017	2012		2012
3	Local GRC	Amerex	CO2 BC	AB-881107	33lb6oz	03/2017	02/2016	N/A	02/2016
4	Timonerie	Amerex	Poudre ABC	AV93258	16lb10z	03/2017	2012		2012
34	Cmpt batterie TB	Amerex	Mousse AB	AC641029	27lb9oz	03/2017	03/2015	N/A	03/2015
33	Cmpt batterie BB	Amerex	Classe K	AD18417	20lb5oz	03/2017	03/2017	N/A	03/2017
	Cmpt. Timo avant bâbord	Amerex	Poudre ABC	AW41389	33lb11oz	03/2017	09/2011		09/2011

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb10.4		
SAFETY AND SECURITY EQUIPMENT PORTABLE FIRE EXTINGUISHERS INSPECTION		

	Cmpt timo avant bâbord	Amerex	Poudre ABC	BB421215	33lb11oz	03/2017	02/2012		02/2012
	Cmpt timo avant bâbord	Amerex	Poudre ABC	12924993	8lb5oz	03/2017	2016		2016
6	Coursive magasin aliments	Amerex	Mousse AB	AC790026	27lb9oz	03/2017	03/2017	N/A	03/2017
8	Cuisine	Amerex	Classe K	AD18416	20lb5oz	03/2017	03/2017	N/A	03/2017
9	Coursive Cmdt, C/M	Amerex	Mousse AB	AC641003	27lb9oz	03/2017	03/2015	N/A	03/2015
12	Salle d'équipement électronique	Amerex	CO2 BC	AB881069	33lb6oz	03/2017	02/2016	N/A	02/2016
13	Génératrice d'urgence	Amerex	CO2 BC	AB881086	33lb6oz	03/2017	02/2016	N/A	02/2016
14	Génératrice d'urgence	Amerex	Poudre ABC	AV92945	16lb10oz	03/2017	2012		2012
31	Extérieur tribord	Amerex	Poudre ABC	AV93417	16lb10oz	03/2017	03/2017	03/2017	10/2011
	Station de ravitaillement (pas sur les plans)	Amerex	Mousse AB	AD16062	27lb9oz	03/2017	03/2017	N/A	03/2017
No.	Emplacement	Marque & Modèle	Type	No. Série	Poids min (lbs)	Inspection annuelle	Dernière recharge	Maintenace 6ans	Dernier test hydro. 5/12 ans
15	Appareil à gouverner	Amerex	Mousse AB	AC641032	27lb9oz	03/2017	03/2015	N/A	03/2015
18	Salle de contrôle	Amerex	Poudre ABC	AV93464	16lb10oz	03/2017	2012		2012
20	Propulseur d'étrave	Amerex	Mousse AB	AC641028	27lb9oz	03/2017	03/2015	N/A	03/2015
21	Coursive (toilettes)	Amerex	Mousse AB	AC641007	27lb9oz	03/2017	03/2015	N/A	03/2015
22	S/M Principale bâbord	Amerex	CO2 BC	AB881104	33lb6oz	03/2017	02/2016	N/A	02/2016

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
<b>Kb10.4</b>		
SAFETY AND SECURITY EQUIPMENT PORTABLE FIRE EXTINGUISHERS INSPECTION		

23	S/M Principale centre avant	Amerex	Mousse AB	AC790010	27lb9oz	03/2017	03/2017	N/A	03/2017
24	S/M Principale tribord	Amerex	Poudre ABC	AW41395	33lb11oz	03/2017	01/2013		09/2011
25	S/M Principale centre arrière	Amerex	CO2 BC	AC412736	25lb12oz	03/2017	06/2013	N/A	06/2013
26	S/M Principale tribord	Amerex	Mousse AB	AC790022	27lb9oz	03/2017	03-2017	N/A	03/2017
28	S/M Auxiliaire arrière	Amerex	Mousse AB	AC641033	27lb9oz	03/2017	03/2015	N/A	03/2015
29	S/M Auxiliaire avant	Amerex	CO2 BC	AB881101	33lb6oz	03/2017	02/2016	N/A	02/2016
30	Cursive (S/C)	Amerex	Mousse AB	AC641015	27lb9oz	03/2017	03/2015	N/A	03/2015
	Kaeble 1	Strike First	Poudre ABC	BT-918474	8lb3oz	03/2017	06/2016		12/2013
	Kaeble 1	Pyrene	Poudre ABC	K-543915	8lb3oz	03/2017	06/2016		2009
	Kaeble 2	Pyrene	Poudre ABC	K-543720	8lb3oz	03/2017	02/2016		2010
	Kaeble 2	Pyrene	Poudre ABC	107660	8lb4oz	03/2017	02/2016		2016
	Z420	Orfeo	Poudre 1kg	3916407		03/2017	03/2017	03/2017	01-2010

#### Kb10.4.D Equipment supplied by owner

**Kb10.4.D.1** Unless otherwise indicated, the Contractor must supply all the material, equipment and parts necessary to perform the work in the specifications.

#### Kb10.4.E TECHNICAL DESCRIPTION

**Kb10.4.E.1** The Contractor shall remove the fire extinguishers in a sequence such that the number of fire extinguishers off the vessel is never more than a third of those that are on board. The Chief Engineer will determine the order in which the fire extinguishers shall leave the vessel.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb10.4		
SAFETY AND SECURITY EQUIPMENT PORTABLE FIRE EXTINGUISHERS INSPECTION		

**Kb10.4.E.2** An annual inspection of portable fire extinguishers must be performed. Fire extinguisher inspection and maintenance shall be entrusted to a qualified representative.

**Kb10.4.E.3** The Contractor must for a 3 year inspection of a foam fire extinguisher replace the foam

**Kb10.4.E.4** The Contractor must remove the fire extinguisher in a sequence that doesn't remove more than a third of fire extinguisher at the time. The chief engineer will chose the sequence for the fire extinguisher removal.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb10.4		
SAFETY AND SECURITY EQUIPMENT PORTABLE FIRE EXTINGUISHERS INSPECTION		

**Kb10.4.F      Annual inspection**

**Kb10.4.F.1**    The fire extinguishers must undergo a visual inspection at least once a year. This inspection involves turning the fire extinguishers upside down and shaking them, top down, in order to loosen the powder that they contain.

**Kb10.4.G      Preventive maintenance/Maintenance**

**Kb10.4.G.1**    Powder fire extinguisher: Every 6 years. Work done: Replacement of powder and verification of equipment's proper operation. A verification collar and a WHMIS label indicating the date of maintenance shall be affixed in accordance with the NFPA10 standard or newer.

**Kb10.4.G.2**    Water Fire Extinguisher, Type K, CO2: Every 5 years

**Kb10.4.H      Hydrostatic Test**

**Kb10.4.H.1**    This test involves confirming that the container is in good condition by subjecting it to a pressure determined by the manufacturer.

**Kb10.4.H.2**    Powder fire extinguisher : Every 12 years.

**Kb10.4.H.3**    Water Fire Extinguisher, Type K, CO2: Every 5 years

**Kb10.4.H.4**    When a fire extinguisher has been used, even partially, it must be refilled immediately. Note that a refill is not considered to be preventive maintenance.

**Kb10.4.I      Proof of Performance**

**Kb10.4.I.1**    Inspection

10.4.I.1.1    All work must be completed to the satisfaction of the Commanding Officer, the Chief Engineer or the person responsible for the vessel's maintenance.

**Kb10.4.I.2**    Testing

10.4.I.2.1    Fire extinguisher tests will be carried out in accordance with the rules of the Lloyd's Register classification society.

**Kb10.4.I.3**    Certification

10.4.I.3.1    The Contractor shall provide the Chief Engineer with two (2) paper copies of maintenance certificates along with the original. The Contractor must also

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb10.4		
SAFETY AND SECURITY EQUIPMENT PORTABLE FIRE EXTINGUISHERS INSPECTION		

send an electronic copy of all reports and certificates to the Vessel Maintenance Manager.

#### **Kb10.4.I.4** Deliverables

##### 10.4.I.4.1 Drawings/reports

10.4.I.4.2 The Contractor shall provide the Chief Engineer with two (2) paper copies of reports and checklists that explain in detail the work and necessary modifications. The Contractor shall also send an electronic copy of all reports to the person responsible for the vessel's maintenance before the end of the work period.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb10.5		
SAFETY AND SECURITY EQUIPMENT FIRE DETECTION SYSTEM		

## **KB10.5**      **FIRE DETECTION SYSTEM**

### **Kb10.5.A**      **SCOPE**

**Kb10.5.A.1** The purpose of this specification is to ensure that the Contractor retains the services of a licensed company to perform the annual inspection and certification of the fire detection system.

### **Kb10.5.B**      **ReFeRENCES**

Document	Title	Included Yes/No
Plan		
AF6095-55500-04_AF	FIRE CONTROL PLAN_Fr	yes
Publications		
Instruction Manual	Integrated fire detection system	
Instruction Manual	Fire Notifier NFS-320 fire detection system	
Standards		
MPO 5737	Fleet safety manual	
Regulations		
	Canada Shipping Act, 2001	

### **Kb10.5.C**      **Equipment supplied by owner**

**Kb10.5.C.1** Unless otherwise indicated, the Contractor must supply all the material, equipment and parts necessary to perform the work in the specifications.

### **Kb10.5.D**      **TECHNICAL DESCRIPTION**

#### **KB10.5.D.1** General

10.5.D.1.1 The vessel is equipped with a Techsol integrated fire detection system with a Fire Notifier NFS-320 panel. The Fire Notifier NFS-320 panel is connected to the integrated fire alarm system, which is part of the vessel's surveillance and alarm system.

10.5.D.1.2 Before work begins, the Contractor shall arrange for a visit from a Lloyd Register classification society inspector.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
<b>Kb10.5</b>		
<b>SAFETY AND SECURITY EQUIPMENT FIRE DETECTION SYSTEM</b>		

10.5.D.1.3 The Contractor shall retain the services of a licensed company to conduct the annual inspection and certification of the fire detection system.

10.5.D.1.4 The cost of repair services and parts will be adjusted up or down on form PWGSC-SPAC 1379.

**Kb10.5.D.2 Location**

10.5.D.2.1 The fire detection system control panel is found on the port side of the wheelhouse.

**Kb10.5.E PROOF OF PERFORMANCE**

**Kb10.5.E.1 Inspection**

10.5.E.1.1 All work shall be completed to the satisfaction of the Chief Engineer.

**Kb10.5.E.2 Certification**

10.5.E.2.1 The contractor shall submit to the Chief Engineer two (2) paper copies of the maintenance certificates and annual certification with their original copy. The Contractor shall also send an electronic copy of all the reports and certificates to the Project officer.

**Kb10.5.E.3 DELIVERABLES**

10.5.E.3.1 Drawings/reports

**Kb10.5.E.4** The Contractor shall submit to the Chief Engineer a hard copy of the typed report, detailing the inspections, modifications and repairs made, prior to acceptance of this item. The Contractor shall also send an electronic copy of all the reports and certificates to the Vessel Maintenance Manager. These documents must be submitted before the end of the work.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
<b>Kb10.6</b>		
<b>SAFETY AND SECURITY EQUIPMENT ANNUAL INSPECTION OF THE FIXED FIREFIGHTING SYSTEM</b>		

## **KB10.6 ANNUAL INSPECTION OF THE FIXED FIREFIGHTING SYSTEM**

### **Kb10.6.A SCOPE**

**Kb10.6.A.1** The purpose of this specification is to perform maintenance on and certify the fixed fire suppression system.

**Kb10.6.A.2** The Contractor shall communicate with the Chief Engineer before undertaking the work for this item. This work shall be performed in conjunction with the portable fire extinguisher maintenance without reducing the fire suppression capacity aboard the vessel.

**Kb10.6.A.3** The fixed fire suppression system is an FM200.

### **Kb10.6.B References**

Document	Title	Included Yes/No
Plan		
AF6095-55500-04_AF	FIRE CONTROL PLAN_Fr	yes
Publications		
90-FM200M-2	Kidde Fenwal FM200 Marine ECS series Engineered Fire Suppression System, Design, installation, Operation and Maintenance Manual	no
Standards		
MPO 5737	Fleet Safety Manual	
Regulations		
	Canada Shipping Act, 2001	

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
<b>Kb10.6</b>		
<b>SAFETY AND SECURITY EQUIPMENT ANNUAL INSPECTION OF THE FIXED FIREFIGHTING SYSTEM</b>		

**Kb10.6.C      Accreditation**

**Kb10.6.C.1**    The contractor must be accredited for the certification of this system by Lloyd's Registers and must certify to the most recent standard of Transport Canada.

**Kb10.6.D      Equipment supplied by owner**

**KB10.6.D.1**    Unless otherwise indicated, the Contractor must supply all the material, equipment and parts necessary to perform the work in the specifications

**Kb10.6.E      TECHNICAL DESCRIPTION**

**Kb10.6.E.1    General**

10.6.E.1.1    The contractor shall retain the services of an authorized representative who will conduct the tests and inspections of the vessel's FM200 system and galley fire system as part of the annual inspection and certification of this system. The Chief Engineer must attend all tests.

10.6.E.1.2    In addition to the following tests, the contractor shall conduct all tests required by the Lloyd's Register inspector on site. The contractor must provide in his estimate the cost for testing alarms (lights and sirens) of all devices, testing the nitrogen release cylinders, testing ventilation closure devices and the test for release buckles and cables.

10.6.E.1.3    The Contractor shall use air pressure to clean the pipes and pneumatic actuators and ensure that they work properly. The pipes and nozzles must be free of obstruction.

10.6.E.1.4    The contractor shall ensure that the alarm displays and sirens are working correctly. The contractor shall weigh each cylinder and record the results. At the end of the refit, the Contractor shall provide the Chief Engineer with copies of all certificates.

10.6.E.1.5    At the end of the tests and inspections, the contractor shall reinstall the systems and return them to service.

10.6.E.1.6    For the FM200 system a halocarbon leak detection test shall be performed by accredited personnel for halocarbons and shall be carried out with adequate detection equipment

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
<b>Kb10.6</b>		
<b>SAFETY AND SECURITY EQUIPMENT ANNUAL INSPECTION OF THE FIXED FIREFIGHTING SYSTEM</b>		

**Kb10.6.F      Security Bulletin**

**Kb10.6.F.1**    The contractor must make the modification to the system according to the bulletin of Kidde / 16-35K-3 Marine Owner.

**Kb10.6.F.2**    Control heads have been identified as part of the recall

**Kb10.6.G      FM 200 Hose replacement**

**Kb10.6.G.1**    The Contractor must replace all FM 200 hoses in the system.

**Kb10.6.H      PROOF OF PERFORMANCE**

**Kb10.6.H.1**    Inspection

10.6.H.1.1    All work shall be completed to the satisfaction of the Chief Engineer, the Vessel Maintenance Manager and the Lloyd's Register inspector.

**Kb10.6.H.2**    Tests

10.6.H.2.1    The Chief Engineer must be present for the system inspection and test.

**Kb10.6.I      Certification**

**Kb10.6.I.1**    The Contractor shall provide the Chief Engineer with two (2) paper copies of maintenance certificates along with the original. The Contractor must also send an electronic copy of all reports and certificates to the Vessel Maintenance Manager.

**Kb10.6.I.2**    For the FM200 a halocarbon leak test must be performed by accredited halocarbon personnel with adequate material. The Contractor must provide a certificate for the leak test. The certificate must show the technician certificate number.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
<b>Kb10.6</b>		
<b>SAFETY AND SECURITY EQUIPMENT ANNUAL INSPECTION OF THE FIXED FIREFIGHTING SYSTEM</b>		

### **Kb10.6.I.3 DELIVERABLES**

#### 10.6.I.3.1 Drawings/reports

10.6.I.3.2 The Contractor shall submit to the Chief Engineer a hard copy of the typed report, detailing the inspections, modifications and repairs made, prior to acceptance of this item. The Contractor must also send an electronic copy of all reports and certificates to the Vessel Maintenance Manager.

10.6.I.3.3 The Contractor must provide before the work begins a copy of the Lloyd's accreditation to work on the fire system.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb13.1		
Hull and structures N/A Annual Maintenance of Generator Alternators		

## **KB11    Hull and structures N/A**

## **KB12    Propulsion N/A**

## **KB13    Electrical Production**

### **KB13.1    ANNUAL    MAINTENANCE    OF    GENERATOR ALTERNATORS**

#### **Kb13.1.A    Scope**

**KB13.1.A.1** Perform the annual maintenance of port, starboard and emergency generator alternators.

#### **Kb13.1.B    References**

Document	Title	Included Yes/No
Plan		
Publications		
	Magnaplug Generator, 280-430 Frame, Installation, Operation and Maintenance Manual	
	Voltage Regulator AVC63-12 and AVC125-10 Manual	
Standards		
TP 127 E	Normes d'électricité régissant les navires	
Regulations		
	Lloyd's special Service Craft 2016	
	Loi sur la marine marchande du Canada, 2001	

#### **Kb13.1.C    Equipment supplied by owner**

**KB13.1.C.1** Unless otherwise indicated, the Contractor must supply all the material, equipment and parts necessary to perform the work in the specifications.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
0		
Electrical Production		

**Kb13.1.D      TECHNICAL DESCRIPTION**

**Kb13.1.D.1    General**

10.1.A.1.1 Check and record insulation resistance with a 500 megohm meter. The minimum acceptable reading is 2 megohms. All electronics (regulators, diodes, capacitors, protection relays) must be disconnected from the winding circuit before checking the insulation. If the reading is less than the minimum, the generator must be cleaned and dried at an authorized service shop.

10.1.A.1.2 Check the no load DC excitation voltage and check the RPM. Record the no load excitation (DC voltage at the excitation stator), the generator terminal voltage and the speed of the drive mechanism as benchmarks for future troubleshooting.

**Kb13.1.E      PROOF OF PERFORMANCE**

**Kb13.1.E.1    Inspection**

10.1.A.1.3 Work shall be completed to the satisfaction of the Chief Engineer.

10.1.A.1.4 Provide a report indicating the values measured and irregularities observed. The report must be given before the end of the work period.

**Kb13.1.E.2    DELIVERABLES**

10.1.A.1.5 Drawings/reports

10.1.A.1.6 The Contractor shall submit to the Chief Engineer a hard copy of the typed report, detailing the inspections, modifications and repairs made, prior to acceptance of this item. The Contractor must also send an electronic copy of all reports and certificates to the project officer. The report must be given before the end of the work period.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb14.1		
Electrical Distribution MAINTENANCE CIRCUIT BREAKERS		

## **KB14    Electrical Distribution**

### **KB14.1    MAINTENANCE CIRCUIT BREAKERS**

#### **Kb14.1.A    Scope**

**Kb14.1.A.1**    The vessel is 5 years old and must submit its circuit breakers for inspection to keep the installation safe

#### **Kb14.1.B    Reference**

1. TP127E, Ships Electrical Standards: <http://www.tc.gc.ca/eng/marinesafety/tp-tp127-menu-263.htm>
2. Lloyd's Rules and Regulations for the Classification of Special Service Craft, 2011
3. Techsol Drawing AF6095-32000-01 Schéma unifilaire
4. Fleet Safety and Security Manual (DFO/5737)
5. Canada Shipping Act 2001 – Marine Machinery Regulations.

#### **Kb14.1.C    Technical information**

Breakers are the following

item		modèle	identifiant		Nominal amp	Installation arrangement
1	ABB	SACE Tmax	P202	Shore power (A)	200 a	
2	ABB	SACE Tmax	P202	Shore power (B)	200 a	
3	ABB	SACE Tmax	2Q07	main tie breaker	225a	
4	ABB	SACE Tmax	E101	Emergency generator	125A	embroachable
5	ABB	SACE Tmax	P201	Stbd Generator	250 a	embroachable
6	ABB	SACE Tmax	P301	Port Generator	250 a	embroachable

table: 1: breaker maintenance list

**Kb14.1.C.1**    Service to remove circuit breakers in Sept-Iles and reinstall them. Circuit breakers cannot be removed at the same time to maintain electrical services for the crew.

**Kb14.1.C.2**    The Contractor is responsible for padlocking with his equipment

**Kb14.1.C.3**    The contractor is responsible for removing the breakers from the distribution panel

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb14.1		
Electrical Distribution MAINTENANCE CIRCUIT BREAKERS		

**Kb14.1.C.4** Primary injection test in workshop with inspector Lloyd's witnessed tests.

**Kb14.1.D** **MAINTENANCE OF CLOSED HOUSING TYPE CIRCUIT BREAKERS**  
**ITEM 1-2-3**

**Kb14.1.D.1** The Contractor must measure and report the contact resistance

**Kb14.1.D.2** The contractor must do the primary release test

**Kb14.1.E** **Electrical Component Maintenance For items 4-5 and 6**

- a) Clean the main and cutoff contacts;
- b) Inspect and replace as necessary all conductive parts (main contacts);
- c) Check the pressure of the main contacts and make adjustments if required;
- d) Clean and re-insulate the molded plastic parts surrounding the main contacts;
- e) Clean and re-insulate cut-off chambers;
- f) Clean and re-insulate all insulators;
- g) Test and clean all auxiliary contacts, replace if necessary;
- h) Clean and lubricate the electrical connection points at the back of the circuit breaker;
- i) Check and replace as necessary the spring loading motor brushes;
- j) Check the general condition of the internal wiring and replace the fasteners as needed;

**Kb14.1.F**

**Kb14.1.G** **Electrical tests**

- a) Check the operation of the protection unit;
- b) Check the operation and adjustment of the SHUNT trigger;
- (c) Measure the resistance of the main contacts;
- d) measure the insulation level of the electrical circuits;
- e) Check the operation of the spring loading motor;
- f) Check the operation of the low voltage trip relay (if applicable);
- g) Check the operation of the anti-surge relay (if applicable).

**Kb14.1.H** **Parts replacement**

If parts are defective or damaged and need to be replaced, the SPAC 1379 process will be used.

**Kb14.1.I** **Deliverables**

Trigger curve

Hard copy and electronic copy of the test report

Service report on maintenance performed

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
<b>Kb14.2</b>		
Electrical Distribution Check Tightness of the Power Supply Panel Connectors		

## **KB14.2 CHECK TIGHTNESS OF THE POWER SUPPLY PANEL CONNECTORS**

### **Kb14.2.A Scope**

**Kb14.2.A.1** Conduct a check of tightness of all terminals and connectors in the main panel for main distribution and emergency distribution.

### **Kb14.2.B Reference**

Document	Title	Inclus
Plan		
Publications		
Standards		
TP 127 F	Normes d'électricité régissant les navires	non
Regulations	Lloyd's special Service Craft 2016 Loi sur la marine marchande du Canada, 2001	

### **Kb14.2.C Equipment supplied by owner**

**Kb14.2.C.1** Unless otherwise indicated, the Contractor must supply all the material, equipment and parts necessary to perform the work in the specifications.

### **Kb14.2.D TECHNICAL DESCRIPTION**

#### **Kb14.2.D.1 General**

14.2.D.1.1 Completely isolate and secure each panel. Isolation of each panel shall be done by withdrawal of a physical element from the electrical network.

14.2.D.1.2 A minimum of current shall be maintained on board for safety purposes

14.2.D.1.3 Coordination of the work shall be done in collaboration with the Chief Engineer.

14.2.D.1.4 The contractor shall check all terminals, relays and attachments for electrical cables within the following cabinets

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb14.2		
Electrical Distribution Check Tightness of the Power Supply Panel Connectors		

- Main panel (including MCC and 600 volt distribution)
- Main emergency panels
- 600 volt power supply
- 240 volt power supply
- 120 volt power supply

14.2.D.1.5 The Contractor must check all power and control cables.

14.2.D.1.6 Bolting of main power supply bars shall be checked and tightened to the torque required by the standards in force. A permanent pen mark shall be made to indicate the bolting done

#### **Kb14.2.E      PROOF OF PERFORMANCE**

##### **Kb14.2.E.1              Inspection**

14.2.E.1.1 Work shall be completed to the satisfaction of the Chief Engineer.

14.2.E.1.2 Provide before the end of the work period a report indicating irregularities observed.

##### **Kb14.2.E.2      DELIVERABLES**

14.2.E.2.1 Drawings/reports

14.2.E.2.2 The Contractor shall submit to the Chief Engineer, before the end of the work period, a hard copy of the typed report, detailing the inspections, modifications and repairs made, and prior to acceptance of this item. The Contractor must also send an electronic copy of all reports and certificates to the Vessel Maintenance Manager.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb14.3		
Electrical Distribution Checking the insulation of various electrical components (MEGGER TEST)		

## **KB14.3      CHECKING THE INSULATION OF VARIOUS ELECTRICAL COMPONENTS (MEGGER TEST)**

### **Kb14.3.A      SCOPE**

**Kb14.3.A.1** Conduct insulation tests of various electrical components from the electrical generation (generator set) to the different components

### **Kb14.3.B      References**

Document	Title	Included Yes/No
Plan		
Publications		
Standards		
TP 127 F	Normes d'électricité régissant les navires : <a href="https://www.tc.gc.ca/fra/securitemaritime/tp-tp127-menu-263.htm">https://www.tc.gc.ca/fra/securitemaritime/tp-tp127-menu-263.htm</a>	
Regulations	Lloyd's special Service Craft 2016 Loi sur la marine marchande du Canada, 2001	

### **Kb14.3.C      Equipment supplied by owner**

**Kb14.3.C.1** Unless otherwise indicated, the Contractor must supply all the material, equipment and parts necessary to perform the work in the specifications. The Contractor must have an electrician with at a minimum a license C to complete the work.

### **Kb14.3.D      TECHNICAL DESCRIPTION**

#### **Kb14.3.D.1      General**

14.3.D.1.1 Conduct a ground leakage test on the different component

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb14.3		
Electrical Distribution Checking the insulation of various electrical components (MEGGER TEST)		

#### 14.3.D.1.2

Port generator set  
 Starboard generator set  
 Emergency generator set  
 Equipment connected to the 600v main distribution panels  
 Equipment connected to the 240v main distribution panels  
 Equipment connected to the 120v main distribution panels  
 Equipment connected to the 600v emergency distribution panels  
 Equipment connected to the 240v emergency distribution panels  
 Equipment connected to the 120v emergency distribution panels  
 Equipment connected to the 24v emergency distribution panels

### Kb14.3.E **PROOF OF PERFORMANCE**

#### **Kb14.3.E.1** Inspection

14.3.E.1.1 Work shall be completed to the satisfaction of the Chief Engineer.

14.3.E.1.2 Provide a report indicating irregularities observed and the values recorded.

#### **Kb14.3.E.2** DELIVERABLES

14.3.E.2.1 Drawings/reports

14.3.E.2.2 The Contractor shall submit to the Chief Engineer a hard copy of the typed report, detailing the inspections, modifications and repairs made, prior to acceptance of this item. The Contractor must also send an electronic copy of all reports and certificates to the project officer.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
<b>Kb14.4</b>		
<b>Electrical Distribution Removal Main switchboard buss tie Undervoltage trip</b>		

## **KB14.4      REMOVAL      MAIN      SWITCHBOARD      BUSS      TIE** **UNDERVOLTAGE TRIP**

### **Kb14.4.A      Scope**

**Kb14.4.A.1** The contractor shall disconnect and remove the UV tripping coil from the Main Switchboard Buss Tie Breaker identified as CB-TIE.

### **Kb14.4.B      Objective**

**Kb14.4.B.1** This buss tie breaker has no capability for generators to parallel across it. Should the 24VDC backup supply fail the system automatically opens this buss tie breaker and the operator must run two ships service generators to power up both halves of the buss. Under this control philosophy, to get back to single generator operation the operator must black out one half of the switchboard to close the Tie Breaker. Under certain conditions (Close Quarters Operations) this blackout operation may not permit the operator to get back to single generator operation without risk of an operational hazard. With the CB-Tie UV trip disabled the main buss functions as a normal switchboard and the Paralleling across the tie breaker is mitigated.

### **Kb14.4.B.2**

### **Kb14.4.C      Reference Documents**

TP127E, Ships Electrical Standards: <http://www.tc.gc.ca/eng/marinesafety/tp-tp127-menu-263.htm>  
Lloyd's Rules and Regulations for the Classification of Special Service Craft, 2011  
Techsol Drawing SB05AA  
Fleet Safety and Security Manual (DFO/5737)  
Canada Shipping Act 2001 – Marine Machinery Regulations.

### **Kb14.4.D      Scope of Work**

**Kb14.4.D.1** Contractor shall make arrangements with the Chief Engineer to remove the CB-TIE breaker (ABB #T3N225TW) from the switchboard. While the breaker is out the contractor shall do a general inspection of the breaker to ensure that it is in good working order. The contractor will then remove the UV trip coil and any related wiring that is not required. The breaker will be reassembled and installed into the switchboard.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
<b>Kb14.4</b>		
<b>Electrical Distribution Removal Main switchboard buss tie Undervoltage trip</b>		

**Kb14.4.D.2** The contractor shall complete a short trial to ensure that all switchboard generator paralleling functionality is normal. The contractor will then simulate a 24VDC backup supply failure and observe the switchboard operation. It is expected that the transformer breakers (2Q04, 3Q02, 2Q06, 3Q04) and emergency switchboard tie breakers (2Q05, 3Q03) will trip on the MSB. Breaker CB-Tie should remain closed. The engineer should then complete a manual ships service start up and put one generator on the board and observe the response. If all is normal then the job is complete.

**Kb14.4.E      Lock Out/Tag Out**

**Kb14.4.E.1** The Contractor shall install and remove locks and tags as required for the performance of this specification item. The Chief Engineer or Designate will assist the Contractor in identifying the appropriate electrical isolations. The Contractor shall supply and install their own locking devices and retain all keys during the performance of this specification item. Upon completion of all work the Chief Engineer or Designate shall be in attendance when all locks/tags are removed.

**Kb14.4.F      Proof Of Performance**

**Kb14.4.F.1** All work shall be subject to witness by the Chief Engineer or delegate.

**Kb14.4.G      Deliverables**

**Kb14.4.G.1      5.1** - The Contractor shall provide the Chief Engineer with a technical report outlining the results of the work procedures completed. Any anomalies or defects/damage identified during the testing and inspection will be discussed and where possible the Contractor shall provide recommendation(s) for repairs where required.

**Lb10.1.A.2** In the event that defects / anomalies have been identified, the Contractor shall provide the Owner with a cost and time estimate for each issue to affect the necessary repairs and shall also indicate the timeline in which such repairs should be completed.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb17.1		
Auxiliary Systems NA HYDRAULIC SYSTEM FLOW METER INSTALLATION		

**Kb14.4.G.2** All test results, reports, and recommendations shall be supplied to the Owner within ten (10) working days upon completion of the work in both electronic and hardcopy formats.

## **KB15    Auxiliary Systems NA**

## **KB16    Domestic Systems NA**

## **KB17    Deck Equipment**

### **KB17.1    HYDRAULIC SYSTEM FLOW METER INSTALLATION**

#### **Kb17.1.A**    **scope**

**Kb17.1.A.1** The Contractor must install two Coast Guard supplied full flow hydraulic flow meters in the supply lines to the bow thruster and crane hydraulic piping circuits on the MSPV's.

#### **Kb17.1.A.2** Equipment Data

- System Specifications
- Supplied flow: 84 GPM max
- Operating Pressure: 4,000 PSI max
- Oil Capacity: 150 US Gal (570 liters)
- Recommended oil: ISO VG 32 Oil

**Kb17.1.A.3** There are 2 (two) hydraulic pumps mounted on each main engine gearbox turning at engine speeds of 1000 to 2100 RPM. Pumps are variable displacement, axial piston type with load sensing controls. Pumps are sized to meet requirements of operating the Bow Thruster from 2 Main Engines at 1000 RPM or 1 Main Engine at 2100 RPM. Output from each pump is directed to a distribution manifold from where flow to hydraulic oil users is provided via directional control valves that are controlled from the bridge and the number of hydraulic oil users is dependent on the mode of operation selected.

**Kb17.1.A.4** Depending on the task required, the ship could be using 1 or 2 main engines to satisfy the working requirements of the specific mode of operation. Operational Modes (Note: GPM values are theoretical and as per manufacture's recommendations.)

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb17.1		
Deck Equipment HYDRAULIC SYSTEM FLOW METER INSTALLATION		

Mode	Enabled Functions	Total Flow (GPM)
<b>Boat Handling</b>	Crane and Bow Thruster	74
<b>Mooring/Anchor/Towing</b>	Capstan, Windlass, Bow Thruster, Towline Reel	68
<b>Fishing</b>	Net/Crab Pot Hauler, Crane and Bow Thruster	73
<b>Bow Thruster</b>	Bow Thruster	49
<b>Alongside</b>	Capstan, Windlass, Crane	32

#### Drawings

Drawing Number	Description
AF8400020 sht1	Schematic plans of hydraulic system for bow thruster, capstan, tow line reel, crab hauler and crane
AF 8400020 sht2	Schematic plans of hydraulic system for bow thruster, capstan, tow line reel, crab hauler and crane

#### Kb17.1.B **Technical**

**Kb17.1.B.1** The Contractor must ensure that all applicable safety precautions including equipment lock outs and tag outs, as per the Fleet Safety Management System, are implemented prior to the start of work.

**Kb17.1.B.2** The Contractor, using a proper lock out/tag out procedure, must isolate the supply power at the main switchboard. Where deemed necessary the Contractor and Chief Engineer must place their own locks so breakers remain isolated by means of two different locks.

**Kb17.1.B.3** The Contractor must also lock out/tag out the hydraulic power unit (HPU) such that the HPU remains isolated from the system while the piping is modified.

**Kb17.1.B.4** The Contractor in conjunction with TA to determine the best suitable place for flow meters installation, keeping in mind the following: ease of accessibility for servicing/ observation/removal based on the piping configuration and adjacent system proximities.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb17.1		
Deck Equipment HYDRAULIC SYSTEM FLOW METER INSTALLATION		

**Kb17.1.B.5** The Contractor must drain, contain and dispose of the hydraulic oil from the isolated “Crane” and “Bow Thruster” piping branches. Disposal of used oil must be in accordance with federal, provincial and municipal regulations in effect.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb17.1		
Deck Equipment HYDRAULIC SYSTEM FLOW METER INSTALLATION		

**Kb17.1.B.6** The Contractor and Chief Engineer must jointly identify the sections of the piping to be removed to drain the system branches.

**Kb17.1.B.7** Flow meter technical data is identified in the document Hedland-variable liquid flow meter manual.

**Kb17.1.B.8** Flow meters shall be installed in horizontal position.

**Kb17.1.B.9** The Contractor must source and provide proper hydraulic fittings (as per system max. working parameters) to accommodate opening ports on the flow meters, which are 1 1/4" SAE 20 for inlet and outlet. Fitting to be of Stainless Steel with max. pressure rating of 6000 psi.

**Kb17.1.B.10** Note: piping from HPU to crane: Tube, steel, DN 32, 38mm x 3mm, WT DIN2391, ST 35 BK, Max. pressure rating 207 bar.

**Kb17.1.B.11** Note: piping from HPU to B/T: pipe, A106GR B , 1-1/2" sch40

**Kb17.1.B.12** max pressure 17 bar

**Kb17.1.B.13** Method of connecting the flowmeter to the main hydraulic lines (welding or threaded connection) to be discussed between TA, IA and the contractor. The contractor must provide the connections between the flowmeter and the existing piping.

**Kb17.1.B.14** The Contractor must manufacture and install 2 (two) support brackets for each flow meter. Brackets must be placed on both sides of the flow meter, within 2" distance from the fittings installed to effectively support the flow meter weight and avoid vibration.

**Kb17.1.C** **Proof of Performance**

**Kb17.1.C.1** Inspections

**Kb17.1.C.2** The Contractor must afford the TA the opportunity to inspect the completed work prior to performing any system tests.

**Kb17.1.D** **Testing/Trials**

**Kb17.1.D.1** The Contractor must install the flow meters, re-assemble the hydraulic system to its original condition and confirm system integrity, cleanliness and no leaks from any of the re-worked section of piping. The Contractor must perform a system test to ensure that flow direction is correct in both flow meters and that they are recording flow rates.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb17.1		
Deck Equipment HYDRAULIC SYSTEM FLOW METER INSTALLATION		

Kb17.1.E **Deliverables**

**Kb17.1.E.1** The Contractor must provide updated “As-Fitted” drawings of the hydraulic system schematic showing the exact installation of the new flow meters installed and any additional fittings installed in the system as a result of this installation. The Contractor shall provide an electronic copy of the updated drawing in AutoCad native DWG format version 2010 or later that must not be password protected. The drawing must be supplied to the TA prior to the close of the contract on a USB stick.



Figure 1: flow meter installation locion

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb17.2		
Deck Equipment Crane inspection		

## **KB17.2**      **CRANE INSPECTION**

### **Kb17.2.A**      **Scope**

**Kb17.2.A.1**    The crane must undergo a 5 year load test.

### **Kb17.2.B**      **Reference**

**Kb17.2.B.1**    Technical manual marine crane model Tb-10-23

### **Kb17.2.C**      **Technical information**

**Kb17.2.C.1**    The Contractor must perform the yearly maintenance on the crane. This maintenance is described in the technical manual and includes

**Kb17.2.C.2**    The Contractor must provide all fluids and oils for the required oil changes, fluid information found in crane manual section table 6.1 lubricant specifications.

17.2.C.2.1    Check swing bearing wear

17.2.C.2.2    If wear is outside range the chief engineer must be notified and repairs will be conducted through PWGSC 1379 process.

17.2.C.2.3    Inspect sheaves

17.2.C.2.4    If wear is outside range the chief engineer must be notified and repairs will be conducted through PWGSC 1379 process.

17.2.C.2.5    Change fluid in swing drive gear reducer.

17.2.C.2.6    Change fluid in the CT winch

17.2.C.2.7    Perform a load test on the crane.

a) The Contractor must provide proof of Lloyd's certification to provide service on the ship's crane.

**Kb17.2.C.3**    The Contractor must change all the hydraulic hoses with hoses supplied by Government.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb17.2		
Deck Equipment Crane inspection		

**Kb17.2.C.4** Here is a list of the hoses to be changed

Item no.	Qty	Size of End	Size of End	Hose diameter	Minimum service pressure resistance	Overall length in inches
1	1	SS 20FR	SS 20FR	1 ¼"	3000 Psi	42
2	2	8FR	8FR	1/2"	3000 Psi	198
3	1	SS20FR	SS 20FRB	1 ¼"	3000 Psi	55
4	1	SS16FR	SS 16FRB	1"	4000 Psi	130
5	1	SS 16FR	SS 16FHB	1"	4000 Psi	146
6	1	SS6FR	SS 6FR	3/8"	3000 Psi	321
7	1	SS 10FR	SS 10FRB	5/8"	3000 Psi	23
8	1	SS 10FR	SS 10FR	5/8"	3000 Psi	27
9	1	SS 10FR	SS 10FR	5/8"	3000 Psi	36
10	1	SS 10FR	SS 10FRB	5/8"	3000 Psi	48
11	2	SS 4FR	SS 4FR	1/4"	3000 Psi	19
12	1	SS6FR	SS 6FR	3/8"	3000 Psi	60
13	1	SS 16FR	SS 16FRB	1"	3000 Psi	32
14	1	SS 4FR	SS 4FR	1/4"	3000 Psi	38
15	1	SS 16FR	SS 16FR	1"	3000 Psi	147
16	1	SS 16FR	SS 16FR	1"	3000 Psi	142
17	2	SS 12FR	SS 12FR	3/4"	3000 Psi	120
18	2	SS 12FR	SS 12FR	3/4"	3000 Psi	64
19	2	SS 8FR	SS 8FR	1/2"	3000 Psi	80

**Kb17.2.C.5** The Contractor must coordinate a Lloyd's register visit to demonstrate a load test of the crane.

**Kb17.2.C.6** In addition to the item change the oil in the CT winch the contractor must do a flush of the CT winch.

**Kb17.2.D** **Proof of performance**

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
<b>Kb17.2</b>		
<b>Deck Equipment Crane inspection</b>		

**Kb17.2.D.1** The Contractor must perform a test run of the unit to prove no hydraulic leaks are present.

**Kb17.2.E      Deliverables**

17.2.E.1.1 The Contractor shall submit to the Chief Engineer a hard copy of the typed report, detailing the inspections, modifications and repairs made, prior to acceptance of this item. The Contractor must also send an electronic copy of all reports and certificates to the project officer.

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb18.1		
COMMUNICATION AND NAVIGATION SYSTEMS INSPECTION OF THE VESSEL’S RADIO		

## **KB18      COMMUNICATION AND NAVIGATION** **SYSTEMS**

### **KB18.1      INSPECTION OF THE VESSEL'S RADIO**

**Kb18.1.A.1** Provide a lump-sum price for inspecting the vessel's radio. The price shall include the cost of transport, accommodation and subsistence. Provide a fee schedule in case there is additional work.

**Kb18.1.A.2** Provide material and labour for inspecting the radio so that a checklist can be supplied for obtaining a radio inspection certificate from the Lloyd Register classification society. The zones covered must be for the Canadian coastlines and the Great Lakes Basin, in accordance with the *Ship Station (Radio) Technical Regulations, 1999*.

**Kb18.1.A.3** The radio checklist is to be given before the end of the work period to the crew and an electronic copy sent to the technical authority.

**Kb18.1.A.4** The GMDSS battery test shall be 8 hours.

**Kb18.1.A.5** The Contractor must provide proof that Lloyd Register has authorized the Contractor to do the work.

#### **Kb18.1.B      List and type of the Vessel's Radios :**

Radio	Model	Fabricant	Note
VHF Radiotelephone #1	RT-5022	Sailor	
VHF Radiotelephone #2	RT-5022	Sailor	
MF Radio #1	Series 5000	Sailor	
INMARSAT SES	TT-3606E	Sailor	
NAVTEX	NX-700	Furund	
SART #1	TRON SART20	Jotron	
SART #2	TRON SART20	Jotron	
EPIRB	TRON 40SMK11	Jotron	Registration # : A78D406774002E5
VHF DF	OAR4400	Cubic	
VHF #1 (portable)	SP3520	Sailor	
VHF #2 (portable)	SP3520	Sailor	
VHF #3 (portable)	SP3520	Sailor	
Radar #1	Visionmaster	Sperry	

Spec Item:	Spec number: 3774-17IN515	TCMS Field #:
Kb18.1		
COMMUNICATION AND NAVIGATION SYSTEMS INSPECTION OF THE VESSEL’S RADIO		

Radar #2	Visionmaster	Sperry	
Reciever for global navigation satellite systems and terrestrial radionavigation systems	GPS SAAB R4	SAAB	
AIS	AIS R4	SAAB	