

# Catalina 22

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1987 Edition



*Owner's Manual  
and  
General Handbook*

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## **FORWARD**

Congratulations on the acquisition of your new Catalina 22. All Catalina yachts are designed and built with care using quality materials to assure you years of sailing enjoyment with a minimum of upkeep and maintenance.

Before attempting maintenance or operation of your Catalina 22, please read the Catalina Yachts Limited Warranty booklet and fill out the enclosed warranty registration card.

The registration card enables Catalina to inform you of developments and modifications to enhance the performance or comfort of your yacht. It is also important to be able to contact owners to comply with Coast Guard notification requirements.

The launching and rigging of the Catalina 22 should be handled by experienced boat yard personnel under the direction of your authorized dealer.

The index page lists the contents of this manual. Warrantees and information regarding installed optional equipment have been included when available and applicable.

Maintaining your yacht properly can become a satisfying part of your sailing activities. A regular inspection is the best preventive maintenance. It will help keep your boat safe and in good condition while in use, and insure peace of mind when the boat is left unattended.

Take good care of your boat and take the time to learn and practice good seamanship.

## **PREFACE**

This manual is intended and supplied to help owners of Catalina 22's understand their boats and answer common questions about maintenance and systems design specific to the Catalina 22.

This manual is not intended to provide sailing instructions. It is assumed the operator will consult books written for that purpose, or take sailing lessons or courses to gain the knowledge necessary for the safe operation of the vessel.

The systems descriptions and illustrations in this manual apply to boats built at the time of publication. Our policy of constant improvement necessitates that changes have been made to the Catalina 22 since its introduction. Therefore, these illustrations and descriptions may not apply to boats built before the time of publication.

Owners of earlier hulls, who have questions not answered herein should consult with their local Catalina dealer, or write to Catalina Yachts. Please include your hull number in all correspondence.

The maintenance check lists contained within this manual are intended as guidelines for boats in normal service under typical conditions.

Climate and use will vary and may require additional or special maintenance. Consult with your local boat yard or Catalina dealer for specific maintenance and precautions recommended for your purposes and climate.

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## 1.0 Introduction

### CAUTION

The aluminum and other metal parts conduct electricity coming in contact with or near an electrical power line or lightning can cause severe injury or death. Stay away from overhead electrical power lines when sailing and/or launching the boat.

## BARRIER COAT AND ANTI-FOULING PAINT

It is recommended that the underwater surfaces be covered with a barrier coat to prevent water penetration into the gel coat. Barrier coatings are available from several paint manufactures, and the coating manufacturer's recommendations should be carefully followed for a successful application.

### 1.1 Reference Data Sheet

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_____ State Registration Number	_____ Radio Telephone Call Number
_____ Hull Number	_____ Insurance Company
	_____ Insurance Policy Number
_____ Outboard Engine Model	
_____ Outboard Engine Serial Number	_____ Owner's Address

Length Overall	21' - 6"	Beam	7' - 8"
Length Waterline	19' - 4"	Draft	
		Swing Keel Board Up	2' - 0"
		Swing Keel Board Down	5' - 0"
		Fixed Keel	3' - 6"
Ballast		Displacement	
Swing Keel	550 Lbs.	Swing Keel	2250 lbs.
Fixed Keel	800 Lbs.	Fixed Keel	2490 Lbs.
Masthead To Waterline	29.1 Ft.	Water Tank Capacity	Portable
Fuel Tank	Capacity For 6 Gallon Portable	Holding Tank	Self Containing Head
Berths	Sleeps (5)	Height On Cradle	8' - 9"
Head Room			
Pop Top Up	5' - 7"		
Pop Top Down	4' - 4"		
			_____ Sail Number

## 2.0 Commissioning Checklist

### 2.1 Pre-Launch Check

1. \_\_\_ Check hoses and clamps.
2. \_\_\_ Check all through hull fittings.
3. \_\_\_ Barrier coat applied, antifouling paint applied.
4. \_\_\_ Hull sides clean, gel coat OK.
5. \_\_\_ Decks clean.
6. \_\_\_ Teak cleaned and oiled.
7. \_\_\_ Interior finished, oiled, clean.
8. \_\_\_ Cushions, carpeting, curtains - clean and in place.
9. \_\_\_ Table converts to berth OK; dinette, traditional table stows OK.
10. \_\_\_ Hatch lids present and fit OK.
11. \_\_\_ Lifelines and pulpits rigged and OK.

12. \_\_\_ Spreaders taped and drilled at base end; upper shroud wired to tip end, and taped.
13. \_\_\_ Standing rigging pinned to mast.
14. \_\_\_ Rigging lengths verified with check list in kit.
15. \_\_\_ Mast and boom inspected; cotter pins, sheaves, tangs, spreaders OK.
16. \_\_\_ Mast lights checked before mast stepped.
17. \_\_\_ Check overhead for electrical wires which may interfere with the space required to raise the mast to its full upright position. If there are wires of any kind, anywhere near the boat, do not raise the mast. Move boat to another location, away from any wires. Contact with wire can be fatal.

## 2.2 In Water Check

### 2.2.1 Electrical

1. \_\_\_ Electrical equipment operational:  
Running, Cabin, Bow, Anchor, Spreaders, Master
2. \_\_\_ Shore power outlet OK.
3. \_\_\_ Check battery switch #1 \_\_\_ OK, #2 \_\_\_ OK.
4. \_\_\_ Check battery fluid level.
5. \_\_\_ Check battery terminal for tightness.

### 2.2.2 Plumbing

1. \_\_\_ No leaks at thru hull fittings with seacocks open.
2. \_\_\_ Fill all water tanks.
3. \_\_\_ Check all water tanks.
4. \_\_\_ Test faucet for leaks.
5. \_\_\_ Check for leaks at sink drain, sink drains OK.
6. \_\_\_ Put water in icebox and check for proper drainage.
7. \_\_\_ Check bilge pump operation, handle present.
8. \_\_\_ Check head by flushing and pumping.
9. \_\_\_ Main hatch no leaks, slides freely; hatch boards fit OK.
10. \_\_\_ Cabin windows hose tested for leaks.
11. \_\_\_ Anchor locker drain OK, no leaks at bow lights.
12. \_\_\_ Stove operates OK; check tank, fuel line, burner.

### 2.2.3 Rigging And Hardware

1. \_\_\_ Mast stepped.
2. \_\_\_ Pin, tape and tune standing rigging.
3. \_\_\_ Backstay adjuster, whisker pole, spinnaker gear, boom vang.
4. \_\_\_ Blocks, cars, cleats rigged, OK.
5. \_\_\_ Test all winches, winch handles present.

## 2.3 Sailing Check List

1. \_\_\_ Tiller moves freely, 45 degrees minimum, at each side of center line.
2. \_\_\_ Sails and halyards, OK.
3. \_\_\_ Boat performance under power and sail, OK.

### 2.3.1 Final Check

1. \_\_\_ All accessory equipment operates, OK.

2. \_\_\_ All boat, engine and accessory literature and/or manuals aboard.
3. \_\_\_ Warranty cards completed and mailed, owner registration card attached, owner informed of warranty responsibilities.

## **3.0 Maintenance Guide**

### **3.1 Pre-Use Maintenance**

#### **Rigging**

1. Inspect turnbuckles - tighten, if necessary.
2. Inspect clevis pins and cotter pins.
3. Visually inspect spreader tips and other areas where sails may chafe during sailing; replace tape as necessary.
4. Halyards free and not tangled.
5. Inspect mast hardware attachment bolts; tighten as required.

#### **Hull And Deck Inspection**

1. Tiller moves freely.
2. Bilges and compartments are dry.
3. Thru hull valves, hoses and clamps, OK.
4. Check running lights.

### **3.2 Monthly Maintenance**

#### **Rigging**

1. Inspect chain plates, fastenings and bolts; tighten as necessary.
2. Inspect blocks, shackles and cotter pins.
3. Check rigging tune, rigging wire condition.
4. Check turnbuckles and locking pins.

#### **Hull And Deck**

1. Check cockpit drains, clear debris.
2. Winches turn freely, lubricate as per manufacturer's recommendations.
3. Clean and oil exterior teak as necessary.
4. Clean and wax gel coat surfaces as necessary.

### **3.3 Seasonal Maintenance**

#### **Rigging**

1. Mast head pins and sheaves turn freely.
2. Halyards and nicropress fittings are in good condition and are taped.
3. Spreader tips and bases; mast fittings.
4. All shroud terminations and swaged fittings.
5. Gooseneck assembly and boom assembly.
6. Mast, boom and spreaders cleaned and waxed.

## **Hull, Deck And Cabin**

1. All chainplates and thru bolts tight.
2. Disassemble winches and lubricate bearings and pawls.
3. Coat electrical system, battery tie downs and terminal connectors to prevent corrosion.
4. Drain and flush fresh water system.
5. Hatch gaskets and hold down dogs.
6. Bottom, keel and rudder condition.
7. Lifelines, stanchions and pelican hooks.

### **3.4 Fiberglass Maintenance And Repair**

One of the major benefits of a fiberglass boat is the elimination of maintenance chores required by other materials. You have only three relatively easy maintenance rules to follow to keep your boat looking like new:

1. Each year, clean, buff and wax the exterior of the boat.
2. Touch up and patch scratches, scars and small breaks.
3. Repair any major breaks as soon as possible to avoid additional damage to the hull of decks.

Most fiberglass boats are manufactured of two "layers" of material, permanently bonded together by a chemical reaction. The outside surface is formed by a colored gel coat. This is a special resin material containing concentrated color. It provides a smooth, finished surface.

The second "layer" is made up of polyester resin reinforced with laminations of fiberglass mat, cloth or woven roving. Both the gel coat and polyester resin are "cured" by a chemical catalyst which causes them to form a hard, strong mass that is highly resistant to impact and, damage.

After sailing, a good hosing down with fresh water and a mild detergent will keep your boat sparkling fresh and clean. The non-skid surfaces may need to be scrubbed with detergent. Smooth glass areas may be polished with liquid wax or any good fiberglass wax to add extra luster. In the case of older boats, where some fading of the gel coat has occurred, the surface should be buffed with polishing compound and then wax finished.

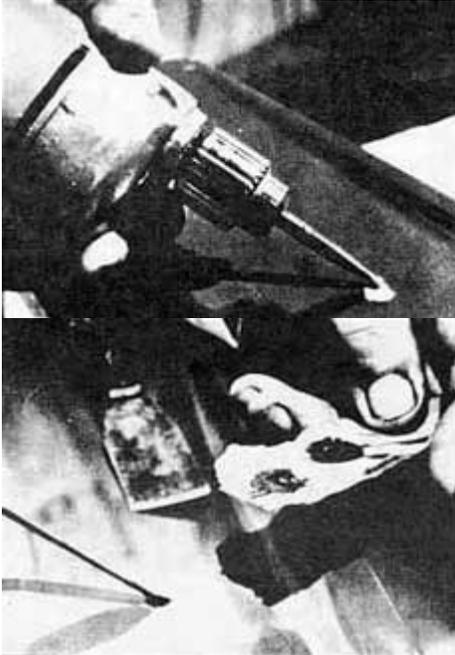
When buffing the boat to restore its finish, care should be taken not to cut through the gel coat surface. This is especially true on corners and edges of the hull. A power buffer may be used, or the work may be done by hand, using a lightly abrasive rubbing compound such as Mirror Glaze No. 1 for power buffers, or Dupont No. 7 for hand buffing. Any high quality paste wax may be used after buffing.

#### **3.4.1 Fiberglass Touch-Up And Repairs**

##### **Scratches, Shallow Nicks, Gouges, Small Holes (That do not penetrate through the hull)**

These repairs are easy because only the surface of the boat is damaged. They fall into two categories: (1) damage to the gel coat colored outer surface, and (2) holes or gouges that are deep enough to penetrate the fiberglass reinforced area of the boat. The repair operations are similar.

For damage to the gel coat surface, you will need a small can of gel coat, of the same color as your boat, and a small amount of catalyst. For deeper holes or gouges (1/8" or more) you will also need some short strands of fiberglass which can be trimmed from fiberglass mat or purchased in the form of "milled fibers." These materials can be purchased from your dealer.



and feather the edge surrounding the scratch or gouge.



penetrates only the color gel step No. 8.).

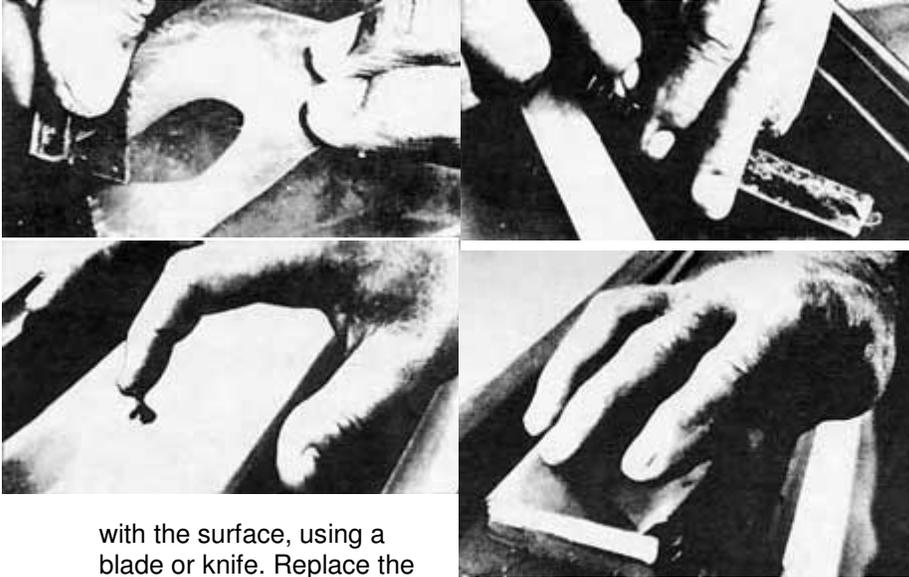
3. Into a jar lid or on a piece of a small amount of gel coat ... fill the area being worked on.

amount of milled fibers with this gel coat, using a putty knife or small flat stick. Then add two drops of catalyst, using an eyedropper for accurate measurement. For a half-dollar-size pile of gel coat, this amount of catalyst will give you 15 to 20 minutes working time before it begins to "gel". Carefully cut the catalyst into the gel coat and mix thoroughly.

cardboard, pour just enough to Mix an equal

4. Work this mixture of gel coat, fibers and catalyst into the damaged area, using the sharp point of a putty knife or knife blade to press it into the bottom of the hole and to puncture any air bubbles which may occur. Fill the scratch or hole above the surrounding undamaged area about 1/16".

5. Lay a piece of cellophane or waxed paper over the repair to cutoff the air and start the "cure."



- with the surface, using a blade or knife. Replace the allow to cure completely (30 hour). The patch will shrink slightly below the surface as it cures.
7. Again use the electric drill with burr attachment to rough up the bottom and edges of the hole. Feather hole into surrounding gel coat, do not undercut.
  8. Pour out a small amount of gel coat into a jar led or on cardboard. Add a drop or two of catalyst and mix thoroughly, using a cutting motion rather than stirring. Use no fibers.
  9. Using your finger tip or the tip of a putty knife, fill the hole about 1/16" above the surrounding surface with the gel coat mixture.
  10. Lay a piece of cellophane over the patch to start the curing process. Repeat step 6, trimming patch when partially cured.
6. After 10 or 15 minutes the patch will be partially cured. When it feels rubbery to the touch, remove the cellophane and trim flush sharp razor cellophane and minutes to an
11. Immediately after trimming, place another small amount of gel coat on one edge of the patch and cover with cellophane. Then, using a rubber squeegee or back of the razor blade, squeegee level with area surrounding the patch. Leave cellophane on patch for 1 to 2 hours, or overnight, for a complete cure.
  12. Using a sanding block, sand the patched area with 600 grit WET sandpaper. Finish by rubbing or buffing with a fine rubbing compound. Some slight color difference may be observed. Weathering will blend touch-up, if properly applied.

### 3.5 Barrier Coat And Anti-Fouling Paint

It is recommended that the underwater surfaces be covered with a barrier coat to prevent water penetration into the gel coat. Barrier coatings are available from several paint manufacturers, and the coating manufacturer's recommendations should be carefully followed for a successful application.

For those owners who apply anti-fouling paint themselves, it should be noted that most brands require all underwater fiberglass surfaces to be very carefully sanded and primed immediately prior to the first application on a new boat. In any event, the instructions of the manufacturer of the paint used should be followed.

Anti-fouling paint should be applied to the bottom of your Catalina 22, if it is to be moored in either fresh or salt water for any length of time. There are many brands available. Anti-fouling paint prevents the growth of algae, barnacles and other fouling organisms on underwater surfaces. Before applying bottom paint, the bottom should be thoroughly cleaned with a solvent to remove any wax.

## **3.6 Teak Maintenance**

### **Wood Trim And Parts**

Most exterior wood is teak, and may be kept looking good by regular oiling with teak oil.

Should the teak become weathered, cleaning and bleaching with a commercially available teak cleaner and bleach will restore the color of the wood; then, oil of the wood with a good grade teak oil to restore the golden color of the teak should be applied. Do not use wire or hard bristle brushes on the wood, as this will remove the softer wood between the annual rings, and leave a rough surface.

## **3.7 Spar Maintenance**

Your boat is equipped with stainless steel standing rigging, and stainless, dacron running rigging to give you years of trouble-free service. However, due to normal wear and tear, it is recommended that a periodic inspection be made on all fittings and wire. Turnbuckles should never be neglected; they should be unscrewed from time to time in order that they do not seize ... every three months should be about right for the average sailor. A slightly bent turnbuckle shaft, or broken wire in your shrouds should be replaced immediately. As a rule of thumb, stainless steel standing rigging should be replaced after five (5) years of service.

### **Fittings**

Marine fittings today need little maintenance. Deck hardware should be hosed down with fresh water after each sail in salt water. Stainless steel fittings such as pulpits and lifeline stanchions should be cleaned and waxed periodically to maintain their appearance. Winches require occasional cleaning and lubrication. Where possible, a maintenance brochure for your winches has been included in this manual. Mast head fittings, halyard sheaves, etc., should be inspected, cleaned and lubricated periodically. Keep your equipment clean of dirt and salt.

### **Spars**

Like all other boat fittings, mast and booms suffer from salt water, air and spray. These should be kept waxed, where possible and, at least, always hosed down with fresh water. Always see that the halyards are tied off, away from the mast. This will eliminate slapping in the wind and subsequent marking of the mast. Keep tack pin (located on front of boom) well lubricated, as without proper lubrication-the stainless steel pin may become seized in the aluminum gooseneck casting.

Find a high pressure nozzle and shoot fresh water to the top of the mast and spreaders. This will help keep your sails clean, too, as they rub on the mast and spreaders.

Inspect spreaders and spreader brackets for signs of fatigue. See that ends of spreaders are wired and well covered with tape to prevent wear on the sails.

### 3.8 Sail Maintenance

Sails should never be put away wet. If they are wet after sailing, leave them in loose bundles and dry them at your first opportunity.

For most problems such as common dirt, dried or caked salt, etc., try scrubbing the surface with a soft bristled brush and liquid detergent. Avoid harsh powder detergents and stiff brushes, as they may damage the finish or stitching. This approach should work nicely for most applications. More severe stains can be taken care of by the following:

\*IMPORTANT: For white sails only.

**Blood:** Soak the stained portion for 10-20 minutes in a solution of bleach (Clorox) and warm water; generally 10 parts water to 1 part bleach. Scrub and repeat, if necessary. Rinse thoroughly - particularly nylon - and dry completely.

**Oil, Grease, Tar and Wax:** Warm water, soap and elbow grease seem to be effective. On hard stains, Propriety Stain Remover and dry cleaning fluids should do the trick. Be careful to remove all fluids, as they can soften the various resinated coatings on sailcloth.

**Rust and Metallic Stains:** These types of stains are very often the most frustrating and difficult to remove. First, scrub with soap and water, then apply acetone, M.E.K., or alcohol. As a last resort, you might try a diluted mixture (5%) of oxalic acid soaked for 15-20 minutes. Hydrochloric acid, 2 parts to 100 in warm water, will also work.

**Mildew:** Hot, soapy water with a little bleach will generally prevail. After scrubbing, leave the solution on the fabric for a few minutes and rinse thoroughly. When using a bleach, a residual chlorine smell may be present after rinsing. A 1% solution of Thiosulphate (photographer's hypo) should remove all chlorine traces. Here, again, rinse and dry well.

**Paint and Varnish:** Acetone and M.E.K. should remove most common paint and stains. In most cases, varnish can be removed with alcohol.

Temperkote or mylar sails are still new and experimental. At this point in time, avoid most solvents, as they may damage the fabric over a period of time. Soap and diluted bleaches should take care of most stains.

Generally speaking, use all solvents with care. Always rinse and dry thoroughly. It should be emphasized that nylon ripstop spinnaker fabrics are less durable and more sensitive than their polyester counterparts. Bleaches and solvents can ruin nylon if not used properly.

Follow the above guidelines, take your sails into your sailmaker for periodical inspection and, I am sure, you will have many effective seasons of racing and cruising pleasure.

### 3.9 Interior Cushions, Fabric Covers

## Cleaning Instructions

1. Regular vacuum cleaning or brushing in the direction of the pile with a soft brush.
2. Stains should, if possible, be removed at once with a damp cloth. Do not allow stains to harden and age.
3. Greasy stains can be removed with ordinary cleaning fluid.
4. For overall cleaning, use commercial types of upholstery shampoo, using only the foam to protect the back padding from moisture. After a minute or so, remove foam and, when dry, vacuum or brush in the direction of the pile.
5. Do not use heat such as an iron or steam.

### 3.9.1 Curtains

When curtains become soiled, DO NOT hand or machine wash, for it will weaken the material. Dry cleaning is the recommended procedure for the removal of any dirt or stains.

## 4.0 Yacht Systems

### 4.1 Rigging

#### 4.1.1 Stepping The Mast

**CAUTION:** The aluminum and other metal parts conduct electricity coming in contact with or near an electrical power line or lightning can cause severe injury or death. Stay away from overhead electrical power lines when sailing and/or launching the boat.

When trailering your boat, always try to undo as little rigging as possible. It is necessary only to undo the two forward lower shrouds and the forestay before lowering the mast.

1. Before raising mast, make sure halyards are neatly tied down and that they are on proper sides of the spreaders. You should never attempt to raise the mast unless the upper shrouds (those that pass over the spreaders and the aft lower shrouds are attached to the deck fittings and the turnbuckles well "started" into their barrels. The turnbuckles must not be completely tightened, however, because slack is needed in the shrouds to enable the mast to be fully raised. The backstay should be attached to the transom chainplate. The upper shrouds, aft lower shrouds, and backstay will keep the mast from falling over when it's raised, therefore, all of these must be attached to the chainplates before the mast is raised.
2. Make sure that the shrouds and stays are not fouled. Backstay should lie clear of the transom. You may step the mast on land or while the boat is in the water. It seems to be easier on land because the boat is more stable. Also, it keeps other sailors from getting impatient while they wait for you to move out of the launch area.
3. Walk the mast aft and drop the mast foot into the mast step located on top of the deck, keeping the mast in center line of boat, insert the pivot bolt and locking nut.
4. One crew member should pull on a line tied securely to the forestay while another pushes up on the mast and walks from the cockpit forward. With the mast erect, attach the forestay and forward lower shrouds.

#### 4.1.2 Tuning The Mast

Your mast is held aloft by the standing rigging (forestay, backstay, upper shrouds, fore and aft, lower shrouds). The term "tuning" refers to adjustment of the standing rigging so that the mast remains "in column" (not bent) when under load. This is accomplished by following the procedure outlined below:

## **At The Dock**

1. Adjust forestay and backstay so that the mast is straight up and down. Tie a bolt to a 6 to 7 foot long piece of light line to make a quick plumb bob, and tape the free end of the line to the front of the mast as high up as you can reach. This device will help you to determine whether the mast is perpendicular or not. Otherwise, sight your mast with a corner of a building.
2. Adjust upper shrouds so that the mast is straight up and down athwartships. That is, from side to side as opposed to bow and stern.
3. The upper shrouds should be firm but not far apart. A 50 pound push should deflect the upper shroud about 1" at shoulder height.
4. The lower shrouds (4 of them) should be adjusted so that they are looser than the upper shrouds. While at dock, they should have no slack, but no tension either. No lower shrouds, when pushed, should deflect the mast more than any other shroud when pushed equally hard. If this can't be achieved, the upper shrouds are too tight. Back off one-half turn at a time on the upper shroud turnbuckles until the tension of the lower shrouds is brought into balance.

### **4.1.3 Setting Up The Boom**

1. Slide the gooseneck fitting into the slot in mast and let it fall to rest on the mast stop screw or downhaul cleat, whichever the case may be.
2. Attach downhaul line to hole in gooseneck slide. Do not cleat at this stage.
3. Attach block to the boom.
4. Shackle mainsheet cam-cleat block to the traveller bar which is located on the transom or across the middle of the cockpit, depending on the model. Some models do not have traveller bars and the mainsheet block will attach at the center of the boom and to a barney-post or pad-eye arrangement on the floor of the cockpit in the center of the boat.
5. "Dead-end" tie the mainsheet line to the mainsheet camcleat block and "reeve" the mainsheet by alternately passing the line through the fiddle block pulleys and the camcleat block pulleys and tie knot at end of mainsheet "figure eight" to keep from losing end of mainsheet while under sail. Your dealer can demonstrate this procedure.

### **4.1.4 Bending On The Mainsail**

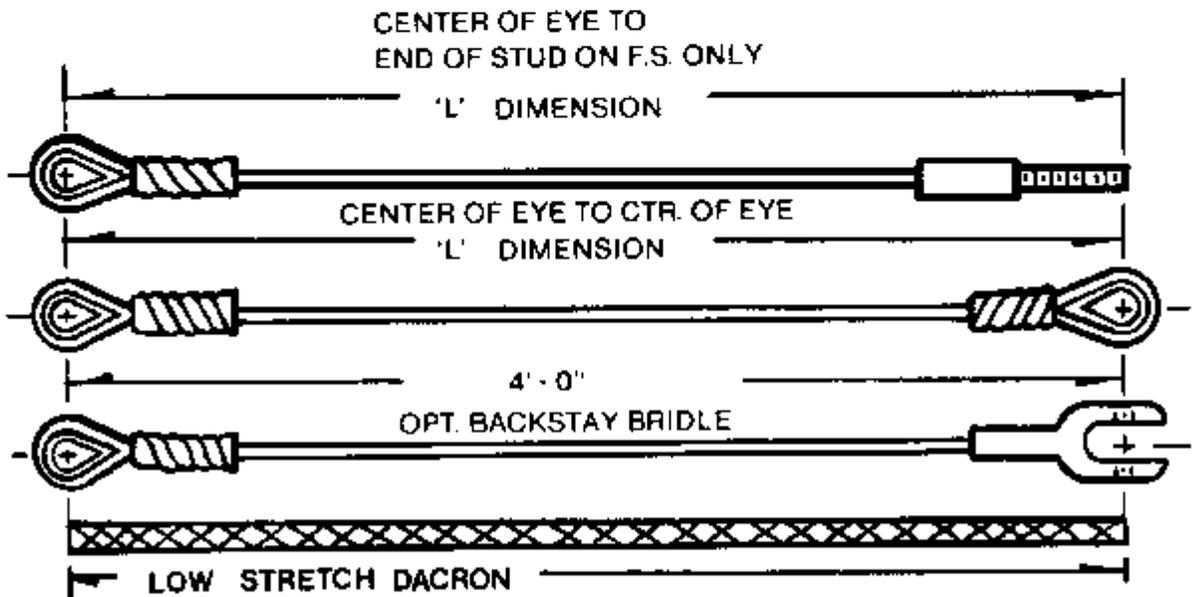
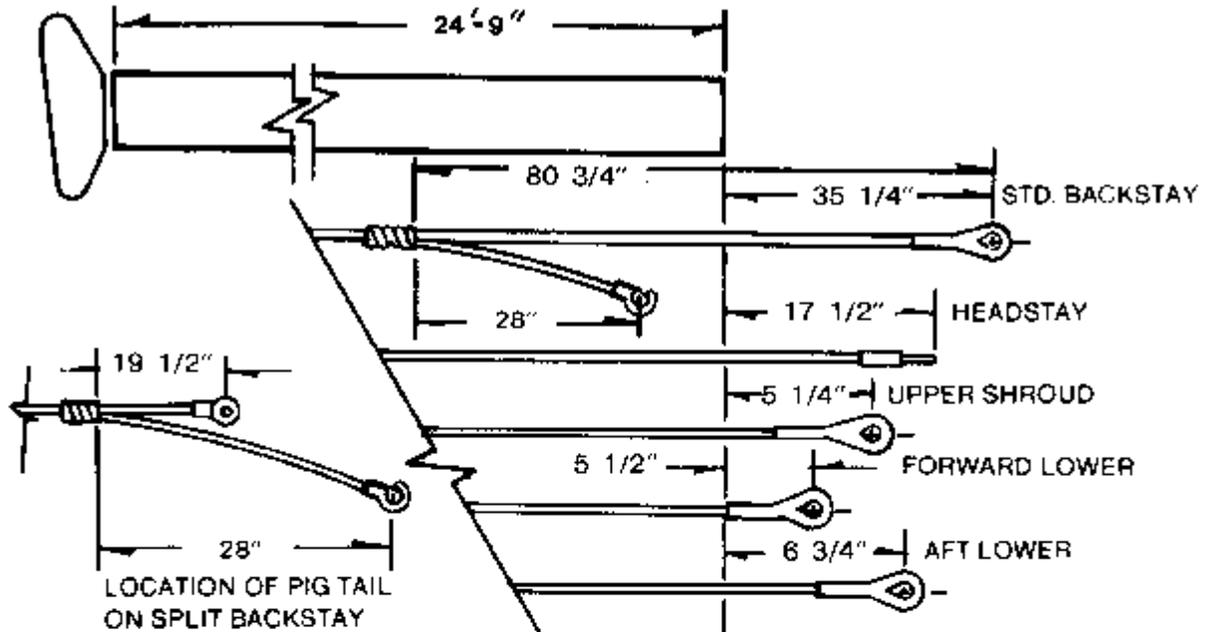
1. Feed the clew of the mainsail into the groove on the boom starting at gooseneck fitting and pulling out to end of boom. This is much easier if done by two persons, one feeding, the other pulling out.
2. Insert tack pin at the gooseneck fitting, passing the pin through the sail's grommet. Pull the sail foot out to remove wrinkles and tie the line to the clew (aft end) of the sail, run the line thru the fitting at the end of the boom and fasten it to the cleat on the port side of the boom.
3. Insert battens.
4. Shackle headboard to end of wire halyard. Look aloft to ensure that halyard is not fouled.
5. Start headboard into mast groove and take slight hoist on main halyard. Sail is now ready for hoisting.

### **4.1.5 Bending On The Jibsail (If Required)**

1. Find tack of sail - this is the forward lower corner of jib.
2. Connect jib to forestay by starting at the bottom snap and working up to the top snap in sequence.
3. Shackle head of jib to wire halyard, again sighting aloft to ensure that halyard is running clear.
4. Find middle of jib sheet line and attach the jib sheet lines to the clew of the jib sail. Run the jib sheet lines back to the cockpit keeping them outside of all shrouds and life lines, if your boat is equipped with lifelines. Pass the ends of the jib sheets through the jib fairlead blocks which have been previously attached to the tracks which are located on the gunwale (railing) of the boat.

- Tie figure-eight stopping knots in the ends of the jib sheets to keep them from falling overboard.
- Boats equipped with the factory supplied roller furling gear for the jib, should read all instructions supplied with the furling gear, before operating the furling unit.

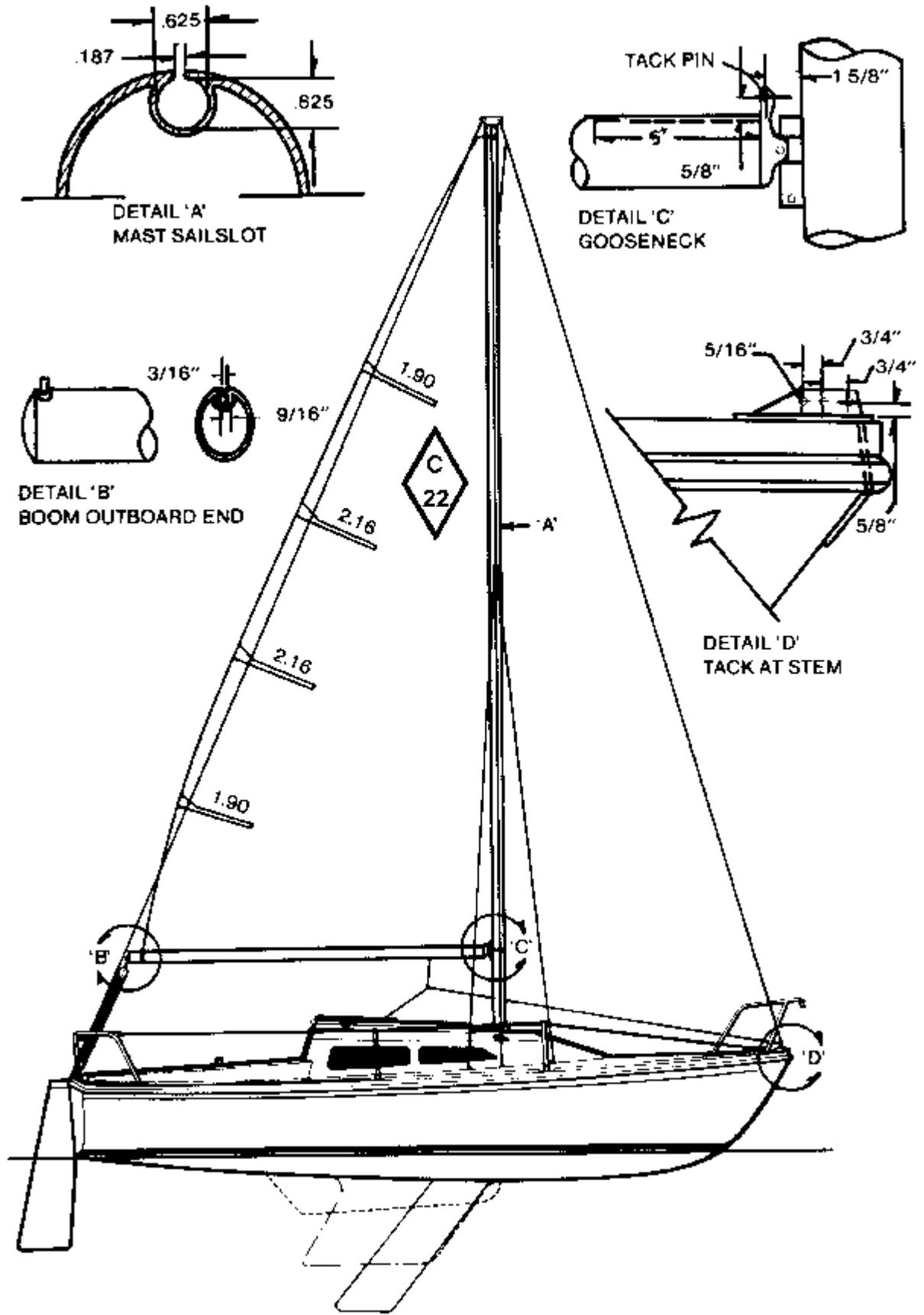
#### 4.1.6 Rigging Wire Length Check List



SPLIT BACKSTAY (OPT.)	24' - 1 3/4"	1/8" 1 x 19	1
BACKSTAY BRIDLE	4' - 0"	1/8" 1 x 19	2

BACKSTAY STANDARD	28' - 2 1/4"	1/8" 1 x 19	1
FORESTAY	26' - 5 1/2"	1/8" 1 x 19	1
UPPER SHROUD	25' -3"	1/8" 1 x 19	2
FORWARD LOWER	12' - 10 1/4"	1/8" 1 x 19	2
AFT LOWER	12' - 11 3/4"	1/8" 1 x 19	2
MAIN HALYARD	60' - 0"	5/16" L.S. DACRON	1
JIB HALYARD	63' - 0"	5/16 " L.S. DACRON	1

#### 4.1.7 Sail Plan Illustration



4.1.8 Mast Head Illustration

TOP VIEW  
MAST HEAD

