

PROFURL IN-BOOM REEFING SYSTEM

MK 3 R

SERIAL NUMBER :

INSTALLATION MANUAL

IMPORTANT NOTICE TO RIGGERS :
PLEASE GIVE THIS MANUAL TO THE BOAT OWNER AND ASK HIM
(HER) TO CAREFULLY READ IT BEFORE USING THE SYSTEM.

RECEIPT OF GOODS

All goods must be checked on delivery and the Buyer should claim from the carrier verbally within three days in the event of loss or damage, and in writing within seven days.



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Congratulations for the purchase of your PROFURL® in-boom reefing furling system. Please read carefully this manual. It will give you to all information for fitting and using your system in order to give you many years of dependable service.

IMPORTANT WARNING FOR USING YOUR SYSTEM :



■ The PROFURL boom is obviously heavier than your conventional boom.

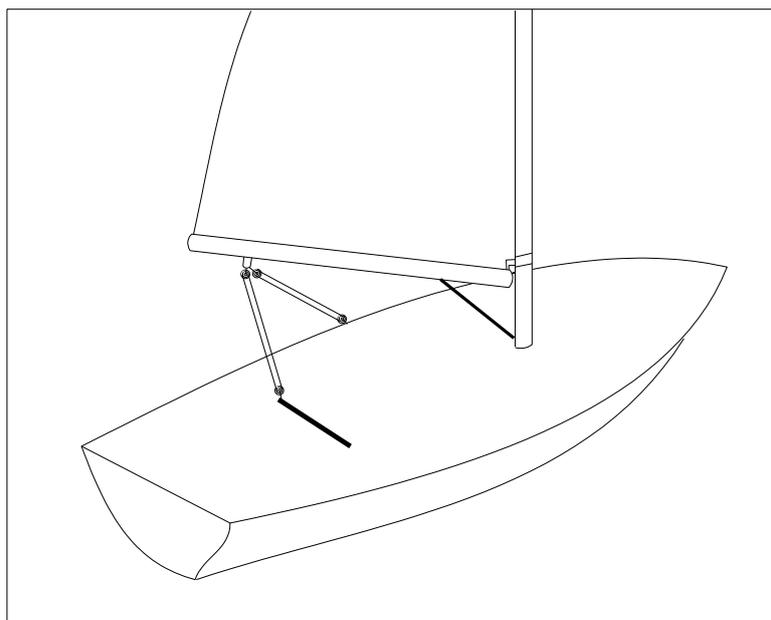
Do not make uncontrolled gibing, specially with strong wind as you could permanently damage your system.

Reminder to gibe :

- 1 - take in or winch your main traveller and main sheet
- 2 - turn your boat to gibe
- 3 - gradually release your main traveller and main sheet.

You can even better fit a tackle as **boom preventer** (see drawing).

You can also fit a **boom brake**, but you must not forget to **completely release** it each time you want to operate your system.



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PRELIMINARY CAUTIONS

The PROFURL in-boom mainsail reefing system is not designed to be installed on wooden masts, or aluminium masts with track added with screws, rivets, glue or any similar assembly. Fitting on a carbon mast is not recommended and requires special skills. Please contact us.

Please check that there is no sign of severe corrosion on the mast which would compromise the strength of the assembly.

The person in charge with fitting will be fully responsible for installation and adaptation on board according to the specifications shown in this manual.

I - GENERAL DESCRIPTION

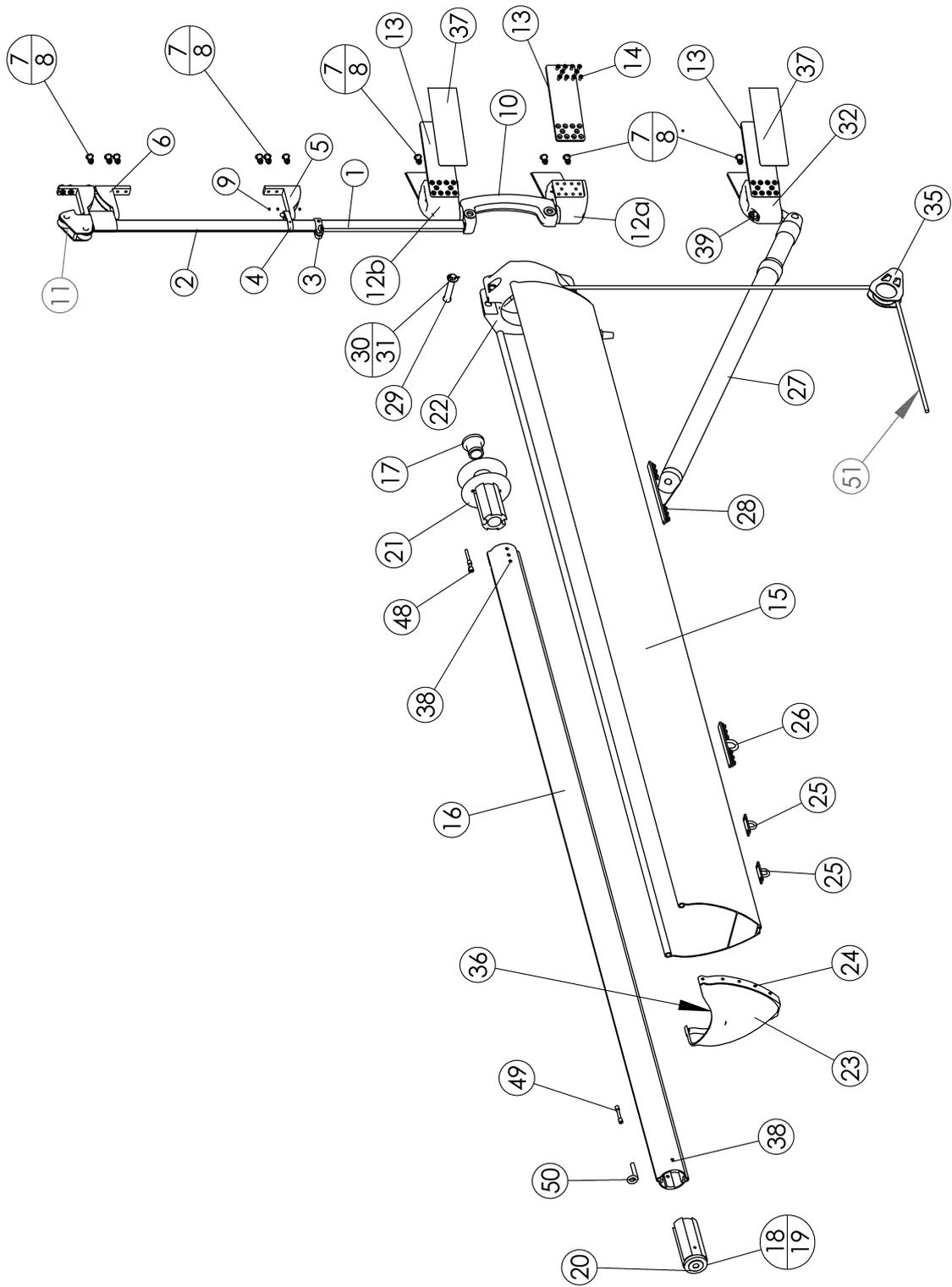
Note : names in bold refer to parts identified on the exploded view

The PROFURL in-boom furling system includes :

1. One set of **luff profiles** (1 and 2) articulated on the aft face of the mast .
*There are 2 different kinds of **luff profiles** : one 0.60 m long **feeder profile** (1) on which the feeder(3) is attached, and several 2 meters long **normal luff profiles** (2) depending on the mainsail's luff length. One of these 2 meters long **normal luff profiles** (2) will be re-cut to length at its upper end to match the expected lug length of the boat. The different **luff profiles** (1 et 2) are connected to each other by mean of **connectors/articulations** (4), which are connected to **articulation brackets** (5) attached on the aft face of the mast.*

CAUTION : the **articulation brackets** (5) have a stainless steel pin. Check the difference with **end brackets** (6), which have Nylon flanges.

2. **Articulation brackets** (5) attached to the mast with 3 **slide screws** (7) slipped in the mast track. Every **slide screw** (7) has a thread and a flat end going through a hole of the **articulation brackets** (5). The thread of the **slide screws** (7) receives a **locknut** (8) for attachment.
3. **Connectors/articulations** (4) also used to connect the different **luff profiles** (1 and 2), held by **set screws** (9). The lower end of the 0.60m long **feeder profile** (1) will be connected on the **gooseneck articulation** (10), thus allowing the **luff profiles** (1 and 2) to rotate together with the boom.
4. A **sheave box** (11) through which the original mainsail halyard is passing. The sheave box (11) will be fit at the top of the **luff profiles** (1 and 2). It is assembled on the **end brackets** [2 times (6)], themselves being attached by mean of **slide screws** (7) and **locknuts** (8).
5. The **gooseneck** (12a) and (12b) fit on the mast with 2 **slide screws** (7), and 2 **gooseneck plates** (13) cambered at the mast shape before fitting, and which will be riveted onto the mast with the **conical head pop rivets** (14) supplied.
6. A **boom profile**(15) which has been delivered upon request in 5 or 6 meters. It will probably have to be re-cut to length when fitting to match the expected boom length.
7. A **mandrel** (16) which turns on **bearings** (17 and 18) fit on a **bearing holder** (19) at the rear end of the boom, and on the drum bearing holder (21) front, turning around a pin inserted in each of the **boom end fittings** (22 and 23). When re-cutting the **boom profile** (15) to length, the **mandrel** (16) should also be re-cut.
8. A **drum boom end fitting** (22). It includes the **drum** (21) fit onto the **mandrel** (16): the **drum** being loaded with the furling line supplied, by pulling on the furling line and releasing the mainsail halyard it will rotate the **mandrel**, which will furl the sail.
9. 1 reinforced adjustable **mainsheet bail** (26) and 2 adjustable mainsheet bails (25).
10. A special **boomvang** (27). It is attached :
 - onto the mast by mean of a **boomvang attachment**, including an **gooseneck** (12) attached onto the mast with 2 **slide screws** (7) **locknuts** (8) and 2 **gooseneck plates** (13) which will be riveted on the mast with **pop rivets** (14) with conical head supplied. The boomvang lower end will be attached onto an **articulation eye** (39) rotating in the boomvang gooseneck.
 - onto the boom with a **boomvang hound** (28).
11. A **ball bearing block** (35) to lead the **furling line** (51) to the cockpit.



TOOLS NEEDED FOR FITTING

In all cases of fitting

- A tape line
- An electric drill
- A set of drills
- A hack saw with a (new) blade with small teeth
- A file
- A pencil
- A plastic hammer
- A 13 mm pipe-wrench
- A 24 mm pipe-wrench
- A dynamometrical wrench (1daN/m)
- 1 set of Allen wrenches (supplied)
- 2 clamps with opening 300 mm
- Universal pliers
- A cutter blade (with new blades)
- A large sheet of paper with corners perfectly at 90° and adhesive tape
- Several small plywood or rubber shims.
- A pop rivet gun for 5 mm stainless steel rivets.
- A ratchet tie down strap more than twice the boom length.

Note : the plates to fit the gooseneck and boomvang attachment are 8 mm thick and made out of aluminium. A convenient hydraulic or mechanical press should be used to bend them at the mast shape, fitting them on the mast with the clamps.

If the fitting is made on a standing mast/

- A Boson's chair
- Some short ropes of 8 or 10 mm diameter.

II - PREPARATION

II.1 - UNFITTING THE HARDWARE FROM THE MAST

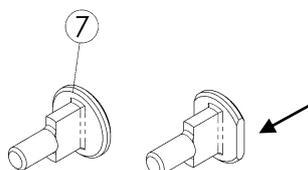
II 1 a - Dismantle the original gooseneck, as well as cleats, winches and winches brackets on the mast, as well as any piece of equipment which would interfere with the fitting of the new gooseneck and with the ability for the forward boom end fitting to rotate when the boom should swing from one side to the other. *Please see § III 1b and drawing 1 for dimensions of the new gooseneck in relation with mark « C » on the mast.*

II 1 b - The original boomvang attachment should not be used, as the axis of rotation of the boom and of the new gooseneck need to be in line, which would never be the case with the original boomvang attachment.

II 1 c - Dismantle the original feeder (if any) at the mast track entrance.

II 1 d - Check that the slide screws (7) supplied have suitable dimensions for the mast track. If not, their width should be modified (turned, machined, grinded, filed) accordingly.

SLIDE SCREWS
Drawing 1



In all other cases please contact us.

III – INSTALLATION

III 1 -DETERMINING THE HEIGHT OF THE GOOSENECK

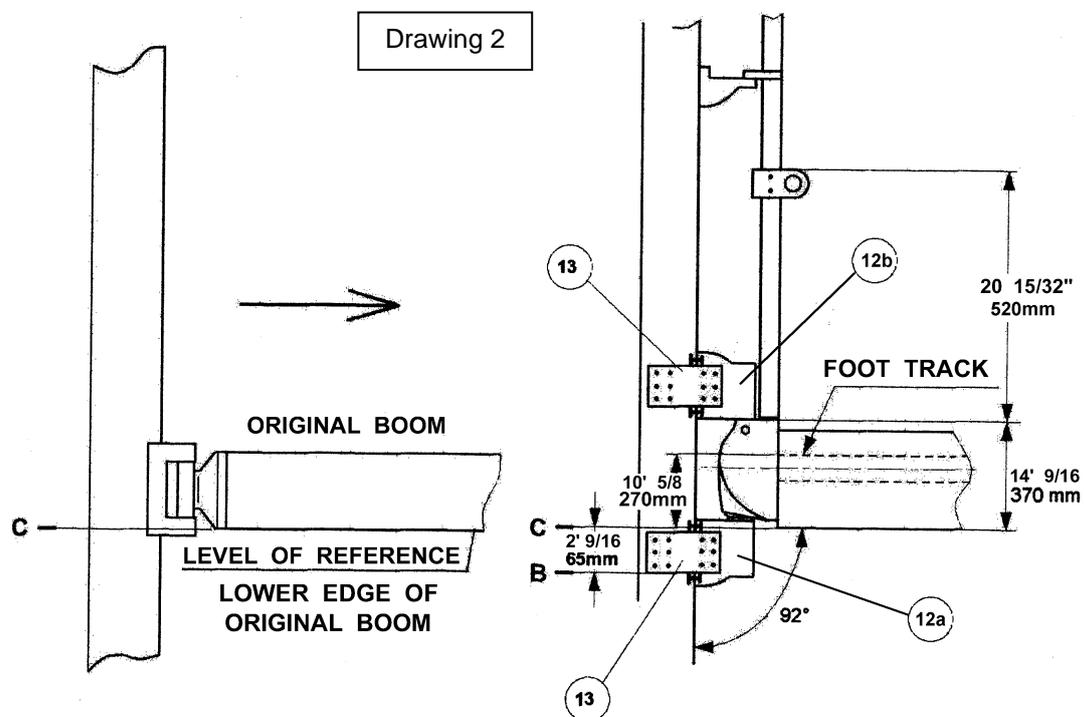
III 1 a -To avoid any potential conflict between the boom and the cabin top, a bimini, a lifeline or any other piece of equipment, please accurately mark the level of the lower edge of the original boom. Please see drawing 1.

III 1 b - Check that the boomvang delivered with your system will make once installed an angle of minimum 30° with the mast and the boom. Should it not be the case, the position of the new gooseneck must be raised on the mast in order to obtain at least this angle of 30°.

Information: pin to pin boomvang length : 1750 mm open / 1605 mm closed

III 1 c - Draw a line « C » on the mast at the level of the lower edge of the original boom. See drawing 1.

III 1 d -Draw a line « B » on the mast at $2 \frac{9}{16}$ " (65 mm) under line « C ».The line « B » will correspond to the level of the lower edge of the lower gooseneck plates (13) once fit on the mast. Please see drawing 2 / right.



III 2 - FITTING THE SLIDE SCREWS INTO THE MAST TRACK

III 2 a - Insert the round side of the slide screws (7) into the mast track. The number of slide screws you need to insert depends on the number of articulation brackets :

A - 2 slide screws are needed for the boomvang attachment . Slide these slide screws down to the mast foot to later fit the boomvang attachment (§ III 11, and drawing 14).

B - Slide 6 slide screws (7) into the mast track for the upper end brackets (6).

C - Slide as many times 3 slide screws (7) into the mast track as the quantity of articulation brackets (5) to be fit. See drawing 6 and 7.

III 2 b - Move the stacked slide screws mentioned in **B** and **C** upwards on the mast above the mast track opening, and temporarily hold them with adhesive tape to prevent them slipping out of the track.

III 2 c - Slide 4 extra slide screws (7) into the mast track for fitting the gooseneck.

III 3 - FITTING THE DOUBLE GOOSENECK

III 3 a - Fit the lower gooseneck (12a) at the convenient height (§ III 1) with the two corresponding slide screws (see above § III 2 c) and corresponding locknuts (8). Tightening torque must be 1 to 1.5 daN/m.

III 3 b - Draw lead lines for drilling on the side plates (13). Would the sideplates be too long, they can be re-cut if necessary, keeping in mind too much length is always better than too little. Camber the side plates to the mast shape with a mechanical or hydraulic press machine, and adjust with clamps (please protect the plates with convenient means). Drill side plates so that there should have at least 12 screws or (14) on the mast each side plate (13).

III 3 c – Pop rivet the sideplates onto the gooseneck.

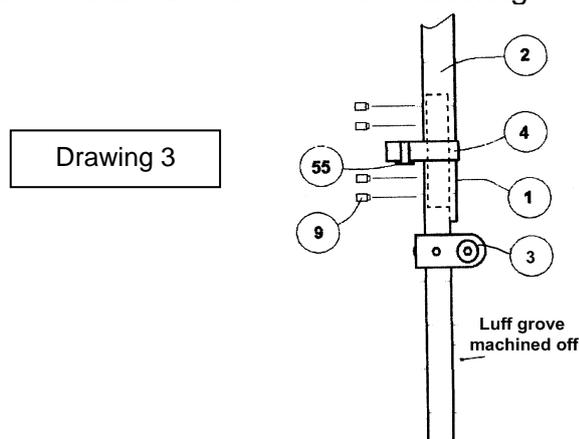
III 3 d - Fit the gooseneck articulation (10) onto the gooseneck (12a) and use it to determine the position of the upper gooseneck (12b) as per drawing 9.

III 3 e – Fit the side plates with the same procedure as the one used for the upper gooseneck.

III 4 - ASSEMBLING THE LUFF PROFILES

Fitting at this stage will be easier flat on the ground.

III 4 a - Fit the luff profiles (1 et 2) together starting with the feeder profile (1) where the feeder (3) is attached. The lower end of this feeder profile can be identified by the luff track has been machined off . Please see drawing 3.



III 4 b - Completely insert a connector/articulation (4) at the upper end of the feeder profile (1) so that the Nylon bushing is turned towards the lower end of the feeder profile. Please see drawing 2 .

III 4 c - Fit and tighten the set screws (9) at the upper end of the feeder profile.

III 4 d - Fit a 2 meter long normal luff profile (2) onto the connector/articulation (4) which has been fit as above.

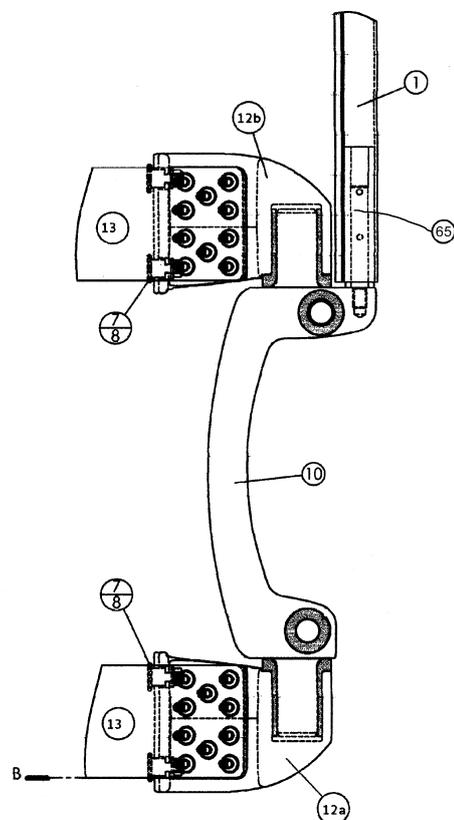
Caution :check again that the collars of the Nylon bushings (55) of the connectors/articulations (4) are turned towards the lower end of the luff profiles column.

III 4 e - Fit and tighten the set screws (9) onto the luff profiles. Fit with the same method all the luff profiles (2) **except the last 2 meter normal profile**. Please see drawing 7.

III 4 f -Hoist the above luff profiles column from the aft side of the mast by preferably using the existing topping lift.

Caution: during hoisting check that the luff profiles are kept as straight as possible by pulling from the bottom end of the luff profiles.

III 4 g - Completely insert the lower end of the feeder profile (1) into the striped aluminium connector of the gooseneck articulation (10) . Please see drawing 4.



Drawing 4

III 4 h - Climb the mast taking with you :

- the 2 end brackets (6)
- all the articulation brackets (5)
- the sheave box (11)
- all the slide screws (7) to be slipped up in the mast track, and locknuts (8).

III 5 - FITTING THE ARTICULATIONS BRACKETS ONTO THE MAST

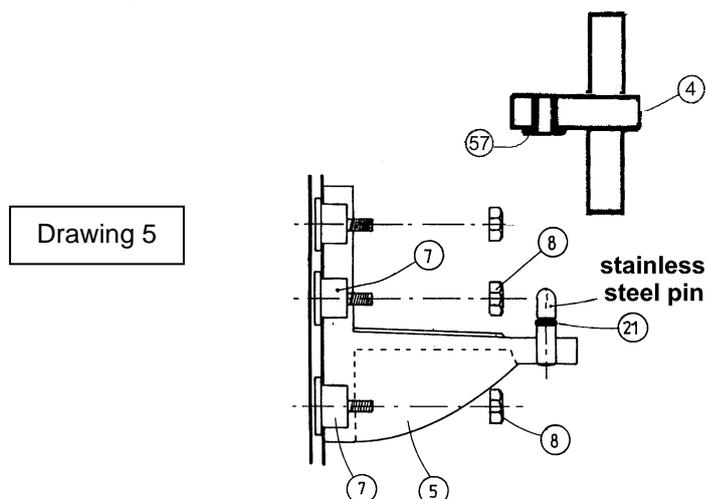
III 5 a - Consider the 3 lower slide screws (7) stacked above track entrance.

III 5 b - Fit an articulation bracket (5) onto these slide screws with the stainless steel finger pointing upwards (please see drawing 5), and completely insert the stainless steel finger into the Nylon bushing of the connector/articulation.

III 5 c - Fit the locknuts (8) and washers onto the thread of the slide screws (7). Tightening torque should be 1 to 1,5 daN/m.

Caution : during fitting the articulation brackets (5) onto the connector/articulations (4), permanently check that the feeder profile is indeed fully inserted into the gooseneck articulation (10).

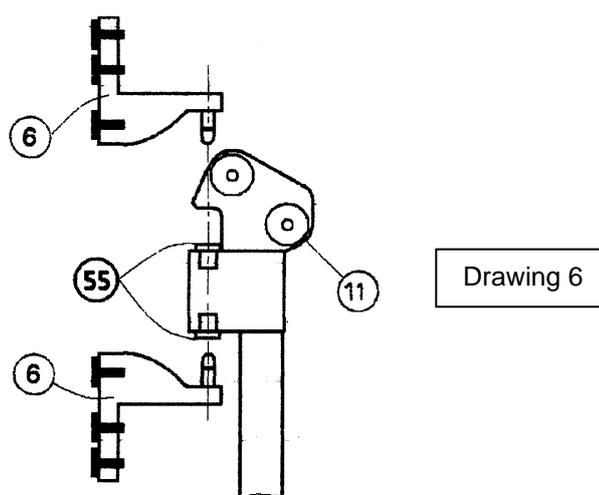
III 5 d - Continue fitting all articulation brackets (5) with the same procedure.



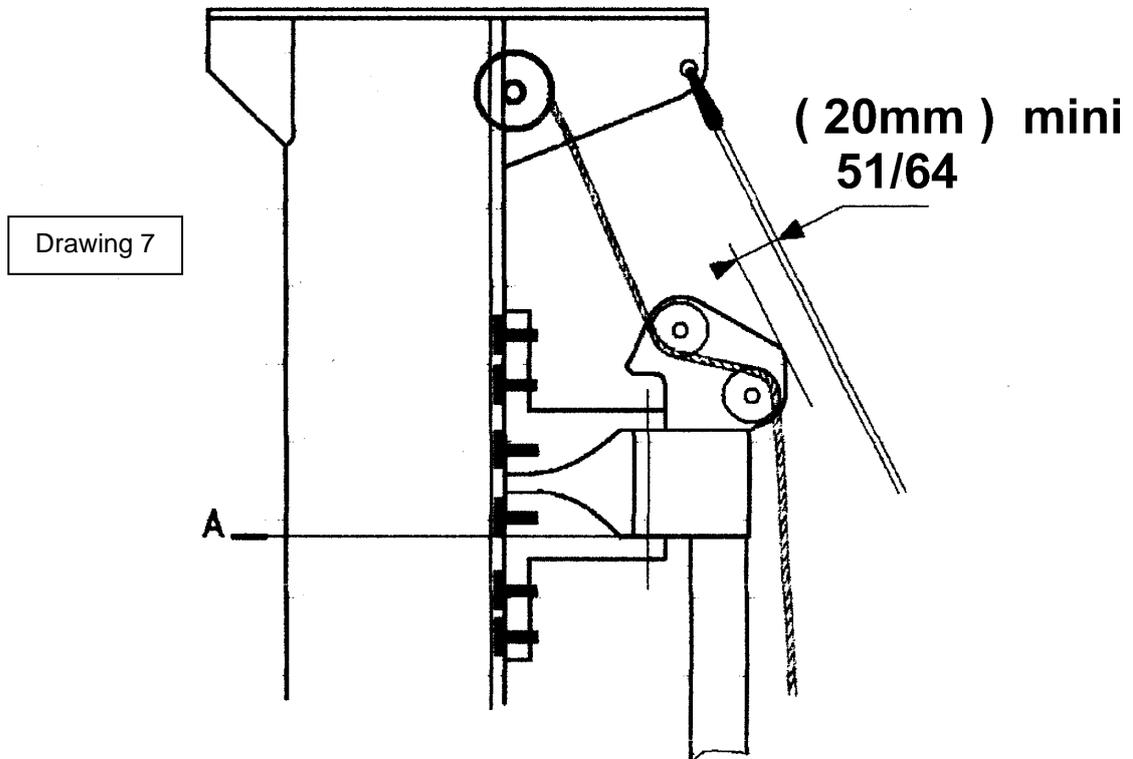
III 6 - FITTING THE SHEAVE BOX

III 6 a - Slide up in the mast track the 6 remaining slide screws (7).

III 6 b - Temporarily fit the 2 end brackets (6) so that the rear upper end of the sheave box (11) leaves a minimum clearance of 20 mm with the backstay(s). Please see drawing 7.



III 6 c - Draw a line "A" on the mast corresponding to the position shown on drawing 7.



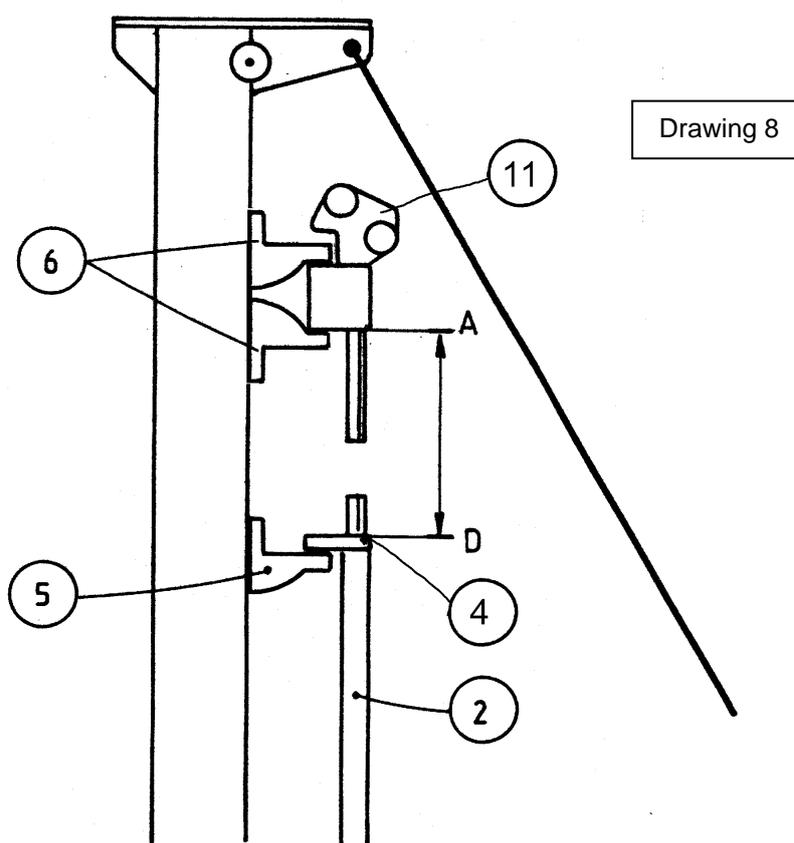
III 7 - MEASURING AND FITTING THE UPPER (CUT) LUFF PROFILE

III 7 a - Please see drawings 8. Accurately measure the length "A" to "D".

III 7 b - Mark the "A" to "D" length on the remaining luff profile (2) and cut it at this exact length. File smooth the cut edge .

III 7 c - Fit without tightening the 2 set screws (9) on the threads located at the opposite side of the cut end.

III 7 d - Hoist the cut luff profile (2).



III 8 - FITTING THE UPPER (CUT) LUFF PROFILE ONTO THE SHEAVE BOX

III 8 a - Slightly ease the 6 slide screws (7) which hold the upper end brackets (6) and remove the sheave box (11).

III 8 b - Completely insert the striped aluminium bar of the sheave box (11) into the cut end of the luff profile (2).

III 8 c - Insert the bottom end of the luff profile (2) into the uppermost connector/articulation (4).

III 8 d - Fit again the sheave box (11) onto/between both end brackets (6) and fasten the 6 slides screws (7) to permanently secure this assembly.

III 8 e - Tighten the set screws (9) at the bottom end of the cut luff profile (2).

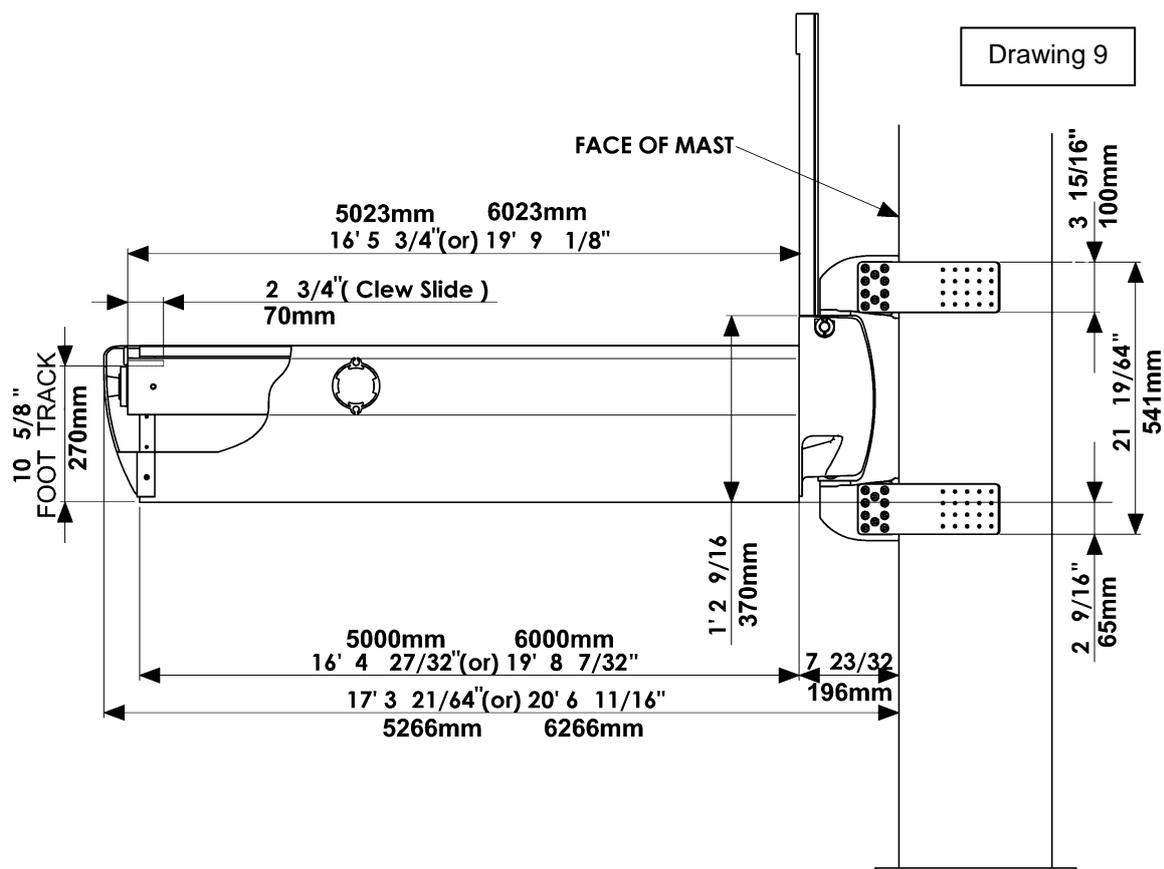
III 8 f - Follow the path for the mainsail halyard as shown on drawing 7.

III 9 - CUTTING THE BOOM PROFILE AND THE MANDREL TO LENGTH**III 9 a -HOW TO CALCULATE THE LENGTH OF THE BOOM PROFILE.**

Case # 1: The PROFURL boom overall length should be the same as the one of the original boom.

Case # 2: The PROFURL boom being delivered in over length, the opportunity may be taken to make the boom longer. *Caution : changing the boom length could affect the balance at the helm when sailing under sails.* In this case check that the aft end of the boom cannot touch the backstay or any other piece of equipment on board.

In both cases please refer to drawing 9 for dimensions.



The PROFURL in-boom reefing system is delivered pre-assembled and in over-length. The boom profile (15) and the mandrel (16) will probably have to be re-cut to length to match the boat's requirements when fitting the system.

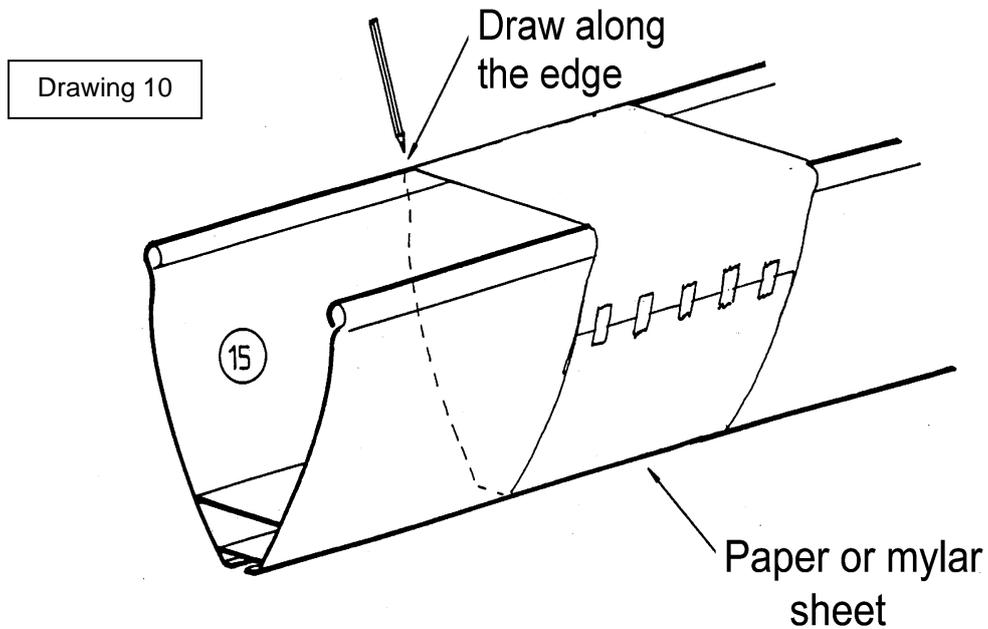
CAUTION : should the complete length of the boom profile be used, the rear boom end fitting is just temporarily attached to the boom profile for shipping. Please follow the fitting procedure from § III 9 c 7 and on, same as if the boom profile had been re-cut.

III 9 a 1 - To cut the boom profile (15) and the mandrel (16) to length, first dismantle the rear boom end fitting (23) from the boom profile and pull out the mandrel (16) from the boom profile.

Caution : during dismantling, the mandrel (16) will not be held any more. Please keep control about the mandrel potentially falling down when pulled backwards. Also mind not to lose the washer (20) located forward of the drum (16) .

III 9 a 2 - To re-cut the boom profile (15) to length, and to make sure that the cut section is accurately perpendicular to the profile, wrap a sheet of paper or mylar (with accurate right angle corners) so that the edges are in perfect line, and attach it with adhesive tape. See drawing 10. Draw a line on the boom profile, following the edge of the sheet where the boom profile will be cut.

III 9 a 3 - Cut the boom profile according to the line and file smooth.



III 9 b -CUTTING THE MANDREL TO LENGTH

The mandrel (16) should be re-cut of exactly the same length of the one having been
 → *Example: the boom had been re-cut by 435 mm; mandrel should be re-cut by the same length.*
 Cut off the boom profile.

III 9 b 1 – Remove the bearing holder (19) + bearing (18) assembly from the rear end of the mandrel (16).

III 9 b 2 - Cut the mandrel (16) **at its rear end** with the same method as the one having been used for cutting the boom profile (15). Same as § III 9 a2. File the rear (cut) end of the mandrel and foot track ends smooth.

Caution : the forward (drum) end of the mandrel (16) must not be cut !

III 9 b 3 - Fit again the bearing (18) and bearing holder (19) into the cut/rear end of the mandrel. Tap threads 2 times M10 (10mm) at 90° of the foot tracks at 50 mm from the cut end. Fit and tighten the screws (38).

III 9 b 4 - In case the mandrel has been cut a little too short, the fore and aft play must be reduced to a minimum. To do this, loosen the screws(38), push the mandrel forward, pull out the bearing holder (19) so that the washer (20) touches backwards, tighten again both screws (38).

III 9 c - FITTING THE MANDREL ONTO THE BOOM

I III 9 c 1 - Fit the mandrel (16) into the boom profile (15), fit the washer (20) and the drum bearing (18) onto the stainless steel pin (36) inserted in the drum boom end fitting (22).

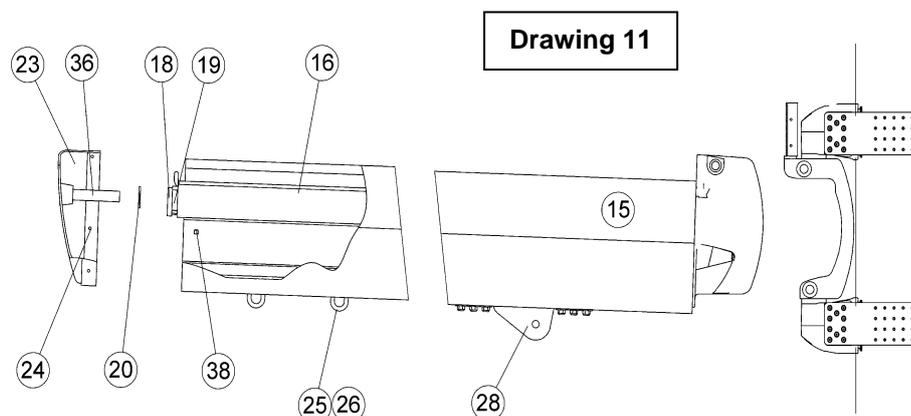
III 9 c 2 - Fit the mandrel (16) into the boom profile (15), fit the washer (20) and the drum bearing (18) onto the stainless steel pin (36) inserted in the drum boom end fitting (23).

III 9 c 3 - Check that the mainsheet bails (25) reinforced mainsheet bails (26) and boomvang hound (28) are properly fit in the bottom track of the boom as shown on drawing 12.

III 9 c 4 - Slide the bearing (17) located at the rear end of the mandrel (16) onto the stainless steel pin inserted in the rear boom end fitting (23).

III 9 c 5 - Completely insert the rear boom end fitting over the rear (cut) end of the boom profile (15). A ratchet tie down strap is a handy tool to do this.

III 9 c 6 - Drill holes \varnothing 5mm at the rear end of the boom profile (15) through the pre-drilled holes of the rear boom end fitting (23). Fit the corresponding flat head pop rivets (24) supplied in these holes to permanently attach the boom end fitting onto the boom profile



III 10 - FITTING THE BOOM ONTO THE GOOSENECK

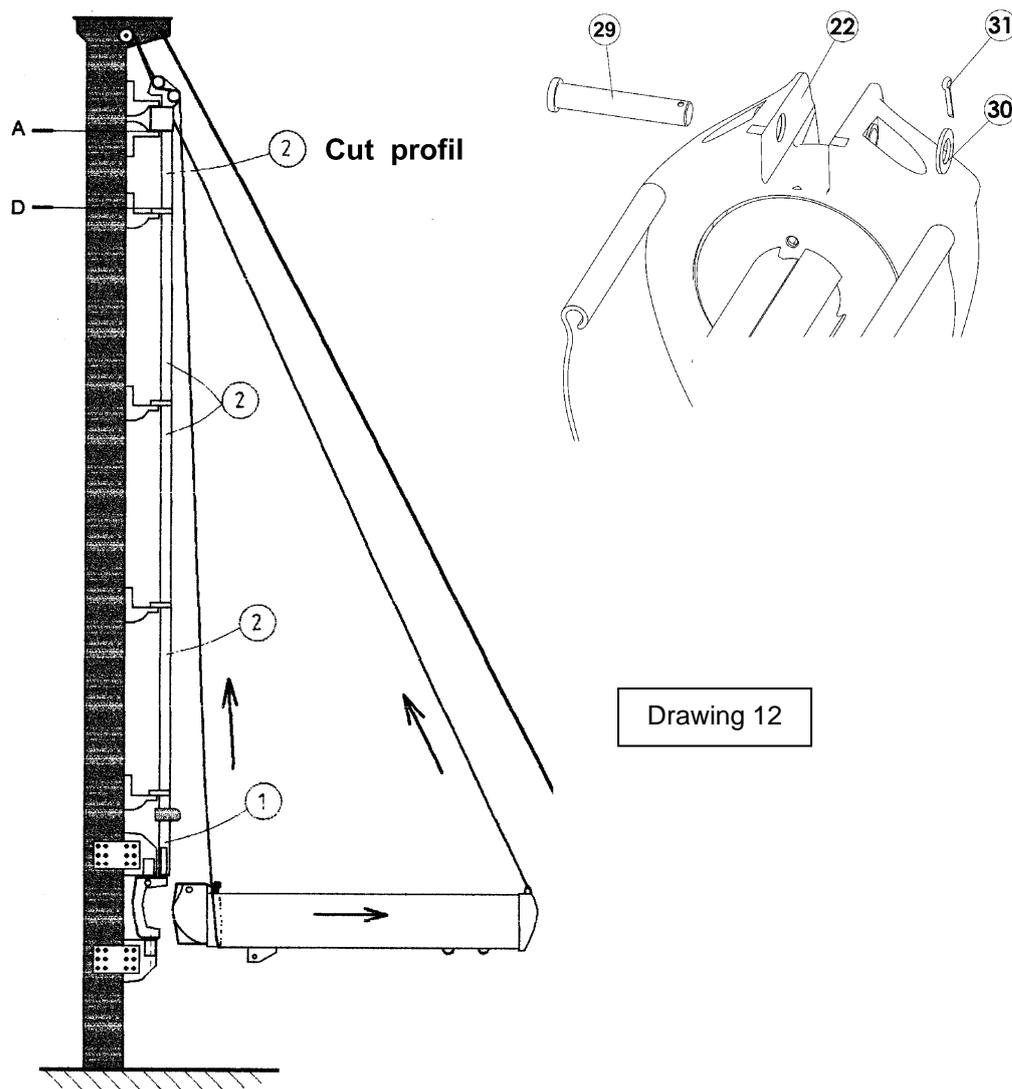
III 10 a - Hoist the boom with a halyard and a topping lift (see drawing 13) **by keeping it as horizontal as possible**. Pull it backwards at the same time.

III 10 b - Slide from underneath the vertical aluminium striped bar of the gooseneck articulation (10) into the bottom end of the feeder profile (1).

III 10 c - Fit the stainless steel pin (29) of the gooseneck articulation (10) washers (30) and open the cotter pin (31).

Caution : do not drop or raise the boom more than 5° from horizontal position as it could cause permanent damage to the gooseneck.

From this stage and on the luff profiles must turn together with the boom.



III 11 - FITTING THE BOOMVANG HOUND AND THE BOOMVANG

III 11 a - Fit the boomvang attachment (32) with the 2 slide screws which had been stored at the mast foot (§ III 2 B).

III 11 b - Bend the aluminium gooseneck sideplates (13) with a mechanical or hydraulic press machine to accurately camber them to the mast shape. During bending please protect the plates from dings and dents. Adjust shape with clamps.

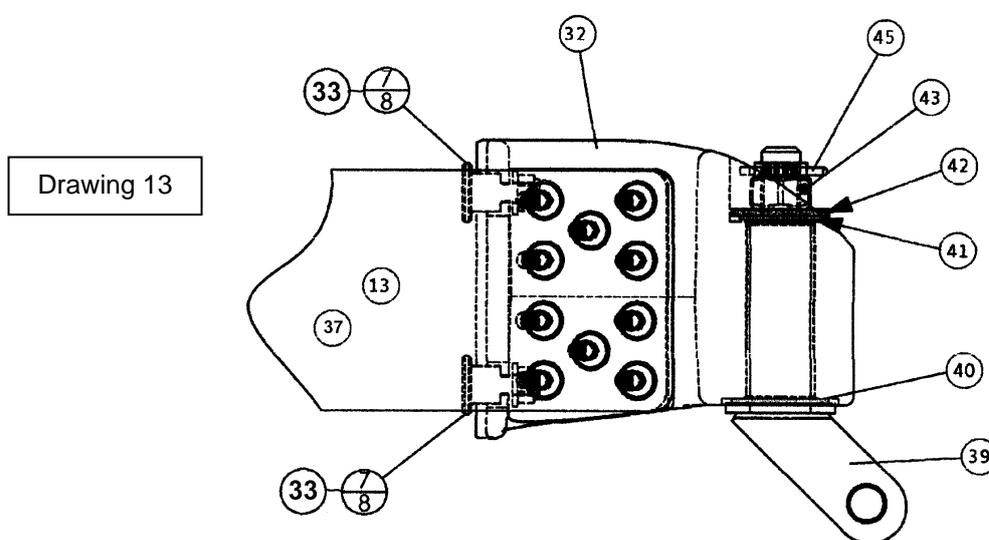
III 11 c - Would the sideplates be too long, they can be re-cut if necessary, keeping in mind too much length is always better than too little.

III 11 d - Draw lead lines for drilling on the side plates (13). Drill at \varnothing 5 mm and machine holes so that the conical heads of the pop rivets (14) will be flush with the surface of the side plates. There should have at least 12 screws on th mast for each side plate.

III 11 e - Fit the stickers (37) onto the plates to hide the screws. Do the same for the gooseneck plates (see III 3 e).

III 11 f - Fit the Nylon washer (40) onto the articulation eye (39), fit eye (39) onto the gooseneck (32). Fit the Nylon washer (41), SS washer (42), locknut (43), and split pin (45).

III 11 g - Fit the boomvang onto the articulation eye (39) and onto the boomvang hound (28). Fit the pins and the split pins.



III 12 - POSITION OF THE MAINSHEET BAILS

III 12 a - Adjust the position of the mainsheet bails (25) or (26) with the set screws which can be reached from underneath. Fasten the mainsheet blocks on the mainsheet bails.

CAUTION : on boats with a mainsail track or mainsail block attachment on deck ahead of the main hatch the mainsheet bails (25) must be re-positioned as far backward as possible.

III 12 b - Push the boom by hand over the lifelines as far as possible and tie a knot on the mainsheet so that in no case the boom profile can be damaged by the rearmost shrouds when running downwind or jibing.

III 13 - INSTALLATION OF THE CONTROL LINES TO THE COCKPIT

REMINDER TO AVOID FRICTION

1. Only use good quality ball bearing blocks, which will have to be cleaned and lubricated from time to time as per manufacturer's specifications.
2. Use ball bearing blocks with a sheave of large diameter.
3. Reduce as much as possible the number of lead blocks between the drum and the cockpit.
4. Reduce as much as possible the angle of deviation of the control lines.

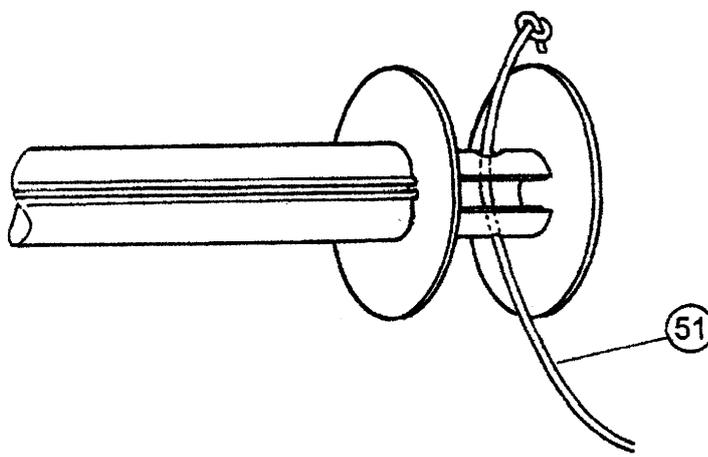
III 13 a - Attach the ball bearing block supplied at the mast foot on starboard at the convenient position to lead the line into the middle of the drum at 90° angle .

III 13 b - Pass the furling line supplied from underneath through the block, then through the hole of the drum's shaft and a tie small knot at its end so that the knot will be completely hidden inside the drum's shaft. (see drawing 15).

III 13 c - To fill the drum with line turn the mandrel (16) by hand towards port side (seen from above) so that the furling line sticks out of the drum on the starboard side.

III 13 d - Fit another ball bearing block at the mast foot to lead the mainsail halyard to the cockpit. Remind to use the right type and dimensions of blocks.

III 13 e - Check that the exit from the mast of the mainsail halyard does not bring too much chafe.



Drawing 14

IV - FITTING THE MAINSAIL

⇒ Please check again that the mandrel grooves have been filed smooth at the rear (cut) end before starting to insert the foot of the sail.

CAUTION : before operating the PROFURL in-boom reefing system please make sure that :

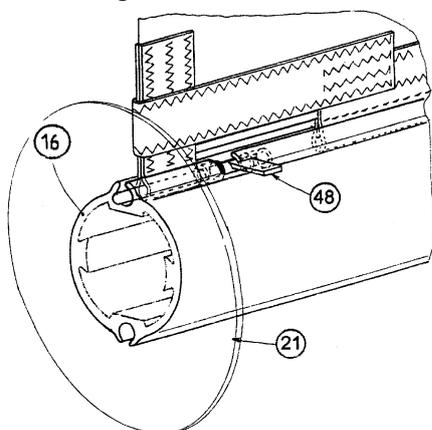
- 1) the mainsail construction and design are in accordance with the attached specifications.
- 2) the boomvang angle adjustment (see § VI) is correct. This adjustment is an essential point to get a good quality furling of the mainsail as well as ease of operation.

Please refer to the attached mainsail design specification.

IV 1 - Turn the mandrel (16) by hand so that the foot track with the machined forward end (please see drawing 16) is upwards.

IV 2 - Do not yet insert the mainsail battens into the batten pockets.

IV 3 - Insert the tack slide (48) into the tack webbing with the flat part backwards and lock the webbing ahead of the two small plastic cylinders.



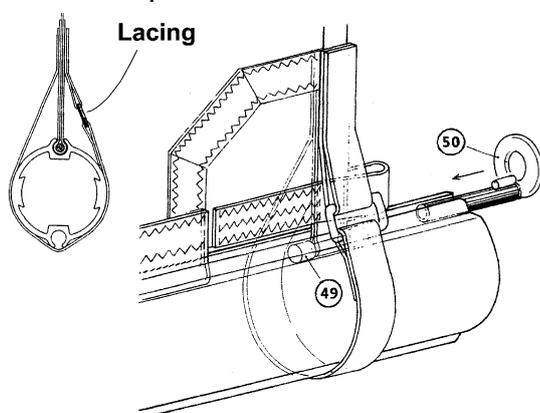
Drawing 15

IV 4 - Insert the webbing with the tack slide (48) into the foot track.

IV 5 - Insert the foot tape into the same foot track and gently pull the sail forward.

IV 6 - Once almost at the front end insert the clew slide (49) into the clew webbing so that the webbing is locked between the two small plastic cylinders of the clew slide (49), and insert the clew slide into foot track. Please see drawing 16.

IV 7 - Lock the flat part of the tack slide (48) into the machining at the front end of the foot track and pull the sail backwards to lock. Please see drawing 15.



Drawing 16

IV 8 - Slide the « finger » of the clew pin (50) with the ring upwards into the foot track. Please see drawing 16.

IV 9 - Lash a line between the clew webbing and the ring of the clew pin (43) and tension the foot of the sail. Make sure you tie or cut any loose or extra length of lash line.

IV 10 - Wrap the « leech webbing » under the mandrel, tie it on the webbing which is sewn on the other side of the sail and adjust its tension. Please see drawing 22.

IV 11 - Insert the battens into the batten pockets.

IV 12 - Attach the halyard to the head of the mainsail.

IV 13 - Unscrew by about 3 turns only the starboard side plastic knob (43) of the feeder (3) to increase the gap between the bronze rollers (44).

IV 14 - Slide the luff tape between the bronze rollers of the feeder and hoist by hand only a few centimetres of sail into the luff track.

V - FEEDER ADJUSTMENT

The feeder has features allowing :

** to very accurately trim the gap between the bronze rollers (44) to exactly match the bolt rope diameter.*

** to quickly increase the gap between the bronze rollers to easily insert the bolt rope/luff tape into the groove of the luff profiles after the sail has been furled or removed.*

** to instant bring back the correct gap for feeding the sail into the luff track to use the system .*

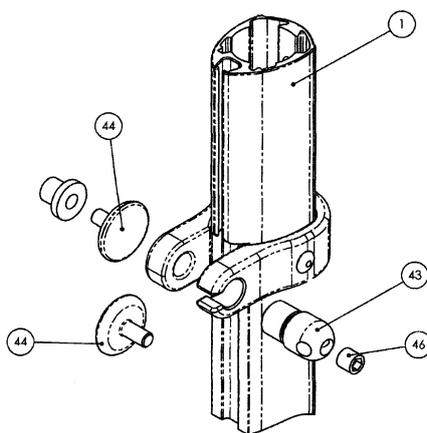
V 1 - ADJUSTMENT OF THE GAP BETWEEN THE ROLLERS (Please see drawing 17)

V 1 a - Screw by hand **but do not over tighten** the starboard side knob (43) of the feeder. Please see drawing 16.

V 1 b - Adjust screw (46) with an Allen key, till feeling that the luff tape is pinched. Then unscrew it back by about $\frac{1}{4}$ of turn to make the luff tape free to slide up and down. The adjustment is now correct.

V 1 c - Hoist the sail by gently pulling on the halyard.

V 1 d - To lower or furl the sail, release the halyard.



Drawing 17

V 2 - TO INSERT THE LUFF TAPE INTO THE FEEDER

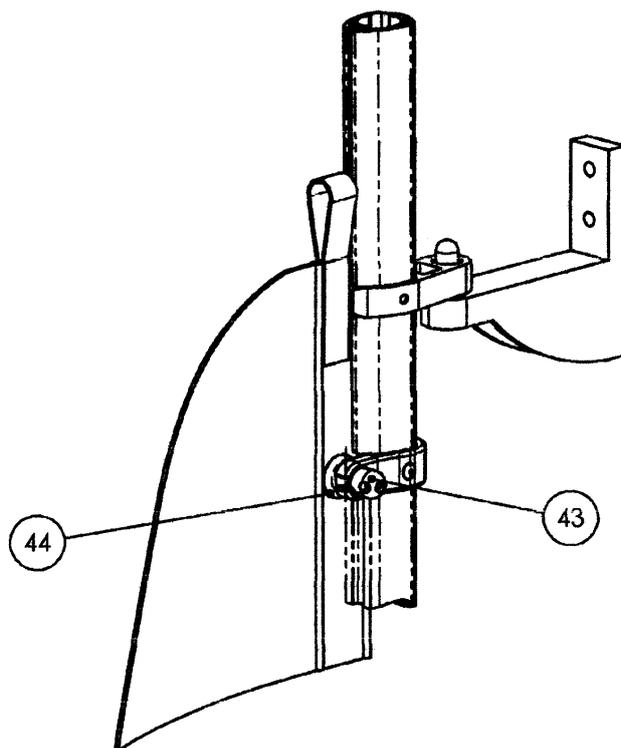
V 2 a - Unscrew the port side plastic knob (43) by a few turns to increase the gap between the bronze rollers (44).

V 2 b - Insert the bolt rope/luff tape between the 2 bronze rollers (44) and push it upwards into the luff groove.

V 2 c - Completely tighten by hand (**do not over-tighten**) the port side plastic knob (46).

V 2 d - Insert the luff tape directly into the luff track.

V 2 e - The mainsail is now ready to be hoisted.



Drawing 18

VI - ADJUSTMENT OF THE BOOMVANG ANGLE TO THE MAST

This essential procedure must be achieved either with no wind at all, or with extremely calm wind and the boat heading into the wind.

VI 1 - Hoist the sail as previously described and tension the halyard normally.

VI 2 - Completely loosen the nuts of the boomvang hound (28) , and make sure the hound is totally free to move fore and aft.

VI 3 - Make sure the mainsheet is completely loose and let the boom hang in this position.

VI 4 - Re-tighten the nuts of the boomvang hound (28) with the boom in this position.

VI 5 -The sail can now be furled by gently releasing the halyard and pulling together on the furling line.

VI 6 - Fine tuning of the boomvang position adjustment may be necessary :

1. If the luff tape rolls too much backwards, adjust the boomvang hound (28) position so that the boom angles down a little more.
2. If the luff tape rolls too much forward, adjust the boomvang hound position so that the boom angles up a little more.

VII - USING THE PROFURL IN-BOOM REEFING SYSTEM

IMPORTANT WARNING : when gibing please keep constant control of the boom with the mainsheet.

You can also install a boom brake. If a boom brake is added release it each time before operating the system.

Rules of thumb :

1. Make the boat's angle with the wind corresponding to a broad reaching or closer to the wind.
2. Before using the system completely release the mainsheet so that the boomvang push effect brings back the angle between the boom and the mast to its « operating » position.
3. If the mainsail is not properly do not attempt to correct this immediately, but hoist the sail completely, check points as per § **VI 6** and try again.

After a short period of time you will feel how much drag is to be given to the halyard to get the right tension to obtain a smooth furling of the sail.

During hoisting the sail a slight drag should be applied to the furling line in order to allow the furling line to be rolled tight enough in the drum : this will make next furling easier.

Should you wish to just a reef your sail, please carefully check that the head of the sail is just above a connector/articulation in order to prevent the luff profile to sag too much. Please stick insignia reefing marks on the luff of the sail which will be at feeder level to show when the head is at the convenient position.

When in **harbor**, or **sailing under power**, please **remove the halyard** from the head of the mainsail, **attach it** onto the rear end of the boom and **tension it**.

VIII - LIMITS FOR USING THE SYSTEM IN RELATION WITH APPARENT WIND

Some boats have spreaders at 90° from boat's axis, some other have spreaders angling backwards. Some other have aft shrouds.

In these last cases the sail will drag on the standing rigging earlier than with boats having spreaders at 90°. This means that the sailcloth will touch the standing rigging sooner or later depending on each boat. A smooth operation is obtained as long as the sail is not touching any shroud or spreader when the mainsheet is completely released. In other terms it is necessary to come into the wind to reef or furl the sail just as you would have done with conventional mainsail reefing.

However in case of emergency the sail can be rolled at larger angles to the wind till the stage when the friction on the standing rigging will make the system more and more difficult to operate. Friction would also obviously increase with the wind's speed. In this case a smooth furling can't be guaranteed.

WARRANTY

1- The PROFURL in-boom reefing system is warranted for 3 years from date of purchase against parts and materials, provided the warranty card is returned within fifteen days from date of purchase. The warranty covers the original owner and is not transferable.

2 -The warranty is limited to the repair and replacement of defective parts only by an authorised PROFURL dealer and only after the written consent of PROFURL France or PROFURL USA .

3 - This warranty covers only the PROFURL parts and materials. Any accidental damages or expenses are not covered.

4 - This warranty is void if the system is modified or repaired without prior written notification to PROFURL S.A. France or PROFURL, Inc (USA).

5 - This warranty does not cover damages caused by systems which has not been properly installed or used.

6 - This warranty does not cover the malfunctioning of the system due to a sail having been designed and made without strictly following the attached specifications.

7 - After installation the customer should check the following :

- the sail dimensions are accurately adapted to the system's dimensions.
- the sail has been designed and made according to the attached specifications.
- all screws are properly tight.
- the various adjustments and operating procedures described in this manual are properly achieved.

✂-----

Please return this portion within 15 days of purchase to :

PROFURL

ZA Pornichet Atlantique
16 Avenue du Gulf Stream
44380 Pornichet
FRANCE

Owner's name :.....

Date of purchase :.....

Boat's type.....

Boat's length.....

Boat's displacement.....

Mainsail's luff length.....

Mainsail's foot length.....

Installed by.....

Date..... Owner's signature :



IN-BOOM MAINSAIL REEFING-FURLING SYSTEM MK 3R MAINSAIL DESIGN SPECIFICATIONS

1. GEOMETRY

The design of the mainsail is very critical to the proper operation of the ProFurl In-Boom Reefing Furling system. General design requires a slightly flatter sail than normal with a minimum luff curve built into the sail to ensure proper rolling of the sail onto the furling mandrel and into the boom cavity.

a) Luff curve design:

Please refer to drawing #19. To compensate for various rig designs and mast prebend, a maximum of 2 inches of luff curve may be designed into the mainsail. Further draft must be built into the sail through the broadseams.

Caution : if the 2 inches luff curve is exceeded it is possible the sail will not roll properly into the boom cavity.

b) Draft:

As with any furling sail, the draft of the mainsail must be flatter than with a conventional mainsail. Leach broad seaming should remain normal with primary changes to the luff broad seams. A maximum draft of 8% may be used on a standard furling mainsail. This design will offer the most optimal sail shape for reefing and furling the mainsail.

If a deeper draft is desired for better light air performance, a sail shaping item such as foam pad must be added to the foot of the sail. The foam pad is designed into the foot of the sail under the same theory as a foam pad is added to the luff of a reefing-furling headsail. Shape and position of the foam pad will be determined by the depth and position of the mainsail draft.

Caution : Increasing the draft above 8% may create a less desirable sail shape when reefing the mainsail.

c) Tack angle and foot curve:

The tack angle based on a straight luff and foot **must be cut at 88°**. Please refer to drawing #20. Minimum foot curve should not exceed 0.5% of the foot length at mid-length of the foot. The finished foot of the sail should be a bolt rope with a finished diameter of 10 mm (3/8”).

d) Roach:

Maximum positive leach curve should not exceed 6% of the leach length. If a fuller roach is desired additional reinforcement will be necessary at the forward end of the batten pockets and may not allow the luff of the sail to set properly in light air. Also, the added load on the battens may accelerate luff tape and broad seams wear.

Battens

a) Number and type of battens:

4 semi-full length battens are recommended. Additional battens may be added, but keep in mind that additional battens create more bulk to the sail and will limit the ability to furl max luff length into the boom cavity. Semi-flat tapered battens may be used if desired, but may also add additional bulk to the sail.

b) Batten pocket positions:

Please refer to drawing #20 for batten pocket angles.

Note: batten pocket angles are based on a straight luff curve.

Batten pockets should be sewn on the **port side** of the sail and be of standard design based on the type of battens being used. Reinforcement of the batten pocket at the luff must **not** be closer than 33 mm (1 5/16") to the leading edge of the luff tape (see drawing #21). Leach end of the batten pockets may be finished in the sailmakers preferred style.

c) Leach line clam cleats (if any) should be fit on the port side of the sail.

2. HEAD, TACK AND CLEW ASSEMBLY

Only webbing straps of 50 mm (2") and a two ply maximum thickness of 4 mm (5/32") should be used at the tack and clew of the sail. Metal grommets should not be utilized as they will not allow the sail to furl properly and may damage the reefing-furling system. Please refer to drawings # 22 to 25 for specific details.

3. LUFF TAPE ASSEMBLY

Teflon luff tape with a finished diameter of 5.7 mm is recommended for the luff of the sail. Attachment of the luff tape should be performed with the sails final luff curve. Luff tape should have only one seam immediately aft of the bolt rope and fit to the sail with the bolt rope immediately aft of the bolt rope and fit to the sail with the bolt rope against the cut luff curve of the sail.

Caution : Luff tape applied to a sail based on a luff curve drawn onto the sail may shorten the life expectancy of the luff tape. Also luff tape with a secondary seam aft of the primary bolt rope seam may require replacement sooner than the recommended type.

LUFF AND FOOT TAPE DIAMETER

a) Luff tape:

Maximum finished diameter of 5.7 mm Teflon luff tape is recommended to minimize friction when hoisting and striking the sail OR Baimbridge BSS High Aspect or equal..

b) Foot tape:

Maximum finished diameter of 10 mm (13/32").

4. TACK AND CLEW REINFORCEMENT

a) Tack reinforcement:

Reinforcement patches at the tack are necessary but should add a minimum amount of bulk to this area of the sail.

b) Clew reinforcement:

A large primary clew reef patch is recommended. Take a measurement equal to 25% of the foot length, measure from the clew towards the tack & mark the sail at this point. At the 25% mark draw a line parallel to the luff of the sail up to the point where the line intersects the leach. A single layer over this entire area will help reinforce the clew and leach when the sail is reefed. Additional reinforcement in this area is at the discretion of the sailmaker.

5. LEACH REINFORCEMENT AND UV PROTECTION.

a) Leach reinforcement

The leach of the mainsail should have a secondary strip approximately 2 feet wide sewn onto the starboard side of the sail. This secondary strip will help to strengthen the leach of the sail as well as add additional bulk to the leach. By bulking up the leach of the sail the leach will roll tighter and improve the shape of the reefed sail.

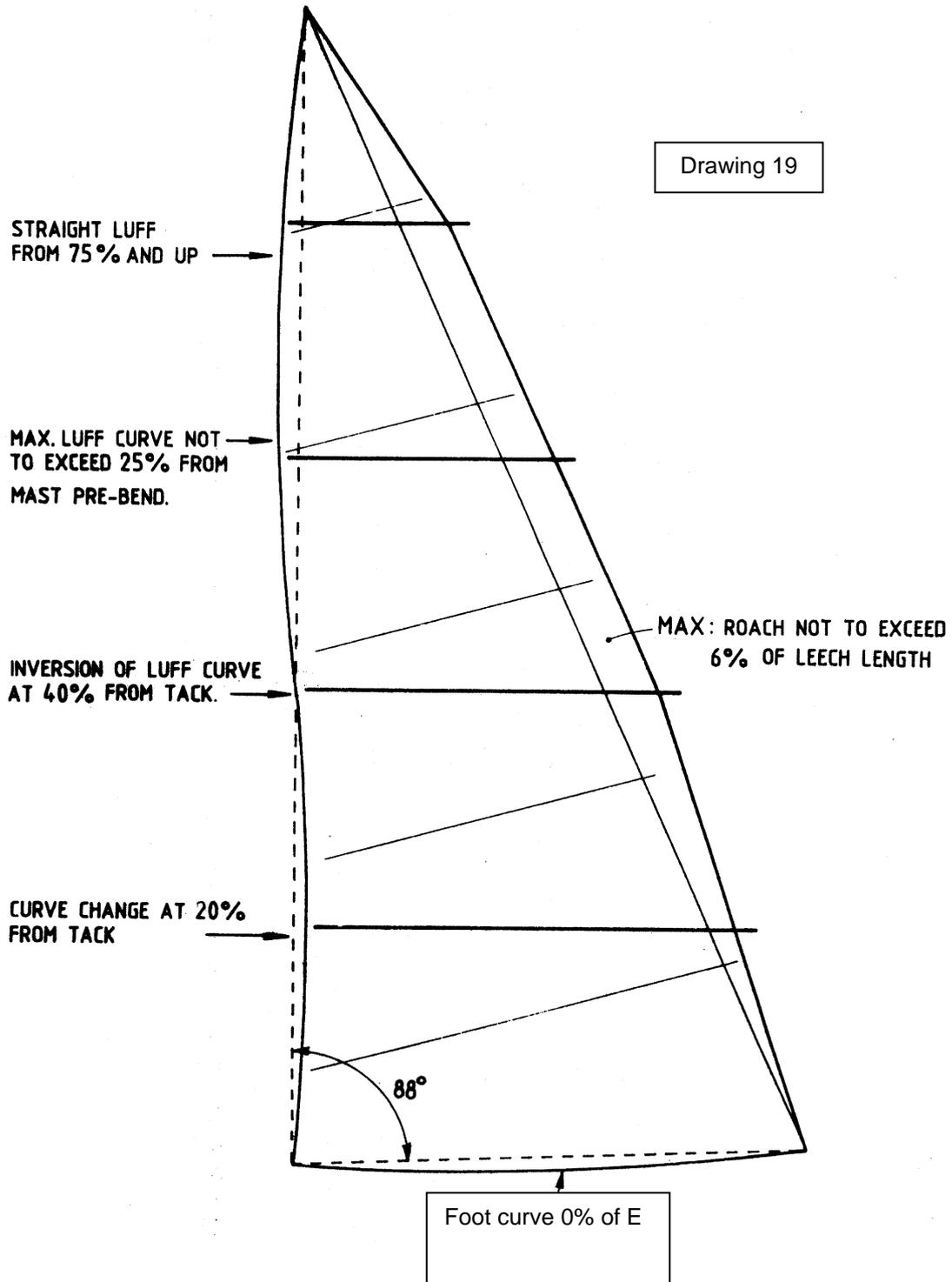
b) UV protection:

A sacrificial strip, applied to the starboard side of the sail, may serve as dual purpose. First to strengthen the leach and also to protect the rolled mainsail from the elements, if a UV stable material is utilized. By having a sacrificial strip on the starboard side of the leach the need for a formal sail cover is eliminated.

Note: The sacrificial UV strip must be wide enough to completely cover the sail when rolled onto a 95 mm (3 3/4") diameter mandrel (tube).

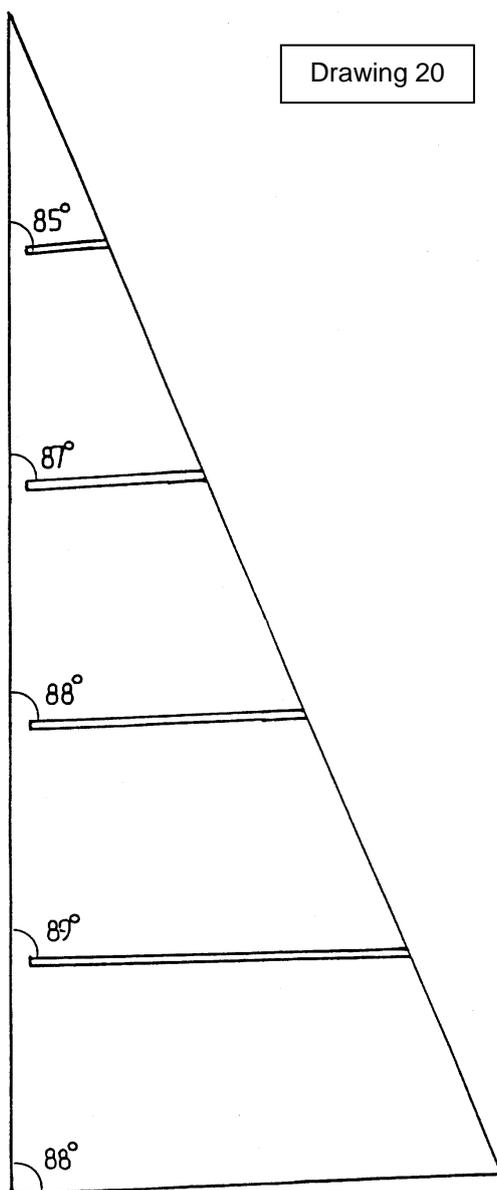
**4 BATTEN MAINSAIL
LUFF CURVE DESIGN**

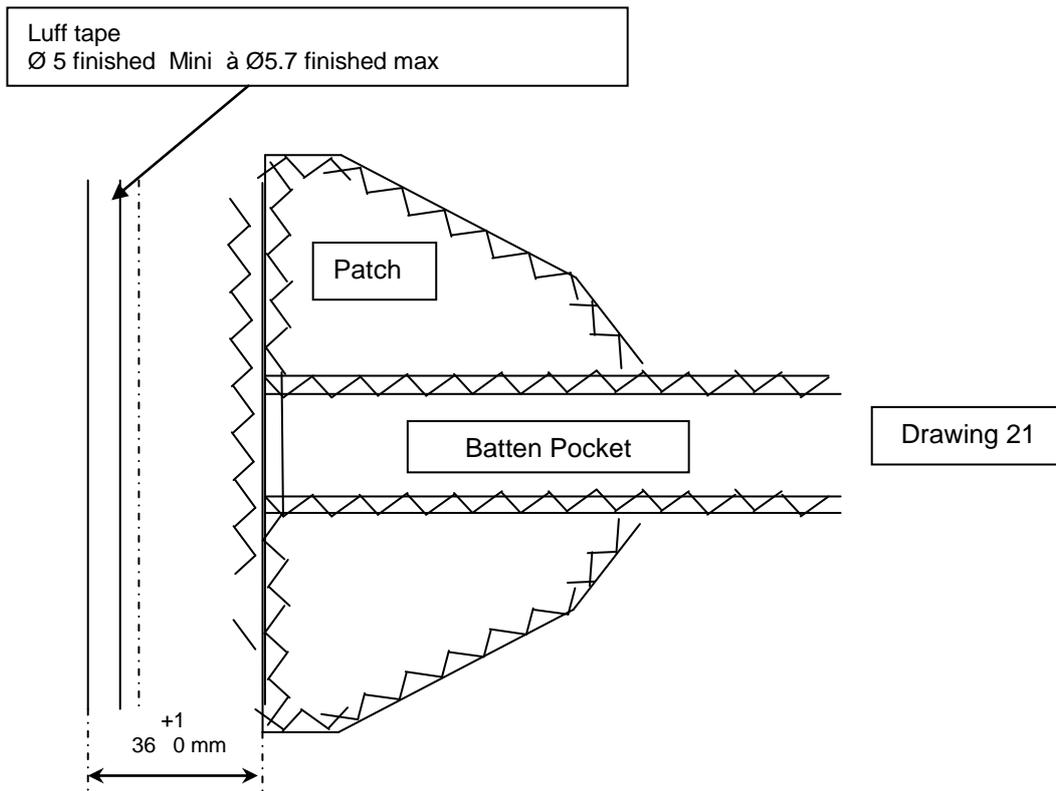
Drawing 19



BATTEN MAINSAIL
BATTEN ANGLE TO THE LUFF
CONSIDERED AS A STRAIGHT

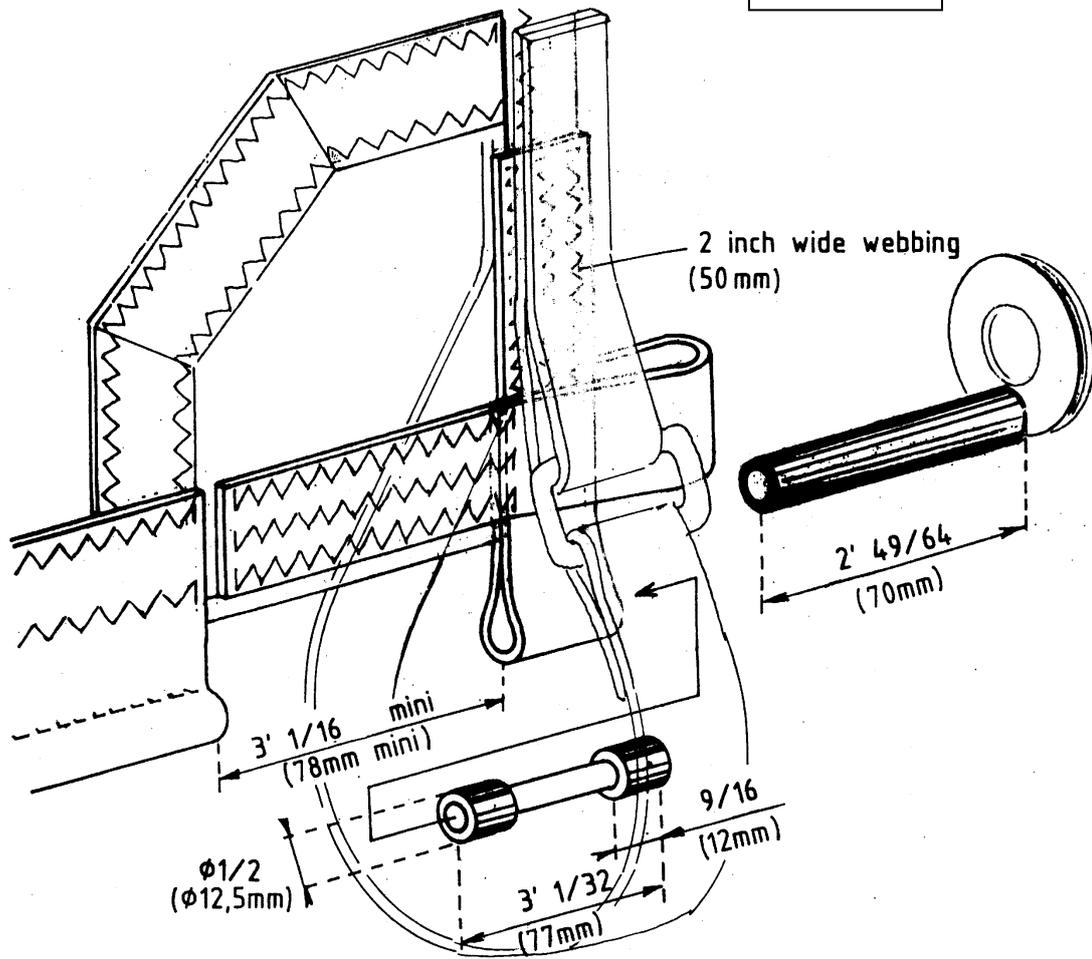
Drawing 20





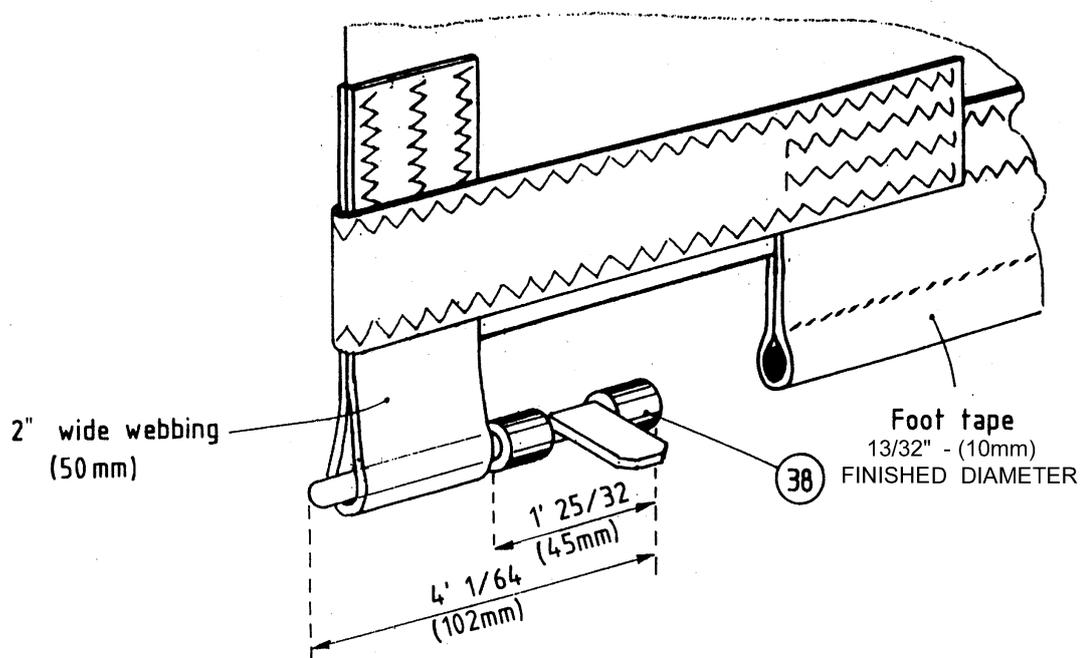
CLEW

Drawing 22



TACK

Drawing 23



Drawing 24

HEAD CONSTRUCTION

