

3 monthly maintenance worklist

## CO-2 DRILL

Print date: 2007-12-09 Due date: 2006-10-13 Last done: Finish date: 2006-10-13

<b>Job Class:</b>	<b>Job Type:</b>	<b>Resp. dept.:</b>	<b>Priority:</b>	<b>Interval:</b>	<b>Duration:</b>	<b>Float:</b>
Safety/Quality/Environmental	Education	Engine	Non critical	3 Month		

**Tech. Acc.:** 156.17 - CO-2 DRILL  
**Reference:**

<b>Model:</b>	<b>Maker:</b>	<b>Makers No.:</b>	<b>Serial No.:</b>	<b>Location:</b>
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### Instructions:

This job replaces QMCF7\_S.

### Instructions:

**Every (3) three months** the system should be tested in the following way.

Prior starting on the test of the CO2 System, stress and explain on the following safety procedures of:

- a) recognition of CO2 Alarm and evacuation routes from E/Rm and Cargo Holds
- b) a quick effective head count to be taken at Muster Station
- c) ensure shutting of doors, opening hatches, vents fan dampers for affected compartment.
- d) in case of engine room fire, the activation of quick shut valves for fuel oil tanks and lub oil tanks in the engine room

### TEST

1. Close main stop valves on the CO-2 tanks so that no liquid CO-2 can run out of the vessel. NB!! (2) two valves, (2) two tanks.
2. Make a release test as described in the release instructions in section "release to engine room-release from master control unit", thereafter check that all alarm signals and valves function satisfactorily.

Engineers and Officers shall

- a) be familiarized with the correct operational procedures of "re-release" of CO2 to the engine if required.
- b) be aware that the **6" Pressure Operated Valve (4A) will close automatically after the calculated release time of 2 minutes 40 secs.**
- c) be aware of emergency requirements for the operation of the **Valve 14 - " the emergency pilot valve for main valve"**

3. Resetting as described in section "clearing after release"

4. Make a release test as described in the release instructions in section "release from CO-2 room". Thereafter check that all alarm signals and valves function. /

5. Resetting of the system.

6. Make a release test to each of the deck zones from the remote release unit or from the CO-2 room. There after check that all alarm signals and valve functions. i

7. After the testing of each deck zone: resetting.
8. Upon completion of all tests, open two main stop valves for the two (2) CO2 Tanks and the system will again be ready for action.
9. Every (3) three months all nozzles should be blown through by means of compressed air through the 3/4" blow-through connection in the CO-2 room.
- (a) Blowing through of nozzles to engine room.
- (b) Blowing through of nozzles to each deck zone.
- All valves on the CO-2 tanks units to remain in there normal positions.
- NB! Can only be made when the deck zone are empty. (no cargo)
- NB! Don't forget to start engine room fans as soon as possible.

**Resources needed:**

Res. Id	Name	Est. qty	Est. hours	Used hours
DOF1	CHIEF OFFICER	1,0		1,0
ENOF	ENGINE OFFICER	5,0		2,0

**WORK REPORT:**

Done no remarks.

Test CO2 bottle to be changed empty after test.

Air blow of cargo holed loops to be done after Australia.

Approved by:  
Date:  
Sign.:

Done by:  
Date:  
Sign.:

## CO-2 DRILL

Print date: 2007-12-09 Due date: 2007-09-04 Last done: 2007-06-04 Finish date:

Job Id: 156.17/QM

<b>Job Class:</b>	<b>Job Type:</b>	<b>Resp. dept.:</b>	<b>Priority:</b>	<b>Interval:</b>	<b>Duration:</b>	<b>Float:</b>
Safety/Quality/Environmental	Education	Engine	1 Low	3 Month		

**Tech. Acc.:** 156.17 - CO-2 DRILL  
**Reference:**

<b>Model:</b>	<b>Maker:</b>	<b>Makers No.:</b>	<b>Serial No.:</b>	<b>Location:</b>
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### Instructions:

This job replaces QMCF7\_S.

### Instructions:

**Every (3) three months** the system should be tested in the following way.

Prior starting on the test of the CO2 System, stress and explain on the following safety procedures of:

- a) recognition of CO2 Alarm and evacuation routes from E/Rm and Cargo Holds
- b) a quick effective head count to be taken at Muster Station
- c) ensure shutting of doors, opening hatches, vents fan dampers for affected compartment.
- d) in case of engine room fire, the activation of quick shut valves for fuel oil tanks and lub oil tanks in the engine room

### TEST

1. Close main stop valves on the CO-2 tanks so that no liquid CO-2 can run out of the vessel. NB!! (2) two valves, (2) two tanks.
2. Make a release test as described in the release instructions in section "release to engine room-release from master control unit", thereafter check that all alarm signals and valves function satisfactorily.

Engineers and Officers shall

- a) be familiarized with the correct operational procedures of "re-release" of CO2 to the engine if required.
- b) be aware **that the 6" Pressure Operated Valve (4A) will close automatically after the calculated release time of 2 minutes 40 secs.**
- c) be aware of emergency requirements for the operation of the **Valve 14 - " the emergency pilot valve for main valve"**

3. Resetting as described in section "clearing after release"

4. Make a release test as described in the release instructions in section "release from CO-2 room". Thereafter check that all alarm signals and valves function.

5. Resetting of the system.

6. Make a release test to each of the deck zones from the remote release unit or from the CO-2 room. There after check that all alarm signals and valve functions.

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9. Every (3) three months all nozzles should be blown through by means of compressed air through the 3/4" blow-through connection in the CO-2 room.
- (a) Blowing through of nozzles to engine room.
- (b) Blowing through of nozzles to each deck zone.
- All valves on the CO-2 tanks units to remain in there normal positions.
- NB! Can only be made when the deck zone are empty. (no cargo)
- NB! Don't forget to start engine room fans as soon as possible.

**Resources needed:**

Res. Id	Name	Est. qty	Est. hours	Used hours
ENOF	ENGINE OFFICER	1,0		

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**WORK REPORT:**

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Approved by:  
Date:  
Sign.:

Done by:  
Date:  
Sign.:

## Survey CO2 Low pressure system

Print date: 2008-02-06 Due date: 2007-06-04 Last done: Finish date: 2007-06-04

**Job Class:** Class & authority relations  
**Job Type:** Survey  
**Resp. dept.:** Engine  
**Priority:** 1 Low  
**Interval:** 2 Year  
**Duration:**  
**Float:**

**Tech. Acc.:** 815.01 - CO2 LOW PRESSURE SYSTEM  
**Reference:** 4224-3

**Model:** **Maker:** **Makers No.:** **Serial No.:** **Location:**

### Instructions:

Second year INSP. BY AUTHORIZED FIRM.  
 SERVICE AGEEMENT WITH GINGE(UNITOR)

### Resources needed:

Res. Id	Name	Est. qty	Est. hours	Used hours
XXCL	CLASS PERSONAL	1,0		

### WORK REPORT:

Done bu UNITOR Bremerhafen

Approved by:  
 Date:  
 Sign.:

Done by:  
 Date:  
 Sign.:

## Survey CO2 Plan control system

Print date: 2008-02-06 Due date: 2006-07-08 Last done: Finish date: 2006-07-08

**Job Class:**            **Job Type:**            **Resp. dept.:**            **Priority:**            **Interval:**            **Duration:**            **Float:**  
 Class & authority    Survey            Engine            Non critical            2 Year

**Tech. Acc.:**    815.90 - CO2 PLANT CONTROL SYSTEM  
**Reference:**    4290

**Model:**                            **Maker:**                            **Makers No.:**                            **Serial No.:**                            **Location:**

### Instructions:

Check weight of bottles, actuators, ventilation stop and start.  
 Yearly inspection by authorised firm.  
 Service agreement with Ginge (Unitor).

### Resources needed:

Res. Id	Name	Est. qty	Est. hours	Used hours
XXCL	CLASS PERSONAL	1,0		

### WORK REPORT:

Done in drydock June 2006

Approved by:  
 Date:  
 Sign.:

Done by:  
 Date:  
 Sign.:

Inspection report from Bremerhaven

# UNITOR®

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# Certificate of Inspection

Date: 2007-06-04	Name of ship/unit: FIGARO	IMO No.: 7917563	Flag: SGP	Certificate No.: HAM/2007/316
Resp. office: HAMBURG	Service station: HAMBURG	Place of service: BREMERHAVEN	Class. society LR	PL No.: 310207943

We hereby certify that the systems and equipment specified below have been inspected and serviced.  
The chart reference states the letter code of relevant enclosed Service charts.

Comments to all Service Charts are summarized on Service Chart S - 'Summary of actions' where Performed/Recommended, Maintenance, Repair & Replacement are specified.

This Certificate is valid only when the Certificate and defined ServiceCharts are duly signed and stamped by UNITOR.

"The Unitor Quality Management System covering the execution of this service is certified according to NS-EN ISO 9001:2000".

NAME	CHART	SERVICE TYPE
CO2 LOW PRESSURE SYSTEM	C	Complete check



UNITOR STAMP AND SIGNATURE

K BEHRMANN

Date:	Name of ship/unit:	IMO No.:	Certificate No.:
2007-06-04	FIGARO	7917563	HAM/2007/316

### Technical Description:

No	Text	Value
1	Manufacturer	GINGE
2	No. of tanks	2
3	Tank capacity (tons), if more than one tank - biggest tank.	23.5
4	No of pilot cyls.	2
5	Pilot cyl. capacity	2 KG CO2
6	No. of dist. lines	5
7	Covering	ENGRM,CARGOHOLD
8	Plant no	1

### Description of Inspection/Tests:

No	Description	Carried out	Not carried	Not appl.	Comm.
1	Close and secure service valve and check that all distribution valves are closed	X			
2	Check correct function of level indicator	X			
3	Contents of Co2 tank checked by tank level indicator	X			
4	Contents of Co2 tank checked by riser tube reading	X			
5	Contents of Co2 tank checked by level control valve	X			
6	Contents of pilot cylinders checked	X			
7	Start/stop function of cooling compressors tested	X			
8	Extended inspection refrigeration system checked according to separate report		X		
9	Test alarm central as per makers specification for high and low level alarm	X			
10	Test alarm central as per makers specification for leaks through relief-valves			X	
11	Main valve inspected	X			
12	Main valve tested	X			
13	Distribution valves inspected	X			
14	Distribution valves tested	X			
15	Release stations inspected	X			
16	Total flooding release mechanism inspected	X			
17	Total flooding release mechanism tested	X			
18	Alarm functions tested	X			
19	Fan stop functions tested		X		
20	Distribution lines and nozzles inspected	X			
21	Distribution lines and nozzles tested		X		
22	Distribution lines and nozzles blown through		X		
23	All doors, hinges, locks and instruction plates on installation inspected	X			
24	Smoke detection system tested according to Service Chart L			X	
25	Service valve opened and secured in an open position	X			
26	System reconnected, sealed and left in operational order, inspection date labels attached	X			



UNITOR STAMP AND SIGNATURE

IMO MSC Circ 850

INTERNATIONAL MARITIME ORGANIZATION

4 ALBERT EMBANKMENT  
LONDON SE1 7SR

Telephone: 0171-735 7611  
Fax: 0171-587 3210  
Telex: 23588 IMOLDN G



*E*

Ref. T4/4.03

MSC/Circ.850  
8 June 1998

**GUIDELINES FOR THE MAINTENANCE AND INSPECTION OF  
FIRE-PROTECTION SYSTEMS AND APPLIANCES**

1 The Maritime Safety Committee, at its sixty-ninth session (11 to 20 May 1998), recognizing the importance of proper maintenance and inspection of fire-protection systems and appliances, approved Guidelines for the maintenance and inspection of fire-protection systems and appliances, as set out in the annex.

2 Member Governments are invited to bring the annexed Guidelines to the attention of shipowners, shipmasters, ships' officers and crew and all other parties concerned.

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**ANNEX****GUIDELINES FOR THE MAINTENANCE AND INSPECTION OF  
FIRE-PROTECTION SYSTEMS AND APPLIANCES****1 Application**

These Guidelines apply to all ships, however it does not contain an exhaustive list of maintenance items and should be used as a recommendation only.

**2 Operational readiness**

All fire protection systems and appliances should at all times be in good order and available for immediate use while the ship is in service. If a fire protection system is under repair, then suitable arrangements should be made to ensure safety is not diminished.

**3 Maintenance and testing**

Instructions for on-board maintenance, not necessarily by the ship's crew, and testing of active and passive fire protection systems and appliances should be easily understood, illustrated wherever possible, and, as appropriate, should include the following for each system or appliance:

- .1 maintenance and repair instructions;
- .2 schedule of periodic maintenance;
- .3 list of replaceable parts; and
- .4 log for records of inspections and maintenance, listing identified non-conformities and their targeted completion dates.

**4 Weekly testing and inspections**

Weekly inspections should be carried out to ensure that:

- .1 all public address systems and general alarm systems are functioning properly; and
- .2 breathing apparatus cylinders do not present leakages.

**5 Monthly testing and inspections**

Monthly inspections should be carried out to ensure that:

- .1 all fireman's outfits, fire extinguishers, fire hydrants, hose and nozzles are in place, properly arranged, and are in proper condition;
- .2 all fixed fire-fighting system stop valves are in the proper open or closed position, dry pipe sprinkler systems have appropriate pressures as indicated by gauges;
- .3 sprinkler system pressure tanks have correct levels of water as indicated by glass gauges;
- .4 all sprinkler system pumps automatically operate on reduction of pressure in the systems;

- .5 all fire pumps are operated; and
- .6 all fixed fire-extinguishing installation using extinguishing gas are free from leakage.

## **6 Quarterly testing and inspections**

Quarterly inspections should be carried out to ensure that:

- .1 all automatic alarms for the sprinkler systems are tested using the test valves for each section;
- .2 the international shore connection is in proper condition;
- .3 lockers providing storage for fire-fighting equipment contain proper inventory and equipment is in proper condition;
- .4 all fire doors and fire dampers are tested for local operation; and
- .5 all CO<sub>2</sub> bottle connections for cable operating system clips should be checked for tightness on fixed fire-extinguishing installations.

## **7 Annual testing and inspections**

Annual inspections should be carried out to ensure that:

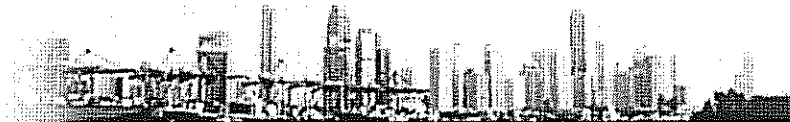
- .1 all fire extinguishers are checked for proper location, charging pressure, and condition;
- .2 fire detection systems are tested for proper operation, as appropriate;
- .3 all fire doors and dampers are tested for remote operation;
- .4 all foam-water and water-spray fixed fire-fighting systems are tested for operation;
- .5 all accessible components of fixed fire-fighting systems are visually inspected for proper condition;
- .6 all fire pumps, including sprinkler system pumps, are flow tested for proper pressures and flows;
- .7 all hydrants are tested for operation;
- .8 all antifreeze systems are tested for proper solutions;
- .9 sprinkler system connections from the ship's fire main are tested for operation;
- .10 all fire hoses are hydrostatically tested;
- .11 breathing apparatus air recharging systems checked for air quality;
- .12 control valves of fixed fire-fighting systems should be inspected; and
- .13 air should be blown through the piping of extinguishing gas systems.

## **8 Five-year service**

At least once every five years, the following inspections and tests should be carried out:

- .1 hydrostatic testing for all SCBA's cylinders; and
  - .2 control valves of fixed fire-fighting systems should be internally inspected.
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Singapore MPA Circular 28 of 2006

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No. 28 of 2006

23-11-2006

**MAINTENANCE, TESTING AND INSPECTION OF FIRE-PROTECTION SYSTEMS AND FIRE-FIGHTING SYSTEMS AND APPLIANCES (REVISED)**

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**Applicable to:** This circular is for the attention of shipowners, shipmanagers, masters and officers of Singapore-flag ships.

*Introduction*

This circular revises Shipping Circular No. 4 of 2003, in that changes are made to paragraph 5(c)(vi) (Low pressure fixed CO2 fire extinguishing installation). Further, all fixed halon fire extinguishing installations shall follow the same maintenance regime as low pressure fixed CO2 fire extinguishing installations. Shipping Circular No. 4 of 2003 is hereby cancelled.

*Maintenance, testing and inspection of fire-protection systems and fire-fighting systems and appliances*

1 Regulation II-2/14.2.2 (Maintenance, testing and inspections) of the 2000 SOLAS Amendments requires maintenance, testing and inspections to be carried out based on MSC/Circ.850 (Guidelines for the Maintenance and Inspection of Fire-protection Systems and Appliances) dated 8 June 1998.

2 A copy of MSC/Circ.850 can be found in MPA's website under "other notices" at: [www.mpa.gov.sg/circulars\\_and\\_notices/shipping\\_notices/sp\\_notices.htm](http://www.mpa.gov.sg/circulars_and_notices/shipping_notices/sp_notices.htm)

3 The maintenance plan should include, but not limited to, the following fire protection systems and fire-fighting systems and appliances, where installed:

- (a) fire mains, fire pumps and hydrants including hoses, nozzles and international shore connections;
- (b) fixed fire detection and fire alarm systems;
- (c) fixed fire-extinguishing systems and other fire extinguishing appliances;
- (d) automatic sprinkler, fire detection and fire alarm systems;
- (e) ventilation systems including fire and smoke dampers, fans and their controls;
- (f) emergency shut down of fuel supply;
- (g) fire doors including their controls;
- (h) general emergency alarm systems;
- (i) emergency escape breathing devices;
- (j) portable fire extinguishers including spare charges; and
- (k) fireman's outfit.

4 In addition to the fire protection systems and appliances listed in paragraph 3, passenger ships are also required to develop a maintenance plan for low-location lighting and public address systems.

5 In addition to the fire protection systems and appliances listed in paragraph 3, tankers are required to develop a maintenance plan for:

- (a) inert gas systems;
- (b) deck foam systems;
- (c) fire safety arrangements in cargo pump rooms; and
- (d) flammable gas detectors.

6 The following are supplementary to the guidelines in MSC/Circ.850:

(a) Portable fire extinguishers

- (i) Portable fire extinguishers should be examined annually by a competent person;
- (ii) Each portable fire extinguisher should be provided with a label indicating that it has been examined and the date of examination;
- (iii) Containers of permanently pressurized portable fire extinguishers and propellant bottles/containers of non-pressurized portable fire extinguishers should be hydraulically pressure tested as follows:

- powder extinguishers every 10 years;
- CO2 extinguishers every 10 years; and
- Other extinguishers every 10 years;

(b) Fixed high pressure CO2 fire extinguishing installation

(i) CO2 bottles of fixed CO2 fire extinguishing installation should be hydraulic pressure tested 20 years after the date on which the bottles were put into use, and every 5 years thereafter;

(ii) The quantity of the medium in the CO2 bottles should be checked once every 4 years. This may be carried out in batches of 25% of the CO2 bottles annually, or 50% of the CO2 bottles biennially or in accordance with the ship's maintenance so long as every CO2 bottle is checked once every 4 years;

(iii) All stop valves should be checked monthly to ensure that they are in their proper open or closed position;

(iv) The installation should be checked monthly for leakage;

(v) All CO2 bottle connections for cable operating system clips should be checked for tightness every 3 months;

(vi) All control valves should be inspected annually, and internally inspected every 5 years; and

(vii) Air should be blown through the piping of the installation annually.

(c) Low pressure fixed CO2 and halon fire extinguishing installations

(i) The tanks, together with fittings shall be inspected externally every 5 years;

(ii) At the external inspection, insulation material of the tank at points showing signs of possible corrosion/deterioration of the tank beneath shall be removed to facilitate the external inspection;

(iii) Pipes and valves at transitional points between insulated and uninsulated areas (cold-conductors) as well as tank supports, flange sockets and valves shall be included in the 5-yearly external inspection;

(iv) The external inspection shall also include maintenance inspection stipulated in the manufacturer's operation and maintenance manual;

(v) At least once a year, a thorough external inspection of the tank supports, flange sockets and valves mentioned in (c) shall be carried out;

(vi) No internal inspection is necessary unless the external inspection mentioned in (i) of this paragraph reveals corrosion or other defects which warrant an internal inspection;

(vii) An internal inspection is necessary after every discharge of the contents;

(viii) Hydrostatic testing of the pipes and tanks may be required at the discretion of the attending surveyor, in cases where the corrosion/deterioration of the external or internal of the pipes and tanks proves prudent to do so; and

(ix) In any case, hydrostatic testing of the pipes and tanks shall be carried out after repairs to the tanks or pipes in cases of cracks or holes.

(d) Fixed dry powder fire extinguishing installations

(i) The system shall be inspected annually, and the dry powder charge should be agitated with nitrogen, using "bubbling" connections where provided;

(ii) In addition to regular shipboard inspections, the system shall be inspected at least once every two years by a service agent acceptable to the organization issuing the Safety Equipment certificate. This inspection should include:

(i) blow-through with air to ensure associated pipes and nozzles are clear;

(ii) operational test of local and remote controls and section valves;

(iii) contents verification of propellant gas cylinders containing nitrogen (including remote operating stations); and

(iv) testing of the dry powder charge for moisture absorption.

(iii) The replenishment and test regime for high pressure nitrogen cylinders shall be the same as for CO2 cylinders in paragraph 5(b).

(e) Fixed pressure water spray fire extinguishing installations

There are no specific inspection or test regime for these systems outside of normal shipboard testing. Service and maintenance shall conform with manufacturers' instructions.

7 Queries relating to this circular should be directed to Mr Ong Hua Siong (Tel: 6375 6210).

KHONG SHEN PING  
DIRECTOR OF MARINE  
MARITIME AND PORT AUTHORITY OF SINGAPORE

Related circulars:

1. Shipping Circular No. 4 of 2004 "Provision of Spare Charges for Portable Fire Extinguishers for Ships constructed before 1 July 2002"

2. Shipping Circular No.16 of 2004 "Graphical Symbols for Shipboard Fire Control Plans"

3. Shipping Circular No. 26 of 2005 "Improved Guidelines for Marine Portable Fire Extinguishers"

Modifications to CO<sub>2</sub> system controls

# RELEASE INSTRUCTION FOR CO<sub>2</sub> ROOM CONTROL UNIT

**1. Open Door to Remote Release Box to the Zone in Fire**

This to activate the alarm signal.

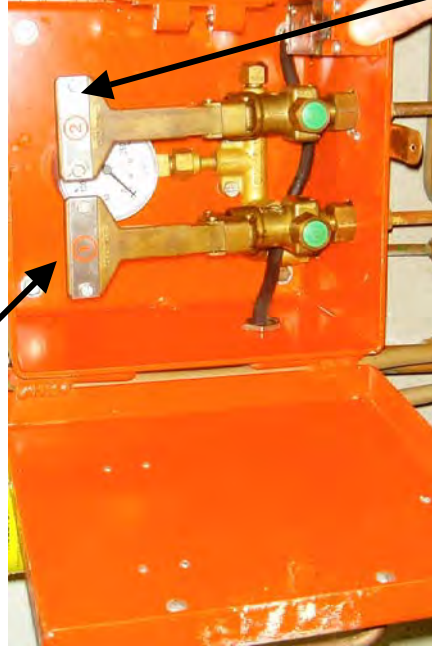
**2. Make sure all ventilation flaps are closed to the Zone**

**And that All Personal are Counted for**

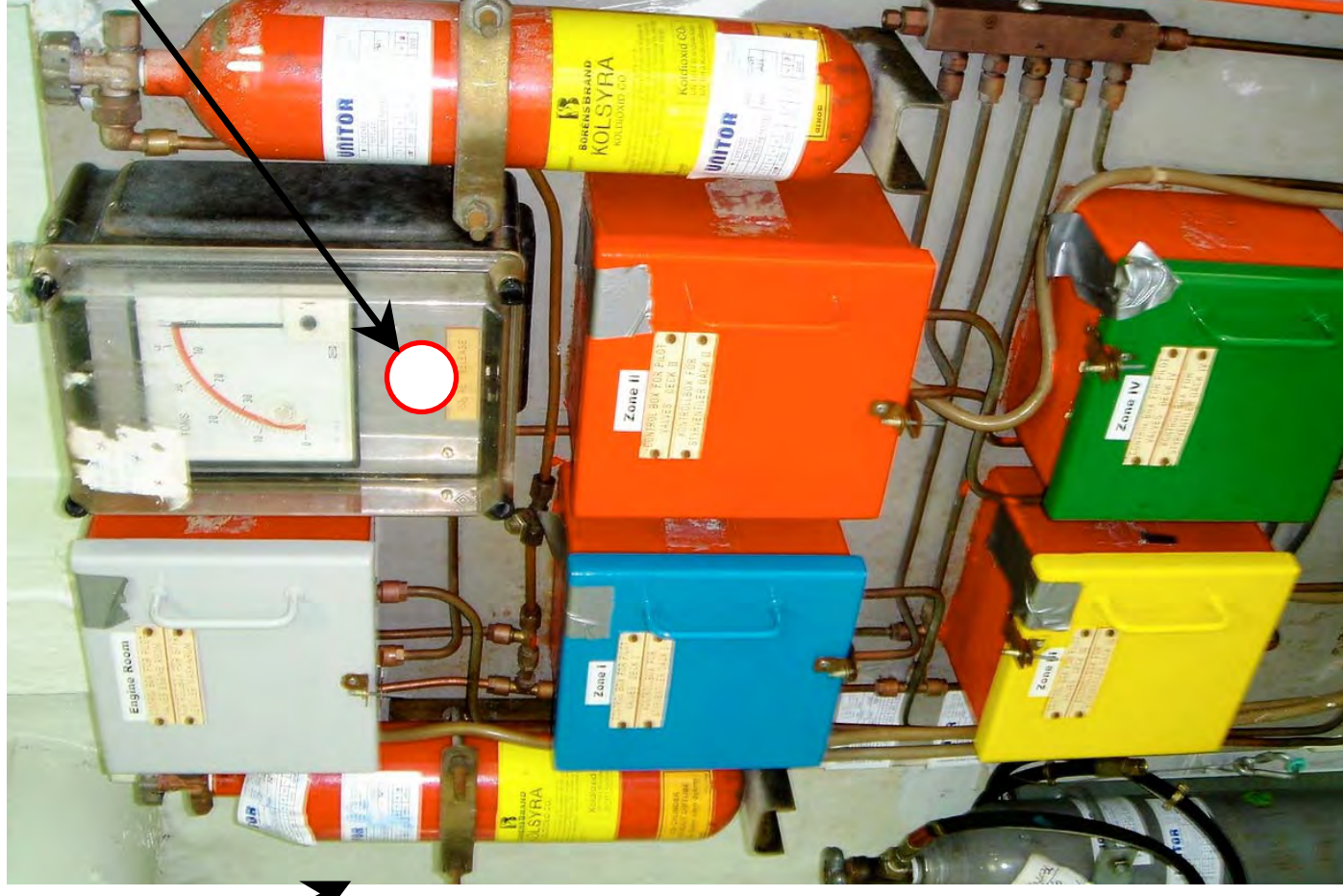
**Confirm this with Chief Officer**

**3. Open Screw Valve on One of the Master Cylinders**

**4. Open Master control valve marked No.1**



**5. Open Master control valve marked No.2  
System will (automatically) release the right quantity of CO<sub>2</sub>**



**6. If the fire hasn't been extinguished during the CO<sub>2</sub> release Press the re release bottom until fire has been extinguished. Pushing the re-release button will inject CO<sub>2</sub> into that zone as long it is pressed and will stop as soon as finger is lifted off.**

# RELEASE INSTRUCTION FOR CO<sub>2</sub> ROOM CONTROL UNIT



1. Open Door to Remote Release Box to the Zone in Fire

This to activate the alarm signal.

2. Make sure all ventilation flaps are closed to the Zone

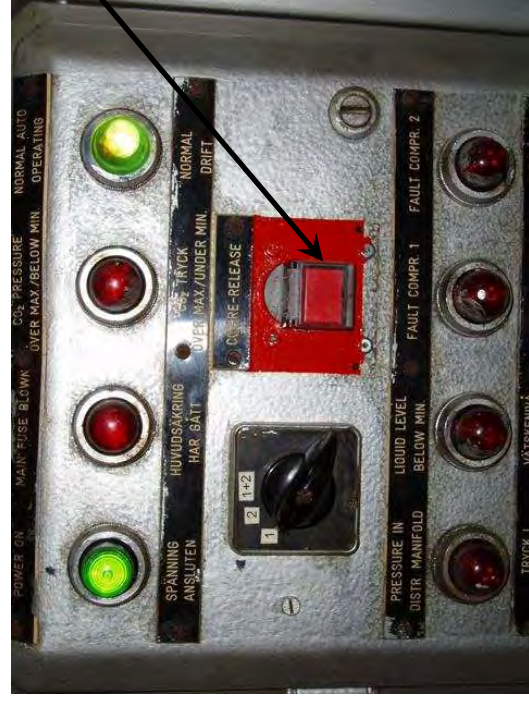
And that All Personnel are Accounted for

Confirm this with Chief Officer



3. Pull down lever to open Pilot valve for Main valve (16 A)

4. Open Pilot valve Inside the Box. System will (automatically) release the right quantity of CO<sub>2</sub>.



5. If the fire hasn't been extinguished during the CO<sub>2</sub> release

**Press the re release button until fire has been extinguished.**

Pushing the re-release button will inject CO<sub>2</sub> into that zone as long it is pressed and will stop as soon as finger is lifted off.

**Re - Release Quantity and Time**

Zone I: Only one release possible	
Zone II: ~33200	15 min
Zone III: ~15600	15 min
Zone IV: ~10600	15 min
Engine room: ~6000	2 min 40 sec

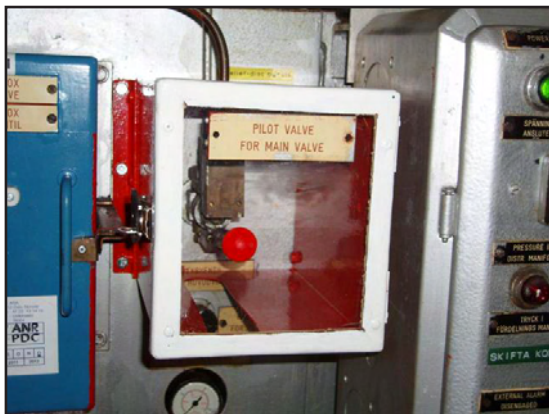
Total quantity of CO<sub>2</sub> 46000 Kg



Colour coding of distribution valves and protective enclosure to main release valve on CO<sub>2</sub> room control panel



Colour coding of main control unit



Protective enclosure to main release valve on CO<sub>2</sub> room control panel



Modification to secondary (re-release) controls