

History of Star Inflatables

Herm Hoops ~ 2016

Wayne Dull, a used car salesman, had a mathematical and drafting background. He and his wife Rachael enjoyed the out-of-doors where they found relaxation and retreat from the stress of everyday life. As they canoed, kayaked, and rafted, Wayne thought about how the design or material could be improved to make more useful, efficient, or durable equipment and he began to draw sketches of designs.

The Dull's had several Eclipse rafts at their Loveland, Colorado home and it is likely they used them as a template for their early designs.(6)(#i.)(#j.) Wayne's next step was to find a company to build their boats.(2) Having traveled the world extensively, doing volunteer work, Wayne had friends in many countries. Dull had changed manufacturers a few times when his friends in Korea introduced him to Woosung I. B. Company in South Korea.(1,2,7)

The president of Woosung had a creative mind, and he treated the "impossible" as a challenge to be explored and conquered. Today the Dull's have an exclusive contract with Woosung to build Star river boats.(2)

Star began using a valve similar to a military valve that changed slightly in design every year. To replace a valve a person had to know what year the boat was built.(7) Star Inflatables have over-lapped seam construction of PVC fabric.(#c.) Beginning in 2006 the inside seam tape was heat-welded the outside seam tape was glued using 2-part PVC glue.

The Select Series (LX) are self-bailing rafts with a permanently attached floor that uses 4,000 denier PVC on the bottom and 1,100 denier PVC on the top to create a protective pocket for a drop-stitch bladder. Access to the bladder is with a zipper under the stern thwart. The drop-stitch floor bladder uses the same construction as an inflatable SUP which translates into a stable platform that drain water efficiently.(#d.) The Select series is double wrapped on the bottom with 1,100 denier PVC and includes 1,100 denier top wear patches and polyurethane bottom wear patches which are light weight, puncture resistant, abrasion resistant, and easy to roll-up. Other features of the Select Series include Leafield valves, double reinforced d-rings and handles, and removable thwarts. Select Series color options are Sky Blue, Kodak Yellow and Red.

In 2002 Mark Shekell of AAA Inflatables recommended to Wayne Dull that Star add at least one or two I beams to their floors to strengthen surrounding I-beams.(5) Comments on sites like Mountain Buzz indicate Star inflatables had seam and air retention issues in a relatively short time.(4,9)(#m)

{Numbers in parenthesis (1) are REFERENCES; letters in parenthesis (#a) are described in SIGNIFICANT NOTES.}

<u>Star LX Series</u>	<u>LX12-SB</u>	<u>LX13-SB</u>	<u>LX14-SB</u>	<u>LX15.5-SB</u>
		<u>Eastern Star</u>	<u>Hurricane</u>	<u>Big Dipper</u>
Length	11'11"	13'	13'10"	15'10"
Width	6'2"	6'1"	7'2"	7'2"
Tube Diameter	19"	19"	20"	20"
Thwart Diameter	12"	12"	13"	13"
Bow/Stern Rise	27"	29"	31"	31"
Weight	114#	120#	150#	168#
Chambers*	4/2	4/3	4/3	4/4
D-rings	12	12	12	12
2016 Price	\$3,290	\$3,640	\$4,000	\$4,550

* = Tubes/Thwarts

The Slice is a 11' frameless paddle-cat with a 5'6" width, 20" diameter tubes, and 6" of symmetrical rocker. The floor design uses a removable 3" drop-stitch bladder and has a continuous hull designed to reduce stalling when hitting big waves and holes. The bottom of the floor is made of 4,000 denier PVC and the tubes are made of 1,100 denier PVC which is very stiff at an operating pressure of only 2.5 PSI. There are six d-rings for rigging a frame and two dry-zip storage compartments for gear. The Slice weighs 50 pounds and comes standard with a backpack, foot-pump, repair kit, and seven year retail warranty.

<u>Inflatable Kayaks</u>	<u>SL-100</u>	<u>SL-200</u>	<u>Beetle Bug</u>
Length	10'6"	12'7"	8'6"
Width	3'4"	3'4"	3'8"
Tube Diameter	13"	13"	13.5"
Thwart Diameter	12"	12"	13"
Bow/Stern Rise	19"	19"	20"
Weight	36#	48#	38#
Chambers*	2/1	2/2	2/1
D-rings	6	2	2
2016 Price	\$1,260	\$1,475	\$895

* = Tubes/Thwarts

A number of outfitters and large liveries, primarily in the East and Midwest, use Star inflatables.(#1.) Four models of the Starlite Series were designed for outfitters and livery businesses to withstand the heavy use. Starlite's have an over-lapped seam construction. Inside seam tape is then heat-welded for solid air-retention and outside seam tape is bonded using PVC glue. They use polyurethane bottom wear patches which are light weight, puncture resistant, abrasion resistant, and allow for an easy roll-up.

Starlite's have a 4,000 denier standard floor that is tightly stretched and raised 2-3" above the bottom of the side tubes to improve tracking. Other features of the Starlite Series include Leaffield valves, double reinforced d-rings and handles, glued-in or removable thwarts.(2)

<u>Starlite SL Series</u>	<u>SL - 10.5</u>	<u>SL-12ST</u>	<u>SL-13ST</u>	<u>SL-14ST</u>
Length	10'3"	12'	13'	14"
Width	5'4"	6'	6"	6'10"
Tube Diameter	17"	18"	19"	18"
Thwart Diameter	13"	X	X	X
Bow/Stern Rise	23"	X	X	X
Weight	60#	62#	103#	122#
Chambers*	4/2	6	7	7
D-rings	6	6	6	10
2016 Price	\$1,970	\$	\$	\$

* = Tubes/Thwarts

Wayne Dull wanted his inflatable raft business to be personal and friendly, yet he seems unable to answer simple design and construction questions.(8) Basically these inexpensive boats appear to model other higher quality designs. Working with foreign manufacturers, especially those in Asia, provide challenges to overcome complex cultural and management norms. In most Asian manufacturing you get what you pay for. Even when you ask a reputable manufacturer to produce a low-cost product, in Asia, they will cut the corners to achieve their profits. A review of various rafting websites indicates that Star Inflatables have consistent seam-blowout problems that are not uncommon with glued seams on PVC. Raft companies who spend an inordinate amount of time and energy training their production team, understanding those cultural intricacies and using exceptional oversight will generally have a good product. Sea Eagle and NRS Outlaw rafts, both manufactured by Woosung/Zebec, have overcome many of the production issues. It appears that Wayne Dull has not achieved that level of quality with his Star rafts.

REFERENCES

- * - University of Utah, J. Willard Marriott Library, Special River Archive, Herm Hoops Collection
- (1) Zebec 2016 Catalog;
- (2) Star 2016 website: <http://starinflatables.com/about>;
- (3) Mike Myers, Division Manager, Email to Herm Hoops; 03/15/2016;
- (4) Herm Hoops, oneway boatworks Inflatable Repair, Jensen, UT;
- (5) Mark Shekell, (AAA Inflatables, Arvada, CO) Email to Herm Hoops, 03/16/2016;
- (6) Dennis (D9er) Schell phone call to Herm Hoops; 06/15/2016;
- (7) Greg Yeager letter to Herm Hoops, 06/30/2016;
- (8) Herm Hoops Multiple Emails to Mike Myers, Star Inflatables, (#k.) beginning in February, 2015;
- (9) Mountain Buzz
- (10) Mountain Buzz - Mike Myers, Star Inflatables, July 5, 2016;

MISCELLANEOUS

- U.S. Coast Guard Hull Code: XEQ
- Star Inflatables; Mike Myers (Division Manager since 2012);
232 Banks Road, Travelers Rest SC 29690
Toll Free: 1-877-900-2628 - Outside USA & Canada: +1 864-836-2800

SIGNIFICANT NOTES:

(#a.) Zebec/Woosung I.B.:

Founded in 1983 Zebec is one of the largest whitewater inflatable boat manufactures in the world. Woosung I.B., under its in-house brand Zebec, is a Korean manufacturer that annually exports inflatable boats worth \$20 million in 60 countries. The founder of Woosang, Mr. Lee Hee-jae, started the inflatable boat company with \$100,000 in 1992 when the Korean water sports industry was still in its early stages of development. Currently, the company is doing business with major buyers in the global markets, including Northwest River Supplies (NRS), Hobie Cat, Sea Eagle, Naish, Tohatsu, Boardworks and Star. Besides whitewater inflatables the company manufactures SUP Boards, Sports Boats, Fishing Boats, Rescue Boats, Race Boats, Waterpark Systems and Inflatable Systems. Their lifeboats and military boats are used in 13 countries including the Indonesian military. The company has manufacturing plants in Korea, China and Viet Nam.(1)

(#b.) Wayne & Rachel Dull:

Each year Wayne and Rachel spend about two months in third world countries, volunteering to build churches, and helping to finance the building projects. They often take groups of young people to assist with the volunteer projects.

(#c.) PVC:

PVC rafts, especially the larger sizes, are difficult to roll up. PVC, which is also commonly referred to as "vinyl," is made from two basic substances: chlorine, which comes from salt, and ethylene, a compound derived from crude oil. The chlorine and ethylene are combined to produce ethylene dichloride, which undergoes high heat and polymerization to create the powder known as "polyvinyl chloride resin." To make PVC fabric, manufacturers process PVC resin with other materials to obtain the desired color and texture, and then use the PVC to coat one side of a knit fabric, such as polyester or Lycra. The origins of PVC fabric date back to the early 1920s, when a scientist named Waldo Semon discovered the versatile material. He called this new product "polyvinyl chloride," or "PVC." In the following decades, PVC was used in a variety of products, from piping to raincoats, with PVC-coated fabrics gaining popularity in the 1950s and 1960s.

(#g.) Drop-Stitch Floor:

Drop stitch fabric was designed in the 1940s as collapsible fuel cells for combat aircraft. The drop stitch material keeps its shape by gluing thousands of threads to the inside of the PVC and then another layer of material is welded to encapsulate the floor. The advantages of drop-stitch are that drop-stitch can take higher pressures than I-beam floors. The high pressure floor adds surface area displacing more water so the boat floats approximately 25% higher making it great for shallow rocky rivers and the floor is smooth making a platform to stand up and cast a rod.

(#h.) Star Inflatable issues:

In 2002 Mark Shekell of AAA Inflatables recommended to Wayne Dull that Star add at least one or two I-beams to their floors to strengthen surrounding I-beams, instead Star moved to a bladder system, which has initial failures.

(#i) Odyssey & Eclipse:

Pro-Advantage imported mostly rubber boats from Taiwan over the few years they were in business - which came after Udisco went out of business. The Eclipse's were a glued PVC boat Pro Advantage brought in the last year they were around, which was 1988 or early '89.

(#j.) Asian Manufacturers & Patents:

It is common knowledge that Asian manufacturers have little regard for patents or other legal protections on property infringements. This was noted by Dan Baxter and Jon Osgood (Campways/Riken), Richard DeChant (Sun Runner/Hyside), Bill Parks (NRS) and others. Greg Yeager and others believe that Wayne Dull's designs were copies of other manufacturers, including the double tube cataraft.

(#k.) Star Questions Unanswered:

After several years and multiple attempts I have not received a response from Wayne Dull or Star regarding the following questions. Some of these questions are simple and mundane, others would require a degree of knowledge about design and construction of inflatable boats. It would be difficult to interpret the reluctance of Mr. Dull to respond, one can possibly infer that if an individual was proud of their product, and had the deep input into design and manufacturing they would be eager to cooperate with this documentation and be able to provide answers to the following questions;

- 1.) I'm especially interested in how you made the transition from using outdoor gear to designing river inflatables. Can you elaborate how you determined designs of things like length, beam, tube diameter, fabric, how you determine the number of bow and stern panels, etc.?
- 2.) How did you determine any modifications or changes in design and why they were made (like changes in overlapping wrap of floor, PSI rating recommendation for floor & tubes.)
- 3.) How did you fund the early venture in the manufacture of the inflatables?
- 4.) What was the first boat model you designed? Tell me about the challenges in getting it from your thoughts to fruition.
- 5.) What process did you use in the early designs? Have you progressed in design technology (CAD) and if so what systems do you use?
- 6.) How/why you chose the name "Star"?
- 7.) Is the U.S. Coast Guard Manufacturer's Hull Serial Number: XEQ? If not what is it and do the letters stand for anything.
- 8.) What companies were involved in the early manufacture of your designs and what year did those manufacture occur?
- 9.) How many threads /square foot are on the drop stitch? And what is the tear strength of a square foot of that fabric.
- 10.) Are the Starlite models SB or NSB?
- 11.) Does Zebec/Woosung keep samples of adhesion tear strength, fabric rolls, etc.?
- 12.) Do you have a dedicated staff to build the boats at Woosang (they only build Star)? How many are the core numbers of workers that build Star?
- 13.) Approximate square feet of Woosung dedicated to Star manufacture.
- 14.) Especially important are copies or originals of early letters or correspondence, photos of first shipment, and other significant milestones. (If you send them to me I will scan and photograph them and return them – I have a good record with other manufacturers); advertisements (I have some from Down River) but I would really like a copy of your first catalog.
- 15.) Copies of any magazine or newspaper articles about Star.

16.) Have you encountered import issues? If so how did you overcome them?

(#l.) Commercial Sales:

Idaho's War Eagle outfitters has a fleet of over 400 Star boats. Other large users of Star are: A Bass River Resort, Huzzah Valley Resort, River Ranch Resort (MO), Spring River Oaks (AR) White Water Adventures (PA),

(#m.) Heat Welding:

Heat-welding is being used due to the epic glue failure Star Inflatables experienced in the early 90's. When you melt two flexible pieces of plastic together they are no longer as flexible when cool and the thicker the plastic the more rigid it becomes when cool. Over time with inflation and deflation the edge where melted and non melted fabrics flex and can create delimitation and a frothy pin-hole boat. Star Inflatables heat-welds the inside seam tape (500 denier PVC) for air-retention and hand glues everything else for strength.

SPECIAL APPRECIATION:

- Partial funding and support from the University of Utah, Marriott Library, Utah River Running Archives, Salt Lake City, UT

- Funding by Val & Herm Hoops, oneway boatworks, P.O. Box 163, Jensen, UT 84035

FOR INFORMATION REGARDING THIS DOCUMENT CONTACT:

**The University of Utah; J. Willard Marriott Library; Special Collections Department;
295 South - 1500 East; Salt Lake City, Utah 84112-0860 (www.lib.utah.edu)**

{ 1st draft 02/15/15 - 656 words; 07/21/16: 2210; 10/2016 - 2312; 12/2016 - 2398 }