



586 Third Line, Oakville, Ontario, CANADA, L6L 4A7
 Tel: 905-825-1371 info@aquamarine.ca www.aquamarine.ca Fax: (905) 825-4116

H5-200 AQUATIC PLANT HARVESTER: Technical Specifications & Pricing

DIMENSIONS & WEIGHT			HARVESTING HEAD	
Operating:			Cutting Width	5'-0" 1,5 m
Length - Overall	33'-1"	10,08 m	Cutting Depth (max.)	5'-6" 1,7 m
Width - Wheels at Side	11'-7"	3,53 m	Horiz. / Vert. Knives	3" (76 mm) w. reciprocating stroke
Width - Wheels at Stern	8'-6"	2,59 m	Belt & Cutter Drives	Hydraulic motors, direct drive
Height - From Water	7'-6" approx	2,13 m *		
Shipping: Length	34'-1"	10,38 m	Impact Absorption	Swinging pivot suspension system
Width	7'-6"	2,29 m	Conveyor Belting	Standard duty galvanized steel mesh
Height (Intl)	7'-9"	2,36 m		Variable Speed
(Fits into a 40 ft. container)			STORAGE & UNLOADING SYSTEM	
Height Overall on dry land	8'-9"	2,67 m	Type	Dual conveyors with articulating off-loading section
Weight Dry without options	6,800 lbs.	3091 kg	Conveyor Bed Width	3'-7" 1,1 m
			Conveyor Overhang	6'-0" 1,8 m
CARRYING CAPACITY			Unloading Height (above deck)	4'-0" 1,2 m
Maximum Volume	200 cu ft.	5,7 m ³	Unloading Time (avg.)	60 seconds (load dependent)
Maximum Weight	3,000 lbs.	1360 kg	Conveyor Belting Type	Standard duty galvanized steel mesh
(@ 30% Freeboard)			Conveyor Belt Drive	Hydraulic motor, direct drive
			Conveyor Belt Frames	Stainless Steel
FLOTATION - (304 / 18-8 Stainless Steel			PROPULSION	
Flat Bottom Hull 14 ga - 2 mm)			Type	Stainless Steel Twin Paddle Wheels
Height	(23"/17.5")	(58 cm/44 cm)	Machine Controls	Tethered proportional electronic remote control
Length	19'-0"	5,8 m		
Width	7'-6"	2,3 m	Diameter x Width	4'-2" x 1'-9" 1,27 x 0.53 m
Two Bolt on Stainless Steel	Pontoons		Paddle Wheel Drives	Hydraulic motors
Compartments	(5) Air & watertight		Paddle Wheel Speed	Variable
Draft (average):			Paddle Wheel Deployment	Side propulsion or swing-a-round
- Light	10.5"	27 cm		Stern propulsion
- Loaded	15.5"	39 cm		
Hull Bottom Protection	2 UHMW		GENERAL	
(add 3 1/2"/9 cm to draft)	Skids		Fasteners	Stainless Steel & high strength alloy steel, as required
POWER SYSTEM & CONTROL BRIDGE			Safety Railing	On Control Bridge
Engine Type	Kubota D1305-4KEA - 2100 rpm		Conveyor Belting Supports	UHMW PE wear strips on running Surfaces
Cooling	Liquid Cooled		Anti-Corrosion System	Unpainted Stainless steel hull throughout, high visibility safety orange industrial epoxy/polyester powder coating on carbon steel super structure
Power Output (total)	24.8 HP (18.24 kW) @ max rpm		Electrical System	12 Volt DC (Battery not included)
Hydraulic Pump	load sensing piston pump			Fire Extinguisher Bracket
SS Hydraulic Oil Tank	22 US gal 85 liter			2 - 12V Power Outlets
Diesel Fuel Tank	13 US gal 49 liter			Marine Standards
System EPA approved				
Operator's Seat	Adjustable, White			
Control Panel	Engine monitoring system (Diesel)			
Hydraulic Control	PVG 32 valve bank			
Hydraulic Fittings	O Ring Face Seal & O Ring Boss (Leak Proof)			

* Without Sun-Rain Bimini Cover

Due to Aquamarine's ongoing efforts to improve its products, specifications are subject to change without notice.

H5-200 USD 89,980.00



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Available Options:

Water Wash Down Pump System: 2 inch poly hydraulically driven Banjo Pump 1" Akron brass nozzle & 50 feet hose 40 US gallons per minute max capacity	USD 5,800.00
Standard Duty Stainless Steel Belting Replaces Standard Duty Galvanized Belting – (w/ Harvesting Head)	USD 2,930.00
Flights – Welded onto Harvesting Head Belting: 14 Pcs Helps convey small weeds and debris up Harvesting Head	USD 480.00
Custom Colour: Standard Colour is RAL 2009 Safety Orange	USD 4,500.00
Lockable Storage Chest – Diamond Plate Aluminum – 10 cubic feet Stainless Steel Welded Support Structure Behind Control Bridge Included	USD 1,480.00
LED Work Lights – 1 Forward, 1 to Stern, 2 strips under Control Bridge	USD 480.00
Powered Paddle Wheel Positioning Two Hydraulic Motors, Valve Section, Controls, Hose Kits, & Brackets	USD 3,980.00
Two Stainless Steel Static Guide Wings on Harvesting Head	USD 980.00
Stainless Steel Extended Bolt on Cleats on Harvesting Head Conveyor – 15 pcs	USD 380.00
Spare Parts Package 10' (3m) of galvanized conveyor belting, or 6' (2m) of Stainless. 5 belt connecting rods 10 knife sections, 5 rock guards, 5 plastic & 5 steel hold down clips 2 conveyor drive bearings 2 high pressure hydraulic filter elements 2 low pressure hydraulic filter elements 2 engine oil filter elements & 2 air filters 2 fuel filter elements	USD 2,180.00

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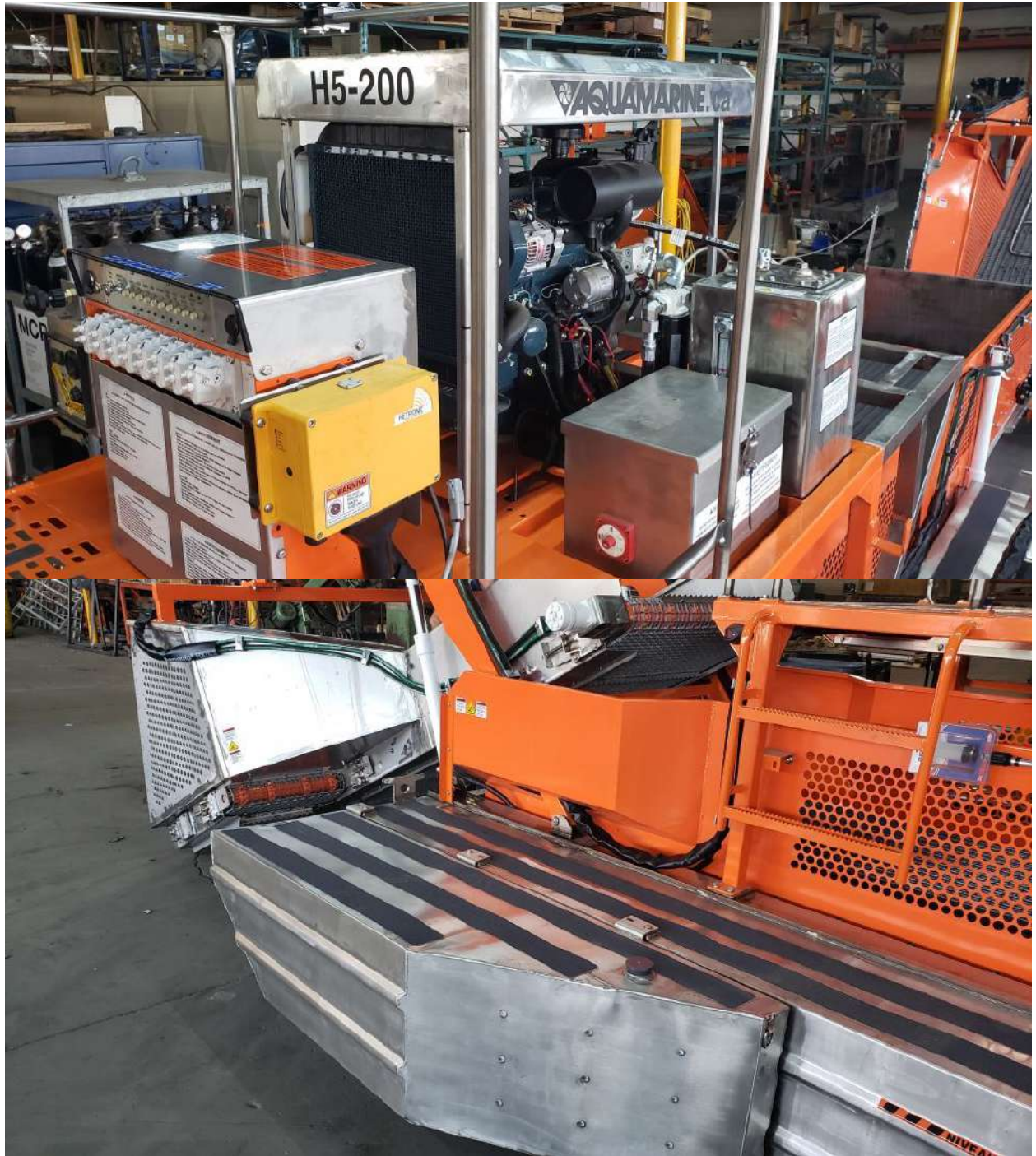
H5-200 AQUATIC PLANT HARVESTER: Technical Specifications & Pricing

Available Options:

Stainless Steel Trash Collecting Skimming Head Replaces Painted Carbon Steel Harvesting Head – Includes Carbon Steel Spreader Bar and Carbon Steel Shafts with cast iron Sprockets, Galvanized Belting	USD 4,980.00
Standard Duty Stainless Steel Belting – Skimming Head Only Replaces Standard Duty Galvanized Belting – Skimming Head	USD 1,380.00
Stainless Steel Harvesting Head Replaces Carbon Steel Harvesting Head – Includes Carbon Steel Shafts with cast iron Sprockets, Galvanized Belting	USD 4,980.00
Central Lubrication System Multi-point greasing – 6 running bearings from Central Manifold Supplied without grease	USD 980.00
Nets – Industrial Grade – each	USD 1,180.00
Net Frame Stainless Steel Frame to Support Net	USD 480.00
Full Solid UHMW PE floor under top belting of front and rear conveyor Replaces Strips of UHMW PE (Helpful for collecting Duckweed and Trash)	USD 1,180.00
Full Solid UHMW PE floor under top belting of 84”/2.1m of Harvesting Head Replaces Strips of UHMW PE (Helpful for collecting Duckweed and Trash)	USD 350.00

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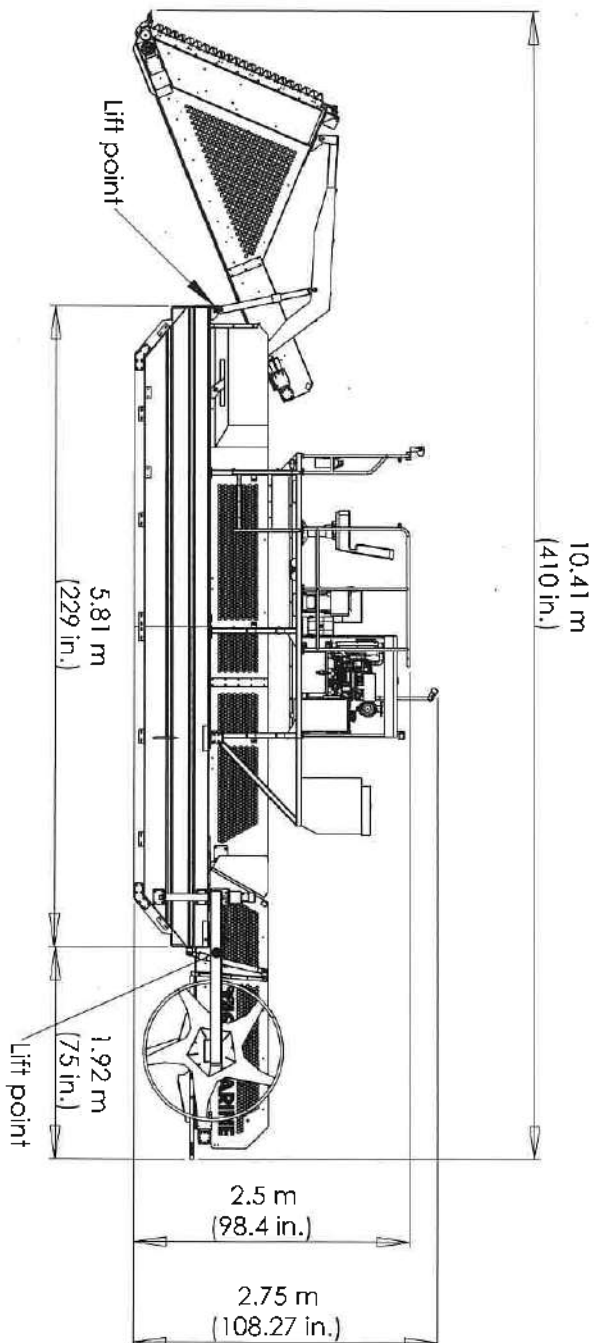
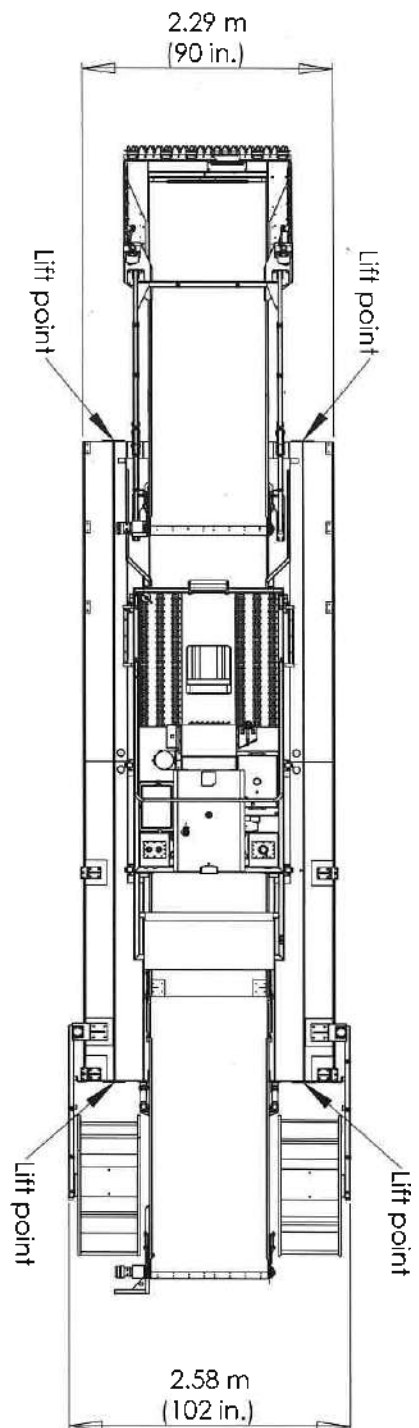








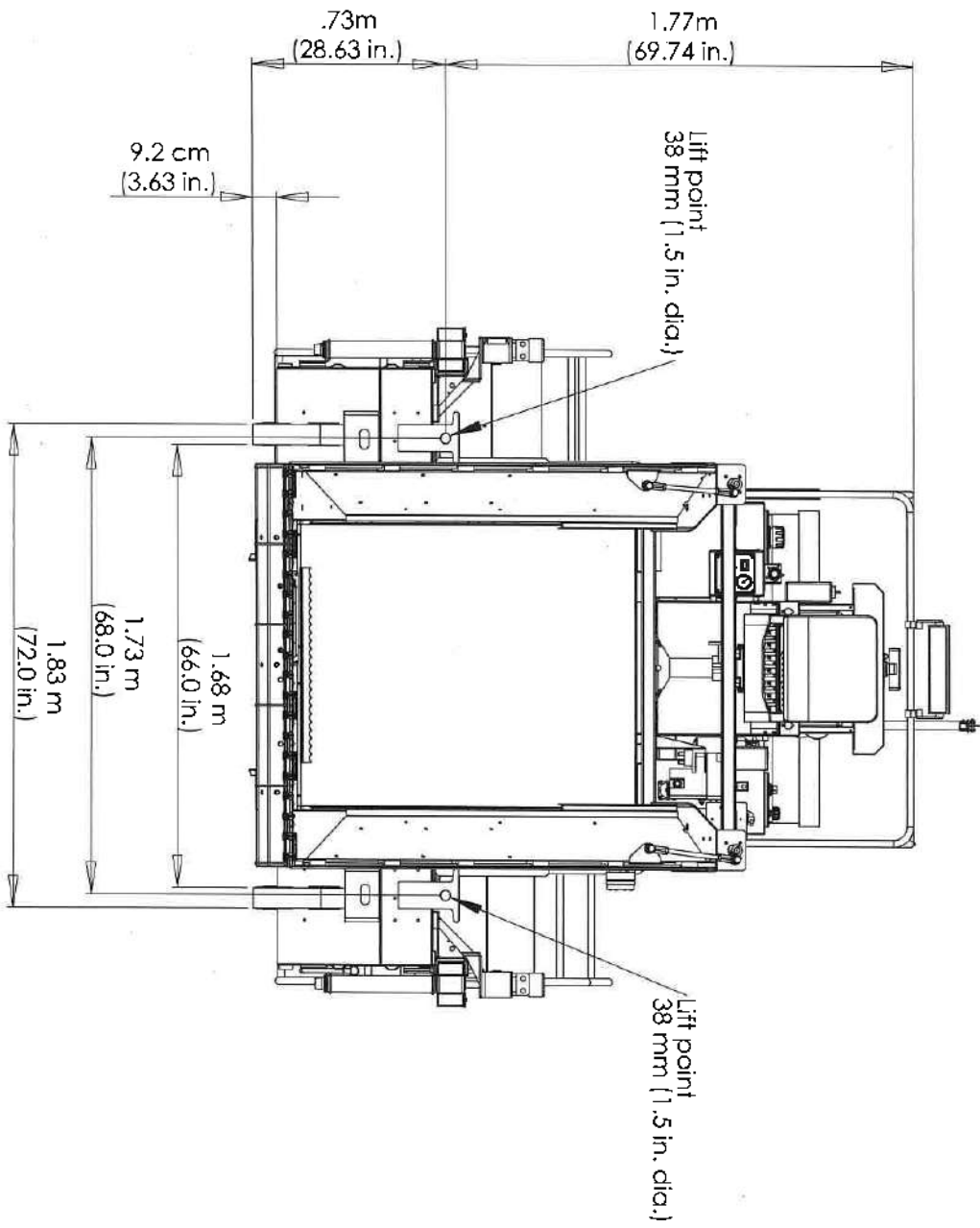




AQUAMARINE H5-200 Harvester

Approximate wt. - 7000 lbs.

March 31, 2022





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Available Options:

Tailgate - Stainless Steel Useful for packing load on Harvester and for supporting Net Frame	USD 980.00
Rear Conveyor Interlocks - Pair Allows Harvester to hook up to Shore Conveyor and Trailer Conveyor	USD 380.00
Sun / Rain Bimini Cover - Foldable Stainless Steel Foldable Frame and Connections White Waterproof Cover	USD 1,980.00
Sun / Rain Bimini Cover – Flat Top Stainless Steel Frame and Connections White Waterproof Cover	USD 1,980.00

Notes:

Please note that for sea container shipping our pricing does not include crane loading into container, but crane loading assistance is available upon customer request free of charge. Your shipping supplier will need to include the “blocking, bracing, and packaging” of your machine in the container and the materials required to do so.

Any equipment order picked up at Aquamarine as customer arranged freight is subject to a USD 1,250.00 charge.

Due to shipping regulations all equipment is sold and shipped without any fluids or batteries.

Customer to provide and use shipping tie downs whenever moving Harvesters on a trailer. Do not use winch to secure load.

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TC-14K-2 TRAILER CONVEYOR: Technical Specifications & Pricing

DIMENSIONS & WEIGHT:

Length Overall	36'-0"	11,00 m
Width Overall	8'-0"	2,44 m
Deck Height	30"	0,76 m
Hitch Type	Holland Lunette eye	2 5/8" 67 mm dia.
Hitch Height	28"	0,71 m
Tongue Weight – Loaded	1,250 to 1,350lbs.	568 to 614 kg
Weight w/o Options	5,000 lbs.	2,273 kg
Carrying Capacity	10,000 lbs.	4,540 kg
GVWR – Max	14,000 lbs.	6,350 kg
Suspension / Axles	(4) Leaf springs, tandem (double) axle set	
Gross Axle Capacity	7,000 lbs/each x 2	3,175 kg / each x 2
Spindle Lubrication	"EZ" Lube / "Bearing Buddies"	
Wheels / Tires	4 @ 3,500 lbs. / 1,587 kg	
Brake Light Set	12-Volt D.C.	

CONVEYOR:

Length	20'	6,1 m
Width	5'-2"	1,57 m
Capacity	9,000 lbs.	4,080 kg
Conveyor Belting	Heavy Duty galvanized flat wire mesh	
Hydraulic Motors	Two (2), 1 per drive shaft	
Sides and Gate	SS Sides, Steel Gate, Removable, 12" / 31 cm high	

POWER PACK

Engine	Gasoline air-cooled with electric start	
Power Output	10 - 15 HP / 7.5 – 11.25 kW @ 3,300 rpm,	
Hydraulic Pump	Fixed Displacement	
Filtration	10 Micron	
Fuel Tank	0.9 US gal	3.3 liters
Hydraulic Oil Tank	6.0 US gal	22 liters
Directional Control Valve	Two Valve Sections	

ACCESSORIES

Winch	Hydraulic	
Winch Pull	9,000 lbs	4,080 kg
Swivel Jacks, 2 Mechanical w Drop Legs	8,000 lbs.	3,628 kg
Safety Chains with Safety Clasp Hooks	2 HD @ 36" long	91 cm long
Electric Connector	6-prong round, standard	
Breakaway Electric Control	Standard kit with charger, included	
Trailer Lighting	Conforms to DOT Code. Suitable for water launch	
Base Coat – Epoxy Primer	Top Coat – Urethane – Black.	

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TC-14K-2 TRAILER CONVEYOR: Technical Specifications & Pricing

All hydraulic hose fittings are O Ring Face Seal (Leak Proof), and O Ring Boss.

Tires – 4 – ST235R16 LRE on 8 bolt 16” white spoke steel wheels.

Holland Tow Ring for Pintle Hook with 5 adjustable height positions bolted to a face plate with 4 grade 8 bolts 5/8” with hard Washers and Stover grade 8 lock nuts.

L.E.D. Sealed marker and tail lights wired to DOT specifications to one terminal block at front of trailer. The rear lights mounted in Recessed, vibration resistant housings in an aluminum, portable light bar. Separate power cord provided to plug light bar into trailer. No outside exposed connections. All connections are crimped, soldered, heat shrink sealed and loomed into corrugated, spiral tubing.

Trailer is designed and built to DOT rules and regulations and is Ministry of Transportation of Ontario (MTO) certified. Customer to verify trailer is suitable for, and meets local use requirements.

TC-14K-2 USD 37,980.00

Options:

Spare Tire, Rim and mounting bracket	USD 690.00
Alternate Paint Colors	USD 1,590.00
Heavy Duty Stainless Steel Belting – Replaces Heavy Duty Galvanized belting	USD 2,980.00
Closed UHMW PE floor under top belting of conveyor	USD 1,380.00

NOTES:

The TC-14K-2 Trailer Conveyor is designated for use with Harvester H6 Models H5 Models, AQS-200 Skimmer Boat, and TBO-4K-II Aquatic Transporter.

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MADE
IN CANADA

SAVINGS
HARVEST

AQUAMARINE SIMPLIFIES FAB AND
ASSEMBLY TO BUILD A BETTER,
LESS COSTLY PRODUCT



MADE IN CANADA

With the effective use of design, fabricating, and welding technology, this Oakville, Ont., manufacturer has streamlined its well-established product line

By Robert Colman

For over 40 years, Aquamarine of Oakville, Ont., has been building a line of aquatic plant and weed harvesting equipment for customers around the world. Because each build was a custom design, keeping up with orders was a serious challenge. For that reason, in the past few years the company decided to streamline its product line to standardized models. The move has kept the company busy and efficient, while lowering the cost of production.

Condensed Complexities

Aquatic plant harvesting and trash collection is a niche market segment, as you can imagine. Aquamarine General Manager Craig Bollinger said that he has seen pictures from the late 1800s of wooden versions of modern-day harvesters that look not unlike the product Aquamarine makes today. As he noted, "It's like comparing the first automobile to today's cars—night and day."

Bollinger's father purchased Altosar, a Brampton, Ont.-based company, 42 years ago. When the Aquamarine Corporation, the No. 1 name in the industry, went into receivership in Wisconsin, he purchased the corporate assets and bundled the two businesses together.

Over the years customers have requested any number of additions to bolster the capabilities of their aquatic harvesters.

Bollinger explained that, "Because the specifications requested by each customer were so specialized, it was almost as if every machine that came off the line was a custom piece of

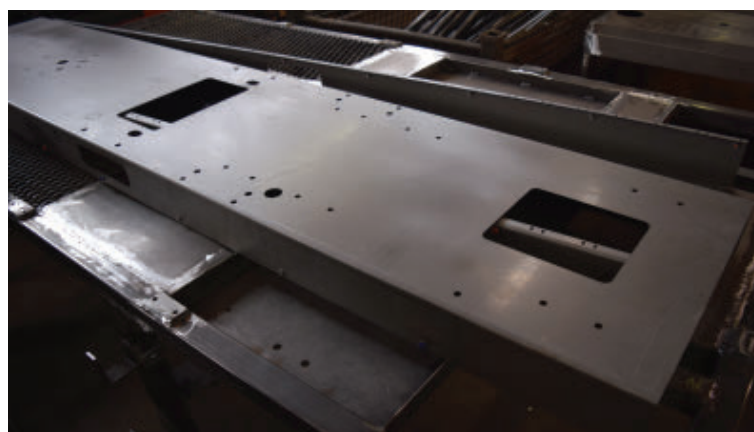
equipment."

When he sat down with his team to determine how they could streamline production, they found that it was possible to make an even more appealing product that could also be less expensive.

"We modernized two of our models that are now certified under Transport Canada's guidelines, which is important for our customers because it is an internationally recognized marine body. The H5-200 model is the largest-sized harvester that can still fit into a standard 40-ft. sea container. The second model is our larger H9-905. More than half of our sales are to customers who purchase two to five H5-200s instead of one H9-905. H5-200s are much more cost-effective once you take into consideration shipping costs, launching and towing weight issues, versatility, and accessibility benefits."

The pictures here show the new H5-200 model on a TC-14K-2 trailer conveyor. The harvester now has a stainless steel hull as standard. Its paddle wheels function in both the side and rear positions, which provides for better access in narrow places and faster travel speeds, as this effectively increases the overall water line length of the vessel. Rear positioning also keeps the paddle wheels out of the debris field when collecting trash. A new electronic system designed and built in-house, complete with tethered remote controls supplied by Hetronic Canada, allows for increased safety and operator comfort.

The head sits at the front of the harvester, collecting weeds and refuse, and then conveying it



The use of a laser cutting machine has simplified assembly and allowed the Aquamarine team to improve the design of its harvesters. "Having Solidworks and a TRUMPF laser makes it possible for us to model and laser cut the main support beam for the control bridge of our H5-200, with over 200 cut outs," said Bollinger.

up and onto the harvester's main conveyor, below a control bridge on which the operator sits.

In addition, users can select from available options, including a diesel engine, a sun/rain bimini, an operator cab, a skimmer package, a wash-down water pump, a toolbox, and an automatic oil lubrication system.

Technology Tightens Turnover

The move to standardized equipment was made for profitability's sake. "We wanted to do a better job, we wanted to build safer equipment, and we wanted to improve profitability," Bollinger said.

What has allowed these improvements to take place is how technology has changed over the past decade or so, and the impact that it has had



"Every weldment now comes off welding jigs and fixtures," said Bollinger. "There isn't a single weldment or assembly that isn't performed on a fixture, which is what now allows us to build components separate to machines."

on the Aquamarine production environment.

For instance, several years ago Aquamarine purchased a TRUMPF CO₂ flatbed laser cutting machine. The accuracy of the cuts capable on a laser, in combination with a SolidWorks design program, has reduced production time because parts can be designed and cut more precisely.

"Every weldment now comes off welding jigs and fixtures," said Bollinger. "There isn't a single weldment or assembly that isn't performed on a fixture, which is what now allows us to build components separate to machines. It used to be that we'd build everything, assemble to ensure fit, disassemble for painting, and then re-assemble the components for final assembly. For this reason, up until three years ago, you would see very little inventory in our shop. But now with the accuracy of the laser, and our welding fix-

tures, that's a thing of the past."

Having the laser has also allowed the company to add design details to parts of the harvesters that would have been difficult to achieve with other cutting methods. For instance, on the paddle wheels, drainage of water from the wheel wells is made easier because of the precise cuts made on the laser, so there is little opportunity for water to be trapped and prematurely wear the paint surface.

Aquamarine has designed and built its fixtures so that welders can position the weldments themselves. They use cranes as necessary so that welders can weld in the down position where possible. "It means our welders can work more safely and productively, while achieving better-quality welds," explained Bollinger.

Now, all finished carbon steel parts are sent out for powder coating to Automatic Coating Limited (ACL) in Scarborough, Ont. With the new design, Aquamarine upgraded from a wet spray to a dual-component epoxy-polyester powder coating system.

"Weldments and parts are blasted, primed with epoxy, and then top-coated with polyester," Bollinger described. "The polyester paint helps to protect UV rays from fading the paint colour."

Stainless Steel Welding Simplified

The switch to stainless steel hulls as a standard material to improve longevity and provide increased toughness is also based on technological changes in the industry.

"It used to be that we would only sell stainless steel as an upgrade," said Bollinger. "Stainless steel is more difficult to cut, to bend, and to weld, unless you have the proper equipment."

For welding stainless steel, Aquamarine purchased a Fronius TPS/i welding system. It is a multiprocess machine. As long as the required hardware capabilities are included in the base model, select processes can be upgraded through a software update. For example, the machine can have the functionality of a pulsed-arc power source added to it with a software upgrade via USB or unlock code. This is what Aquamarine uses.

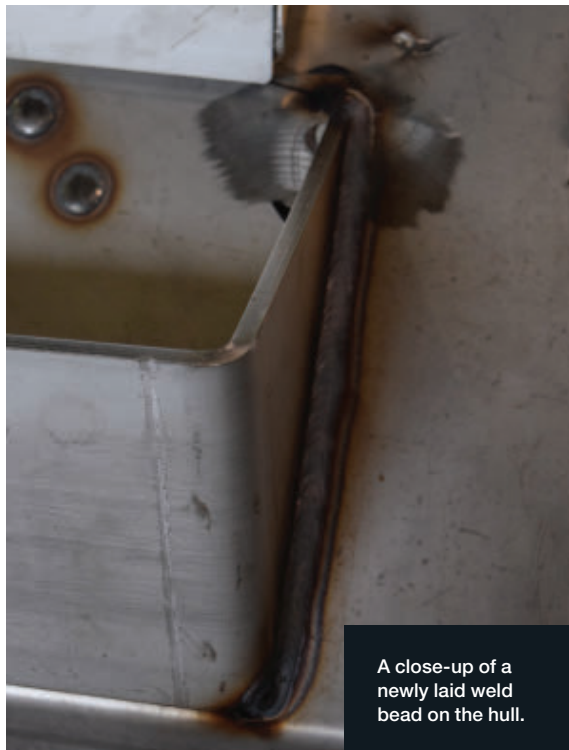
With its Pulse Multi Control (PMC) process, which is part of the TPS/i power source, Fronius provides welders with a tool for improving pulse welding. The two multicontrol features of the PMC process are the arc penetration stabilizer and the arc length stabilizer. Used together, they ensure that amperage remains constant at the welding arc, regardless of stick-out changes. The penetration stabilizer will vary wire feed speed to maintain a constant amperage at the arc, translating into consistent penetration results.



Welding the stainless steel hull has been made easier with the introduction of Fronius welding technology.

The arc length stabilizer is an induced short circuit in the pulsed waveform. It takes readings so that adjustments to wire feed speed can be made accurately and the penetration profiles can be improved. The arc length stabilizer ensures there will be minimal changes in arc characteristics throughout different welding positions.

"This was the best technology I could find without going to a laser welding machine, which would be impractical for the work we do," said Bollinger. "So we had to choose between going with a standard TIG machine and the Fronius. And for us, the Fronius is like having a CNC



A close-up of a newly laid weld bead on the hull.

welding machine. Instead of designing paths and your CNC performing the motion, it kind of reverses that process: You perform the motion and it performs all the changes required on the job in real time. It's basically changing its wire feed speeds multiple times a second to maintain weld consistency.

"As you move your gun farther from or closer to the material, it reacts," he continued. "For instance, as the operator changes his stick-out (contact tip to work distance), the machine will recognize this change and ensure a quality weld is deposited. Our best welder didn't like it at first because it was so different from what he was used to. It's like TIG welding with a CNC MIG gun. After two weeks, that same welder didn't want to use anything else."

Programming was the biggest adjustment, compared to previous welding systems the team had used.

"It took a while to get all the programming in place for the variety of fit-ups of different gauges," explained Bollinger. "It's a machine we generally use for light-gauge applications, but there are heavier weldments that weld onto reinforced sections. We had to develop our programs to deal with 14 gauge to 14 gauge, 14 to 11, and quarter inch to 14 gauge. Now we run those programs and it's faster, there is significantly less cleanup, less heat input, and therefore less distortion. We use less filler materials as well, and end up with better welds."

Part Flow Improvement

Once parts are welded on Aquamarine's jigs and fixtures, they are shipped in traveller bins that go to and from the paint shop. The bins also serve as inventory and assembly bins.

"The part will live its whole life in the bin and will be kept off the shop floor," said Bollinger. "When customers come into the shop, we want them to be able to see our inventory of parts and weldments as well as the machines that are being assembled."

Aquamarine began this process change about five years ago and they now produce 2.5 times the number of parts with the same amount of labour. Man-hours per machine has been reduced by 60 per cent.

"We used to spend more on direct labour than what we sell the machines for today," said Bollinger. The base price for an H5-200 harvester is now down to US\$49,900, where it has remained for five years.

Kit Convenience

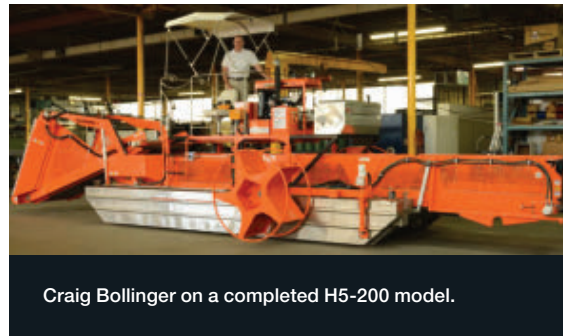
There is more to these machines than just the metalwork, of course, but Aquamarine has

simplified each of these systems as well so that essentially everything on it is a kit produced by a well-respected, internationally recognized supplier: Kubota engines, Danfoss hydraulics, Hetronic controls, and Lincoln Lube lubrication systems, to name a few.

"We redesigned our line of equipment with our suppliers," Bollinger explained. "For example, we used to make all of our own hydraulic hose assemblies here at Aquamarine. Now our supplier, Omniflex Hose & Equipment Ltd. in Cambridge, Ont., supplies hydraulically certified hose assemblies to us in kit form so if, somewhere in the world, a client pops a hose, we can send them a replacement part just as easily as a complete kit."



That, and the safety improvements resulting from having the harvester built to Transport Canada standards, creates yet more interest for



Craig Bollinger on a completed H5-200 model.

Aquamarine products in the marketplace.

Aquamarine is now at the stage where it is keeping up with orders and beginning to accumulate some finished inventory. With sales growing every year, it is a good-news story for the Aquamarine team. **FW**

Editor Robert Colman can be reached at rcolman@canadianfabweld.com.

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