Our Materials

China Sail Factory

The Sailmakers' Sailmaker

Content

Introduction

Welcome to the 2011 China Sail Factory Material Specification book, your guide to the materials we offer in building sails to your specification.

China Sail Factory has evolved and grown since its inception in 1996 and is now recognised as one of the world's leading sail manufacturers, manufacturing for Sailmakers in every corner of the globe.

As the Sailmakers Sailmaker an essential part of our mission statement is to produce sails to your designs and specification without unnecessary intervention. Our product range is extensive: from Spinnakers of any size, Dinghy and One Design Sails, Blue Water Cruising Sails, to MXL Club Race LP and Grand Prix MXL Carbon Membranes. This guide is intended to ensure that your part in this process is as straight forward as possible and our sail making customers can easily select the correct material options for the required application.

China Sail Factory sources material from three of the major Sailcloth suppliers: Bainbridge, Challenge and Dimension Polyant with an increasing proportion of our polyester cloth being contract woven and finished in house in our own finishing plant. This allows us to both improve material quality as well as more competitive pricing.

Our HTN Nylons are a good example of where we have been able to improve the product whilst being able to offer pricing at extremely competitive levels.

Our MCL laminate range of material has been produced in house for the last three years at significantly improved prices. In this guide we bring you details of other laminates we are now producing in our purpose built facility.

China Sail Factory continues to build better sails with better materials and more competitive prices than ever.

This Materials guide provides technical details, test result data and specific application charts for the materials we offer to produce our complete high quality range of sails. We are also pleased to be able to produce sails in other cloths not listed in this book which you may free issue to us under our supplied material program.

Details of our MXL range of Membrane Sails is covered in "Our Sails and Specifications" which also provides details of the sails we make, the standard features we build in and available options for all our sails, whether they be built in Woven Polyester, Nylon, Laminates, Custom Axis Laminates and MXL Load Path Sails.

Please do take the time to familiarise yourself with our product range, we think you will find it extremely comprehensive – however if there is something further that you would like to see please don't hesitate to ask.

Woven Polyester

Blue Water Cruise Dacron

Our Blue Water Cruise Dacron is woven on the highest quality water jet and Dornier looms to high cover factors and is finished in our purpose built finishing facility under the careful control of our technical experts. The range is specifically designed for maximum durability, withstanding extensive use in the challenging conditions of offshore cruise applications. These materials are woven tightly with relatively balanced yarn constructions to make them stable without the use of heavy resin coatings – coatings that tend to break down with age. Their woven integrity and unique finishing enable Blue Water Cruise Dacron to last several seasons of extensive use in the Caribbean Charter market.

Cloth Code	Yarn Denier		Cloth Weight		Cloth Width		Finish (3)
	Warp	Weft	SM oz	gsm	mms	Inch	
BCD - 160 White (1)	150	250	3¾	158	1524	60	Soft & Medium
BCD - 160 Colours (2)	150	250	3¾	158	1524	60	Soft
BCD - 250	250	250	5¾	250	1524	60	Soft
BCD - 300	250	500	7	300	1524	60	Soft
BCD - 350	500	750	8	350	1524	60	Soft
BCD - 400	500	1000	9¼	418	1524	60	Soft
BCD - 450	500	1300	10½	447	1524	60	Soft

NOTE:
(1) BCD -160 in white is an ideal material for training sails such as the Laser, 420, 470, Optimist and similar classes and we therefore offer this in a Medium hand finish as well as Soft. This cloth is finished at the upper end of Medium with a bias of about 7 - 8 units.
(2) BCD -160 is available in the colours shown below and can be produced in other colours to special order – Please ask.
(3) Our BCD range of cloth from 250 gram up to 450 gram is finished at the firmer end of our soft hand range at a bias of 9-10 units.

White Red Blue Green Yellow Orange Black

Blue Water Cruise Application Chart

Boat Size		Sail Type	160	250	300	350	400	450
ft	m							
Up to 20	Up to 6	Main	●	●				
		Jib < 105%	●	●				
		Genoa > 105%	●	●				
20 to 25	6 to 7.5	Main		●	●			
		Jib < 105%		●	●			
		Genoa > 105%		●	●			
25 to 30	7.5 to 9	Main			●	●		
		Jib < 105%			●	●		
		Genoa > 105%		●	●			
30 to 35	9 to 10.5	Main				●		
		Jib < 105%				●		
		Genoa > 105%			●	●		
35 to 40	10.5 to 12	Main				●	●	
		Jib < 105%				●	●	
		Genoa > 105%			●	●		
40 to 45	12 to 13.5	Main					●	
		Jib < 105%					●	
		Genoa > 105%				●	●	
45 to 55	13.5 to 16.5	Main					●	●[1]
		Jib < 105%					●	●
		Genoa > 105%					●	●
55 to 65	16.5 to 20	Main				●[2]		●
		Jib < 105%						●[1]
		Genoa > 105%					●	●
65 to 75	20 to 23	Main				●[2]		●[1]
		Jib < 105%				●[2]	●[1]	●[1]
		Genoa > 105%				●[2]	●[1]	●[1]

[1] = 2 Ply to leach & foot and head down 2.8 meters
[2] = 2 Ply to whole Sail

Woven Polyester

Strong Fill High Aspect Dacron (SFD)

Our High Performance Dacron is very tightly woven using High Tenacity Yarn. Our high aspect material features Strong Fill Dacron fibres (SFD) for use in mainsails and high aspect headsails.

SFD Specification Chart

Cloth Code	Yarn Denier		Cloth Weight		Cloth Width		Finish
	Warp	Weft	SM oz	gsm	mms	Inch	
SFD - 250	150	500	5¾	250	1524	60	Firm & Medium Hand
SFD - 280	150	500	6½	280	1524	60	Firm & Medium Hand
SFD - 300	250	750	7	300	1524	60	Firm & Medium Hand
SFD - 350	500	750	8	350	1524	60	Firm & Medium Hand
SFD - 380	250	1000	9	385	1524	60	Medium
SFD - 430	500	1300	10	430	1524	60	Medium
SFD - 500	500	1500	11½	500	1524	60	Medium
SFD - 575	500	2000	13½	575	1524	60	Medium

NOTE:
The four lighter weights are produced in both a Firm hand with a 10 lb bias range of 5 – 8 and a Medium hand with a 10 lb bias range of 8 – 12
SFD-385, 9 ounces and up are produced only in Medium hand for easier handling of these larger sails.

SFD Application Chart

Boat Size		Sail Type	SFD 250	SFD 280	SFD 300	SFD 350	SFD 380	SFD 430	SFD 500	SFD 575
ft	m									
10 to 20	3 to 6	Main	●							
		Jib < 105%	●							
		Genoa > 105%	●							
20 to 25	6 to 7.5	Main	●	●						
		Jib < 105%	●	●						
		Genoa > 105%	●	●						
25 to 30	7.5 to 9	Main		●	●					
		Jib < 105%		●	●					
		Genoa > 105%		●	●					
30 to 35	9 to 10.5	Main			●	●				
		Jib < 105%			●	●				
		Genoa > 105%			●	●				
35 to 40	10.5 to 12	Main				●	●			
		Jib < 105%				●	●			
		Genoa > 105%				●	●			
40 to 45	12 to 13.5	Main				●	●	●		
		Jib < 105%					●	●		
		Genoa > 105%				●	●	●		
45 to 55	13.5 to 16.5	Main					●	●		
		Jib < 105%					●	●		
		Genoa > 105%					●	●		
55 to 65	16.5 to 20	Main						●	●	●
		Jib < 105%						●	●	●
		Genoa > 105%						●		
65 to 75	20 to 23	Main				●[2]			●[1]	●[1]
		Jib < 105%				●[2]				●[1]
		Genoa > 105%						●	●	●[1]

[1] = 2 Ply to leach & foot and head down 2.8 meters
[2] = 2 Ply to whole Sail

Bainbridge and Challenge Sailcloth

Conversion Chart

Strong Fill High Aspect Dacron (SFD)
SFD Conversion Chart

SFD Code	Challenge Sailcloth Code	Bainbridge Code
SFD - 250	5.93 HMD	Ocean 655
SFD - 280	6.53 HMD	Ocean 655
SFD - 300	7.3 HMD	Ocean 755
SFD - 350	8.3 HMD	Ocean 855
SFD - 385	9.3 HMD	
SFD - 430	10.3 HMD	
SFD - 500		Ocean 1155
SFD - 575	13.9 HMD	

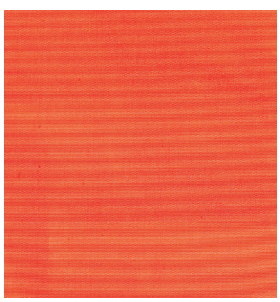
All Purpose Low Aspect Dacron (APD)
APD Conversion Chart

APD Code	Challenge Sailcloth Code	Bainbridge Code
APD - 215	5.53 HMD	Ocean 555
APD - 250	6.53 HMD	Ocean 655
APD - 280	7.03 HMD	Ocean 745
APD - 340	8.03 HMD	Ocean 845
APD - 385	9.03 HMD	Ocean 955
APD - 420	10.53 HMD	Ocean 1055

Storm Sail Dacron (SSD)

Our Storm Material is a heavy duty material produced in High Visibility Orange. The cloth features a balanced construction with reduced resin application resulting in a strong and sturdy cloth for demanding conditions.

Cloth Code	Yarn Denier		Cloth Weight		Cloth Width		Cloth Description
	Warp	Fill	SM oz	gsm	mm	Inch	
Storm - 325	300	600	7.6	325	1,372	54	Heavy duty material finished in Bright Orange to comply with safety requirements for high visibility storm sails
Storm - 415	450	850	9.7	415	1,372	54	



Woven Polyester

All Purpose Dacron

Our Low Aspect Cloth is an all purpose balanced construction made from the same High tenacity yarns as the SFD range and woven on state of the art looms.

APD Specification Chart

Cloth Code	Yarn Denier		Cloth Weight		Cloth Width		Finish
	Warp	Weft	SM oz	gsm	mms	Inch	
APD - 215	150	250	5	205	1524	60	Medium
APD - 250	150	250	5½	227	1524	60	Medium
APD - 280	250	500	6½	280	1524	60	Medium
APD - 340	500	500	8	344	1524	60	Medium
APD - 385	500	840	9	388	1524	60	Medium
APD - 420	500	1000	10	425	1524	60	Medium

APD Application Chart

Boat Size		Sail Type	215	250	280	340	385	420
ft	m							
10 to 20	3 to 6	Main	●					
		Jib < 105%	●					
		Genoa > 105%	●					
20 to 25	6 to 7.5	Main	●	●				
		Jib < 105%	●	●				
		Genoa > 105%	●	●				
25 to 30	7.5 to 9	Main		●	●			
		Jib < 105%		●	●			
		Genoa > 105%		●	●			
30 to 35	9 to 10.5	Main			●	●		
		Jib < 105%			●	●		
		Genoa > 105%			●	●		
35 to 40	10.5 to 12	Main				●	●	
		Jib < 105%				●	●	
		Genoa > 105%				●	●	
40 to 45	12 to 13.5	Main					●	●
		Jib < 105%					●	●
		Genoa > 105%				●	●	
45 to 55	13.5 to 16.5	Main					●	●
		Jib < 105%					●	●
		Genoa > 105%				●	●	
55 to 65	16.5 to 20	Main						●
		Jib < 105%					●	●
		Genoa > 105%				●	●	●
65 to 75	20 to 23	Main						●[1]
		Jib < 105%						●[1]
		Genoa > 105%					●	●

[1] = 2 ply to leach & foot and head down 2.8 meters
[2] = 2 ply to whole Sail

Woven Polyester

Premium Sailcloth

Photo courtesy of Challenge Sailcloth

Our Premium Performance Dacron (PPD) comes in both Low and High aspect styles. We use Challenge Sailcloth's iconic Marblehead weaves for the Low aspect and the high aspect fibre 104 with Honeywell 1W70 yarns for the High aspect range.

This material is woven on the most modern Power-Looms resulting in less sail shape deformation and longest life. PPD Marblehead/104 cloth uses very high counts of fine yarns. Such weaves of fine yarns feature more yarn intersections than those of coarser yarns, yielding better bias strength and durability. The cloth is passed through a button breaker after curing to remove surplus resin and leave a well boned surface that is tough and durable.

Consequently, PPD Marblehead is cloth of the tightest possible weaves achieved at the expense of machine speed and, therefore, cost. The result however is excellent bias control, as the weave is less dependant on finishing resins for bias stability. We have set out below test data for the five weights we have chosen. The weave tightness and lack of reliance on finishing resin is demonstrated by the small difference between the initial 10lb result and the result after flutter. The 1% numbers are quite simply impressive.

Cloth Specification

Low Aspect Cloth Specification

Style	Challenge Style	Yarn Denier		Cloth Weight		Cloth Width		Elongation in units after 10lb pull		Force in lbs to stretch fill by 1%
		Warp	Weft	SM oz	gsm	mms	Inch	Initial	After flutter	
PPD - 300	6.77	220	350	7.0	300	1370	54	1.8	2.2	83
PPD - 350	7.77	300	440	8.0	350	1370	54	??	??	??

High Aspect Cloth Specification

PPD - 340	7.62	220	570	8.0	340	1370	54	1.6	2.0	87
PPD - 380	8.62	220	700	8¾	380	1370	54	1.1	1.4	140
PPD - 420	9.62	220	880	9½	420	1370	54	??	??	??

Application Chart

Boat Length		Full Battened Main	Short Battened Main	Furling Genoa	# 1 Headsail	# 2 Headsail	# 3 Headsail
ft	m						
25 - 30	7.5 - 9.0	2.5:1 ratio or less use 300 2.5:1 ratio or higher use 340	2.5:1 ratio or less use 300 2.5:1 ratio or higher use 340	2.5:1 ratio and lower use 300	2.5:1 ratio and lower use 300	2.5:1 ratio and lower use 300	2.5:1 ratio or higher use 340
30 - 35	9.0 - 10.5	2.5:1 ratio or less use 300 2.5:1 ratio or higher use 340	2.5:1 ratio or less use 300 2.5:1 ratio or higher use 340	2.5:1 ratio or less use 300 2.5:1 ratio or higher use 340	2.5:1 ratio and lower use 300	2.5:1 ratio and lower use 300 2.5:1 ratio or higher use 340	2.5:1 ratio or higher use 340
35 - 40	10.6 - 12.0	25:1 ratio or lower use 350 2.5:1 ratio or higher use 380	25:1 ratio or lower use 350 2.5:1 ratio or higher use 380	25:1 ratio or lower use 350 2.5:1 ratio or higher use 340	25:1 ratio or lower use 350	25:1 ratio or lower use 350 2.5:1 ratio or higher use 340	2.5:1 ratio or higher use 380
40 - 45	12.0 - 14.7	2.5:1 ratio or higher use 380 or 420	2.5:1 ratio or higher use 380 or 420	2.5:1 ratio or higher use 380	2.5:1 ratio and lower use 350 2.5:1 ratio or higher use 340	2.5:1 ratio or higher use 380	3:1 ratio or higher use 420
45 - 50	14.7 - 15.0	3:1 ratio or higher use 420	3:1 ratio or higher use 420	2.5:1 ratio or higher use 380	2.5:1 ratio and lower use 350 2.5:1 ratio or higher use 380	3:1 ratio or higher use 420	3:1 ratio or higher use 420

CSF: ISAF Certification

As the world's leading independent offshore sail manufacturing facility, China Sail Factory has again set the standard by becoming the first offshore manufacture to achieve ISAF in house certification (IHC).This follows an onsite audit from ISAF in 2009 and an inspection in 2010.

Following his visit and inspection Rob Taylor from ISAF said "We were extremely impressed with the existing system's and quality control procedures already in place at China Sail Factory, the fact that following a 2 day inspection we were able to endorse this assessment and award ISAF IHC status can only be good news for CSF and the sail makers they supply. This is the first inspection we have done on a sailmaker with a PASS first time!"

Whilst the requirements of the ISAF certification mirrored many of the existing systems already in place at China Sail Factory, the direct benefit of this new status for CSF customers will be in One Design . The additionnal ability for IRC yacht sails to be officially measured before leaving the factory, further enhances the turn key sail manufacturing package already being offered to sailmaking customers of CSF around the world.


ISAF
WORLD SAILING

This is to certify that

China Sail Factory

has been awarded the status of

ISAF In-House Certification Approved Manufacturer

Göran Petersson
President
International Sailing Federation

ISAF certified measurers in the plant all the time

Janny Guo – One Design Production Manager
Jane Zhu – QC Manager
Tim Keogh – Operations Director

China Sail Factory stands behind it's products

All sails produced by China Sail Factory are warranted against faulty workmanship.

All China Sail Factory Materials (including laminated membrane sails) are warranted for one year from date of manufacture.

To see our full warranty terms, click on "Warranty Policy" under the Information tab.

One Design Sailcloth

China Sail Factory has obtained ISAF's In House Certification as an approved sailmaker and are one of only a select few sailmakers world-wide to have achieved this standard. Four of our staff have been examined and certified as both ISAF and RYA in house measurers.

Professional sailor & sailmaker, Skip Dieball, manages the One Design Program. Skip is a multi-class One Design Champion who won the 2009 Championship of Champions in the United States.

We attached no less importance to our One Design materials which we source from the finest producers in the market using very strict criteria. These include using only material that is perfectly flat to precisely replicate Sailmakers patterns and carefully laboratory testing at predetermined positions throughout a material lot to standards well in excess of other sailcloth.

For years much of the research and development in woven sail cloth has been focused on the One Design styles. Tighter weaves, Ripstop orientations and higher resin content has all yielded One Design cloth that not only performs better within the rules of various classes, but also yields better shape holding characteristics over time. Since its inception, CSF has been working with the leading One Design cloth suppliers not only to deliver sails in these progressive cloth styles, but also to ensure that every lot of cloth meets our customers' expectations. Whether it is woven or laminated, CSF is working on the technical side of cloth specification to deliver great sails for your customers.

Our primary focus with woven materials has been to provide both Plainweave and Ripstop styles and to match specifically these styles to the respective design criteria of aspect ratio & rigors of One Design sails. Furthermore China Sail Factory's MXL Membrane technology is leading the way in load path sails! Classes such as J-24, J-105, J-92, Farr 30, Melges 24 & 30 all can recognize the benefits of our proprietary laminating efforts. The result is championship sails that last!

One of the most competitive One Design classes is the Lightning. Popular in North America, Europe and South America, this class continues to balance the needs of both club racers and world-wide campaigners. CSF has been working with Lightning sails for years and our processes from initial specification through cutting and assembly has helped us produce the nicest Lightning sails in the world! This picture from the Miami Midwinter Championship shows just how close the competition is. CSF's sail manufacturing can help you and your customers gain that edge needed to ensure success!

One Design Sailcloth

China Sail Factory has a dedicated One Design sail loft within the main factory and is completely committed to producing One Design Championship calibre sails. Our One Design Sailcloth (ODD) is sourced from industry leading One Design cloth suppliers and we test every batch to make sure it meets our crisp high tempered standards

One Design Dacron (ODD) Specifications

Cloth Code	Yarn Denier		Square Ripstop	Cloth Weigth		Cloth Width		Finish	Typical Classes	DP Cloth Code
	Warp	Weft		SM oz	gsm	mms	Inch			
ODD - 140	125	125	No	3¼	140	910	36	Crisp	Optimist	140 B HTP
ODD - 160	125	150	Yes 2 x 500	3.9	165	910	36	Crisp	Thistle and larger dinghies	165 SQ HTP
ODD - 170	150	200	No	4	170	910	36	Crisp	420, 470	170 OD HTP
ODD - 180	150	250	No	4¼	180	910	36	Crisp	FID, Highlander, Lightning	180 OD HTP
ODD - 185	125	150	Yes 2 x 1000	4¼	180	910 1370	36	Crisp	Interlake, Scow	180 SQ HTP
ODD - 190	125	200	No	4½	190	910	36	Crisp	Lightning	190 B HTP
ODD - 230	125	380	No	Cloth 5¼	230	910	36	Crisp	Lightning, J22	230 SF HTP
ODD - 240	250	250	No	5½	235	910	36	Crisp	J22 Jib	240 B HTP
ODD - 255	250	250	Yes 2 x 500	6	250	1370	36	Crisp	210, log Canoe	253 SQ HTP
ODD - 260	125	500	No	6	260	910	36	Crisp	J24, J80	260 SF HTP
ODD - 280	250	440	No	6½	280	910 1370	36	Crisp	DN Iceboat, J80 Mainsail	280 AP HTP
ODD - 300	200	500	No	7	300	1370	54	Crisp	J 105 Main, T10 Main	300 SF HTP

NOTE:
** CRISP denotes D/P's HTP Plus finishing standard. FIRM denotes D/P's HMT finishing Standard.

Other One Design Materials

We are now stocking the full range of AirX including the Silicone coated AirX 620S and the 40 gsm class specific AirX 650. Our Radial Dinghy Laminates have also been extensively used in One Design Sails as has our Radial Pentex Laminate (RPL). For further details of these laminates and Nylons for use in One Design sails please refer to the relevant section of this book.

Spinnaker Materials

High Tenacity Nylon (HTN)

Our High Tenacity Nylons (HTN) are continually monitored for potential improvements, the current third generation of this cloth now exceeds the performance of that currently being offered by the major sailcloth suppliers for the equivalent product line. The test data table below illustrates this and test graphs are available should further verification be required. HTN is proven to meet the exacting performance requirements of both Club Race and Offshore Cruising applications. The material uses type 6,6 nylon yarn with a tenacity of 6.8 grams per denier. This substantially exceeds yarn strength typically used for generic Cruising Nylons. That is why we designated the cloth as "High Tenacity Nylon" (HTN).

The HTN material is produced on the most up to date Water jet looms by an ISO9002 certified weaver. The cloth is then finished to our strict technical parameters using a modern chemical system. The whole process from fibre sourcing to finished material is monitored by our experienced technical staff, to ensure a product of the highest and most consistent quality.

The construction we have developed includes a 5 mm ripstop woven into the material. Normally this type of ripstop construction is uneconomic for nylon at this price level. Direct development of HTN has enabled us to significantly improve the quality of the material, whilst maintaining very competitive pricing.

To summarise: HTN should be YOUR Club race and Offshore Cruising Choice. Built from High Tenacity yarn, coated and finished using the most up to date equipment and systems, Woven on modern state of the art water jet looms competitively priced, our HTN material is a proven Industry Leader.

Cruising Nylon Specifications

Cloth Code	Description	Yarn Denier		Cloth Weight		Cloth Width		Colours Available
		Warp	Weft	SM oz	gsm	mms	Inch	
HTN - 50	Offshore ¾ oz	30	30	1.2	50	1524	60	Full range
HTN - 70	Offshore 1½ oz	70	70	1.6	70	1524	60	Full range
HTN - 120	Heavy air 2½ oz	150	150	2.8	120	1524	60	White only

Test Data

		HTN-50	HTN-70	HTN-120
Elongation at 10 lbs	Warp	13	9	6
	Weft	22	14	12
	Bias	42	22	14
Load required @ 1%	Warp	12	17	25
	Weft	8	11	12
	Bias	5	8	11
Tear in lbs	Warp	4.3	8.4	10.6

NOTE:
The test data shown here is an historical average of the Nylon we produced in 2010.
Our Nylon has extensive on the water testing. Pictured is a Mills 41 with an HTN-70 spinnaker in very blustery conditions in Hong Kong. Ask us for material graphs.

Colour Range

HTN 1½ and ¾ ounce is available in a range of bright modern colours. The colours shown below are a representation only; please refer to our material swatch book for precise colour matching.

White | Red | Blue | Light Blue | Green | Pink | Yellow | Silver | Black

Spinnaker Materials

AIRX Racing Spinnaker Cloth

China Sail Factory recommends AIRX from Bainbridge for Racing applications.

AIRX Spinnaker Cloth from Bainbridge has set standards in spinnaker fabrics combining unprecedented strength, performance and quality by providing sailmakers with lighter weight, better stability, greater strength and improved durability. These fabrics allow Grand Prix sailors to use lighter sails higher up the wind range and club racers to use lightweight sails that are far less likely to blow out or tear.

China Sail Factory stock five weights of AIRX fabrics.

- AIRX-500 features outstanding performance and strength, so much so that the rule book on generic 0.5oz spinnakers has been thrown away. AIRX-500 has now been further improved with a new ripstop construction, providing even higher tear and burst strength, despite being one of the lighted 0.5oz cloths available. CSF carries white only.
- AIRX-600 exhibits performance and strength that shames many generic 0.75oz products making it ideal for medium wind range spinnakers despite being classed as a generic 0.6oz. The fabric provides 0.5oz performance in reaching spinnakers and running sails capable of withstanding unprecedented wind strengths. CSF carries stocked in Red, White and Blue.
- AIRX-620S adds Silicone to the finish of AIRX-600 resulting in the ultimate high slip spinnaker fabric. The Silicone maximizes water repellency and reduces surface friction, making for easier gybing of asymmetrics, hoists and drops from spinnaker bags and chutes.
- AIRX-650 is specified for One Design classes that designate a 40 gram minimum weight in downwind sails. Melges 24, J24 and T10 are some of the classes that have this requirement.
- AIRX-700 A Generic 0.75oz product, AIRX-700 sets new standards in a market that demands excellence in a variety of applications. From Grand Prix racers looking for ultimate performance to cruising sailors expecting outstanding durability AIRX-700 delivers both in class leading quantities. CSF carries stocked in Red, White and Blue.
- AIRX-900 is a high performance 1.5oz spinnaker cloth designed to be used in composite constructions with AIRX-700 or for heavy reachers and runners on yachts over 45ft. AIRX-900 has already been confirmed by independent tests as the best product available in this weight range. CSF carries stock in White only.

AIRX Specifications

Cloth Code	Yarn Denier		Description	Cloth Weigth		Cloth Width		Colours Stocked
	Warp	Fill		SM oz	gsm	mm	Inch	
AIRX 500	30	20	½ oz Nylon, Polyurethane coated, zero porosity	0.70	32	1.524	60	White
AIRX 600	30	30	¾ oz Nylon Polyurethane coated, zero porosity	0.86	37	1.524	60	Red, White, Blue
AIRX 620S	30	30	¾ oz Nylon with Silicone coat finish, zero porosity	0.88	38	1.524	60	White
AIRX 650	30	30	Class compliant 40 gsm ¾ oz Nylon	0.95	40	1.524	60	White
AIRX 700	30	30	1 oz Nylon, Polyurethane coated, zero porosity	1.03	44	1.524	60	Red, White, Blue
AIRX 900	70	70	1½ oz Nylon Polyurethane coated, zero porosity	1.58	67	1.524	60	White

Application Chart

Boat Size		Ligth Downwind and VMG Sails	Medium All Purpose	Heavy Air Reaching and Runners
ft	m	Cloth Code	Cloth Code	Cloth Code
20 - 35	6.0 - 10.5	500	600	700
33 - 45	10.0 - 13.5	500	600	700
45 - 55	13.5 - 16.8	600	700	900
55 - 65	16.8 - 19.8	600	700	900
65 - 75	19.8 - 22.8	600	700	900

Unparalleled strength & efficiency.
Zero porosity finish.
Incredible tear strength.
Class leading warp, fill and bias performance.
Excellent durability.
Superb water repellency.

Spinnaker Materials

Code Zero Laminates (CZL)

As an ultra flat asymmetric spinnaker Code Zero sails are increasingly popular on the club race circuit.

Code zero's are typically used in 60° - 120° apparent wind angles and work particular well for fractional rigged yachts with non overlapping jibs, where they can act as a large Genoa type sail to give extra horsepower when reaching.

Code Zero's for IRC boats have to be designed with Spinnaker Mid Width (SMW) greater than 75% of the foot length in order that they can be rated as a spinnaker.

For Offshore Cruising and Yachts not restricted by rating rules, the performance benefit of a Code Zero designed with a smaller mid width - typically about 60% - allows the sail to be used closer to the wind. In these instances conventional spinnaker fabrics have insufficient stretch resistance to provide a stable foil shape and CZ laminate or MXL membrane need to be specified.

China Sail Factory's Technical Laminate Division, has developed a lightweight laminate with Aramid fibres in the warp and offload support provided by the same Technora scrim used in our MXL membrane sails. Experience over the last few years has led us to develop a Light, Medium and Heavy style for CZL fabrics.

A Medium weight Code Zero in a typical application on the Hong Kong team's J109 in the Commodores Cup.

Code Zero Specifications

Cloth Code	Description	Cover Taffetas	Warp Fibre	Bias Scrim	Film	Cloth Weight		Cloth Width	
		gsm				SM oz	gsm	mms	Inch
CZL - 90	Light	40	None	Black Polyester 22° X Scrim	½ mil 12 micron	2.1	90	1524	60
CZL - 110	Medium	40	Black 1500 denier Aramid at 20 mm	Black Polyester 22° X Scrim	½ mil 12 micron	2.6	110	1524	60
CZL - 150	Heavy	40	Black 1500 denier Aramid at 10 mm	Black Polyester 22° X Scrim	1 mil 23 micron	3.4	150	1524	60

NOTE: Taffetas colour is grey.

Application Chart

Light Upwind Sails (Code Zero)			Medium - Heavy Air Reaching (Screechers)		
Cloth Code	Boat Size		Cloth Code	Boat Size	
	ft	m		ft	m
CZL - 90	30 - 40	9 - 12	CZL - 90	20 - 30	6 - 9
CZL - 110	40 - 50	12 - 15	CZL - 110	30 - 40	9 - 12
CZL - 150	50 - 60	15 - 18	CZL - 150	40 - 55	12 -16

Radial Laminate Sails

Multi - Film Cruise Laminate (MCL)

The MCL range of Taffeta-on-Taffeta Polyester laminates is suitable for cruising applications up to 45 feet. MCL utilises two films and is laminated as a membrane. The range uses a High Tenacity Polyester scrim which virtually eliminates warp crimp and resists stretch. The film and scrim is encapsulated in tough polyester using the same taffeta cover as we use on MXL strung sails to provide tear strength and impact resistance.

The Taffeta exterior cover is available as standard in white and in grey to special order. The Taffeta cover is laminated with an Anti Fungicide for the prevention of mildew and mould growth that can occur with this type of Sailcloth. We use a special formula of laminating adhesive to produce a soft hand further reducing fibre breakdown, extending longevity and making sails easier to use and handle.

We have been building MCL in house for several years with thousands of sails now out on the water. Incremental improvements made during this time make MCL an outstanding Radial Cruise Sailcloth offered at a highly competitive price.

MCL Specifications

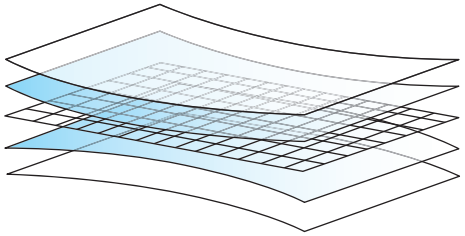
Cloth Code	Cover Polyester Taffeta	Film	Scrim 0° / 90°		Film	Cover Polyester Taffeta	Laminate Weight and Width		
			Warp	Fill			SM oz	gsm	mm / Inch
MCL 300	1.75 oz 75 gm²	1 mil 23 micron	1000 denier high density polyester	500 denier ultra low stretch polyester	1 mil 23 micron	1.75 oz 75 gm²	7.4	317	1400 / 55"
MCL 350	1.75 oz 75 gm²	1 mil 23 micron	2000 denier high density polyester	500 denier ultra low stretch polyester	1 mil 23 micron	1.75 oz 75 gm²	8.3	354	1400 / 55"
MCL 400	1.75 oz 75 gm²	1 mil 23 micron	3000 denier high density polyester	500 denier ultra low stretch polyester	1 mil 23 micron	1.75 oz 75 gm²	9.1	391	1400 / 55"

Application Chart

Boat Length		Mainsail	Furling Genoa	Headsail		
ft	m			# 1	# 2	# 3
20 - 25	6.0 - 7.5	300	300	300	300	300
25 - 30	7.5 - 9.0	300	300	300	300	350
30 - 35	9.0 - 10.5	350	350	300	350	350
35 - 40	10.5 - 12	350	350	300	350	400
40 - 45	12.0 - 16	400	400	350	350	400

Multi Film Cruise Laminate (MCL) Test Data

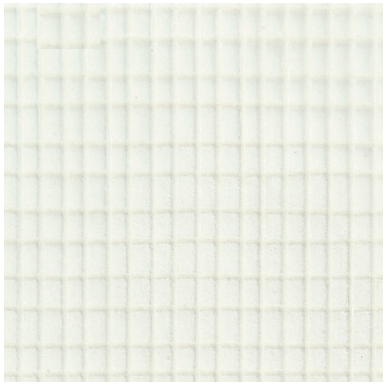
	Elongation at 10 lbs			Load required @ 1%		
MCL	Warp	Weft	Bias	Warp	Weft	Bias
MCL 300	2	3	6	78	50	30
MCL 350	2	4	5	123	51	34
MCL 400	2	3	4	127	54	35



NOTE:
The test data shown is an historical average of the MCL we produced in 2010.

Radial Laminate Sails

Radial Core Laminate (RCL)



The RCL range of Film-on-Film Polyester laminates is an exclusive CSF product and the only radial CORE cloth on the market for traditional tri-radial constructed sails. The cloth was developed by our Technical laminate division using their vast experience from 8 years of producing membrane sails and experimenting with various laminating techniques. RCL cloth has a unique internal Taffeta core which provides a lighter alternative to MCL and suitable for use as a cruise/race Sailcloth for Yachts up to 45ft. The range uses High Tenacity Polyester scrim which virtually eliminates warp crimp and resists stretch. The cloth has a 'hi-tech' look with a subtle grey colouring.

The internal lightweight Taffeta combined with a special laminating process produces a much softer hand than a normal film-on-film sail, extends longevity and makes a 'quieter' sail.

RCL Specifications

Code	Film	Scrim 0° / 90°		Internal Taffeta	Film	Laminate Weight		Cloth Width		Available Colours
		Warp	Fill			SM oz	gsm	mms	Inch	
RCL - 210	1 mil 23 micron	1000 Denier high density polyester	500 denier ultra low stretch polyester	1.0 oz 40 gm²	1 mil 23 micron	4.9	210	1400	55	Grey
RCL - 245	1 mil 23 micron	2000 Denier high density polyester	500 denier ultra low stretch polyester	1.0 oz 40 gm²	1 mil 23 micron	5.7	245	1400	55	Grey
RCL - 290	1 mil 23 micron	3000 Denier high density polyester	500 denier ultra low stretch polyester	1.75 oz 75 gm²	1 mil 23 micron	6.7	290	1400	55	Grey

Application Chart

Boat Length		Mainsail	Furling Genoa	Headsails		
ft	m			# 1	# 2	# 3
20 - 25	6.0 - 7.5	245	245	210	210	245
25 - 30	7.5 - 9.0	245	245	210	245	245
30 - 35	9.0 - 10.5	245	245	210	245	290
35 - 40	10.5 - 12	290	290	245	290	290
40 - 45	12 - 14	290	290	245	290	290

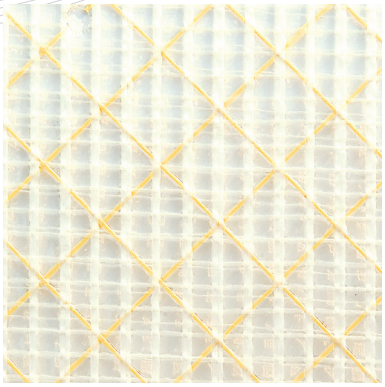
Test Data

	Elongation at 10 lbs			Load required @ 1%		
	Warp	Weft	Bias	Warp	Weft	Bias
RCL – 210	3	4	6	58	40	31
RCL – 245	3	4	6	78	42	31
RCL - 290	2	4	6	87	41	29

NOTE:
The test data shown is an historical average of the RCL we produced in 2010.

Radial Laminate Sails

Radial Pentex Laminates (RPL)



Our Radial Pentex Laminates (RPL) is a film on film laminate with Pentex warp fibres. Polyester is used in the weft giving a combination of a virtually zero crimp Pentex warp with a softer Polyester fill to prolong competitive use. A 45° black Polyester scrim reduces the film loading and stabilises the bias.

This laminate cloth is ideal for small keelboat and sport boats - applications that demand more strength than standard Polyester and one-design classes where high modulus fibres are not allowed.

RPL Specifications

Code	Film	Warp	Fill	45° Dacron X Scrim	Warp DPI	Film	Cloth Weight		Cloth Width	
							SM oz	gsm	mms	Inch
RPL - 160	½ mil 12 micron	Pentex 1500 Denier 4 per inch	Polyester 500 Denier 5 per inch	Polyester 840 Denier 2 x 2 per inch	6000	½ mil 12 micron	3.9	160	1372	54
RPL - 180	½ mil 12 micron	Pentex 1500 Denier 6 per inch	Polyester 500 Denier 5 per inch	Polyester 840 Denier 2 x 2 per inch	9000	½ mil 12 micron	4.3	180	1372	54
RPL - 230	1 mil 23 micron	Pentex 1300 Denier 10 per inch	Polyester 500 Denier 5 per inch	Polyester 840 Denier 2 x 2 per inch	12960	1 mil 23 micron	5.4	230	1372	54
RPL - 265	1 mil 23 micron	Pentex 3000 Denier 6 per inch	Polyester 500 Denier 5 per inch	Polyester 840 Denier 2 x 2 per inch	18000	1 mil 23 micron	6.2	265	1372	54

RPL Application Chart

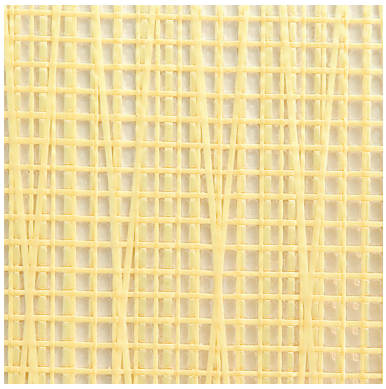
Boat Length		Mainsail	Furling Genoa	Headsails			
ft	m			# 1 Light	# 1 Medium - Heavy	# 2	# 3
20 - 25	6.0 - 7.5	180	180	160	160	160	180
25 - 30	7.5 - 9.0	180	180	160	180	180	230
30 - 35	9.0 - 10.5	265	230	180	230	230	230
35 - 40	10.5 - 12	265	265	230	230	230	265
40 - 45	12 - 14	265	265	230	265	265	265

Conversion Chart from Bainbridge Diax LSP to PRL Codes

Bainbridge Code	RPL - Code
Diax 60 LSP	RPL - 160
Diax 90 LSP	RPL - 180
Diax 130 LSP	RPL - 230
Diax 180 LSP	RPL - 265

Radial Laminate Sails

Radial Aramid Laminates (RAL)



Our Aramid Racing Laminate (RAL) is ideal for racing applications up to 55 feet.

Construction is a film on film laminate with Aramid warp and fill fibres coupled with a 22° black Aramid scrim which reduces the film loading and stabilises the bias. This combination provides the ultimate in low stretch, light weight and cost effectiveness.

The material is especially useful for # 2 and # 3 headsails as a cost effective alternative to a strung membrane Sail.

RAL Specifications

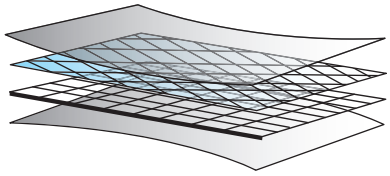
Code	Film	Warp	Warp Fibres overlaid in Aramid	Fill	22° Aramid X Scrim	Warp DPI	Film	Cloth Weight		Cloth Width	
								SM oz	gsm	mms	Inch
RAL - 200	½ mil 12 micron	Aramid 1000 denier 6 per inch	Aramid 1140 denier 5 per inch	Aramid 1000 denier 5 per inch	1000 Denier 2 x 2 per inch	11700	½ mil 12 micron	4.8	200	1372	54
RAL - 250	½ mil 12 micron	Aramid 1000 denier 6 per inch	Aramid 1140 denier 10 per inch	Aramid 1000 denier 5 per inch	1000 Denier 2 x 2 per inch	17400	½ mil 12 micron	6	250	1372	54
RAL - 300	½ mil 12 micron	Aramid 1000 denier 7 per inch	Aramid 1140 denier 12 per inch	Aramid 1000 denier 7 per inch	1000 Denier 2 x 2 per inch	20680	½ mil 12 micron	7	300	1372	54

RAL Application Chart

Boat Length		Mainsail	Headsails			
ft	m		# 1 Light	# 1 Medium - Heavy	# 2	# 3
20 - 25	6.0 - 7.5	200	200	200	200	200
25 - 30	7.5 - 9.0	200	200	200	200	250
30 - 35	9.0 - 10.5	250	200	200	200	250
35 - 40	10.5 - 12	250	200	250	250	250
40 - 45	12 - 14	300	250	250	250	300

Conversion Chart from Dimension Polyant X - Tech to RAL Codes

DP Code	RAL - Code
X 10	RAL - 200
X 15	RAL - 250
X 20	RAL - 300



Radial Laminate Sails

Radial Dinghy Laminates (RDL)

CSF's unique warp orientated polyester laminate is designed to be used for a variety of one design and small keelboat applications. The cloth is ideally suited for radial construction of sails for club and school fleets, our RDL cloth exhibits good durability as well as performance with Zero crimp warp yarns and overall stability.

Combining high tenacity, low stretch polyester warp and fill fibres with a Black X-ply for off-thread line bias performance, provides a rugged construction and a modern hi-tech appearance.

Available in three weights, the RDL range was developed for and successfully tested on extreme land-sailing craft.

The RDL 205 is suitable for small keelboats up to 22ft.

RDL Specifications

Code	Film	Warp	Fill	X Scrim	Warp DPI	Film	Cloth Weight		Cloth Width	
							SM oz	gsm	mms	Inch
RDL - 150	½ mil 12 micron	Polyester white 1000 Denier 6 per inch	Polyester white 500 Denier 5 per inch	22° 1000 denier black polyester with warp insert	6000	½ mil 12 micron	3.5	150	1372	54
RDL - 175	½ mil 12 micron	Polyester white 1000 Denier 6 per inch	Polyester white 500 Denier 5 per inch	22° 1000 denier black polyester with warp insert	9000	1 mil 23 micron	4	175	1372	54
RDL - 205	1 mil 23 micron	Polyester white 2000 Denier 6 per inch	Polyester white 500 Denier 5 per inch	22° 1000 denier black polyester with warp insert	12000	1 mil 23 micron	4.8	205	1372	54

RDL Application chart

RDL 150 - Suitable for small dinghies where light weight cloth is important.
RDL 175 - Dinghies up to 15 feet and as an all-round cloth where more durability is required.
RDL 205 - Use for larger dinghies, training schools, and club fleets as well as small keelboats and extreme land-sailors.

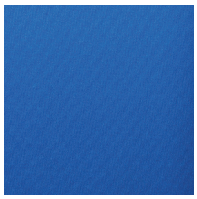
Style		RDL150	RDL175	RDL205
Weight	gsm	150	182	214
	SM oz	3.50	4.25	5.00
Stretch @ 10 lbs	Warp	0.03	0.03	0.01
	Weft	0.05	0.06	0.05
	Bias	0.04	0.06	0.06
Load @ 1% (lbf)	Warp	41.86	61.00	75.09
	Weft	24.20	29.41	33.41
	Bias	21.82	28.75	27.15

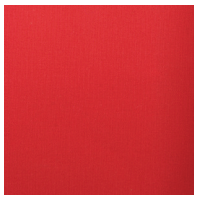
Cover Material / Bag Material

Cover Material

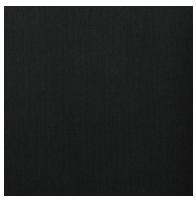
China Sail Factory manufactures an extensively range of boom covers, lazy cradles, Genoa and Spinnaker sleeves in Solution Dyed Acrylic as well as using the material for sail suncovers. We stock the full range of standard Sunbrella colours which are shown below. If your customer wants a non standard colour we will be happy to obtain this to special order for a small surcharge.

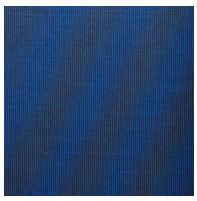
The colour code references are standard Sunbrella colours.

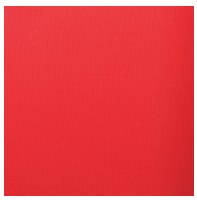

Pacific Blue (6001)


Jockey Red (6003)

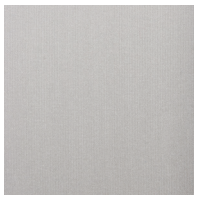
Natural White (6004)


Jet Black (6008)


Royal Blue (6017)


Logo Red (6006)


Navy (6026)


Cadet Grey (6030)


Burgundy (6031)


Forest Green (6037)


Captain Navy (6046)

Bag Materials

Our standard bag material is manufactured for us to a very high standard. The material is made from 420 denier Nylon yarn tightly woven to produce a higher than normal 180 gram per m² material. We then apply an internal coating of clear Polyurethane to make the material water tight. We stock seven standard colours as shown below. If your branding requires a non-standard colour and you can commit to the minimum dye lot of 800 meters, please let us know and we will produce this especially for you.

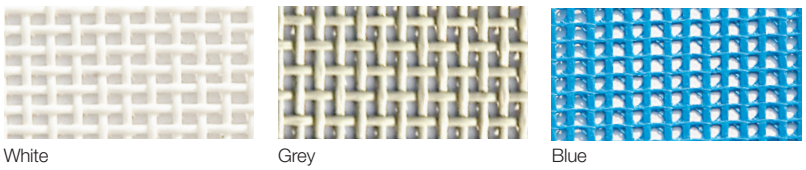

Black | Blue | Light Grey | Standard Grey | Red | White | Yellow

Our large yacht bags are woven from 750 denier material woven into a 600 gram per m² material which is similarly Polyurethane coated. Reinforced with spectra webbing these bags are able to withstand heavy mechanical lifting from the sail locker. We stock this weight in four standard colours shown below.


Blue | Standard Grey | Red | White

Mesh Material

Stocked in three standard colours which can be specified for bags.

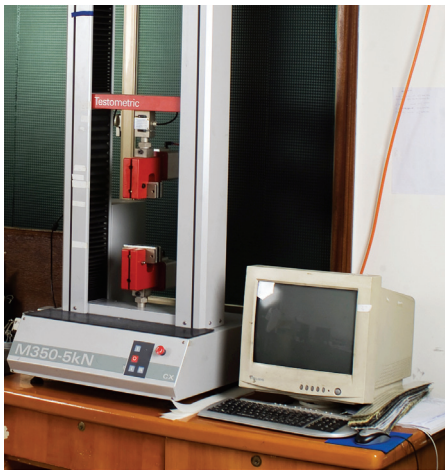

White | Grey | Blue

Quality Control Process

Since 2005 China Sail Factory has had an extensively equipped in house material testing laboratory which has enabled us to implement a rigorous quality control process.

Every single lot of material is subjected to our own test procedures before being released to production. Testing includes elongation before and after flutter, UV stability, salt water crocking, colour fastness and porosity tests where appropriate. Results are then compared with the manufacturer's supplied data for comparison prior to material acceptance.

Test data is available on all the sails that we build, if you would like this information for a specific sail please contact us with the CSF job number and we will forward the relevant test graph.



Sailcloth elongation test equipment


Flutter machine

SailKote Plus

China Sail Factory can enhance all materials by application of this coating system in its purpose built spay facility pictured right.

The McLube Sailkote Plus application provides mould and mildew protection, substantially reduces water absorption and resists dirt and grime greatly extending the life of all types of materials.

China Sail Factory recommends the application of SailKote Plus.

As a result of these changes and our control over the finishing process, we are now able to offer a different finishing 'hand' from Crisp to Soft depending on intended use.

Hand	Description	Bias at 10 lbs	Applies to
Crisp hand	Highly tempered racing finish with a very firm hand. Sails MUST be rolled.	Under 5	One Design Dacron (ODD)
Firm hand	A hard tempered cloth with a firm hand. Sails can be folded but should be rolled if possible.	5 - 8	ODD and Strong Fill Dacron (SFD)
Medium Hand	An all purpose medium tempered finish. Sails can be flaked or folded	8 -12	SFD and All purpose Dacron (APD)
Soft Hand	A fine finish with a soft hand. Sails should be flaked or folded but can also be stuffed into a bag.	10 - 15	Blue Water Cruise Dacron (BCD)

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China Sail Factory
The Sailmakers' Sailmaker

Real sails with Real Performance made with Real Experience.

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