CAST-X Circulation Heaters

Summary Sheet

CAS CAST ALUMINUM Solutions

ALL CAST-X CIRCULATION HEATERS FEATURE:

- Stainless Steel (316L) Flowpath Tubes
- Non-Welded Construction
- UL®-Approved Heating Elements
- Cast-In Heating Elements
  (except CAST-X 500: replaceable cartridge heater)
- Ability to Heat Liquids or Gases
- Ability to Safely Heat Flammable Media
  (isolated in flowpath tube: *never contacts heating elements*)

The table below shows data for standard CAST-X models and components.
Custom tube materials, finishes and configurations are also available.
See a CAS representative for details and a formal quote on all custom orders.

MODEL	POWER RANGE	MAX OPERATING TEMPERATURES	TUBE SPECS	STANDARD NO. OF TUBES	MAX PRESSURE (standard 316 SS)	ENCLOSURE OPTIONS
CAST-X 500	300 - 1500 Watts	No Enclosure: 392°F (200°C) NEMA 1 250°F (121°C) NEMA 4 250°F (121°C) NEMA 7 392°F (200°C)	OD: .250" (1/4") (6.3 mm) Wall: .035" (.89 mm)	1	5100 psi (351 bar)	No Enclosure NEMA 1 NEMA 4 NEMA 7
CAST-X 1000	750 - 3000 Watts	No Enclosure: 662°F (350°C) NEMA 1: 608°F (320°C) with thermostat: 250°F (121°C) NEMA 4: 482°F (250°C) with thermostat: 250°F (121°C)	OD: .313" (5/16") (7.9 mm) Wall: .020" (1.7 mm)	1	2100 psi (144 bar)	No Enclosure NEMA 1 NEMA 4
CAST-X 2000	1 - 6 Kw	NEMA 1: 482°F (250°C) with standoff: 662°F (350°C) with t-stat: 250°F (121°C) NEMA 4: 350°F (175°C) with standoff: 662°F (350°C) NEMA 7: 482°F (250°C)	OD: .50" (1/2") (12.7 mm) Wall: .065" (1.7 mm)	1	5100 psi (351 bar)	NEMA 1 NEMA 4 NEMA 7 Standard or Standoff Design
CAST-X 2500	2.4 - 15 kW	NEMA 1: 662°F (350°C) NEMA 4: 572°F (300°C) NEMA 7: 482°F (250°C) ATEX: 482°F (250°C)	OD: .625" (5/8") (15.9 mm) Wall: .065" (1.7 mm)	2	4000 psi (275 bar)	NEMA 1 NEMA 4 NEMA 7 ATEX
CAST-X 3000	2.6 - 27 kW	NEMA 4: 572°F (300°C) NEMA 7 / ATEX: 482°F (250°C)	OD: .750" (3/4") (19.1 mm) Wall: .065" (1.7 mm)	2	3300 psi (228 bar)	NEMA 4 NEMA 7/ATEX
CAST-X 4000	6.7 - 60.3 kW	NEMA 4: 572°F (300°C) NEMA 7 / ATEX: 662°F (350°C)	OD: 1.0" (25.4 mm) Wall: .083" (2.1 mm)	2	3100 psi (214 bar)	NEMA 4 NEMA 7/ATEX
UNIVERSAL SOLVENT HEATER	6 - 8 kW	392°F (200°C)	Solvent Tube: OD: .750" (3/4") (19.1 mm) Wall: .065" (1.7 mm) Cooling Tube: OD: .250" (1/4") (6.3 mm) Wall: .035" (0.9 mm)	1 Solvent Tube 1 Cooling Tube	3300 psi (228 bar)	NEMA 7

NEED ASSISTANCE ? :

The CAS Team is ready and available to provide assistance with engineering calculations, part numbering protocols, and general application advise. Feel free to give us a call or email. We're here to help.

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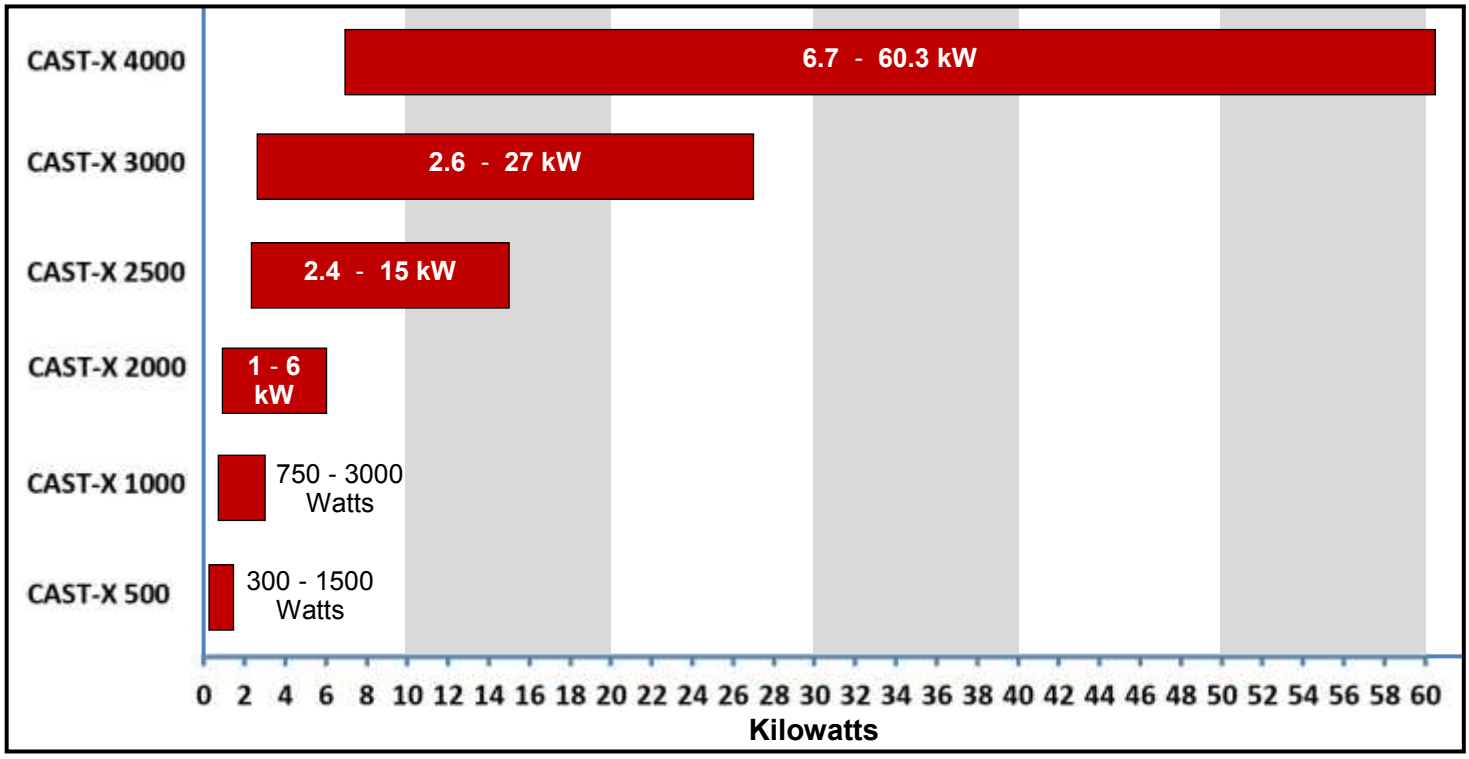
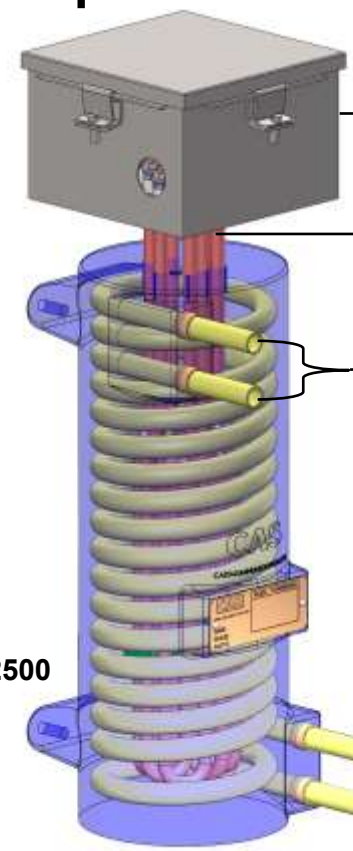
Power Ranges for Standard CAST-X Circulation Heaters



Important Features of CAST-X Circulation Heaters



CAST-X 2500

Power supply, high-limit switch and thermocouple connections are housed in safety-certified electrical enclosures.

CAS offers a variety of moisture-resistant, explosion-proof and general-purpose enclosures, to meet your application's needs.

Heating elements (orange) and flowpath tubes (yellow) are cast into the aluminum body: *the produces excellent heat transfer.*

Standard CAST-X units have Seamless Stainless Steel (316L) flow-tubes. *These are compatible with high-pressure applications.*

For example, CAST-X 2500 tubes are rated to 4000 psi / 275 bar.

Additional tube materials & coatings are also available.

You can safely heat flammable gases & liquids with CAST-X.
(perfect for natural gas, aerospace, petrochemical applications)

Media is isolated in tubes, never touching heating elements.

This design also prevents contamination.
(perfect for food, medical, and semiconductor applications)

Also: Tubes are "self-draining" (important safety feature)

Tube Configuration Options: For CAST-X Models with two flowpath tubes there are many options.

Single Tube: Although two tubes are available, only one is utilized. The extra tube acts a spare.
Parallel: Media flows through Tube 1 then through Tube 2, for maximum dwell time and increased Delta-T.
Series: Media flows simultaneously in and out of Tubes 1 & 2, for maximum flow-rate.

Electrical Enclosure Types – Non Hazardous Location Environmental Rating Standards Comparison

NEMA and UL are standards writing organizations. The ratings are based on similar application descriptions and performance expectations. UL requires testing for compliance by qualified evaluators independent of the manufacturer. NEMA does not require independent testing and leaves compliance up to the manufacturer.

Enclosure Rating	**National Electrical Manufacturers Association** (NEMA Standard 250)	**Underwriters Laboratories, Inc.** (UL50 and UL 508)
Type 1	Indoor use to provide a degree of protection to personnel against access to hazardous parts and to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt).	Indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree of protection against falling dirt.
Type 2	Indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt); and to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing).	Indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment, to provide a degree of protection against falling dirt, and to provide a degree of protection against dripping and light splashing of non-corrosive liquids.
Type 3	Indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); and that will be undamaged by the external formation of ice on the enclosure.	Indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, and windblown dust; and that will be undamaged by the external formation of ice on the enclosure.
Type 3R	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); and that will be undamaged by the external formation of ice on the enclosure.	Indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, and snow; and that will be undamaged by the external formation of ice on the enclosure.
Type 3S	Indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); and for which the external mechanism(s) remain operable when ice laden.	Indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, and windblown dust; and in which the external mechanisms remain operable when ice laden.
Type 3X	Indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); that provides an additional level of protection against corrosion and that will be undamaged by the external formation of ice on the enclosure.	
Type 3RX	Indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); that will be undamaged by the external formation of ice on the enclosure that provides an additional level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.	
Type 3SX	Indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow); that provides an additional level of protection against corrosion; and for which the external mechanism(s) remain operable when ice laden.	
Type 4	Indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); and that will be undamaged by the external formation of ice on the enclosure.	Indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, and hose-directed water; and that will be undamaged by the external formation of ice on the enclosure.
Type 4X	Indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (windblown dust); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (rain, sleet, snow, splashing water, and hose directed water); that provides an additional level of protection against corrosion; and that will be undamaged by the external formation of ice on the enclosure.	Indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, hose-directed water, and corrosion; and that will be undamaged by the external formation of ice on the enclosure.
Type 5	Indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and settling airborne dust, lint, fibers, and flyings); and to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing).	Indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against settling airborne dust, lint, fibers, and flyings; and to provide a degree of protection against dripping and light splashing of non-corrosive liquids.
Type 6	Indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (hose directed water and the entry of water during occasional temporary submersion at a limited depth); and that will be undamaged by the external formation of ice on the enclosure.	Indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, hose-directed water and the entry of water during occasional temporary submersion at a limited depth; and that will be undamaged by the external formation of ice on the enclosure.
Type 6P	Indoor or outdoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (hose directed water and the entry of water during prolonged submersion at a limited depth); that provides an additional level of protection against corrosion and that will be undamaged by the external formation of ice on the enclosure.	Indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, hose-directed water, corrosion, and the entry of water during prolonged submersion at a limited depth; and that will be undamaged by the external formation of ice on the enclosure.
Type 7	Designed to contain an internal explosion without causing an external hazard.	Indoor use in hazardous (Classified) locations classified as Class I, Division 1, Groups A, B, C, or D as defined in NFPA 70.
Type 8	Designed to prevent combustion through the use of oil-immersed equipment.	Indoor or outdoor use in hazardous (Classified) locations classified as Class I, Division 1, Groups A, B, C, and D as defined in NFPA 70.
Type 9	Designed to prevent the ignition of combustible dust.	Indoor use in hazardous (Classified) locations classified as Class II, Division 1, Groups E, F, or G as defined in NFPA 70.
Type 10	Designed to contain an internal explosion without causing an external hazard.	Meet the requirements of the Mine Safety and Health Administration, 30 CFR, Part 18.
Type 12	Constructed (without knockouts) for indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and circulating dust, lint, fibers, and flyings); and to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing).	Constructed (without knockouts) for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against circulating dust, lint, fibers, and flyings; against dripping and light splashing of non-corrosive liquids; and against light splashing and consequent seepage of oil and non-corrosive coolants.
Type 12K	Constructed (with knockouts) for indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and circulating dust, lint, fibers, and flyings); and to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing).	Constructed (with knockouts) for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against circulating dust, lint, fibers, and flyings; against dripping and light splashing of non-corrosive liquids; and against light splashing and consequent seepage of oil and non-corrosive coolants.
Type 13	Indoor use to provide a degree of protection to personnel against access to hazardous parts; to provide a degree of protection of the equipment inside the enclosure against ingress of solid foreign objects (falling dirt and circulating dust, lint, fibers, and flyings); to provide a degree of protection with respect to harmful effects on the equipment due to the ingress of water (dripping and light splashing); and to provide a degree of protection against the spraying, splashing, and seepage of oil and non-corrosive coolants	Indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against circulating dust, lint, fibers, and flyings; and against the spraying, splashing, and seepage of water, oil, and non-corrosive coolants.