

# Sea Eagle - Inflatable Kayaks

by Herm Hoops ~ 2016

Sea Eagle inflatable kayaks were one of the earliest available with an inflatable floor. They were priced right, durable and introduced many people to the joy of running a smaller inflatable.(14,15) Until other inflatable kayak manufacturers discovered the potential of the whitewater market, Sea Eagle had legitimate claim to the best inflatable kayak around.(7) Sea Eagle Boats, Inc. a family owned and operated business dating back to 1968, is located 60 miles east of New York City on Long Island. When not in the offices, you will find their employees following their passion testing, experimenting, designing and paddling around for enjoyment.(2)

In 1968, Cecil Hoge Sr. bought an inflatable boat business in Milwaukee, Wisconsin. He and his wife Fritzie trimmed back all its products except an inflatable canoe which they talked Sears and Roebuck into selling for \$99. The Hoge's branded their boats Sea Eagles.(10)(#c.)

Sea Eagle's first product was a two person inflatable kayak (IK) made in France, using Pennel & Flipo fabric, called the Pyrawa.(12)(#d.) This kayak enjoyed substantial success during the late 1960s and early 1970s and was sold through Sears and Roebuck, L.L. Bean, Eddie Bauer, Eastern Mountain Sports, catalogues and dealers, as well as through promotional advertising and direct sale.(2)(#c.) By 1995 Sea Eagle inflatables were a \$1.6 million business. Seventy percent of sales were through mail order, twenty percent wholesaled to retailers and ten percent sold to waterparks. A company goal was to expand retail sales to boat retailers and marinas.(10)

After Dumitier Decre, the French company that manufactured the Pyrawa IK, went bankrupt Sea Eagle moved the manufacture of their inflatables to Adamoli Sintectiche Resine, located in the town of Varese, Italy. Adamoli Sintectiche Resine produced and formulated their own PVC, a pure thermoplastic material with a special formulation that they called Polykrylar. Dumitier Decre went bankrupt in the late 1990s.(12)(#e.) Presently (2015) Sea Eagle's craft are manufactured in Asia by Hifei Marine, Woosung (aka Zebec), Hwa Nan Plastics and High Crown International.(12)(#f. #g. #h. #i.)

To compete with their major rivals Zodiac (France), Achilles (Japan) and others, Sea Eagle introduced new models, expanded advertising and promotional efforts to make their inflatables available at a reasonable price. Over the years the line-up has grown to include touring kayaks, SUPs, motor mount boats and transom boats that could take up to 25 HP engines.(2,10) Sea Eagle IKs continue to be one of the most durable and reasonably priced IKs around.

The original 1968 IK was very similar to the present Sea Eagle Sport Kayaks. The general design of an upturned bow and stern, with a spray dodger helped shed water. The I-beam, inflatable floor had a drain hole, but was not a true self-bailing floor. They tended to ride over waves rather than through them. The tubes were generally small diameter, ranging from 9" to 11" and the longer boats had a tendency to twist in heavier rapids. They had inflatable seats, the rear of which was attached to the stern spray dodger.

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

The boat's operating pressure was 3.2 p.s.i. and the seat inflated to 1.1 p.s.i. Early Sea Eagles used a one-way Boston valve which consisted of a cap and insert with a rubber flap to prevent air from leaking during the inflation process. These valves proved unreliable because the screw on cap was easy to lose. By the late 1980s Sea Eagle began using Halkey-Roberts valves.(2,3,4,7,12) They continue to use an improved Boston Style valves on SE 330, 370 and 9 Models and Halkey Roberts valves on all other models.(12)

In the beginning the Italian company used a mix of heavy duty PVC, called *Dynaweave*, a 32 mil, 1000 denier fabric, which became a model for other inflatable boat manufacturers to copy. The fabric had welded seams, was very wear-resistant and highly resistant to punctures and tears, and thus the boats did not need wear chafers as many other inflatable kayaks had. Sea Eagle Sport Kayaks packed to a fraction of their inflatable size, could be carried almost anywhere. The price ranged from \$300 to \$500 depending on size.(3,4,5,7)

All Sea Eagle products had a three-year guarantee on manufacturing defects.(2) They came with a very complete instruction sheet that covered everything from safety and inflation to repair of leaks.(2) Since they were introduced there have been many improvements including superior one way valves, thicker hull material and a better fabric formulation for greater strength, reliability, and durability on the water. Sea Eagle uses two types of material on their products, the 1000 and 1200 Denier Polyester Reinforced Fabric that can stand up to a claw end of a hammer and 38 mil PolyKrylar (K80 PVC) material that isn't quite as strong, but is very dependable.(13)(#k. #1.)

The 38 mil PolyKrylar material has high frequency welded seams and I-beam floor construction. Several years ago they changed floor construction from a 7 tube I-beam floor to 5 tubes. This enhanced the paddling performance because the paddler sat higher and most of the weight is born by the floor, rather than the side chambers. Because larger I-beam tubes have more rigidity than smaller tubes it also created a more rigid inflatable floor that improved speed and tracking.(2) In addition they produced models with a drop stitch floor.(#a.)

The Sea Eagle Explorer was used on the first descent of the Yangtze River in China. ARTA used a fleet of over 20 Sea Eagle Explorers on the Yampa and Green Rivers in Dinosaur National Monument and Desolation/Gray Canyons from the mid-1980s until 1992.(1) Navtec used the Sport Model in the flat water above Cataract Canyon on the Colorado River. Adventure Bound briefly tried Sea Eagles in 1987 when they were getting started with IKs and found they just did not last.(9) Orange Torpedo Trips of Merlin, Oregon used a fleet of Sea Eagle IKs on the Rogue, Salmon and Klamath Rivers. They were used by numerous rental companies, especially those on the Delaware, Farmington and Housatonic Rivers and they were chosen as the official boat of the Boy Scouts of America.(8) Over the years, 5,000 to 10,000 Sea Eagle boats have been used for river rental programs.(12)

In 1975 Sea Eagle introduced their IK Models 330X and 370X with self-bailing floors. In 1980 they produced the Sea Eagle 6, 8 and 9 rafts. In 1987 they introduced the 320R (raft) and in 1988 the 300X, 340X and 380X inflatable kayaks.(8)

<b><u>RAFTS (EARLY)</u></b>	<b><u>320R</u></b>	<b><u>SE6</u></b>	<b><u>SE8</u></b>	<b><u>SE9</u></b>
Introduced	1987	1980	1980	1980
Exterior	10'6"x5'4"	8'8"x4'4"	9'7"x4'6"	11'x4'8"
Weight	67#	25#	33#	40#
Tube Diameter	14"	14"	14"	14"
Valves/Chambers	3	3	5	5
Floor	SB	ST V beam	ST	ST
Floor Fabric	Double layer	30 mil.	33 mil.	35 mil.
Suggested \$	\$650	\$300	\$350	\$400

### **EXPLORER MODELS (EARLY)**

	<b><u>300X</u></b>	<b><u>340X</u></b>	<b><u>380X</u></b>	<b><u>330</u></b>	<b><u>370</u></b>
Introduced	1988	1988	1988	1975	1975
Exterior	9'6"x2'9"	11'x2'9"	12'6"x2'9"	11'2"x2'9"	12'5"x2'9"
Weight	28#	36#	60#	32#	34#
Capacity	1/350#	1-2/500#	1-3/650#	1-2/500#	1-3/650#
Tube Diameter	12"	12"	12"	12"	12"
Valves/Chambers	3	3	5	5	
Floor	SB	SB	SB	SB V beam	SB V beam
Floor Fabric	PVC 1000 Den.	PVC 1000 Den.	PVC 1000 Den.	30 Mil. Ploykrlar	33 Mil. Ploykrlar
Suggested \$	\$770	\$825	\$880	\$325	\$370

### **H-Series (1986)(6,9)**

	<b><u>290H</u></b>	<b><u>330H</u></b>	<b><u>370H</u></b>
Introduced	1988	1988	1988
Exterior	9'8"x2'9"	11'x2'9"	12'6"x2'9"
Weight	21#	29#	34#
Capacity+	1-2/400#	2/500#	3/750#
Tube Diameter	8.25"	8.25"	8.5"
Chambers	9	9	12
Fabric	24 mil/1000 Denier PVC	30 mil/1000 denier PVC	33 mil/1000 denierPVC
Floors	{ all I-beam inflatable draining floors }		
Suggested \$	\$200	\$240	\$280

+ Capacity in people over total pound ratings.

David Bolling, in a *River Runner Magazine* review of inflatable kayaks rated the H-Series seat the most comfortable of all the manufacturers tested. The floors of Sea Eagles had a single drain hole to help remove water and thus was not true self-bailing floor. Bolling rated the model 290H, a one person IK he tested as being very responsive and riding high and light over the waves in whitewater.(7)

Sea Eagle Explorer Kayaks are designed for class IV whitewater, but are also stable, dry and comfortable on flat-water as well. Computer-aided design and state-of-the-art fabrication, 1000 denier reinforced (98% welded, double over lapped seams with 2% additional super strength reinforced glue finish) allows a reduction in weight (9-12 lbs) while improving structural strength, and a separate high pressure drop stitch floor\* with 16 self-bailing drain valves that can be left open for whitewater and ocean kayaking or closed for high and dry flat-water paddling. The Explorers also feature a removable slide skeg for improved tracking on open water. The package comes with inflatable seats, four-part paddle, foot pump, repair kit and storage bag.

<b><u>EXPLORER (2015)</u></b>	<b><u>300X</u></b>	<b><u>380X</u></b>	<b><u>420X</u></b>
Exterior	9'10" x 39"	12' 6" x 39"	14' x 39"
Weight	28#	38#	42#
Capacity+	1 or 395 lbs.	2-3 or 750 lbs.	2-3 or 855 lbs.
Interior	8'9" x 16"	11' 9" x 15"	13' 4" x 15"
Tube Diameter	11.5"	11.5"	11.5"
Deflated	24" x 16" x 6"	31" x 20" x 9"	31" x 21" x 10"
Valves/Chambers*	3	3	3
Suggested \$	\$799	\$999	\$1,099

\*Chambers include inflatable floor. The Sea Eagle Explorer™ features a super rigid, high pressure, drop stitch floor that sits on top of an outside floor.(3,4)(#a.)

+ Capacity in people over total pound ratings.

With two people in the boat plus coolers and gear the 380X Explorer still sits high on the water while the 385 FT sits low and sometimes allows water into the boat in light whitewater. On both models the person in the rear sits very far back while the person in front sits just ahead of the middle of the boat. This causes the boat to rise in the front and drop in the back. The extra air volume in the 380X Explorer keeps the water out even in moderate whitewater. Larger tubes does pose one problem though: riding two up in the 380X Explorer the person in the rear has less room than the person up front due to the converging rear tubes. Riding two up in the 385 FT both persons have more than enough space without the tubes touching them.

### **FAST TRACK SERIES**

The Sea Eagle FastTrack™ has an asymmetrical, narrower, tapered bow for faster entry through wind, waves and current. It is wider at the stern which provides buoyancy where most needed - where 1 or 2 paddlers sit. It is lighter than most all-rigid kayaks and now comes with a new state of the art, external, rigid, inflatable NeedleKnife™ keel. (U.S. Patent #8,286,573 2) The fabric is electronically welded 1000 denier PVC with quadruple overlapped seams. The floor is drop-stitch that sits on top of an outside floor. The high pressure drop stitch floor provides great rigidity and rigid hull like performance. The reinforced outside fabric floor provides a double layer of added protection where it's most needed. The modular design allows the drop stitch floor to be easily removed.

### **FAST TRACK (2015)**

	<u>385ft</u>	<u>465ft</u>
Exterior	12'6"x36"	15'3"x36"
Weight	32#	38#
Capacity+	3/635#	3/795#
Interior	11'7"x18"	14'2"x18"
Tube Diameter	9.5"	9.5"
Deflated	25" x 18" x 8"	30" x 19"x 9"
Valves/Chambers*	4	4
Suggested \$	\$999	\$1,249

\*Chambers include inflatable floor.

+ Capacity in people over total pound ratings.

### **RAZORLITE SERIES**

Drop stitch inflatable kayaks are lighter, narrower and paddle faster than traditional inflatable kayaks. A razor sharp, tapered, hard-nose bow and stern, combined with a fully constructed drop stitch technology hull enables the Sea Eagle RazorLite™ Kayaks to cut through waves allowing paddling speeds up to 6 mph. Because of its high performance design and capabilities the RazorLite™ kayaks are best recommended for intermediate and advanced paddlers.

### **RAZORLITE SERIES (2015)**

	<u>393rl</u>	<u>473rl</u>
Exterior	12'10"x28"	15'6"x30"
Weight	28#	38#
Capacity+	1/500# max.	2/750# max.
Interior	12'2"x17"	14'10"x21"
Tube Diameter	8.5"high 4" thick	10"high 4" thick
Deflated	22" x 22" x 12"	30" x 19"x 9"
Valves/Chambers*	3	3
Suggested \$	\$899	\$1,399

\*Chambers include inflatable floor. This kayak uses 3" drop stitch material for the floor and 4" drop stitch material for the side walls.

+ Capacity in people over total pound ratings.

### **INFLATABLE SPORT KAYAKS**

Sea Eagle began in 1968 selling an inflatable kayak very similar to their present Sea Eagle Sport Kayaks. Since then they have made improvements to the boats and their design, improved Halkey-Roberts one way valves, thicker hull material and an even better material formulation for greater strength, reliability, and durability on the water. The Sport Series are rated up to Class III whitewater.

## **SPORT KAYAK SERIES (2015)**

	<u>SE 330</u>	<u>SE 370</u>
Exterior	11'2"x34"	12'4"x34"
Weight	26#	32#
Capacity+	2/500# max.	3/6750# max.
Interior	9'6"x15"	10'8"x15"
Tube Diameter	10"	10"
Deflated	24" x 16" x 7"	31" x 19"x 8"
Valves/Chambers*	3	3
Fabric	33 mil Polykrylar	38 mil Polykrylar (K80 PVC)
Suggested \$	\$239	\$329

\*Chambers include inflatable floor. This kayak uses an inflatable I-beam floor construction.

+ Capacity in people over total pound ratings.

## **PaddleSki™ Series**

### **435ps Paddleski™**

The Sea Eagle PaddleSki™ is an inflatable catamaran kayak with 4 hulls in 1. It can be paddled, motored or sailed. With most IK's a person has to choose between a stable, wide craft and a speedy, tippy narrow craft. The PaddleSki™ catamaran/kayak features two widely spaced inflatable tubes that cut through the water and provide a well balanced boat. Specifications: {Exterior 14' 6" x 39"; Interior 12' 6" x 16"; Deflated 38" x 19" x 10"; Weight 41 lbs.; Load Capacity 2 Adults or 650 lbs.; Tube Diameter 14"; Chambers 2 (port & starboard); 16 D-Rings to secure seats and gear; Material 1000 Denier Reinforced, Seam Quadruple Overlap, Floor 1000 Denier reinforced; Three aluminum yokes for a rigid structure, Two rear carry handles & bow handle; Two skegs for directional stability; Engine Capacity 55 lb. thrust electric (max motor weight 25 lbs, min. 15" shaft) or 3 hp gas w/ center motor mount (max motor weight 45 lbs, 15" shaft)}

Today's line-up of Sea Eagle boats includes 10 different inflatable kayaks, 6 different inflatable SUPs, 2 inflatable pontoon fishing boats, an inflatable canoe and 5 different inflatable fishing, motor mount and transom boats, a 4 in 1 (fishing, sailing, motoring, and paddling) hull called the PaddleSki™ and an inflatable bodyboard call the Wave Slider™. Sea Eagle inflatables have constantly evolving features and advanced designs developed by the Hoge family. The Sport Kayaks feature thicker gauge and improved formulation of material (specifically K80 PVC material), an improved floor drain valve and more comfortable seats. Explorer Kayaks are unique in that they are both wet and dry (white water or flat water) kayaks because the 16 floor drain valves can be open or closed and they feature modular inside drop stitch floors for greater structural strength, a removable skeg which is used in white water, but also makes flatwater far more efficient. The FastTrack Kayak Series has a unique, patented outside drop stitch keel, inside modular drop stitch floor, removable skeg and improved seats. RazorLite Kayaks are the first all drop stitch construction kayak in the world and Sea Eagle has applied for that patent. The PaddleSki has a unique catamaran design with floor above the waterline. The FoldCat has a patented folding assembly system that eliminates nuts and bolts and reduces assembly time to less than 7 minutes. The Transom Boats feature inside 4" and 6" drop stitch floors and outside patented drop stitch keel and the NeedleNose SUPs have a patented molded bow.(16)

The Hoges hold 3 patents with a 4<sup>th</sup> patent pending. All Sea Eagle boats are designed by the Hoges and made to their specifications. When Hoge founded Sea Eagle in 1968 everything was drawn on graph paper.(11) Today Cecil Hoge does design drawing in Graphic.autodesk, a fairly simple drawing program originally called iDraw. It allows him to provide accurate measurements and to get most of the design ideas understood by the manufacturer, but it is not a full CAD program.(12) After many years of introducing new and unique kinds of inflatable crafts the Sea Eagle brand name has become synonymous with quality, affordability, and excellent one on one customer service. Sea Eagle has always been more than just a family business. When you call Sea Eagle you'll actually hear a pleasant voice on the other end of the phone.

Sea Eagles have navigated the length of the Mississippi River and plied the rapids of the Colorado River. For over 47 years, whether it is an adventure to Angel Falls in South America, a first descent of the upper Yangtze River in China, down the Ganges River in India, or a family expedition on a local river Sea Eagle quality, design and price makes them an affordable inflatable boat choice for a wide variety of applications.(2)

## **REFERENCES**

University of Utah, J. Willard Marriott Library, Special River Archive, Herm Hoops Collection;

- (1) ARTA - American River Touring Association is a non-profit river touring corporation, founded in 1963. ARTA operates trips in California, Idaho, Oregon and Utah/Colorado. Their headquarters is in Groveland, CA.;
- (2) Sea Eagle website: [www.SeaEagle.com](http://www.SeaEagle.com);
- (3) Herm Hoops; purchased an excess Sea Eagle IK from ARTA's Debbie Dohm and used it until 2010;
- (4) "River Running;" Verne Huser; 1975; (page 64);
- (5) "Wildwater - The Sierra Club Guide to Kayaking and Whitewater Boating"; Lito Tejada-Flores; 1978; Sierra Club Books; (page 208);
- (6) 1986 Blackadar Catalog - Sea Eagle; (page 18); From Herm Hoops Collection;
- (7) "The River Runner inflatable Kayak Review" David M. Bolling, *River Runner Magazine*, September 1986; (pages 44-47); From Herm Hoops Collection;
- (8) "Rubber and Air - 1990" *River Runner Magazine*, February 1990; (pages 12-20); From Herm Hoops Collection;
- (9) Tom Kleinschnitz (Owner, Adventure Bound) Email to Herm Hoops; December 12, 2015;
- (10) *Direct Marketing Magazine*, The Lure Of Mail Order; February 14, 1995;
- (11) *Fishing Tackle Retailer*; July 1, 2015;
- (12) Cecil Hoge (Sea Eagle CEO) Email to Herm Hoops; December 21, 2015;
- (13) *Paddle World*; February 19, 2014;
- (14) Rod Nash Email to Herm Hoops; March 5, 2015;
- (15) Lanis Arnold Email to Herm Hoops; March 5, 2015;
- (16) Cecil Hoge (Sea Eagle CEO) Email to Herm Hoops; January 5, 2016;

## **MISCELLANEOUS**

- Hull Cod: LES
- Sea Eagle, USA; 19 North Columbia Street, Port Jefferson, NY 11777; (800) 748-8066
- Sea Eagle is a Division of Harrison-Hoge Industries, Inc.
  
- There are Sea Eagle Dealers in AZ, GA, MA, MT, NJ, NV, NY, TN, WA and WY as well as the following countries: Australia, Bangladesh, Barbados, Bermuda, Canada, Chile, Colombia, Costa Rica, Denmark, France, Germany, Hong Kong, Hungary, India, Japan, Malta, Mexico, New Zealand, Philippines, Poland, Romania, Slovakia, Slovenia, Surinam, Sweden and United Kingdom
- Sea Eagle models are NMMA, ISO & CE Certified
  
- Northern Arizona University: The Margaret Eiseman Collection documents trips along the Colorado, Little Colorado and Green Rivers. This section of the Eiseman Collection focused upon different boats. In this case a Sea Eagle inflatable kayak seen in 1972: NAU.PH.2004.8.2.14g.1 Item number 48294

## **SIGNIFICANT NOTES:**

### **(#a.) Drop Stitch Floor & Material:**

The modular design of the Sea Eagle Explorer™ features a super rigid, high pressure, drop stitch floor that sits on top of an outside floor to provide double protection. The reinforced outside fabric floor provides an additional layer of protection so it can bounce off rocks, logs and other objects without damaging the inflatable floor. The modular design allows the drop stitch floor to be easily removed for quick and thorough cleaning. The drop stitch material uses thousands of high tensile strength threads connecting the top and bottom fabric layers, creating thousands of supports. This enables the floor to be inflated to a much higher pressure (10 psi) than other kayaks (3-4 psi) which increases overall rigidity.

### **(#b.) Valves:**

#### **Deluxe One-way Valves On All Air Compartments**

The Halkey-Roberts one-way valves are an improvement over traditional pipe valves which are hard to close, lose air easily and crack over time. Sea Eagle Deluxe Boston style valves now have an inner diaphragm that allows air to be pumped in without air escaping. The larger opening of the Deluxe Valve allows for rapid inflation and deflation. They have molded O-rings that can't be lost and a tether to keep them attached to the hull. The final air seal is achieved with the outside cap.

### **(#c.) Sea Eagle:**

The Hoge's originally planned to name their product "Eagle" but their attorney thought the name Eagle was too generic and on the spur of the moment they came up with "Sea Eagle."(12) Sea Eagle is a Division of Harrison-Hoge Industries, Inc., a small, family-owned business, established in 1968 and incorporated in New York. In 1995 the inflatables were a \$1.6 million business. Seventy percent of sales were through the mail order channel, twenty percent were wholesaled to retailers and ten percent are sold to water parks for white water thrills. A goal was to expand retail sales to boat retailers and marinas. Harrison Hoge Industries, Inc. uses mail order successfully to sell fishing lures, inflatable boats and hats to the tune of \$6 million a year and employs a staff of 20-49.

But mail order is just a means to an end - retail distribution. Cecil Hoge Jr. (son of Cecil Sr.) puts it this way, "Mail order advertising is planned to make a profit, to bring back more dollars than we spend. Our mail order ads in relevant magazines, newspapers and TV give us national prominence. The end game is to attract retailers to stock and sell our products. Thus, the majority of our base product is sold at retail. We play the role of wholesaler/importer."(10) Sea Eagle uses brokers as intermediaries and has to overcome the difficulties of using intermediaries and language doing business with non-English speaking foreign manufacturers. In the 1970s they used a Telex to communicate but moved on to faxes and eventually e-mail.

Sea Eagle was a major supplier of inflatable boats to Sears and Roebuck, L.L. Bean, Eddie Bauer, Eastern Mountain Sports and other outlets. If you include their simpler inflatable kayaks as river boats and certainly many were used that way, they likely sold between 250,000 to 300,000. If you just assume the Sea Eagle Explorer kayaks, whose main function is river-running, it is 30,000 or 40,000 inflatable kayaks. While Sea Eagle did make some river rafts and sold a few thousand of those, it was never a main focus of the company.(12) .(10)

**(#d.) Dumitier Decre & Pyrawa IK:**

Dumitier Decre, a French company, manufactured the Pyrawa IK. Penel e Flipo, located in Lille, France, made the material. Penel e Flipo is still in existence and were the principle supplier of material to Zodiac, Northwest River Supply and others. Decre employed around 100 people in a plant of around 50,000 square feet.(12)

**(#e.) Adamoli Sintectiche Resine:**

Adamoli (Carnago, Italy) produces a quality PVC product. They not only make the plastic sheeting from which boat parts are crafted, they also put the inflatables together. A computer- controlled operation automatically prints and welds a complete inflatable boat in minutes rather than hours and days. Adamoli Sintectiche employed around 500 people in perhaps 200,000 square feet.(10,12)

**(#f.) Zebec:**

Woosung I.B. is a Korean inflatable boat manufacturer of inflatable boats worth \$20 million under its own in-house brand Zebec. The company has become one of the leading inflatable boat manufacturers that annually exports inflatable boats worth \$20 million dollars to customers in 60 countries. Mr. Lee Hee-jae, founder of the inflatable boat company, started with \$100,000 in 1992 when the Korean water sports industry was in its early stages of development. Currently, the company is doing business with major buyers in the global markets, including NRS, Hobie Cat, Sea Eagle, Naish, Tohatsu, Star, Boardworks and Starboard. Zebec has manufacturing plants in Korea, Viet Nam and China. They have around 500 to 1500 people dedicated to inflatable manufacture in plants varying from 100,000 to 400,000 square feet.

**(#g.) Weihai Hifei Marine Co., Ltd**

Weihai Hifei Marine Co., Ltd was established in 2006 (formerly Weihai Haifei Fishing Tackles Co., Ltd established in 2004), their main products are inflatable boats. They use Hypalon & PVC coated fabric from France, Germany & Korea. The company has become one of the top five inflatable boats manufactures in China. The company has about 300 employees, with a production capacity of 3600 per month.

**(#h.) Hwa Nan Plastics:**

Hwa Nan Plastics Mfg. Ltd. an inflatable manufacturer in Taiwan, was incorporated in 1968 to produce and sell all kinds of PVC inflatable toys, novelties and sporting goods. In 1995 the company expanded and moved to China to increase production. Hwa Nan owns two Automerix's cutter machines, several Hot air welder machines, 150/ 200KW welder machines, large number of sewing machines. They also have a hand-glue department to produce all kinds of reinforced PVC or Hypalon boats, kayaks, etc.

**(#i.) High Crown International**

High Crown International is a Chinese company with 1,100 employees who have specialized in the manufacture of inflatable products since 1990.

**(#j.) Polykrylar & PVC:**

PolyKrylar (K80 PVC) is a rugged PVC material. Polyvinyl chloride (PVC) is the third-most widely produced synthetic plastic polymer, after polyethylene and polypropylene. PVC comes in two basic forms: rigid and flexible. The rigid form of PVC is used in construction for pipe and in profile applications such as doors and windows, bottles, other non-food packaging, and bank or membership cards. It can be made softer and more flexible by the addition of plasticizers, the most widely used being phthalates. In this form, it is also used in insulation, imitation leather, inflatable products, and other applications where it replaces rubber.

**(#l.) Polyester Reinforced Fabric:**

Inflatable boats are made out of “rubber” fabric. In order to give the fabric strength and to hold it’s shape it is comprised of an inner fabric that is coated with PVC, Hypalon, neoprene or other similar coatings. That inner fabric was, in the earliest days a cotton fabric that did not hold up well. As synthetics were developed it is made of nylon, kevlar, polyester or other similar products. As a specific material, polyester most commonly refers to a type called polyethylene terephthalate (PET). Fabrics woven or knitted from polyester thread or yarn are used extensively in apparel and home furnishings. Industrial polyester fibers are used in tire reinforcements, coated fabrics and plastic reinforcements with high-energy absorption. Polyester fabrics are highly stain-resistant - in fact, the only class of dyes which can be used to alter the color of polyester fabric are what are known as disperse dyes. Polyester fabrics and fibers retain their shape, are extremely strong, resistant to most chemicals, stretching and shrinking, wrinkle resistant, mildew and abrasion resistant.

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- 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](http://www.lib.utah.edu))**

{ 1<sup>st</sup> draft 02/15/12 - 448 words; 2<sup>nd</sup> draft 12/ 30/15 - 3991 words; 3<sup>rd</sup> draft - 4281 }