

Selection of Equipment - Evaluation Panel Report

2024 Mixed Two Persons dinghy event

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1 Introduction

Following the slate of Events approved by Council at the Annual Conference in November 2018, World Sailing invited Class Associations and manufacturers to tender for equipment to be selected for the **Mixed two persons dinghy event**, starting at the 2024 Olympic Sailing Competition.

The process for the selection is guided by World Sailing regulations. An Evaluation Panel formed with members of the relevant Committees evaluated the tenders against World Sailing Policies and the approved Equipment Criteria.

This report seeks to serve as guidance for the Equipment Committee in its task to make a recommendation to Council for the selection of equipment under regulation 23 for the Mixed Kite event.

2 Executive Summary

The evaluation followed the procedure stated in the Invitation to Tender. World Sailing received tenders from the Melges 15, a concept design from Melges Boat Works, and from the 470 Class Association.

- The International 470 Class is responsible for the organization and administration of the 470 Class around the world. The equipment is manufactured either by licensed manufacturers (currently applicable to hulls only) or freely by any interested party (spars, hull appendages, sails, fittings and other equipment).
- Melges Boat Works withdrew their application of the Melges 15, resulting in the 470 Class as the sole tenderer.

Recommendation:

Having found the 470 Class tender compliant with all requirements and the equipment well suited against all criteria, the Evaluation Panel recommends to the Equipment Committee that the 470 is selected as the Mixed Two Person Dinghy Equipment subject to the Olympic Classes Contract for 2024.

3 Evaluation

3.1 Evaluation panel

The Evaluation Panel was appointed by the Equipment Committee and brought together different backgrounds including members from the Equipment Committee, the Events Committee, World Sailing's Technical and Offshore team and Board members:

Dina Kowalyshyn	Equipment Committee Chair, and Evaluation Chairman.
Torben Grael	Board Member, World Sailing Vice President
Bill Abbot	Equipment Committee
Cedric Fraboulet	Equipment Committee
Riccardo Simoneschi	Events Committee
Jaime Navarro	WS - Head of Technical and Offshore
Hendrik Plate	WS - Technical Specialist

3.2 Criteria

The tenders have been evaluated against World Sailing Policies and the approved Equipment Criteria around the following areas: Equipment criteria, Technical considerations, Event considerations, Cost, Durability, Sustainability and Market considerations. The Invitation to Tender document containing all related criteria can be found here:

[http://www.sailing.org/tools/documents/MixedtwopersonsdinghyTenderinvite-\[24769\].pdf](http://www.sailing.org/tools/documents/MixedtwopersonsdinghyTenderinvite-[24769].pdf)

The approved main equipment criteria from Submission 058-18 is described as:

- A displacement boat (non-foiling),
- Glass fibre reinforced with polyester hull construction,
- Suitable for a skipper weight range between 50kg to 70kg,
- Suitable for a crew weight range between 65kg to 80kg.
- A single trapeze rig with a 9m² to 10m² mainsail, a 3m² to 4m² jib and a 13m² to 14m² Symmetrical Spinnaker.
- Suitable for competition at wind ranges between 5 to 35 knots
- Allow for multiple manufacturers (such as 'measurement controlled' Classes)

3.3 Procedure

The invitation to tender, published on the 12th February 2019 at the World Sailing website divided the evaluation process in two phases. The results of each phase would determine the need to go to the next phase.

'Phase 1

Document based evaluation of tenders against Equipment criteria and technical considerations, Event considerations, Cost, durability and sustainability considerations and Market considerations as described in part 3 of the document' (Invitation to Tender). 'The Evaluation Panel will shortlist the candidates to continue with Phase 2.'

'Phase 2

Shortlisted tenders will be requested to provide any additional information required to evaluate the tender. If the Evaluation Panel considers it a requirement, World Sailing Technical and Offshore Department Staff will visit production and/or assembly sites or proposed events for shortlisted tenderers.'

The submitted documents were evaluated and following the withdraw of the Melges 15

Following Phase 1, the Evaluation Panel concluded that the tender from the International 470 Class Association was fully compliant and its equipment matched all stated criteria.

4 470 – Equipment

4.1 Spars, Hull appendages and Sails

‘Sails can be manufactured worldwide by anyone without restriction, but are measurement controlled and are required to be certified in accordance with the Class Rules before they can be used for racing. Currently all of the main sailmakers of the class are licensed within the In-House Certification (IHC) system of WS, which negates the need for sailors to find official measurers to certify their sails and greatly simplifies inspection process at major events. All sails must carry royalty sail labels which manufacturers have to buy from the International 470 Class.

Masts, booms, spinnaker poles, centreboards and rudders may be manufactured by anyone without restriction. There is no certification requirement but these parts are measurement controlled during event inspections. There is no royalty labelling system in place yet.

Beyond 2020, the International 470 Class plan is to permit carbon fiber masts and for that to happen a licensing system, identical to that of the hulls, shall be introduced.

These masts will be constructed under a detailed Building Specification and only mast manufacturers who comply with these requirements will be licensed. Royalty / identification labels will be used in the same way as the hull plaques.’

4.2 Hull

‘Hulls may be manufactured by WS licensed manufacturers in compliance with strict Building Specification, production standards and full measurement at the builder premises.

Each hull is delivered to the customer with a fully filled measurement form and a WS plaque affixed. The current status of plaque sales for 2017 & 2018 is detailed below, together with the approximate build capacity achievable by each manufacturer.’

4.3 Boat Fittings

‘Sailors may use boat fittings, such as blocks, cleats, lines, shrouds, compasses, covers, trailers, etc. from any manufacturer, as long as in compliance with the Class Rules.

Sailors will make their choice of equipment manufacturer, depending on their sailing level, sailing style, boat configuration and personal preference.

Popular manufacturers include: Allen Brothers, Clamcleat, Harken, Kingfisher, Marlow, Ronstan, RWO, Schaefer, Sea Sure, Selden, Servo, Spinlock, SuperSpars, Raymarine/TackTick.’

5 470 Class Tender information - Equipment Considerations

The following is an extract from the tender documentation received from the 470 Class:

a) Proof of Compliance with World Sailing Equipment Criteria

The 470 Class equipment is fully compliant with the World Sailing Equipment Criteria as below:

- A displacement boat (non-foiling),

The 470 is a conventional centreboard dinghy designed to plane easily both upwind and downwind.

- Glass fibre reinforced with polyester hull construction,

As explained in 4 (b) (i) below, the 470 is built under a strict specification and permitted materials for the hull laminates include polyester resin and E-Glass chopped strand mat, woven roving or multiaxial fabrics.

- Suitable for a skipper weight range between 50kg to 70kg,
- Suitable for a crew weight range between 65kg to 80kg.

A fully adjustable racer, the 470 is the only Olympic Class boat tunable to suit different sailing styles and crew weights. The 470 is the premier non-sailboard solution for lightweight athletes' Olympic participation since 1976, and suits the widest range of athlete body types among all current Olympic Classes. The 470 is the only dinghy in the Olympic Games that caters for lightweight men. A high percentage of young men worldwide weigh naturally between 60-75kg. This is especially so in Asian countries and is another reason why the 470 has such worldwide appeal. Men helms optimally are 60-70kg, and men crews 67-80kg. Optimum weight for women 470 helms can be 50-65kg and for crews 65-75kg.

Athlete body range data 2012 & 2016 Olympic Games				
Women			Men	
Helm	Crew		Helm	Crew
156-178	165-187	Height - cm	167-183	166-193
48-67	61-73.5	Weight - kg	59-69	63-79
17 to 36		Age - years	15 to 40	

- A single trapeze rig with a 9m² to 10m² mainsail, a 3m² to 4m² jib and a 13m² to 14m² Symmetrical Spinnaker.

The 470 Class Rules permit only a single trapeze on the rig. Approximate sail areas are: mainsail 9.1m², jib 3.6 m² and spinnaker 13 m²

- Suitable for competition at wind ranges between 5 to 35 knots

The 470 is arguably the only all-weather two-person boat in the Olympic programme, offering level field tactical racing and high performance from 5 to

35 knots and from flat water to big seas. The range of sail and rig controls on the 470 allows the boat to be tuned to obtain optimum performance in a wide range of conditions; a skill that is fundamental to sailing in the wider context.

- **Allow for multiple manufacturers (such as ‘measurement controlled’ Classes)**

The 470 is a well-controlled one-design class, with excellent Class Rules and Building Specification, delivering a level playing field, with competitive equipment readily available from many independent manufacturers around the world along the principles outlined and explained in 3(b) above.

b) Construction and Design Considerations

(i) Building specification; including dimensions, weights, materials (For hull, appendages, spars, and sails)

The hull lines are described in a set of electronic files that are distributed to the licensed manufacturers by WS.

The hull shape is controlled by a 12-piece set of aluminium templates, which is CNC-manufactured by a single supplier and then distributed to all licensed manufacturers, ensuring uniformity and consistency. Copies of the design files are kept by WS. Measurement is performed according to the class rules, section D, which can be found in the WS website: [http://www.sailing.org/tools/documents/470CR150119-\[24655\].pdf](http://www.sailing.org/tools/documents/470CR150119-[24655].pdf)

Hull construction details, materials, deck and cockpit general arrangement is described in the detailed ‘Building Specification’, the latest version of which can be found in the WS website and is included in Appendix 4 with the Class Rules: [http://www.sailing.org/tools/documents/470005080213BuildSpec-\[14399\].pdf](http://www.sailing.org/tools/documents/470005080213BuildSpec-[14399].pdf)

Hull fittings and control systems are described in the Class Rules, section D, which can be found in the WS website: [http://www.sailing.org/tools/documents/470CR150119-\[24655\].pdf](http://www.sailing.org/tools/documents/470CR150119-[24655].pdf)

Hull appendages shape, construction materials and fittings are described in detail in the Class Rules, section E, which can be found in the WS website: [http://www.sailing.org/tools/documents/470CR150119-\[24655\].pdf](http://www.sailing.org/tools/documents/470CR150119-[24655].pdf)

Rig dimensions, materials and fittings are described in detail in the Class Rules, section F, which can be found in the WS website: [http://www.sailing.org/tools/documents/470CR150119-\[24655\].pdf](http://www.sailing.org/tools/documents/470CR150119-[24655].pdf)

Sail dimensions and materials are described in detail in the Class Rules, section G, which can be found in the WS website: [http://www.sailing.org/tools/documents/470CR150119-\[24655\].pdf](http://www.sailing.org/tools/documents/470CR150119-[24655].pdf)

There are no rig and sail plans in the Class Rules document because the class is following the ERS and thus all relevant drawings are in the ERS booklet.

(ii) Construction manuals

There is no specific construction manual. Hull manufacturers use the Building Specification together with the Class Rules to create their tooling

(moulds and assembly jigs). Construction of the 470 hull is single skin E-glass/polyester resin laminate reinforced with top-hat type stiffeners. Manufacturers are following good practice principles of composite construction for boat building.

Sails are made by conventional panelled construction. 90-95% of the sails are made by sailmakers who are in the WS IHC scheme, so they follow detailed procedures as part of their IHC certification.

Rigs and hull appendages are manufactured with current good practice principles.

(iii) General Arrangement

The hull general arrangement is described in the detailed 'Building Specification', the latest version of which can be found in the WS website: [http://www.sailing.org/tools/documents/470005080213BuildSpec-\[14399\].pdf](http://www.sailing.org/tools/documents/470005080213BuildSpec-[14399].pdf)

(iv) Sail plan

There is no current sail plan available: all sail dimensions are following the ERS standards and are described in detail in the Class Rules, section G, which can be found in the WS website: [http://www.sailing.org/tools/documents/470CR150119-\[24655\].pdf](http://www.sailing.org/tools/documents/470CR150119-[24655].pdf)

(v) Class documents, or draft proposals, (Constitution and

Class Rules) *Please see Appendices for current copies of:
Appendix 2 - International 470 Class Constitution – last updated
November 2016
http://www.470.org/uploaded_files/Document_577_20170616194109_en.pdf*

*Appendix 3 - International 470 Class By-Laws – last updated
November 2016
http://www.470.org/uploaded_files/Document_441_20170616194606_en.pdf*

*Appendix 4 - International 470 Class Rules – last updated 15
January 2019
[http://www.sailing.org/tools/documents/470CR150119-\[24655\].pdf](http://www.sailing.org/tools/documents/470CR150119-[24655].pdf)*

(vi) Construction methods and processes

The 470 was always a boat built with simple methods easy for everyone, using low priced materials. This was meant to keep it as affordable as possible and through the years the rules and specifications have been adjusted in order to improve the longevity and performance potential. One can say that with the 470, our manufacturers have perfected their methods and optimized their construction to have the best possible product without going to far more expensive materials and methods. See also 4(b)(ii) above.

(vii) Required certification methods to race

Hulls and sails must be certified before being used for racing. Hull certificates are issued by each MNA/NCA based on the hull measurement form. Sails only need certification marks and not paper certificates.

Rigs and hull appendages must comply with the Class Rules during racing but they are not required to be certified. They are inspected at events.

This is the way the 470 Class balances bureaucratic and practical requirements. At the 470 Class Championships, each team's equipment is normally inspected within 10 minutes.

(viii) Assembly process

This depends on each hull manufacturer, but all follow good practice principles. See 4 (b) (ii) above

(ix) Weekly maximum delivery capacity, worldwide

Build and delivery capacity varies for each equipment manufacturer is detailed in Appendix 1.

(x) Warranty Policy and Claim form

Equipment manufacturers' Warranty Policy and Claim Form details are detailed in Appendix 1.

The nature of the level of customer service is that equipment manufacturers deliver a personal service to sailors, coaches, NCAs and MNAs and through this close relationship can swiftly address any issues.

(xi) Any Brochure or marketing material

Marketing information is available for each equipment manufacturer as detailed in Appendix 1.

*The International 470 Class has produced the following promotional material: Brochure: <https://bit.ly/2tgFWWhU>
Video: <https://bit.ly/2GEcZnT>*

(xii) Sustainability and environmental considerations regarding the production

Equipment manufacturers are obliged to comply with the sustainability and environmental requirements in their respective nation, and as put in place by their local province/council. Further information for each equipment manufacturer is detailed in Appendix 1

The International 470 Class supports WS Sustainability Agenda 2030 and will be working with WS and equipment manufacturers to deliver compliance.

c) Quality Control

Due the strict nature of licensing and equipment control as well as equipment being provided by long-established manufacturers, the build quality and recreational or competitive lifetime of equipment is already well-proven.

The continued popularity of the 470 Class speaks for the quality, service and customer support provided by equipment manufacturers and distributors around the world.

Further information for each equipment manufacturer is detailed in Appendix 1.

(i) Production process and methods

470 hulls are built in female moulds. Typically builders use separate moulds

for the hull, deck and foredeck which may include the forward bulkhead, centreboard case capping which may include the thwart, and keelson which may be in two parts (fore and aft of centreboard case). Assembly of the various parts may be done with the help of assembly jigs/pressurized tools to keep their alignment. The single skin laminates are built with hand layup but RTM / infusion systems can also be employed. Vacuum systems may be employed to help consolidate the laminates and/or the stiffeners on the hull. The 470 Class International Measurers who are measuring the prototypes also collect information about the production process, moulds etc and photographic archives are kept for each builder.

(ii) Material purchase and records

Note: WS advised this question is for manufacturers' one-designs and not necessary for the International 470 Class or the equipment manufacturers to complete.

(iii) Tooling, description of manufacture of tooling and numbers of tools; and life expectancies, i.e. how many parts can be taken from a tool before it is replaced

Note: WS advised this question is for manufacturers' one-designs and not necessary for the International 470 Class or the equipment manufacturers to complete.

(iv) Building tolerances

Hull shape tolerances are relatively small and have decreased since the class was selected for the 1976 Olympic Games. Rocker tolerances range from $\pm 4\text{mm}$ at the hull ends to $\pm 7\text{mm}$ at the middle, section shape tolerances are $\pm 5\text{mm}$ at the transom and $\pm 7\text{mm}$ in all other sections, with further limitations for the difference between minimum and maximum values in each section which cannot exceed 10mm. The structural arrangement of the hull is also tightly controlled with specified positions for all stiffening parts and small tolerances for the deck and cockpit features

Hull appendage shapes are also tightly controlled with small permitted deviations from the designed shapes.

(v) Subcontracted equipment controls

Note: WS has advised that this question is for manufacturers' one-designs and not necessary for the International 470 Class or the equipment manufacturers to complete.

(vi) Standardization practices

The Class Rules and Building Specification state that all boats built from each hull manufacturer shall conform to the same laminate specification submitted to WS before production is authorized to commence. No custom boats are permitted and any changes in the materials must be approved by WS first and they apply to all boats subsequently built. Manufacturers submit detailed laminate plans and samples from each part of the boat that are used for reference during inspections at main events. Moulds are approved by WS after successfully concluded detailed prototype measurements at each manufacturer by the class international measurers. All production hulls undergo certification measurement before they leave

the manufacturer's premises by official measurers and measurement forms are completed and provided to the new owners.

(vii) Compliance verification with Class Rules and technical specifications

470 manufacturers are obliged to follow the Building Specification and laminate plan details they declare when they are licensed for all the boats that they produce. Class Rules compliance is checked before the boats are delivered by the mandatory full measurement process by independent official measurers.

Sails must be certified before they can be used for racing. All of the major sail lofts that produce 470 sails are in the WS IHC scheme so more than 90% of 470 sails come with IHC labels.

There is no certification requirement for rigs and hull appendages. Rules compliance is checked at events but our current main manufacturers have more than 30 years of experience and measurement related issues are very rare. Same with the rudders and centreboards.

(viii) Damages and equipment claim

Further information for each equipment manufacturer is detailed in Appendix 1.

(ix) Customer service

It is in the interest of equipment manufacturers to deliver outstanding customer service, with time spent talking to sailors, coaches, NCAs and MNAs to ensure 100% satisfaction.

Further information for each equipment manufacturer is detailed in Appendix 1.

d) Suitability to Olympic Equipment and Event Considerations

470 equipment complies with requirements and objectives of Regulation 23.1.2 as below:

- ***demonstrate the diversity of skills required to race various types of small boats, and minimise the overlap between Events;***

The 470 is a unique boat in the Olympic Games: sailing style and the necessary technical and tactical skills are quite different between the 470 dinghy and the 49er skiff. Two-person dinghy and skiff racing are not the same thing. In the Olympic lineup, the 470 is the only boat with a fully adjustable rig, tunable to suit different sailing styles and crew weights, with symmetric spinnaker and single trapeze. The 470 is able to race in any format, providing racing styles not possible for the skiff and multihull boats. Furthermore, it is arguably the only all-weather two-person boat in the Olympic programme, able to sail in the widest possible range of wind and wave conditions.

- ***place an emphasis on athlete skill rather than equipment development, and limit the impact of equipment on performance;***

The 470 is an exhilarating and fully controllable, high-performing racing machine even in the strongest winds and heavy seas and at the same time it is a highly manoeuvrable tactical racing boat in light and medium conditions. In this fully adjustable, but with tightly controlled rules,

performance racer, it is the skill set of the crew that decides the race results. The excellent Class Rules help in delivering a level playing field, with competitive equipment readily available from many independent manufacturers around the world. Events have been won by off-the-shelf equipment by many different manufacturers and customized hulls are prohibited by the Class Rules and Building Specification.

- ***demand a high level of athletic ability as well as excellent sailing skills;***

470 sailors must be fully accomplished in all aspects of sailing: tuning, tactics, strategy, technique, boat handling, agility and teamwork and they need to master symmetric spinnaker downwind sailing techniques and strategies. As the Class Rules provide for no limitations on RR42 above 8 knots of windspeed, the physical ability and skills to perform kinetics are vital for success.

- ***be attractive and accessible to young athletes from all continents, and of different size and weight, with a clear pathway from World Sailing Youth to Olympic Events and Equipment;***

The 470 has a highly developed pathway particularly via the popular and proven 420 and Cadet classes. Traditionally, the 470 has always attracted the youngest sailors across the multi-crew Olympic Classes, and offers the widest possible athlete body range. It has been the premier non-sailboard solution for lightweight athletes' Olympic participation since 1976. 19 nations have won medals in 470 World & European Championships and the Olympics between 2015-2017. 6 different nations won the 6 Olympic medals in Rio 2016 and 13 nations from 5 continents have won medals since the 2004 Olympic Games. Also see point 4(e)(i)4 below.

- ***maximise the participation of the world's best sailors and showcase the diversity of the sport;***

The 470 Class enjoys a comprehensive events calendar around the world, covering elite events, such as the World and Continental Championships and Sailing World Cup events, through to premier multi-class events, Regional Games, and national events. Most NCAs hold an annual 470 National Championship alongside a national racing programme.

The 470 requires the crew to be accomplished in all aspects of sailing including tuning for speed, tactics, strategy, technique and boat handling. Sailing a 470 provides a sailor with skills which can be transferred to many other forms of sailing and enhance the opportunities for a professional sailing career for those that choose this path. As an example, many 470 sailors can be found in the America's Cup, Volvo Ocean Race, World Match Racing Tour and other professional circuit events.

- ***provide an effective platform for promotion of the sport, and elite sailors, between Olympics;***

The 470 Class offers a direct connect from the Olympic Games to mainstream sailing, as enjoyed by millions of sailors who race and participate recreationally around the world.

The 470 has proven itself to be attractive to the media, and also attracts high numbers of fans through online platforms. Coverage of 470 Championships and the 470 at the Aarhus Worlds and Sailing World Cup generate a global audience. As well as close and exciting racing, our sailors provide colourful and interesting sports characters.

The 470 Class promotional video at <https://bit.ly/2GEcZnT> has racked up over 109,000 views on Facebook. Examples of 470 videos published on

Facebook at:

<https://www.facebook.com/pg/470olympicsailing/videos> and

YouTube at:

<https://www.youtube.com/user/470OlympicSailing>

- ***progress towards an equal number of Events for men and women to participate in;***

The 470 was the equipment of the first ever women's Olympic event back in 1988. Since then the two 470 Olympic events have been the only fully matched events for Men and Women, with 100% common equipment, with the same training drills, sharing skills and knowledge, bringing ease of development to nations and simplifying logistics and campaign planning.

- ***avoid unnecessary or excessive equipment costs, development costs, measurement costs, coaching costs, race organisation and race official costs, and television and other media costs;***

The 470 is a mature class, with non-existent equipment wars. The equipment is highly affordable, especially compared to the other two-person Olympic Classes. Equipment is durable and the Class Rules limit equipment at an event, so teams don't have to buy multiple sets to compete in a regatta. Certification requirements are limited to the absolutely necessary, with heavy involvement with the IHC sail certification scheme so measurement costs are kept low. Event measurement is streamlined and efficient and race organization requirements are not excessive.

- ***offer continuity of Events and evolution of Equipment to give MNAs and sailors a dependable pathway into Olympic competition with continuity of investment;***

Two-person dinghy sailing reflects an accessible and realistic pathway from Youth to Olympic with well-developed affordable solutions in suitable classes across all continents. Sailors start with the highly popular boats like the 420 or Cadet and progress to the 470. The International 470 Class runs a fully-fledged Junior programme with annual World and European Championships, using exactly the same equipment as in the senior fleets. In this way, junior teams can easily acquire second-hand equipment from the Olympic teams. Also see point 4(e)(i)4 below.

- *provide suitable Events and Equipment for Regional Games and other regattas;*

The 470 has been on the programme of Regional Games over many years, as it is affordable, accessible to purchase and accessible to sail by nations around the world. Many sailing events at Regional Games follow the Olympic pathway, and the 470 Class actively works with Regional Games event organizers to support the class's inclusion.

- *minimise environmental impact.*

The International 470 Class Association supports WS Sustainability Agenda 2030, and are working with our sailors, coaches, national class associations, officials and event partners to promote and support the agenda. Appendix 1 details the actions taken by equipment manufacturers regarding the environment and sustainability

e) Suitability to Event Considerations

Suitability to Equipment and Event Considerations is detailed above. Further information highlighting the spread of the 470 Class and accessibility around the world is detailed below:

f) Distribution

1. *Existing fleet size and information regarding fleet size through the years.*

Participating nations and fleet sizes for 470 Championships, Continental and major Regional Games are shown in Appendix 5. Data for 2018 shows 48 nations competing in 470 events.

The data in Appendix 5 does not include World Cup events, as WS already has analysis data.

It should be noted that there are numerous other 470 events and multi-class events taking place around the world, including international events, National Championships, Regional Games etc, which embrace many more nations than detailed in Appendix 5. Further information at: <http://www.470.org/default/events>

Only a nation's top teams tend to compete at 470 Championships, so nation numbers at these events do not reflect the 470 fleet size in each nation.

The number of participating teams and nations fluctuates from event to event depending on scheduling and event location.

The International 470 Class is committed to take its Championships around the world, and particularly outside of Europe, which inevitably impacts participation levels.

It should also be noted that in the Olympic year, as nations have qualified and many teams been selected, participation numbers tend to reduce.

2. *Number of National Class Associations and members world-wide.*

The International 470 Class offers two levels of membership, National

Class Association and Individual Member, and both these membership statuses are detailed in the data below. Over the years 2015-2018, 59 different nations have been members of the International 470 Class.

In respect of number of members of each NCA, the requirements for membership are different in each nation, ie in some nations only teams competing internationally or at a 470 Championship or WS event need to be members. Therefore, it is commonly accepted that actual numbers of sailors and boats active in that nation are higher than indicated.

It should also be noted that some nations come in and out of membership of the International 470 Class, simply dependent on whether they intend to compete at an international championship that year, such as: ALG, ASA, BEL, CAN, CHI, ECU, INA, IND, ISV, LTU, MEX, MON, MYA, PAK, PHI, QAT, URU, VEN.

There are also some countries that are active in the 470 Class, but as they do not compete internationally are not obliged to become members of the International 470 Class, like MOZ, SRB and TUN.

3. Proof that the equipment is widely accessible and available around the world

470 equipment is accessible and available around the world direct from equipment manufacturers or their distributors. Appendix 1 details the equipment manufacturers, from whom purchasers can buy directly, and also their distribution networks.

The 470 Class has thrived on the basis that equipment is available around the world and everything may be manufactured locally, which in turn is reflected in the spread of nations sailing the class.

4. Existence of pathway classes

The 470 is affordable and accessible to youth sailors and there are regularly young sailors who compete at both the 470 Junior and Senior Championships. 470 sailors are drawn from a wide range of youth classes (one-person and two- person dinghies), including Optimist, Laser/Laser Radial, Topper, 420, Cadet, FJ, RS Feva, Fireball to name a few.

Post-470 career, 470 sailors can be found in a vast range of classes within and beyond the Olympics.

Two-person dinghy sailing reflects an accessible and realistic pathway from Youth to Olympic with well-developed affordable solutions in suitable classes across all continents. The 470 class represents this mainstream sailing pathway at the Olympic Games, providing a direct connect from club sailing through to Olympic Sailing.

There are 20+ WS two-person 'centreboard' classes with over 325,000 boats build around the world. 12 of these boats are single-trapeze symmetric spinnaker classes, representing over 275,000 boats. The 470 represents the globally popular discipline of single-trapeze symmetric spinnaker sailing at the Olympic Games.

A very popular pathway to 470 sailing is via the proven 420 and Cadet classes with 90,000 boats around the world. The 420 class used at the

Youth Sailing World Championships provides a perfect stepping stone into the 470. The 420 and 470 classes hold joint 420 and 470 Junior European Championships, making the transition from Youth to Olympic Competition easy and non- intimidating for youth.

5. Ability to be chartered locally through a strong distribution network

At every 470 Championship, charter boats are available, either from dedicated charter boat providers (e.g. NewBlue), direct from manufacturers (for example Nautivela / Mackay), via the event organizers (multiple equipment manufacturers) or directly from sailors.

Charter fees are reasonable, with for example NewBlue charging approximately

€1,800 for an 8-9 day event charter, with discounts available for multiple bookings by a nation, or charter across multiple events by a nation/team. Charter prices are lower for used boats.

g) Event format

WS Criteria

Although any new format options will need to be thoroughly tested before final decisions are made for the 2024 Olympics, the equipment selected must be able to accommodate a range of formats such as long-distance race or slalom racing while focusing on fleet racing and upwind and downwind performance in a wide range of winds.

The 470 Class is proven to offer a level playing field, delivering tactical racing and high performance in winds from 5-35 knots. Racing is close and exciting in any wind and wave condition, including extreme conditions such as those experienced in the 1988 and 2016 Olympic Games. The highly maneuverable 470 is adaptable to close-to-shore racing, city racing, slalom courses and to practically any race format.

The 470 lends itself to multiple race format options, which can better present the style of symmetric spinnaker tactical sailing, rather than the limitations of the current Olympic format and the class is investigating new format possibilities along these lines for 2024. Improved use of on-board cameras, headcams and audio will better convey the intensity of racing, precision of team work and the range of skills needed to sail such a boat.

6 470 – Cost

‘Sailors may use boat fittings, such as blocks, cleats, lines, shrouds, compasses, covers, trailers etc from any manufacturer, as long as in compliance with the Class Rules.

Sailors will make their choice of equipment manufacturer/supplier, depending on their sailing level, sailing style, boat configuration and personal preference.

Popular manufacturers include: Allen Brothers, Clamcleat, Harken, Kingfisher, Marlow, Ronstan, RWO, Schaefer, Sea Sure, Selden, Servo, Spinlock, SuperSpars, Raymarine/TackTick.’

The tender documentation received from the 470 Class contains information of those builders that provided their details to the 470 Class in time for their inclusion. Further information was submitted and evaluated but is considered confidential. The list of builders is the following:

Hull

- Bootswerft Ziegelmayr – Germany
- Mackay Boats - New Zealand
- Nautivela - Italy
- Persson Marine - Japan
- Rondar Raceboats - Great Britain
- Sport-Sails Center - Poland
- Yamaha Motor Co Ltd - Japan

Spars

- Selden Masts - Great Britain
- AG+ Masts - France
- SuperSpars - Great Britain
- VMG - Greece

Foils

- Mackay Boats - New Zealand

Sails

- North Japan – Japan
- Zaoli – Italy
- Olympic - Italy

Mackay Boats Ltd – NZL (NZL\$ to € exchange rate at 0.59)	
Boat ready to Sail	NZ\$30,543 / €18,020
Boat ready to Sail including items for transportation/storage	NZ\$32,893 / €19,406. Includes beach trolley, top and bottom cover
Complete Hull incl spin bags, rudderstock, all fittings & ropes	NZ\$21,100 / €12,449
Centreboard	NZ\$1,320 / €778
Rudder	NZ\$1070 / €631
Mast - Superspars	NZ\$2,350 / €1,386 Superspars masts are carried in stock
Boom - Superspars	NZ\$385 / €227 Superspars, Selden and VMG booms are offered and carried in stock
Jib Luff Wire	NZ\$190 / €112
Trapeze adjusters	NZ\$160 / €94
Pole - Superspars	NZ\$220 / €130 Superspars & Selden poles are carried in stock
Mainsail - North Sails	NZ\$1,699 / €1,002 Sails are imported to order. Both North and Zaoli sails are offered.
Jib - North Sails	NZ\$876 / €517 Sails are imported to order. Both North and Zaoli sails are offered.
Spinnaker- North Sails	NZ\$1148 / €677 Sails are imported to order. Both North and Zaoli sails are offered.

Nautivela srl - ITA	
Ready to Sail	€13,200
Ready to Sail incl items for transportation/storage	Nautivela does not supply a boat with transportation equipment
Complete Hull incl spin bags, rudderstock, all fittings & ropes	€10,700
Centreboard	€450
Rudder	€330

Bootswerft Sebastian Ziegelmayr - GER	
Fitted out hull	€13,629
Fitted out hull, including all ropes, centreboard and rudder, mast, boom and spinnaker pole	€16,879
Hull	€16,879 (as above)
Top Cover	€200
Bottom Cover	€185
Launching Trolley	€305

PERSSON MARINE JAPAN Co., Ltd. - JPN	
Hull	¥1,500,000 / €11,925 items included: main sheet block and cam cleat, spin sheet block and cam cleat, centreboard adjusting sheet block, jib sheet block and cam cleat, cunningham block and cam cleat, mast, boom, spinnaker pole, centreboard, rudder
Hull incl items for transportation/storage	¥1,570,000 / €12,481
Bare hull	¥1,200,000 / €9,540

	Note items except Bare Hull are purchased from other manufacturers.
Mast	¥263,550 / €2,095
Boom	¥44,100 / €350
Spinnaker Pole	¥18,300 / €145
Rudder stock (and tiller)	¥132,000 / €1,049.43
Centreboard	¥184,000 / €1,462.86

Rondar Raceboats Ltd - GBR

Hull incl mast step, shroud ubolts, forestay fitting, mainsheet bar	£9,200 / €10,500
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Sport Sails Center - POL

Ready to Sail	€12,415 / PLN53,385 all net including mast, boom, spinnaker boom, Sails complete, foils, rudder-head
Ready to Sail incl items for transportation/storage	€13,085 / PLN56,270 all net including mast, boom, spinnaker boom, Sails complete, foils, rudder-head, top and bottom cover, trolley
Equipment	Retail Cost
Fitted Hull	€7,995,00 / PLN34,400 all net

Yamaha Motor Corporation Limited - JPN

Complete Boat (as detailed)	¥1,945,000JPN / €15,560 with mast, boom, centreboard, rudder, rudder head
Hull	¥2,700,000 / €21,600 as above
Mast	¥210,000 / €1,680
Boom	¥37,170 / €297
Centreboard	¥110,000 / €880
Rudder	¥70,000 / €560
Rudder head	¥70,000 / €560

Selden Mast Ltd - GBR

Mast	£683.46 / €793
Boom	£185.77 / €215 £255.84 / €296
Spinnaker Pole	£84.87 / €98
Rigging Pack	£303.84 / €353

AG+ Spars - FRA

Mast	€875
Boom	€320

Spinnaker Pole	€70.83
Rigging	€320

Super Spars Ltd - GBR	
Mast	M7470 / M7+ ^{1 2} - £709.82 M7470AJD / M7+ ^{1 2} - £831.51 M7470AJD / M7+ ^{1 3} - £813.59
Boom	BA / B1470 - £144.12 BA / B1470 - £174.89
Spinnaker Pole	SP470 - £84.90
Rigging	R470 - £225.35 R470OE - £326.72

Sail Technologies Private Company – VGM - GRE	
Boom	€330

North Sails Japan INC - JPN	
Mainsail	€1,000 / US\$1,125 / ¥117,000
Jib	€516 / US\$580 / ¥65,000
Spinnaker	€667 / US\$750 / ¥70,000

Zaoli Sails - ITA	
Mainsail	Main R15 - €890 Main R16L Gold - €890 Main R14 M - €890 Main R12 - €890 Main R14 - €890
Jib	Jib R14 - €460 Jib R14G - €460 Jib R16 HP Gold - €460
Spinnaker	Spinnaker MOD S2R - €590 Spinnaker SPK5 - €590 Spinnaker SPK10 Gold - €590

Olisails srl - ITA	
Mainsail	€870
Jib	€400
Spinnaker	€600