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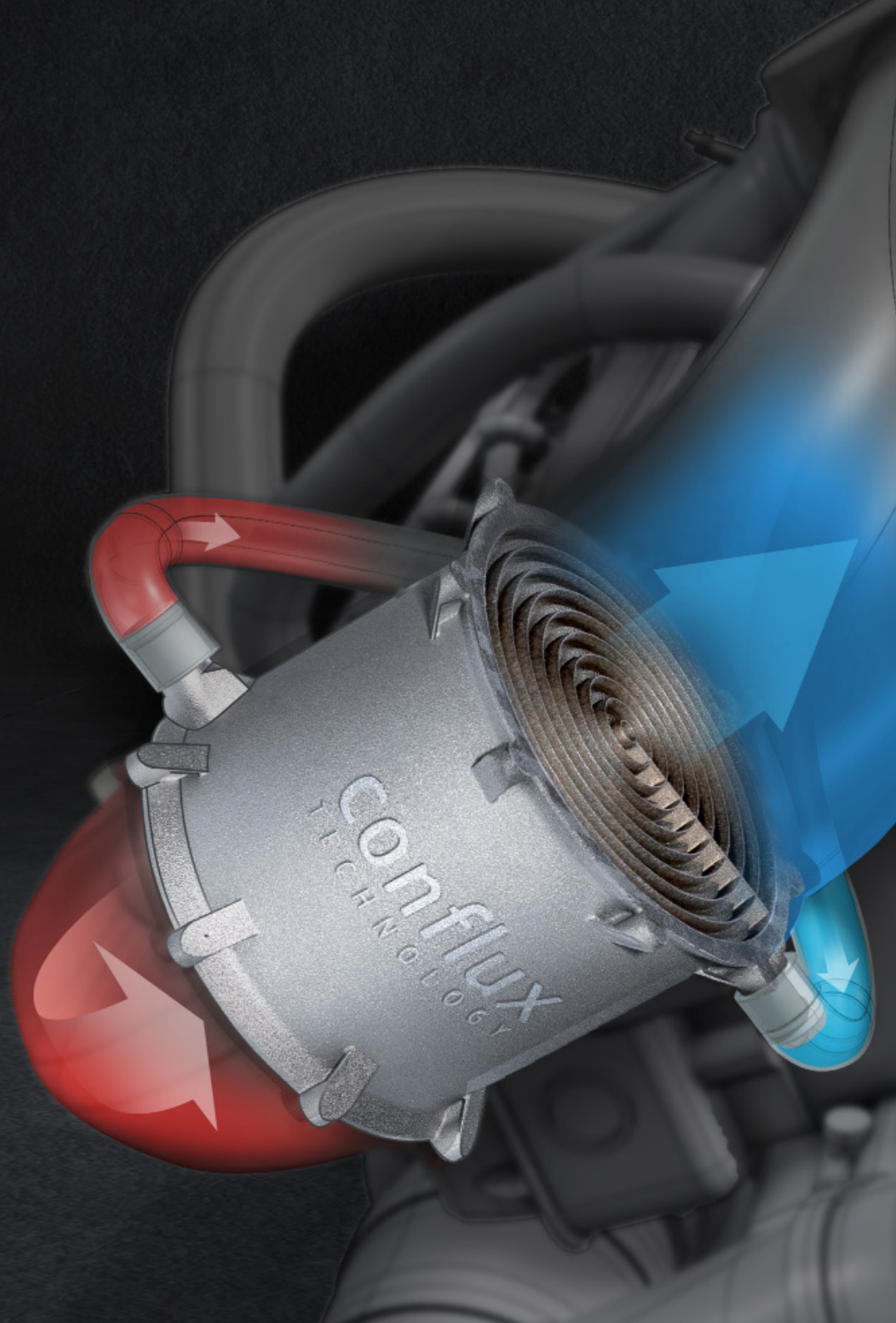
CONFIGURABLE AM PRODUCTS

Conflux Water Charge Air Cooler

- Ultra-high performance WCAC delivers significant reductions in **core volume, pressure drop** and **weight**
- A flexible design, rapidly configured and manufactured to your exacting requirements
- Priced to compete with premium WCACs, without compromising performance



CONFIGURABLE AM PRODUCTS

Conflux WCAC

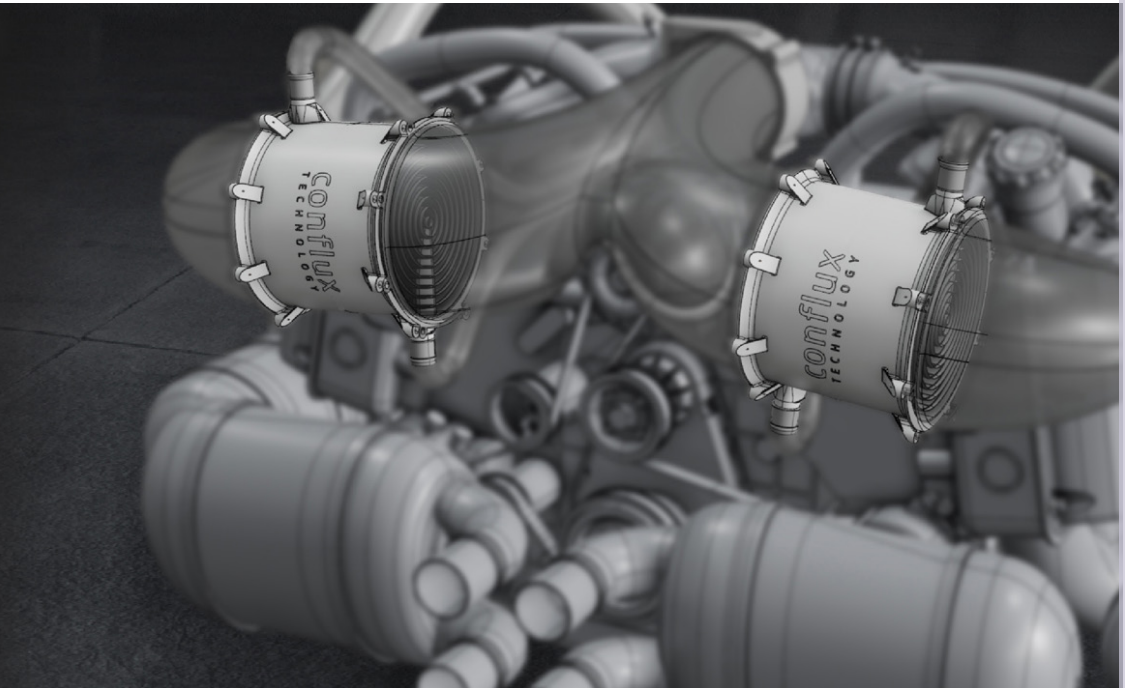
The Conflux Water Charge Air Cooler delivers industry-leading heat exchange with lower pressure drop, volume and weight. When benchmarked against the leading microtube WCAC, for the same heat transfer we saw:

82% reduction in water side pressure drop

39% reduction in wet weight

24% reduction in air-side pressure drop

15% smaller core volume



ADAPTABLE DESIGN

Our design process facilitates scaling, configuration and manufacture unique to your boundary conditions, performance and packaging requirements.

EMBEDDED COMPLEXITY

Complex geometries and micro features unachievable with traditional manufacturing drive the core performance, alongside fins and thin wall features that are optimised for the evolving thermal-physical properties of the working fluids throughout the heat exchanger.

HIGH EFFICIENCY

The high surface area to volume ratio of the core is enhanced by designs that ensure even mass flow distribution, providing more heat exchange per unit of weight or volume.

RAPID CONFIGURATION

Conflux AM experts simplify configuration (gathering requirements, confirming sizing and design) and support prototype supply, validation testing and production planning

Need bespoke instead? Speak to us about a heat exchanger solution tailored to your unique packaging requirements and performance needs.

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Conflux Products

Conflux Products are scalable and configurable to unique boundary conditions, performance and packaging requirements.

Conflux expert design tools and cutting-edge capabilities combined with additive manufacturing enable rapid configuration to adapt:

-Packaging approach and ducts

-Form factor and dimensions

-Port location, fittings and configuration

-Materials

Performance requirements drive design, so speak to us for an assessment of your heat exchange application.

"Conflux has aggregated our expertise in first principles calculations, core engineering design and additive manufacturing into a set of tools that can rapidly inform a solution."

Dan Woodford, Chief Product Officer

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Packaging

The heat exchanger can be manufactured in the following ways:

-As a monolithic AM part

-Fitted with ducts

-Developed as a cartridge with an outer case

Duct and cartridge casing can be AM or traditionally manufactured.

Form factor

Conflux WCAC geometry can be configured to match packaging constraints, including:

-Annular (1)

-Rectangular (2)

-Contoured / bespoke (not shown)

(1)

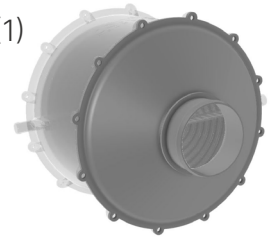
(2)

Ducts

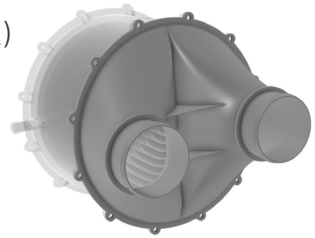
Standard approach to production is with ducts. Ducts are optional. Duct length and contouring are configurable to packaging requirements.

Below:
(1-4) Examples of duct formatting on annular form
(5-6) Examples of duct formatting on rectangular form

(1)



(2)



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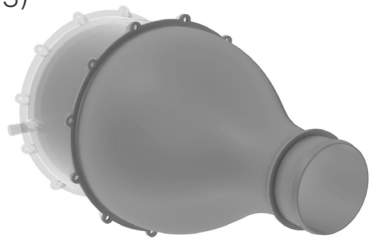

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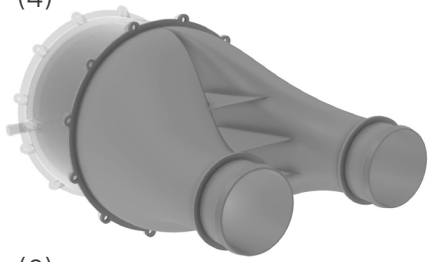

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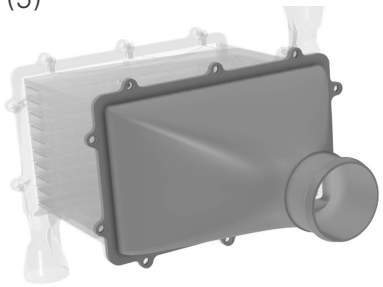
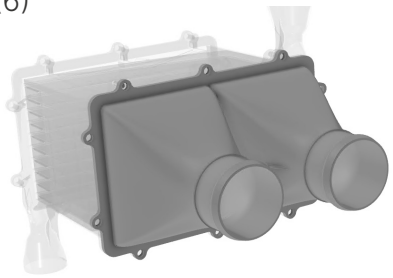


(6)



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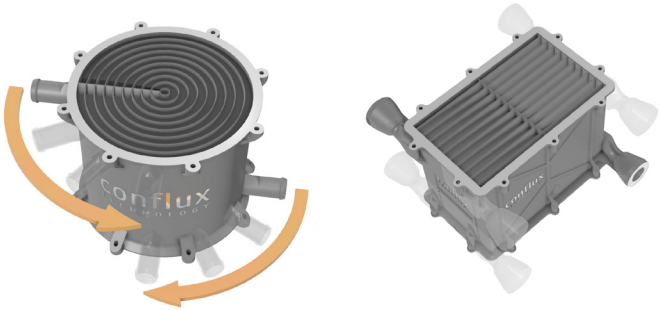
Port location

Port locations can be configured to match packaging requirements;

-Annular (1) may be rotated from optimal, opposite position.

-Rectangular (2) Optimal positions shown below.

-Contoured / bespoke (not shown) dependent on packaging form.



Port fittings

Port fittings are printed or machined during post processing to specification. Most global standard port connections can be accommodated

Min/max dimensions

Conflux heat exchangers are scalable to the maximum build volume of the manufacturing machine (e.g an AMCM M 4K machine offers a build volume of 1000mm high and 450mm diameter). Custom multi-core parts and arrays address larger heat exchange requirements.

Materials

Conflux manufactures in common and bespoke AM materials. Material selection is influenced by customer boundary conditions (fluid, temperature, pressure, flow rate) and performance requirements (heat exchange, pressure drop, weight reduction, durability).

Performance

Performance graph at high pressure and high mass flow condition.

The Conflux WCAC can be scaled across dimensions to achieve target heat exchange performance given fluid and boundary conditions. Our sizing tools combine experimental data and simulation to model performance across multiple dimensions.

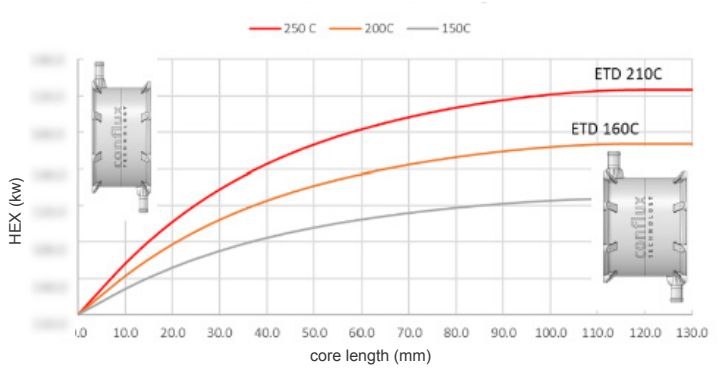
Contact Conflux for a rapid assessment of your specifications and a sizing estimation.

These diagrams represent the output of the sizing tools, fixing selected parameters and illustrating how diameter and length vary performance.

Table: Fluid condition and material

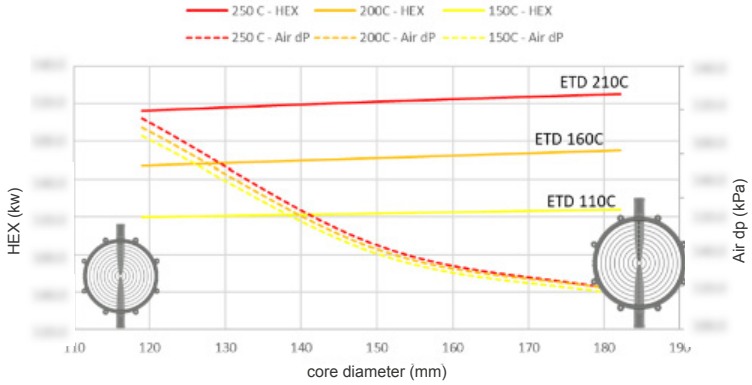
Hot side		Cold side	
Air flow (kg/s)	[illegible]	Water flow (LPM)	[illegible]
Air-in pressure (bar)	[illegible]	Water in temperature (C)	[illegible]
Material used:	AlSi10Mg		

Graph: Performance with HX diameter of 150mm at varying core length and air inlet temperature



ETD = entrance temperature difference
HEX = heat exchanger (performance)

Graph: Performance with varying core diameter and air inlet temperature



air dP = air pressure drop

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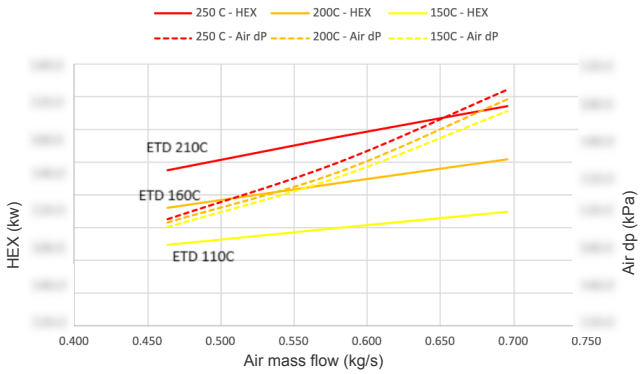
Performance

Performance graph at high pressure and high mass flow condition

Table: Fluid condition and material

Hot side		Cold side	
Air flow (kg/s)	[illegible]	Water flow (LPM)	[illegible]
Air-in pressure (bar)	[illegible]	Water in temperature (C)	[illegible]
Material used:	AlSi10Mg		

Graph: performance with HX diameter of 150mm and length of 130mm of varying air inlet mass flow



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air dP = air pressure drop

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Stay ahead with Conflux

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