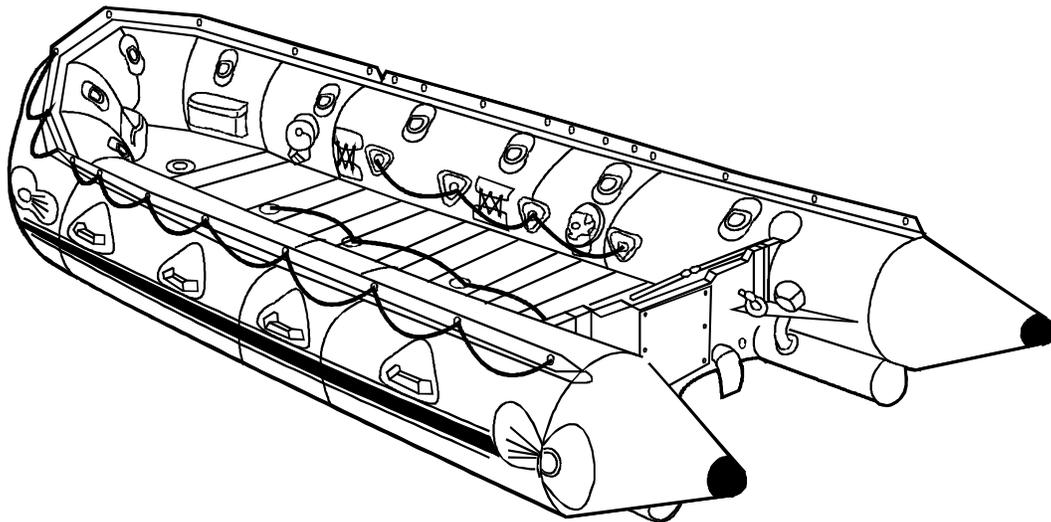

F 420 - F 470 - F 530

Section III

OPERATIONS

**FEATURES - ROLL-UP FLOOR - ALUMINUM FLOOR - MANUAL ASSEMBLY
AUTOMATIC ASSEMBLY - DEFLATION - MADPAC - NAVIGATION**





The F 470 features:

- . A main buoyancy tube in Hypalon/Neoprene 1880 dtx, which comprises 5 airtight intercommunicating chambers
- . Two 940 dtx Hypalon/Neoprene shock-absorbing lower tubes or skegs, inflated from the main buoyancy tubes through two elbows, and clamped off by isolator or clamps
- . A 940 dtx Hypalon/Neoprene inflatable keel, which gives the ideal shape to the hull
- . A transom in special marine plywood, which supports the motor
- . Two large self-bailers
- . A thrustboard
- . A fabric bow floor
- . An integrated foldable, aluminum, fabric-covered slat floor with a sheath for CO2/compressed air inflation

- . Transom straps to brace the transom when aluminum roll-up floor is used

Specific F 470 models have removable keels and lower tubes.

Accessories:

- pouches (some removable)
- paddle sheaths (some removable)
- lifelines: external/internal and on the floor
- D-rings on "butterfly supports"
- D53 rings
- carrying handles
- bow carrying handle with mooring line
- wide rubbing strake around the hull
- keelson rubbing strakes on underside
- roll-up floor (removable)

Inflation System:

- 2 - overpressure valves
- 4 - intercommunicating overpressure valves

- 2 - CO2/compressed air inflation valves with diffusers
- 2 - lower buoyancy tubes and isolator clamps

Loose Accessories:

- 6 - paddles
- 2 - foot pumps with hoses
- 1 - towing sling
- 1 - lifting sling with hardware
- 1 - repair kit with pressure gauge
- 1 - storage/carry bag

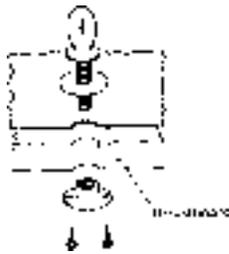


Figure 2

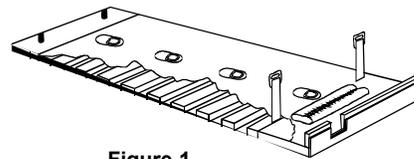


Figure 1

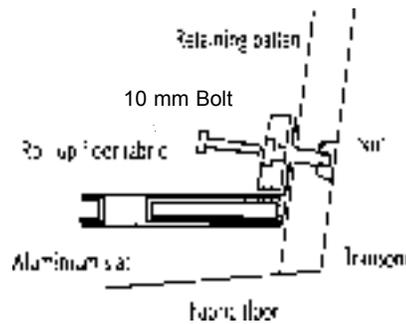


Figure 3

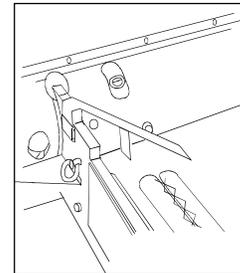


Figure 4

The Roll-up Floor

The slatted floorboard decking, arranged in a folding mat, is uniquely designed to enhance the rapid deployment concept, is completely removable and comes factory installed so that it rolls normally in with the fold of the boat. It is constructed as a single, mat-type roll-up flooring system consisting of slats made from anodized aluminum that are factory covered with wear-proof fabric. A lacing sheath is installed on the aft area of this floorboard section to secure a CO₂/ compressed air cylinder should the boat be deployed with such a system.

Roll-up floor is secured:

Forward: on the thrustboard (fig 2).

Aft: between the transom and the transom retaining batten (fig 3).

It is adjusted:

On the transom: (fig 4) by two tension straps from floor to transom. Tighten straps 1" past snug.

On the sides: by placing the floor under the rubber triangular extrusion glued to the bottom of the pontoons on either side of the transom inside the boat.

Optional Aluminum Floorboard:

These floorboards do not allow the use of automatic inflation (refer to the assembly instruction delivered with the aluminium floorboards).

When the slatted floorboard decking is not preferred for use, it is easily removed and as easily replaced with the optional aluminum floorboards.

Aluminum floorboards are used when the use of the boat requires a

higher rate of speed, mobility and maneuverability, better helm controls through high sea conditions, as well as achieving better fuel economy. The optional aluminium floorboards are made of lightweight anodized marine aluminum, are self-locking and come in four panels with two securing aluminum stringers. With practical training, the time required to install this flooring system can be reduced to only a few minutes.

It is mandatory to use this type of floor when using more than 40 hp engine or a twin engine combination of not more than 2 x 35 hp. Check the maximum allowable HP capacity on every type of boat. In all cases, ALL engines should be bolted through the transom.

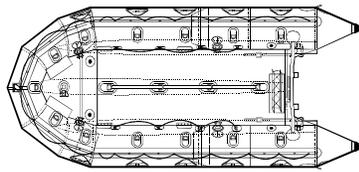


Figure 1

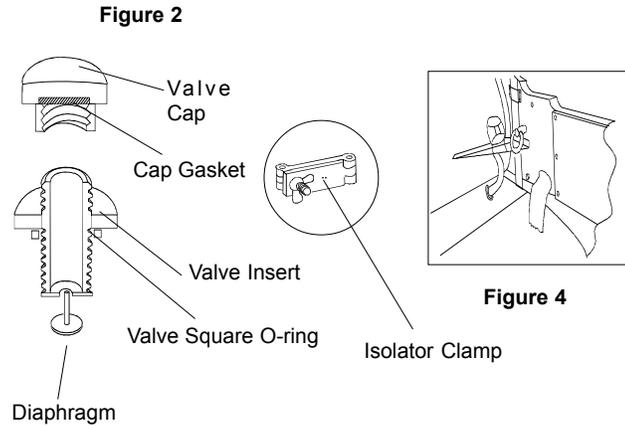


Figure 4

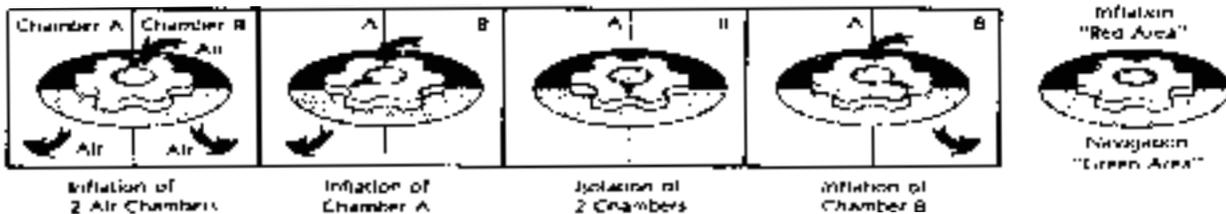


Figure 3

Assembly (All assembly/disassembly operations to be done on a flat surface)

Method 1: Manual Assembly

Open the bag, unroll the boat, and remove the accessories. While inflating Figure 1, make sure that: (a) the roll-up floor is under the triangular extrusions situated just forward of the transom, between the bottom and main buoyancy tubes, (b) the lifelines near the paddle sheath securing strings are not caught under the slatted floor, and (c) the transom tension straps are buckled loosely.

Manual Inflation System

It comprises:

The foot-pumps and hoses.

The valves caps and valve inserts.

(Valve inserts have a small diaphragm that will prevent air from rushing out, and becomes airtight once caps are installed. The caps, with their washers, ensure total air-tightness (fig 2). Through the diaphragm small air leak, pressure readings can be taken with the pressure gauge. The intercommunicating valves (fig 3) function as gates, allowing air to

flow into each pressure chamber, then close to seal air pressure into its own respective chamber. This same valve system is engineered to sense over-pressure buildup in the air chambers. An overpressure release mechanism self-activates when the danger of over-pressure is sensed and immediately releases the excess, avoiding any possibility of causing severe damage to the boat. When installed after inflation, the lower chamber isolator clamps ensure the air-tightness of the shock-absorbing tubes. All valves must be serviced regularly. See Maintenance chapter.

Manual Inflation Procedure

Screw all valve inserts into their I/C valve, and turn valve flywheels to the inflation position ("red area"), 12 o'clock. Make sure lower tube clamps are disconnected.

Use the foot pumps smoothly, without hurrying. Position your foot pump hose into the Bow Port or Aft Port valve insert and position your pressure gauge into

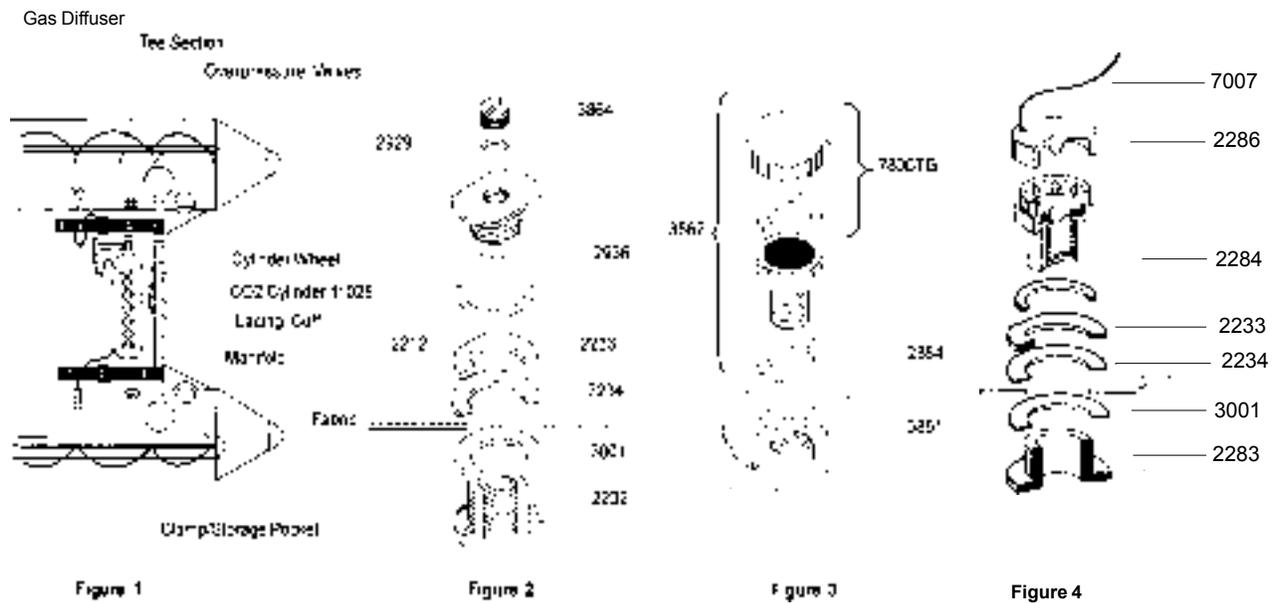
the Bow Starboard or Aft Starboard valve insert, so as to monitor the inflation pressure visually from the other side of the boat. Inflate until the pressure gauge indicates top of green, go/no go. Screw on both valve caps.

Inflate the keel (240 mb/3.4 psi) and screw the valve cap on.

Isolate the shock-absorbing tubes with the isolator clamps (fig 4). Reset the valves in the navigation position ("green area"), 6 o'clock, thus isolating each chamber.

Once the boat is in the water, the pressure may drop about 20 mbrs as a result of the difference in temperature. Before setting off, it is mandatory to verify the buoyancy tube pressure by a simple rotation of the flywheel to 12 o'clock. Visually register the pressure in the tubes by adjusting pressure gauge to any valve insert and topping up boat if necessary.

Minimum authorized "navigation" pressure in your boat should never be beneath 240 mbrs/3.4 psi.



Assembly (cont)

Method 2: Automatic Inflation (CO2/compressed air cylinder)

Open the bag. Check that folding instructions have been followed (intercommunicating valves should be in inflation position, red area or 12 o'clock so as to let the CO2 circulate throughout the boat) and that valve inserts and valve caps are in place and lower tube clamps are in their OFF position.

Turn the wheel of the CO2/compressed air cylinder 1/4 of a turn. The F470 has 1896 cu. liters or 67.0 cu. feet of volume. **During automatic inflation, it is highly recommended for one person to stay with the inflation cylinder to stop the air flow if a malfunction were to occur. Air flow can be stopped by closing the bottle inflation tap.**

Automatic Inflation System

It comprises:

- 2 - gas inflation non-return valves (fig 1) port and starboard of transom (also called gas diffusers).

- 2 - overpressure valves (they allow the excess gas out (fig 3).
- 4 - intercommunicating valves that can also be manually activated by pulling on their flywheels.

All four intercommunicating valves must be turned with their arrows to the inflation (red area) to allow the gas to circulate throughout the boat. (to deflate the boat, valves should also be in this position, and remove valve caps and inserts).

The two lower air chamber isolator clamps (fig 4 page13) ensure the isolation of shock-absorbing tubes. They are in 2 pockets on the outside of the transom (fig 1, clamp storage pocket).

Optional

- 1 - inflation hose kit (2-way), referred to as the manifold.
- 1 - CO2 cylinder: CO2 load = 5 kg = 11 lbs equipped with a manually-operated valve.

(Scuba dive bottle & Yoke not furnished by Zodiac as options.)

Automatic Inflation Procedure

The boat inflates in 2 to 3 minutes at 70 degrees F. Do not prevent unfolding.

Monitor inflation of the boat by checking intercommunicating valves to ensure they are in the correct position (at 12 o'clock). Rotate flywheel to 12 o'clock if necessary.

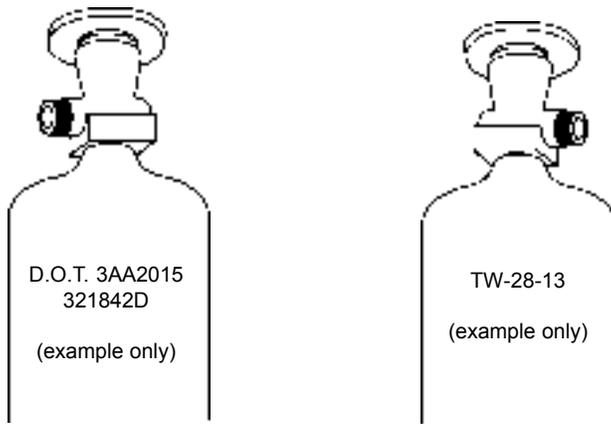
Inflate the keel with the foot pump to an air pressure level of 240 mb/3.4 psi.

Isolate the lower tubes with the isolator clamps (see page 13 fig 4) after the overpressure valves start to hiss, indicating air pressure is achieved.

Turn arrow on wheel of each I/C valve to the 6 o'clock position as shown in fig 3 page 13.

Close with the overpressure valve cap the overpressure valves, only when these have reset themselves and do not vent air anymore.

The boat is now operational.



D.O.T. approved Scuba Bottle

[NOT FURNISHED BY ZODIAC]

CO2 Cylinder (cont)

The United States Department of Transportation requires the manufacturer to affix the federal Control Code and the Tare Weight (TW) on the cylinder. This information is stamped on the upper shoulder of the bottle. The cylinder is subject to a hydrostatic test every 5 years, and must be decommissioned if it fails the test. The CO2 bottles have a safety disk on the operation head. In the event of overpressure due to unusual ambient climatic conditions, this disk ruptures to discharge the cylinder, thus preventing any damage to same.

All CO2 bottles/compressed air bottles/dive bottles should be laid down on the ground when not in use. A compressed air cylinder, when standing up, can become a life-threatening hazard if it were to fall and shear its neck.

How to Check a Gas Cylinder

The Tare Weight (TW) is stamped on the bottle. Add 11 pounds (CO2 charge) to this figure to determine gross weight of bottle and gas. A precision scale is needed to check actual weight. Weigh the cylinder with its operation head and compare with the previously determined weight.

The acceptable tolerance is + or - 5 % of the gross weight.

Inflation Hoses

Check for any cracks or cuts. If detected, change the hose.

Change all fiber gaskets after each CO2 inflation. Neoprene O-rings do not have to be discarded and replaced after each use, but MUST be checked for cracks and changed accordingly.

CO2, when discharged into the atmosphere, goes from its liquid stage to a gaseous stage. During this time (called its sublimation), the gases will reach -70 to -80 degrees C, or -94 to -112 degrees F.

Adequate precautions must be taken not to exhaust these gases into sensitive environments. Adequate eye and hand protection gear must be worn at all times.

NEVER REPAIR AN INFLATION HOSE. REPLACE IT.

NEVER RE-USE A GASKET. REPLACE IT.

SERVICE YOUR TANK REGULARLY IN ACCORDANCE WITH NATIONAL AND LOCAL REGULATIONS.

General Recommendations

Deflation - Folding

Clean the boat and let dry.

Pull the buoyancy tubes inward.

Roll up the boat from the bow to the transom (the CO₂ cylinder remains accessible). This roll method will present a larger pack than rolling boat around its transom toward the bow.

Install charged CO₂/compressed air cylinder and check your I/C valves at 12 o'clock with lower tube clamps in the off position.

Fold the cones onto the transom. Put the boat in its bag.

Never store (rolled up) a boat that has not been washed and dried. Never store a wet, rolled-up boat.

Very Important - When using the CO₂/compressed air inflation system:

When the boat is deflated, screw in the valve inserts and their caps. Set the intercommunicating valves in inflation position (red area), 12 o'clock, and position the valve covers. **This is of the utmost importance.**

The gases must run through the intercommunicating valves into the next chamber, and so on, so as to inflate chamber after chamber and the lower tubes.

If one of the I/C valves were to be closed (green area), 6 o'clock, the gases will not inflate the whole boat. There also is a possibility of damaging the boat as a result of this.

Pressure

CAUTION : Never depart without your pump and pressure gauge. Do not navigate with an under-inflated boat. Pressure gives rigidity to your boat. Operating pressure must be maintained at 250 mbar for the tubes and for the keel. Pressure must be inspected frequently. Changes in temperature influence pressure greatly. A variation of 1°C or 1.8° F results in a corresponding variation of +/- 4 mbar (+/- 0.058 psi).

Under operating conditions of maximum payload, maximum engine HP and rough seas, maximum pressure must be maintained for good performance of the boat. Incorrect pressure will also reduce the life expectancy of your boat.

1 mbar = 0.01450 PSI

1 psi = 69.0 millibars

1 bar = 14.5 psi

General Recommendations (cont)

MADPAC - Maintenance/Deterioration Prevention/and Control

Zodiac boats are rot-proof. They require simple maintenance however, which is essential for long life expectancy.

After each use:

Inflate boat and rinse with fresh water, then carefully remove sand and various debris from inside the boat. Carefully clean the boat between the bottom and the shock-absorbing tubes. Stand the boat upright on its cones against a wall, or suspend it. Carefully rinse with fresh water between the main pontoon and the shock-absorbing tubes. Then deflate the lower tubes, allow to dry, and remove any remaining sand or debris.

Check and clean all metallic parts. Leave the boat to dry. Repack in the bag.

Every 6 months:

Service all valves, valve inserts, valve caps and I/C valves by cleaning their threads, washers and O-rings.

Perform the pressure test, i.e., inflate the buoyancy tube to 300 mbar. Use shop gauge, P/N 7111.

Screw the valves caps on. Check the airtightness of all inflation points and valves with a soap and water solution. Change all crazed O-rings.

Stabilize the pressure for half an hour and record the ambient temperature.

Reset pressure at 240 mbar. Separate the compartments (valves in navigation position [green area]) and clamp the lower air chambers to isolate them. Take the pressure reading after five hours: correct any

variation in pressure in proportion to the ambient temperature variation. Add or subtract to the recorded ambient temperature 4 mbar for every 1.8 degree F or 1 degree C increase or decrease shown on the pressure gauge. Only deal with pressure drops greater than 4 mbar per hour (i.e., 20 mbar for 5 hours).

Check, clean and grease the intercommunicating valves with marine type grease (OMC - Triple Gard). Paint (3 coats) the wooden parts (polyurethane paint or varnish) after having sanded them down, if required.

Check the overpressure valves as well as the gas "T" manifold and pressure hoses for abrasion, cracks or any suspect problems.

Refer to:

USMC F470 TM 09665A-13 & P/1-1

US Army F470 TM 5-1940-279-13 & P-1,

May 1993, PCN 096650-00

US Army F530 TM 5-1940-321-13&P, Sept 1998

General Recommendations (cont)

Navigation

The boat must be correctly inflated to 250 mbar.

The outboard motor must be properly positioned (the motor should align with the central axis of the boat) and through-bolted through the transom.

Secure the engine with a rope to the safety loop of the metallic transom plate.

The adjusting of the angle of the motor in relation to the transom is essential to obtaining the best performance from your boat (generally on the 2nd tilt pin position).

The boat will porpoise if the motor is too far out from the transom (tilt).

The boat will buckle if the motor is too far into the transom (trim).

The height of the outboard motor also affects the boat's performance (water through the clamps, cavitation).

The clamps should be securely tightened by hand and retightened after 10 minutes of running.

The choice of the propeller also is important.

For short-shaft engines, the engine cavitation plate should be a full inch under the lowest part of the transom.

A circuit breaker line is highly recommended to avoid possible accidents. It should be attached to the pilot. In case of this separation from a moving boat, the line will disconnect the circuit breaker and shut off the engine instantly, thus minimizing any limb injuries to an overboard person.

Do not let the gasoline spill in the boat. If it were to happen, wash with abundant water, then wash with soap once returned from the mission.

Load Distribution

The maximum payload is greater than the planing of the boat (1600 to 1800 lbs. for a single 35 hp engine).

In heavy seas from the bow: load the bow of the boat. In heavy seas from the stern: load the stern of the boat. This can be achieved by shifting personnel or objects in the boat. Once on plane, best results are obtained with load toward the transom. Do not sit in the bow triangle. NEVER sit on a collapsible fuel tank.

Towing

Never use the bow carrying handle, use the 2 D-rings on each side of the bow, and attach the towing sling provided as standard equipment. For best performance while towing, cross towing lines, port to starboard and starboard to port, thus describing an "X" with your towing line.

Lifting

To lift the boat in the air with lifting sling (standard equipment), use the 2 eye-bolts of the thrustboard and the 2 eye-bolts in the transom.

Do not hoist boat with personnel on board, unless using a specific certified lifting sling (Coef. 6).

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Section IV

Maintenance & Repair

GLUING TECHNIQUES - MSDS - KEEL & LBT UPGRADES - ZODIAC MTT

