RYA YTC, powered by the RORC RATING OFFICE

2023 POLICY AND PROCEDURES

Valid from 1 January 2023

YTC.RORCRATING.COM

Table of Contents

The YTC Committee thanks Professor Linda Wolstenholme (Cass Business School and Emsworth Slipper SC) for her kind permission to use her handicap models.

1. INTRODUCTION

1.1. The RYA YTC, powered by the RORC Rating Office (abbreviated to YTC) has been developed over recent years to assist the wide variety of yacht-types that take part in local and club-based events to race competitively and fairly. It is based on the statistical models developed by Professor Linda Wolstenholme, of the Cass Business School and Emsworth Slipper SC. The system is jointly owned by the RYA, YTC Main Committee and RORC Rating Office. The system is administered by the RORC Rating Office with the kind assistance of the YTC Main Committee.

1.2. The aim of this document is to set out the process by which a boat's YTC number is developed. The ethos throughout is to develop the number in a fair, open and transparent manner, if necessary, bringing the yacht's skipper into the discussion where appropriate. It is intended that the YTC process will assist the achievement of fair racing as required by the Racing Rules of Sailing.

1.3. Boats competing in racing will be allocated a YTC number using the process shown in Section 3 below.

1.4. A boat's YTC number may be used by individual clubs at their discretion: for club racing only, the YTC system allows a club's handicapping team to adjust a boat's YTC number as it sees fit.

2. APPLICATION PROCESS

2.1. Boats wishing to apply for a YTC number are to complete and submit a web-based YTC Form. This is obtained by following the process set out at ytc.rorcrating.com or www.swytc.org.uk.

2.2. The first step is to request a code to access the application form (see the example screenshots at Appendix B). The user is informed of the code by email and this should take a few moments only. The code is then entered (see the example screenshots at Appendix C) and the application form is completed (see the screenshots at Appendix D). If the system already has data about the boat on the YTC system, a recall code will be emailed to the user that when applied will automatically upload those data and populate the form with minimal input from the user, but the user will be able to edit those data if necessary and be asked to confirm that the data is correct.

2.3. A new form should be submitted if there is a change to a boat's data during the season.

2.4. The RORC Rating Office or YTC Main Committee will use the data supplied as a basis for calculating a YTC number but reserves the right to overrule specific data or to standardise dimensions, e.g. for a one-design class.

2.5. The boat weight and other hull data will be based on the RORC Rating Office standard hull data. If that is not available, then boat brochure data or other available data will be used.

2.6. It is a breach of the rules for any owner to intentionally supply false information.

2.7. The RORC Rating Office and/or YTC Main Committee at their sole discretion may refuse to issue or re-issue a YTC certificate.

3. YTC CERTIFICATE

3.1. A boat while racing using YTC shall comply with the rules of the event and shall comply with their YTC certificate in accordance with Racing Rules of Sailing RRS 78.

3.2. Boat-owners will receive a YTC certificate by email showing the boat's allocated YTC number and the data on which that YTC number is based (see the example at Appendix F); this is generated by the YTC software under the control of the YTC administrators.

3.3. If a boat's sails are measured by a sail measurer during that process, a YTC sail measurement certificate will be issued: see the example at Appendix G. Sails may be measured using the in-house certification system, RYA sail measurer or other measurer approved by the RORC Rating Office or YTC Main Committee.

3.4. A boat shall only hold one valid YTC certificate and Issue of a new YTC certificate automatically invalidates the old one.

3.5. The RORC Rating Office, YTC Main Committee or RYA at their sole discretion may withdraw a YTC certificate where there is reasonable evidence that a boat does not conform to its certificate, an error in determining the rating or any other reason involving breach of the rules, good manners or sportsmanship.

3.6. The RORC Rating Office or YTC Main Committee may require a boat to be submitted for measurement at any time without giving reason.

4. PROCESS FOR DEVELOPING A YTC NUMBER

4.1. In general, a boat's basic YTC number will be calculated automatically by the YTC software using the boat measurement data in section 5 below and the formulae in section 6 below.

4.2. The YTC number will then be adjusted to reflect the yacht's engine and propeller configuration, rig and downwind sail area using the tables in section 7 below.

4.3. Some boats (e.g. light displacement boats, gaff-rigged boats and others) will be allocated a YTC number using the formulae and other pertinent data as necessary at the sole discretion of the RORC Rating Office or YTC Main Committee

4.4. The calculated number shall be the boat's YTC number for events and inter-club racing, and the basic number for club events. A boat's YTC number may be used at other events, at the discretion of the relevant organising authority.

4.5. Failure to complete the YTC Form before racing may result in a temporary YTC number being issued until the necessary boat data has been obtained and checked and the necessary calculations have been completed. Late entries may also be allocated a temporary YTC number, until the necessary calculations can be completed.

4.6. When issued, a temporary YTC number shall not be altered; also, any results using this number shall not be altered retrospectively.

4.7. YTC numbers are calculated in good faith from the data available. Neither the RORC Rating Office, YTC Main Committee or RYA shall have any liability whatsoever for any error in the application of the policies or the determination of any YTC number or changes in the policy or rules.

4.8. Queries concerning individual YTC numbers shall be made in writing to the RORC Rating Office at admin@swytc.org.uk.

5. YTC DATA

5.1. YTC uses boat measurements and data to calculate a YTC number. The required measurement data and units and are as follows:

Data	Description
LH	Hull length overall (metres)
LWL	Waterline length (metres)
D	Boat weight (displacement), empty/dry (kilograms)
d	Draft (metres)
SA	Total upwind sail area (metres^2) Sum of mainsail and headsail (genoa or jib) area
DSA	Total downwind sail area (metres^2) Sum of mainsail and spinnaker area

5.2. Boat data are the maximum value except for boat weight which is the minimum value.

5.3. In addition, the propeller type and keel configuration are required, see Section 6 and 7.

5.4. To calculate mainsail, headsail and spinnaker areas from linear sail measurements see Appendix A.

6. YTC FORMULAE

6.1. Yachts will be issued a YTC number which will be based on the formulae in the table below:

YTC Formula Fin-keeled boats	$YTC = k_f\left(2091 - 407d + 86d^2 - 30.5L - 59.6\frac{SA}{L^2} - 810\frac{SA^{1/3}}{D^{1/4}}\right)$
YTC Formula Bilge-keeled boats	$YTC = k_f\left(1801 - 307d + 65d^2 - 23L - 44.9\frac{SA}{L^2} - 611\frac{SA^{1/3}}{D^{1/4}}\right)$
Notes	flat single keels, k_f = 1.00 long keels k_f = 0.98 for non-flat keels (bulbs, winged, etc.), k_f = 1 - 0.003*k_g k_g ranges from 1 for a slight flare or bulb to 5 for a winged keel. twin bilge keels, k_f = 1.00 triple bilge keels, k_f = 1.01
	L = LH - 0.5*(LH - LWL)

6.2. To calculate a YTC corrected time the formula is as follows:
Corrected Time = Elapsed Time * 1000 / YTC

7. YTC RIG AND ENGINE RELATED ADJUSTMENTS

7.1. The formulae in paragraph 6.1 above assume a boat has a two-blade fixed propeller and a spinnaker.

7.2. Calculated basic YTC numbers will be adjusted to reflect declared engine, propeller and sail configurations, using the tables below:

Engine related	**Percentage allowance**
2-blade fixed propeller	0% (this configuration is assumed in the formulae)
3-blade fixed propeller	+2%
Folding propeller	-1%
Outboard (able to be lifted clear of water)	-2%

Rig related	**Percentage allowance**
Use of conventional or asymmetric spinnaker	0% (this configuration is assumed in the formulae)
No use of spinnaker or other downwind sail	+2.5%
In mast reefing	+2%
Twin mast ketch	+3%
Spinnaker Area Allowance (to account for variation in spinnaker area)	The formula 1.75 - (DSA/SA) generates the percentage required.

8. COLLECTION OF RACE TIMINGS DATA

8.1. An important part of the YTC quality control process lies in verifying that under normal race conditions, boats perform approximately to their YTC number. This is achieved by comparing their calculated performance number in a race or series of races, with their YTC number. This performance number can be calculated using the YR2 process, from the elapsed times recorded for each boat on a race spotting or recording sheet.

8.2. A specimen proforma for recording these data in a fleet race is at Appendix H. A specimen proforma for a pursuit race is at Appendix I. These forms are normally completed by the race committee team. Clubs in the YTC scheme should compile a file of these recording sheets as the season progresses; these data files will then inform the end-of-season performance review process.

Note. Quite clearly, normal club spotting or recording sheets, or Sailwave print-outs, could be adapted for this task. However, in order to achieve proper analysis of the results, all the data fields shown on the templates should be on such an adapted form and should be completed for each race and the boats sailing in that race.

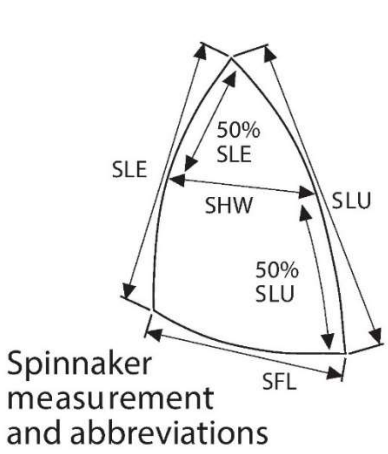
APPENDIX A – SAIL AREA CALCULATIONS

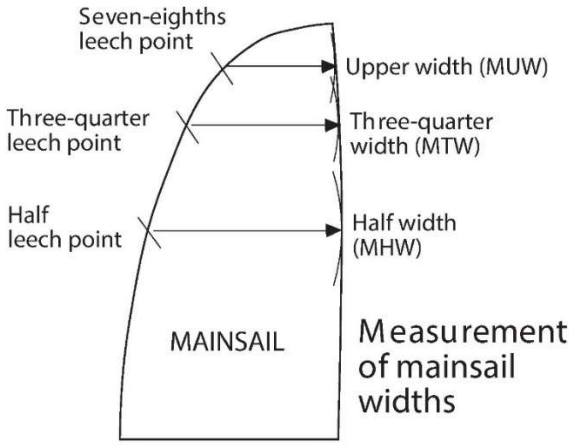
Mainsail Area = (P/8) * (2.04*E + 3*MHW + 1.5*MTW + MUW)

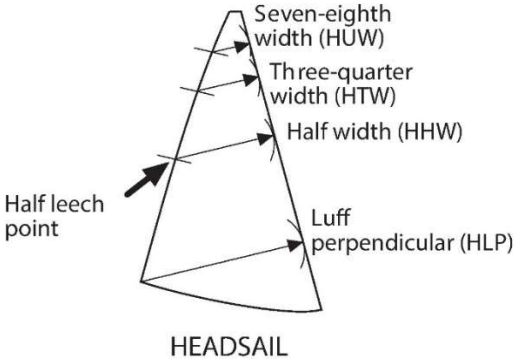
Where P is the **Mainsail Luff Mast Distance** – See Equipment Rules of Sailing F.2.3(d)
E is the **Boom Outer Point Distance** – See Equipment Rules of Sailing F.3.3(a)

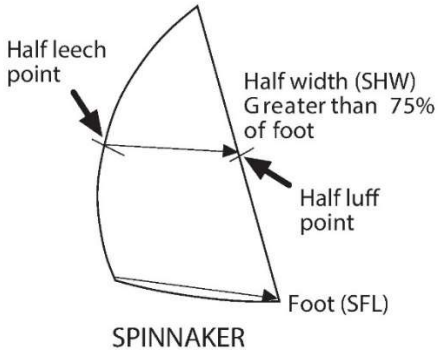
Headsail Area = 0.0625*HLU*(4*HLP + 6*HHW + 3*HTW + 2*HUW + 0.09)
Where HLU is the Headsail Luff Length

Spinnaker Area = ((SLU + SLE)/2) * ((SFL + (4 * SHW))/5) * 0.83

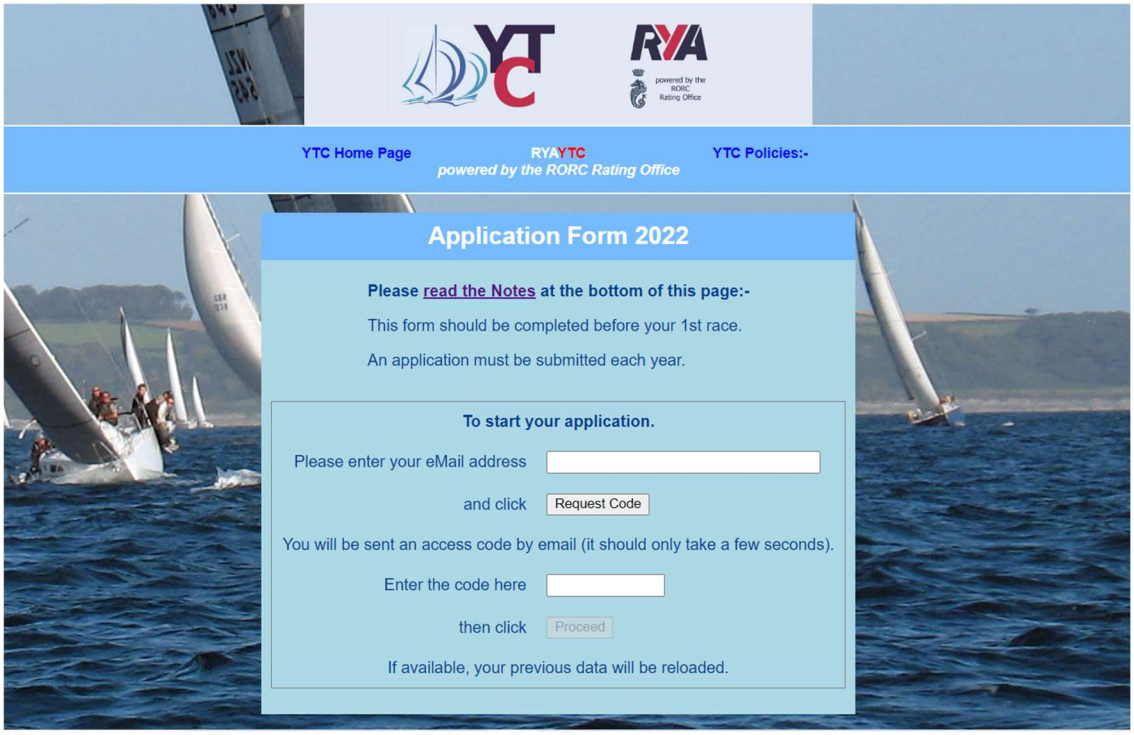






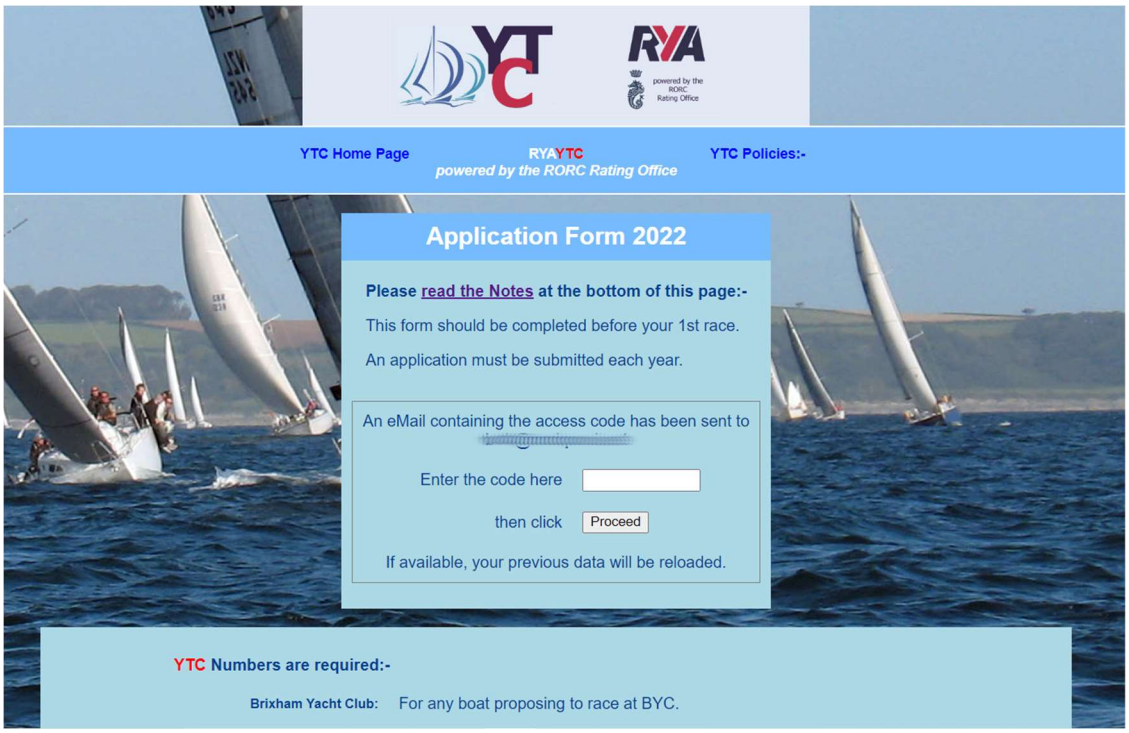


APPENDIX B - THE INITIAL FORM TO ACCESS THE RYA YTC SYSTEM



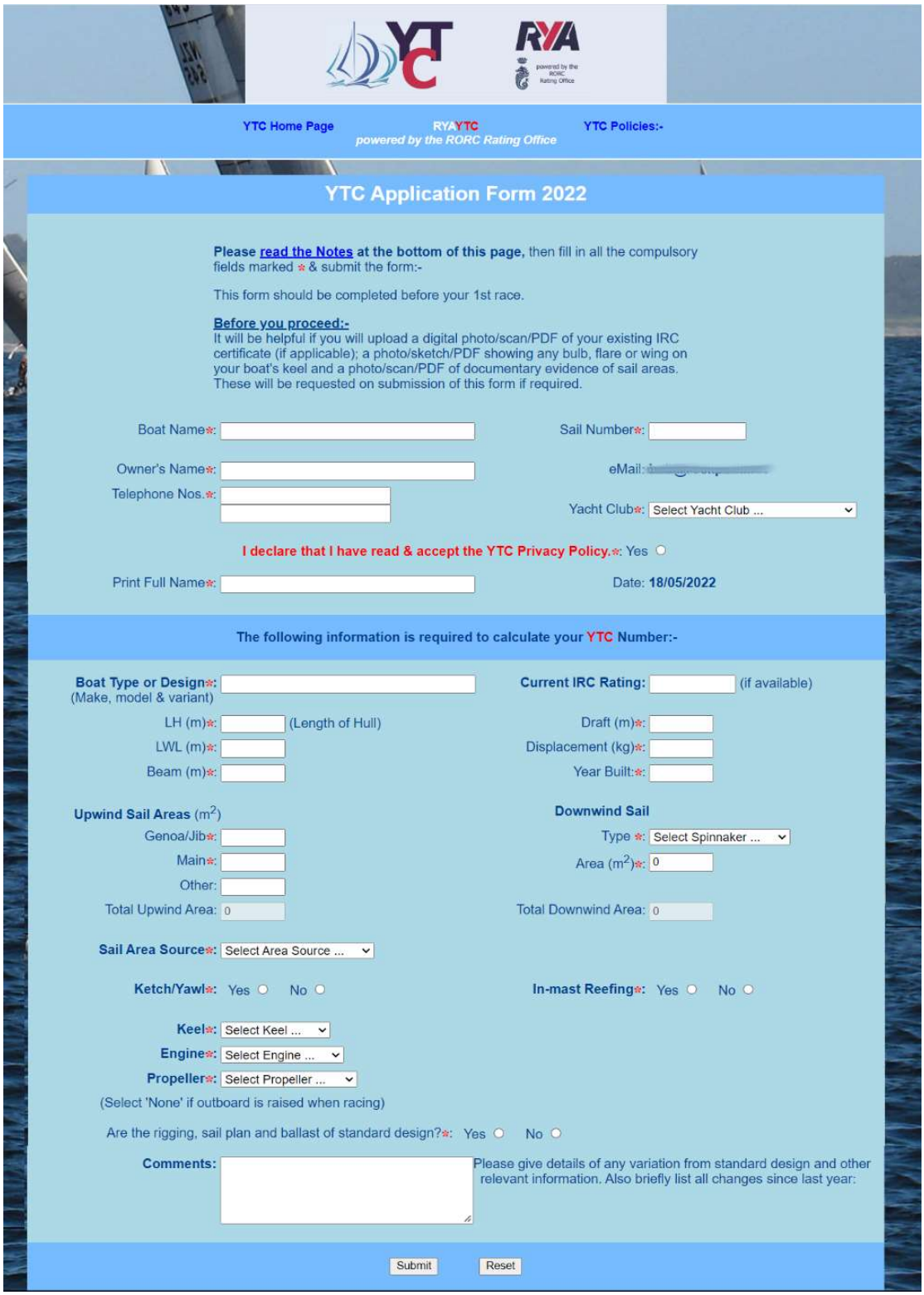
Enter your email address and click “Request Code”. You will be sent an access code by email.

APPENDIX C - ENTER THE CODE TO ACCESS THE APPLICATION FORM



Enter the access code and click “Proceed”

APPENDIX D - SCREENSHOT OF THE WEB-BASED YTC DATA ENTRY FORM



YTC Home Page | RYA YTC powered by the RORC Rating Office | YTC Policies:-

YTC Application Form 2022

Please read the Notes at the bottom of this page, then fill in all the compulsory fields marked * & submit the form:-

This form should be completed before your 1st race.

Before you proceed:-
It will be helpful if you will upload a digital photo/scan/PDF of your existing IRC certificate (if applicable); a photo/sketch/PDF showing any bulb, flare or wing on your boat's keel and a photo/scan/PDF of documentary evidence of sail areas. These will be requested on submission of this form if required.

Boat Name*: | Sail Number*: | Owner's Name*: | eMail: | Telephone Nos.*: | Yacht Club*: Select Yacht Club ...

I declare that I have read & accept the YTC Privacy Policy.*: Yes

Print Full Name*: | Date: 18/05/2022

The following information is required to calculate your YTC Number:-

Boat Type or Design*: (Make, model & variant) | **Current IRC Rating:** (if available)

LH (m)*: (Length of Hull) | Draft (m)*:
LWL (m)*: | Displacement (kg)*:
Beam (m)*: | Year Built:*:

Upwind Sail Areas (m^2)

Genoa/Jib*:
Main*:
Other:
Total Upwind Area: 0

Downwind Sail

Type *: Select Spinnaker ...
Area (m^2)*: 0
Total Downwind Area: 0

Sail Area Source*: Select Area Source ...

Ketch/Yawl*: Yes No | **In-mast Reefing*:** Yes No

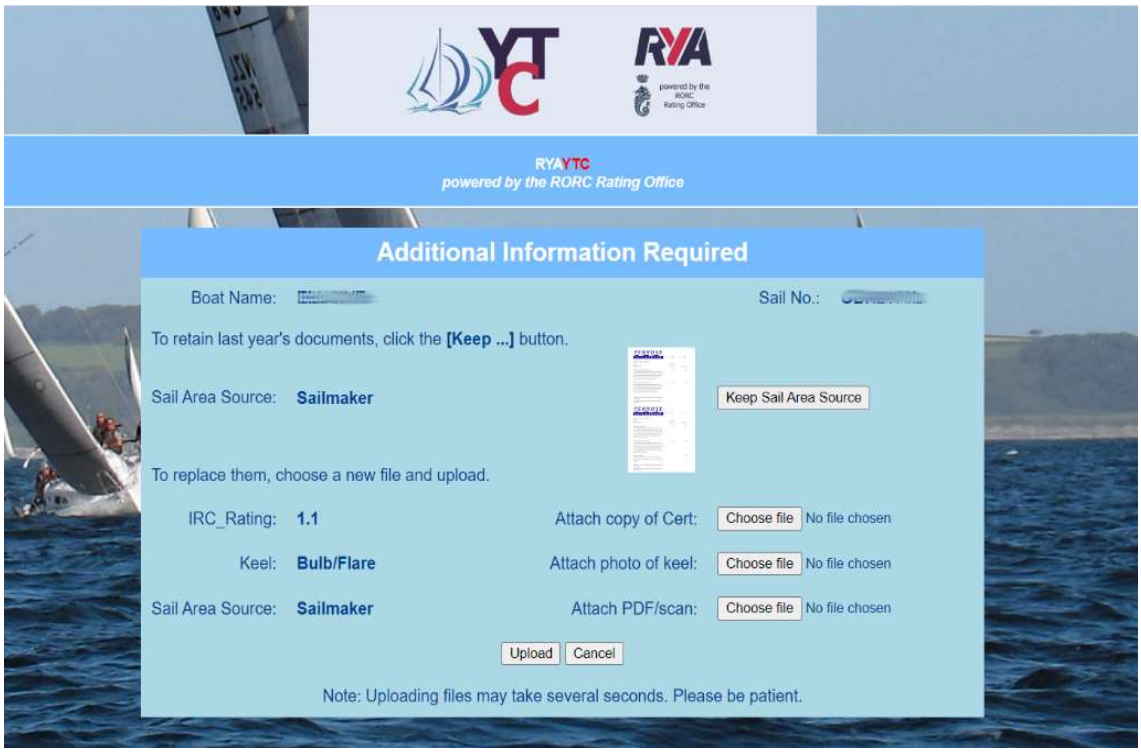
Keel*: Select Keel ...
Engine*: Select Engine ...
Propeller*: Select Propeller ...
(Select 'None' if outboard is raised when racing)

Are the rigging, sail plan and ballast of standard design?*: Yes No

Comments: Please give details of any variation from standard design and other relevant information. Also briefly list all changes since last year:

Submit | Reset

APPENDIX E - SCREENSHOT 2 OF THE WEB-BASED RYA YTC DATA ENTRY FORM



Additional information may be required depending upon your answers to the questions on the main form. Please upload supporting documents in PDF, JPG or PNG formats and keep image files below 1MB.

APPENDIX F - AN EXAMPLE YTC CERTIFICATE

Tony Hardman

From: noreply@swytc.org.uk
Sent: 13 February 2019 15:32
To: [redacted]
Subject: swYTCs Certificate

South West Yacht Time Correction System

YTC Certificate 2019

Boat Name: WIZARD OF CLEE Sail No.: 1813 T

YTC No.: 1065 White Sail: 1065

Boat Type: Beneteau First 285 Config uration: 0FIBF

Date Issued: 13/Feb/2019 Expiry Date: 31/Dec/2019

These YTC numbers are calculated from the following data:-

LOA (m)	LWL (m)	Beam (m)	Draft (m)	Displac ement (kg)
8.44	7.62	3	1.2	2800
Jib SA (m²)	Main SA (m²)	Other SA (m²)	Upwind Total (m²)	
21.656	17.857		39.513	
Downwind Sail	< td>Downwind SA (m²) Downwind Total (m²)	Ketch/Yawl	Inmast Reefing	
None	0	39.513	No	No
Keel	Engine	Propeller		
Wing	Inboard	Folding/Fe ther ng		

Certificate No.: 2019/375 ontact: admin@swytc.org.uk

EXAMPLE

EXAMPLE

1

APPENDIX G - AN EXAMPLE YTC SAIL MEASUREMENT CERTIFICATE

27/02/2018 South West Yacht Time Correction System - Sail Measurement Certificate

South West Yacht Time Correction System

Sail Measurement Certificate

Boat_Name:	Wizard of Clee	Sail_Number:	GBR1813T
Headsail	(m)	**Mainsail**	(m)
Headboard (HHB):	.07	Headboard (MHB):	.134
Luff_Length (HLU):	9.32	Luff_P (MLP):	9.19
Luff_Perp (HLP):	4.57	Foot_E (MFE):	3.34
1/4 (HQW):	3.37	1/4 (MQW):	2.804
1/2 (HHW):	2.21	2 (MHW):	2.07
3/4 (HTW):	1.082	3/4 (MTW):	1.16
7/8 (HUW):	.56	7/8 (MUW):	.65
Mid_Width (HMW):	3.5		
Foot_Length (HFL):	4.78		
Ratio HMW/HFL:	0.732		
Downwind Sail	(m)	**Sail Area**	(m^2)
Sail_Type (SST):	White Sail	Headsail:	20.951
Luff_Length (SLU):		Mainsail:	17.857
Leech_Length (SLE):		Downwind:	0.0
Half_Width (SHW):		Total Upwind Area:	38.808
Foot_Length (SFL):		Total Downwind Area:	38.808
		Ratio Downwind/Upwind:	1
Comments:	Test measurement		
Measurer:	A Davis	Date:	27/02/2018

SPECIMEN

APPENDIX H - TEMPLATE YTC RACE DATA COLLECTION SHEET FOR A FLEET RACE

CLUB	**RACE** (Series, race number)	TIME OF START FOR CLASS	DATE

CLASS	COURSE SAILED	Wind direction / speed at start	Wind direction / speed at finish

Sail number	Boat	Owner	YTC number	Finishing time	Elapsed time	Corrected time	Position

APPENDIX I - TEMPLATE YTC RACE DATA COLLECTION SHEET FOR A PURSUIT RACE

CLUB	**RACE** (Series, race number)	DATE

CLASS	COURSE SAILED	Wind direction / speed at start	Wind direction / speed at finish

Sail number	Boat	Owner	YTC number	Start time	Finishing time	Elapsed time	Corrected time	Position