

The Q-Bond Story of Sail Making

A new era of sail making

-It can't be right to join panels of modern high tech sail fabrics by using a double sided sticky tape and then punching a lot of wholes with a more than 150 year old machine technology. The sewing machine was invented 1844 by Elias Howe. Something has to be done... This was the insight that started the Q-Bond project in the beginning of the nineties.

In 1999, the company Q-Bond AB introduced a new sail making method, making it possible to join panels without stitching. The method was based on a gluing tape called the Q-Bond Tape, and a stationary ultrasonic activation device. In the beginning some resistance of this new technology could be noted, it was in some sense a trial-and-error learning period. However some sail makers sharing the insight regarding "punching a lot of wholes" invested in the Q-Bond technology. Today we know that these brave ones did not make a mistake since most of these first sails still are in use.

After four years of usage we consulted these sail makers about their ideas and needs for an improved system. Everyone said "We want a skateboard like activation machine running on top of the joint with the sail laying flat. -We want to get rid of material handling". The development work started and during the summer 2005 we had the Mobile Activation System ready. -It became an immediate success!

The Q-Bond Way of Sail Making

The sail is designed, laser cut and plotted the ordinary way. The sail maker can also with the mobile system take full advantage of cross-cut laminates like the Dimension-Polyant Flex or Contenders Maxx, as well as ready panels with a tailor made load-path fiber layout like the Dimension-Polyant's D4-Sail concept.

In the following pictures Andreas Turesson at Ottoson Sailmakers in Sweden illustrates the basic steps of the Mobile Q-Bond system.

Step 1



Open the sealed tape bag and spray water from the spray-can on the tape roll.

Step 2



Apply the Q-Bond Tape like an ordinary sticky tape. Take away the release liner.

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Step 3



Attach the second panel and continue with the entire sail section

Step 4



Ultrasonic Activation with the Mobile Unit.

Activate towards the corner.

Before activation apply a Mylar Tape to protect the fiber edges from capillary water penetration

Henrik Ottosson: “- In the beginning we were quite skeptic, but now after nine months of usage we do not want to produce sails with the sewing machines any longer. We have become totally dependent of the system, and now we offer both racing Dacron- and laminate sails that are totally Q-Bonded.”

Temperature and Pressure

To get a strong glued joint. The adhesive needs to be hot, and liquidized and pressed into the sail fabrics microscopic cavities with high pressure.

The need of heating with ultrasonic depends on the laminate; the kind of fiber used, the thickness and how many layers of fabric is being used. More layers generate a higher temperature. This means operate the machine faster on patches and batten-pockets.



The integrated thermometer displays the surface temperature of the sail fabric directly after the ultrasonic heating.

The operator adjusts the speed of the activation unit to get the right temperature. Pressure is generated by the weight of the device, and the glue is pressed into the fabrics with 7-8 atmospheres. After the entire sail is assembled and activated the sail maker continues the production by Q-Bonding the clew, head and tack patches, and with the batten-pockets.

The adhesive needs three days curing time to get 100% strength. During this time the sail should be kept as flat as possible or stored in large rolls. During curing it is important not to fold the joints in the panels or patches.

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Martin Baas Hagoort Sails Netherlands:” -I thought it was much more difficult to learn how to use the Q-Bond Mobile Sail Making System. Already at the first day of training we were producing sails. During the afternoon of the first training day we produced a set (head and main) of Flex 16 Aramide sails to our own X-35, and a large light genoa to a 40 footer made from Contender Maxx carbon aramide. It only took us 2 hours of production time for these first three sails.

What kind of sail fabrics are suitable?

North Sails in Denmark has Q-Bonded sails since year 2000 in all sizes from X 99-boats to 140 feet one off yachts. Many Americas Cup and Volvo Ocean Race yachts (SEB, Assa Abloy) have had their sail wardrobe Q-Bonded. Fabrics used are aramid, Pentex and carbon laminates, and Cuben Fiber fabrics. Largest sail produced by one person with the mobile unit is a 800sqmeter gennaker made in Cuben Fiber 29. Other sail makers produce One Design Class racing sails of hard tempered Dacron fabrics. Also taffeta laminates are used in cruising sails by Saltsjöbadssegel, Sweden.

Strength of the Q-Bonded joint

The Q-Bonded joint is stronger than the fabric itself. The aramid or carbon fibers are pulled out of the laminate with an intact joint. This means the sail designer needs to adapt joint or seam width in the sail designed to match maximum loads in the sail.

Tests and analysis performed at the Royal Institute of Technology, Sweden shows that the Q-Bonded joints are 2,2 to 5,5 times stronger than sewn seams. In these tests UV-resistance was also much higher than for the UV-exposed treads in sewn seams.

When we tested sail fabrics we found that joints made with aramid fiber laminates performed much better laminated into the sail fabric compared to carbon laminates. We have also found that Pentex laminates generates stronger joints than Carbon fiber laminates.



X-Voiles La Baule, France

Q-Bonded sails from X-Voiles have been very successful during 2006. Winner of Spi-Ouest in J80 Class and top of the class in J80 European Cup had Q-Bonded jibs in Flex Aramide. Other very successful sails are D4 sails to Mumm 30 in the Tour the France. At X-Voiles, La Baule in France they work upright to save knees and back when Q-Bonding panels into sections, and larger sections to sails on the floor.



Ullman GZ, Iseo Italy.

Pablo Soldani:”- We have done lot off very successful Cross Cut sails glued with Q-Bond. Some results:
A-Cat :1st, 2nd in 4 major regattas 2006
Tornado:3rd placement in the last South American, 6th at 2006 Worlds in Argentina.
F18: 20/30 sails has bin manufactured.

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When making glued joints it is very important to understand that it is only the surface of the sail panels being glued together. If the surfaces are contaminated with silicone, teflon, salt, grease or oil the joint will brake. The same happens with low surface energy materials like the spectra fibers. It is a must for the sail maker to make test with new unfamiliar fabrics, and when a sail maker use the mobile system for making repairs or re-cuts it is very important to clean away salt and dirt from the sail.

Main reasons for this production technology

There are several reasons to use the Q-Bond Technology in sail production. From the sailor's point of view it is the possibility to take full advantage of modern laminates generating lighter sails, improved shape, and smoother surface with less distortion of sail shape from millions of perforating needle holes. The opportunity of a re-cut after some initial test races is also worth mentioning.

From the sail makers point of view there are several aspects to take in consideration. First of all we can note some production oriented aspects as well as quality and environmental. If you analyze the lead-times and the steps in the production process there are usually a lot of extra work generated in terms of handling and logistics in the production. -Let the sail lay still and flat on the floor or table and do more of the refinement there.

1. There is no need to roll, fold or move the sail, you can use the loft layout more flexible.
2. It is so easy to use the system that several persons can be involved in the production.
3. A lot of man-hours are saved by Q-Bonding the patches and full length batten pockets in stead of having several persons feeding material through a sewing machine.
4. Compared to sewing machines the service needs are reduced, some occasional cleaning of the sonotrod and press wheel from glue residues might be necessary.
5. It is even possible to move the Mobile Unit to a large yacht harbor instead of transporting large sails for repairs at the loft.

The Q-Bond system offers a controlled process witch enables high quality products to be produced under environmentally acceptable conditions. There is no need of any protective clothing or separate ventilation.

The Q-Bond method is in depth described in demonstration video, found at web-site www.q-bond.com. At the web-site you also find technical reports and guidelines to sail makers.



The machine is run with the right hand and NO extra pressure is needed.

You will always get exactly the same pressure on the adhesive in the joint, and get the same joint width along the seam. Always the same high and even quality joint.

Above picture from of Quantum Denmark

Some references:

Alain Afflelou Figaro 2 Race 2006

The French Sailor Marc Emig used Q-Bonded sails for his Beneteau Figaro 2 boat named AST. The race is 1898 miles long, and goes between France, Spain and Ireland in four laps. The sail maker was Incidences La Rochelle and Dimension-Polyant provided the Flex Aramide.

Trofeo de SM la Reina Rolex Cup and IMS 670

The 2005 title holder of the Trofeo S.M. La Reina, and bronze medal holder in the World series IMS 670 was the 37 ft Gran Soleil Card & Oil Premium, skipper Dany Cuevas. Q-Bonded sails from Dicort, Spain.

The AC Team Prada Luna Rossa Challenge 2007

This team uses the Mobile Q-Bond System, and we have made some test work for them.

Contact Q-Bond AB

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Sailmakers using the Q-Bond System

Australia Dimension-Polyant	Stationary System (2006)
Croatia Elvström Sobstad	Mobile System (2007)
Denmark Elvström Sobstad, Aabenraa North Sails, Alleröd North Sails One Design, Skjaelsör Quantum, Copenhagen	Mobile System (2007) Mobile (2005) and Stationary System (2000) Stationary System (2000) Mobile System (2006)
Estonia WB-Pirita	Mobile System (2007)
France All Purpose Voiles Delta Voiles Manguio Incidences, La Rochelle X-Voiles, La Baule	Mobile System (2007) Mobile System (2006) Mobile System (2006) Mobile System (2005)
Germany Faber & Münker, Kiel Beilken, Lemwerder Fritz Segel, Prien	Mobile (2008) and Stationary System (2000) Stationary System (2000) Mobile System (2006)
Greece Quantum Athens	Mobile System (2008)
Holland Hagoort Sails	Mobile System (2006)
Hungary Doyle / Puntec	Mobile System (2008)
Italy Ullman Sails GZ, Iseo Team Prada Luna Rossa Challenge 2007 Tre Effe Elle Veleria Montefusco	Mobile System (2006) Mobile System (2006) Mobile System (2008) Mobile System (2007)
Phillipines Hyde Sails Cebu	Stationary System (2002)
Slovenia Victory Sails, Materija	Mobile (2007) and Stationary System (2002)
Spain BMW-Oracle Racing Team UK Halsey / Dicort, Malaga	Mobile System (2008) Mobile System (2006)
Switzerland EuropSails Voile Isaac	Mobile System (2007) Mobile System (2007)
Sweden Quantum Kungälv Kinnevikens Segelmakeri North Sails, Stockholm	Mobile System (2006) Mobile System (2007) Mobile (2007) and Stationary System (2000)

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Saltsjöbadssegel, Stockholm	Mobile (2005) and Stationary System (2000)
Turkey Quantum Istanbul / Doblin Yelken	Mobile System (2008)
United Kingdom Dolphin Sails North Sails, Gosport	Mobile System (2008) Stationary System (2000)
USA Dimension-Polyant Putnam UK Halsey Sails, New York North Sails, Milford North Sails Minden	Mobile System (2007) Stationary System (2000) Mobile (2006) and Stationary System (2007) Mobile System (2008)