

# Hyperchill Laser Chillers for the Laser Industry Market Application Publication



The laser is the most universal tool available for cutting, welding, marking, drilling, coating, hardening, and performing structural processing work on surfaces.

The characteristics of cooling systems used to remove heat from lasers are well defined and standardized. Each manufacturer is able to provide the required refrigerating capacity needed to cool the laser head and the optical circuit for their machinery.

The power required usually ranges from 102,364 up to 170,607 BTU (30 up to 50kW) although recently there has been a tendency to increase the power to ensure higher outputs for plate processing lines, and to dispose of as much as 238,850 to 272,971 BTU (70 to 80 kW) per system.

The reference temperature for the laser inlet/outlet cooling fluid are 68/77°F (20/25°C). The control must be "exact" with a maximum differential of 2°F (1°C) at every heating load. This absolute differential must also be ensured in the phases of changing plates, with a low heating load or none at all. Often, deionized water with an anti-passivation agent added. To prevent corrosion or the process fluid contamination, the entire hydraulic circuit must be made of non-ferrous materials (stainless steel, copper and brass). Pumps must provide a useful head pressure of 72 psi (5 bar) for the system to overcome the high losses of head that occur in the small distribution pipes inside the laser. To ensure minimum water temperatures (approximately 68°F (20°C), heating elements are required for the hydraulic circuit, even when starting up for the first time, with a lower external temperature than required by the laser.



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## Features and Benefits:

- Compliant scroll compressors
- High efficiency evaporator
- Integrated stainless steel pump
- High-density polyethylene storage
- Microprocessor control
- Non-ferrous hydraulic circuit prevents corrosion and process fluid contamination
- Flexibility of use
- Extensive range of kits and accessories



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## Why was Parker domnick hunter chosen as the solution?

A major laser OEM was in the market for a new chiller manufacturer to complement their systems. They came to Parker domnick hunter with two major requirements. The chiller needed to improve both the supply water temperature tolerance and use an environmentally friendly refrigerant. At that time, the OEM was being supplied a chiller which only maintained process water at  $\pm 0.5^{\circ}\text{C}$  and used R22 refrigerant.

Dan Rogowski, Parker domnick hunter Market Development Manager and Robert Tucker, Process Cooling Product Manager visited their site to discuss their requirements.

The Parker domnick hunter Hyperchill Laser Chiller provides a very tight supply water temperature tolerance ( $\pm 0.3^{\circ}\text{C}$ ) by utilizing its "Close-Control" feature. The Hyperchill includes a precise, very efficient stainless steel heat exchanger combined with proprietary microprocessor software. The software was designed and tested with the OEM so the program could be updated to the customer's specific needs. The improved "Close-Control" supply temperature ( $\pm 0.3^{\circ}\text{C}$ ) accomplished a more precise laser wave length, high output efficiencies, improved beam quality and reduced thermal stress on the laser system.

Many chillers on the market today use R22 refrigerant. Due to R22's ozone depletion potential, this refrigerant will no longer be

manufactured after January 1, 2010. Only recycled or saved stocks of the refrigerant can be used. Hyperchill uses R407C, which has no chlorine content or ozone depletion potential.

With their two main requirements covered, along with a quality product at a competitive price and our North American service capabilities, Parker domnick hunter's range of Hyperchill Laser Chillers was chosen to complement their systems.

## Typical installation

