



ACS Group

JOE PLATEK

SALES DIRECTOR



KEY INFORMATION

- Manufacturing facilities
 - New Berlin, WI – AEC, Cumberland, Sterling lines
 - Wabash, IN – Wabash and Carver lines
 - Suzhou – limited line of AEC and Cumberland products primarily serving China and southeast Asia
- Approximately 300 employees
- ~85% of business is in North America
- Dedicated parts/service organization, delivering on most requests same or next day
- ISO 9001:2015 certified



KEY INFORMATION

- An engineering and technology driven company dedicated to producing leading solutions for process industries worldwide
- Formed by the acquisition / integration of four leading companies with strong positions in the plastics industry
 - AEC (Application Engineering Corporation), founded 1957
 - Cumberland, founded 1939
 - Sterling, founded 1916
 - Wabash/Carver, founded 1941
- Breadth of product has moved ACS Group beyond plastics to a wide variety of process industries

Food/Pharma
Metalworking
Recycling

Chemicals
Printing
Many others...



NORTH AMERICAN MANUFACTURING



- 180,000 square feet of manufacturing, warehousing, and administrative space in New Berlin, WI
- Additional 60,000 square feet of warehousing and testing space at NB2 located within walking distance of main plant
- Engineering, sourcing, product development, and production together in product-focused teams
- Custom design and production capabilities



TEMPERATURE CONTROL

- Water TCUs
 - Up to 300 degrees F
 - Wide range of heater and pump capacities
- Oil TCUs
 - Customizable for a wide range of high temperature applications



WATER PROCESS COOLING

- Process Cooling
 - Packaged Chillers
 - Central Chiller Systems
 - Pump Tank Systems
 - Cooling Towers
 - Blown Film Coolers



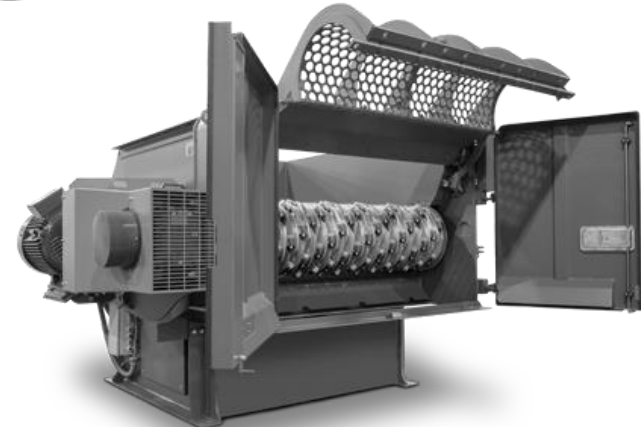
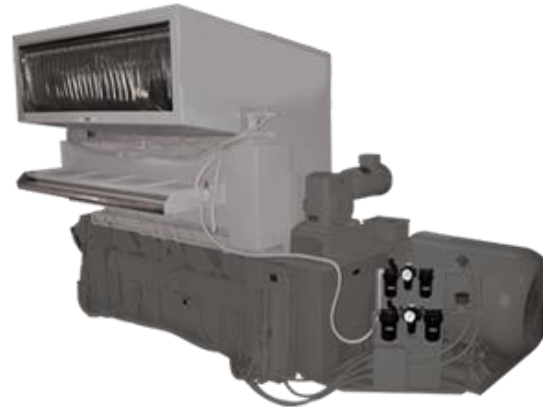
MATERIAL HANDLING PRODUCTS

- Blending
- Drying
- Conveying

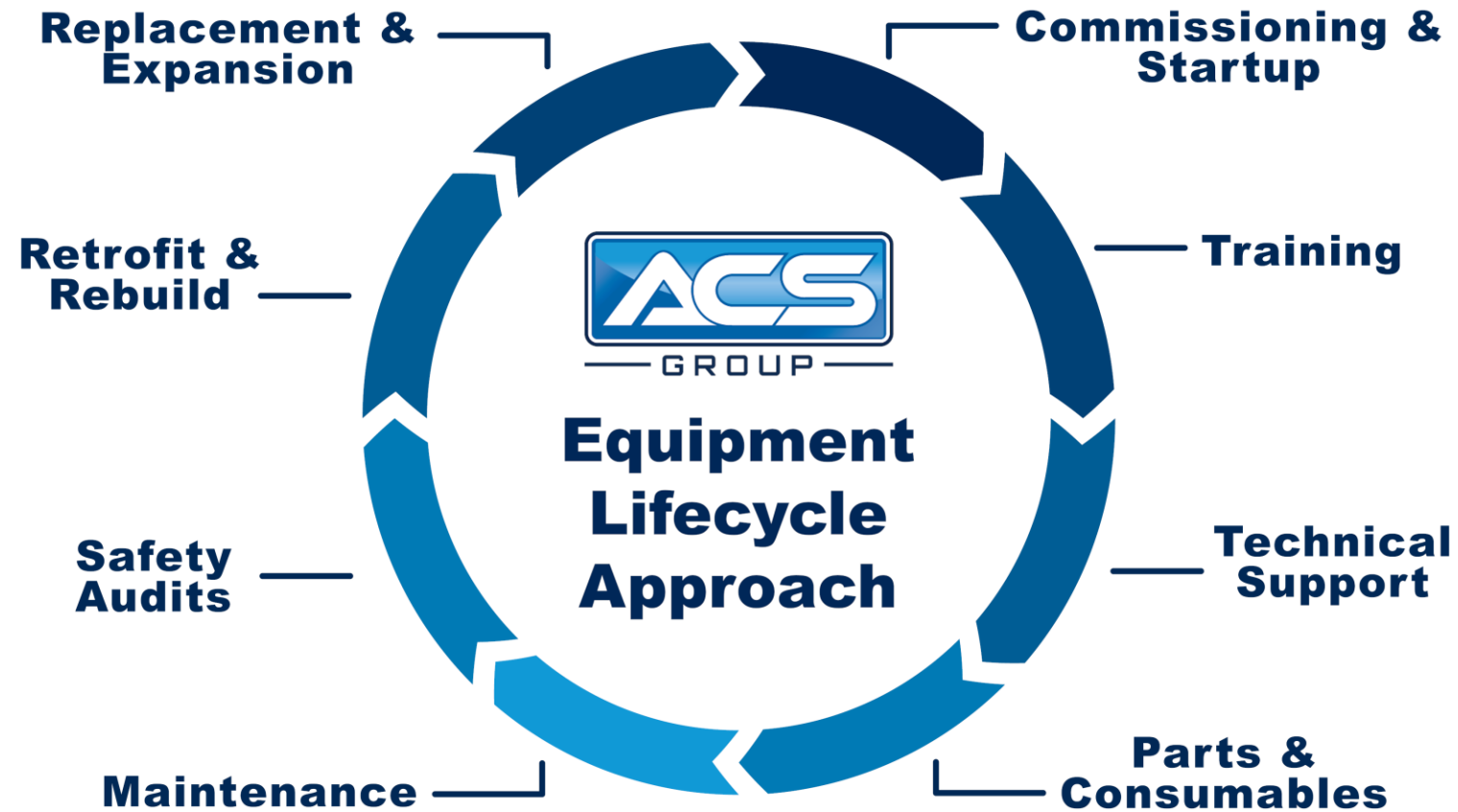


SIZE REDUCTION PRODUCTS

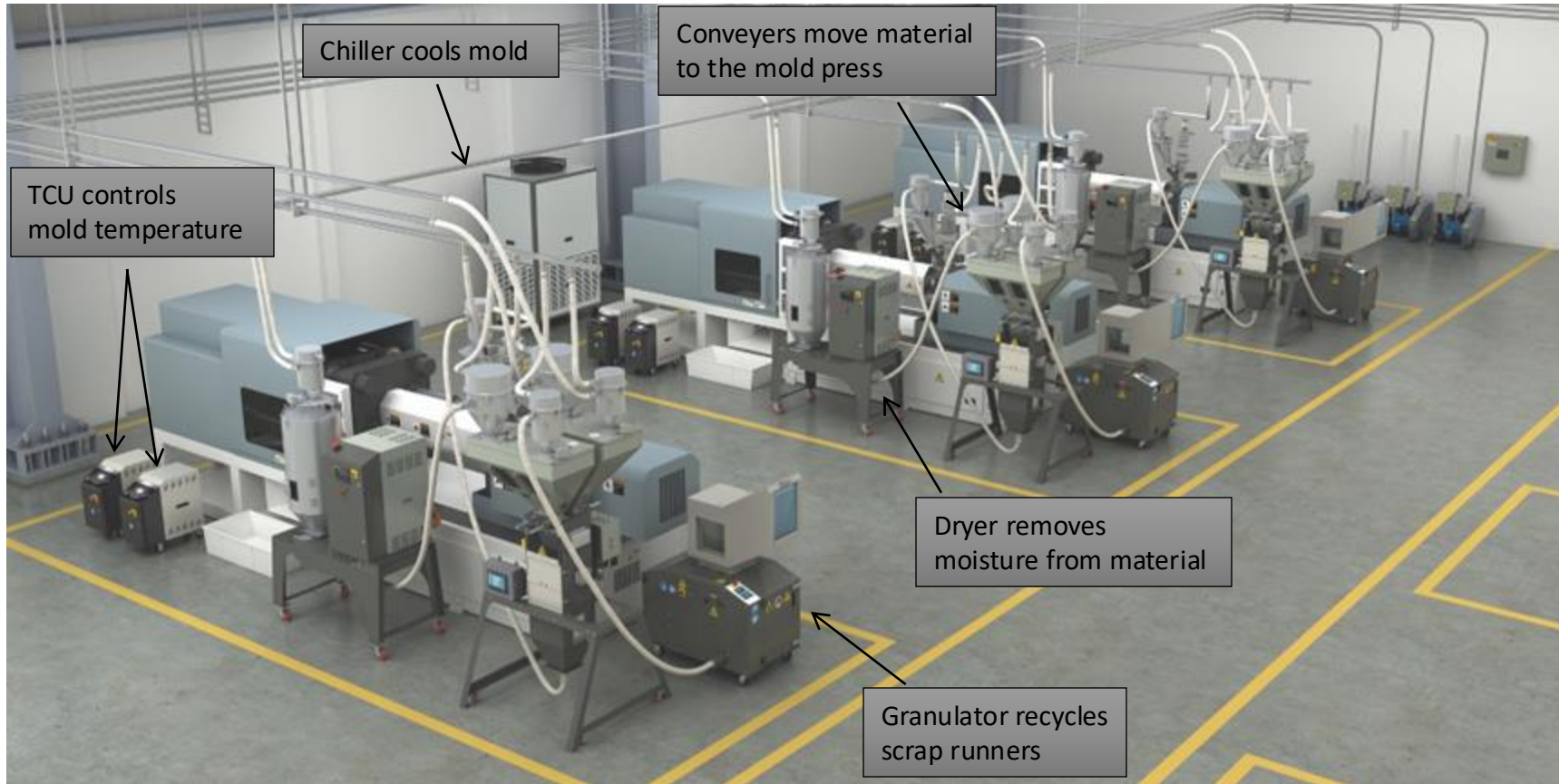
- Beside-the-press granulators
- Thermoforming granulators
- Central granulators
- Shredder systems



AFTERMARKET SERVICE



EQUIPMENT FOR PLASTIC MOLDING

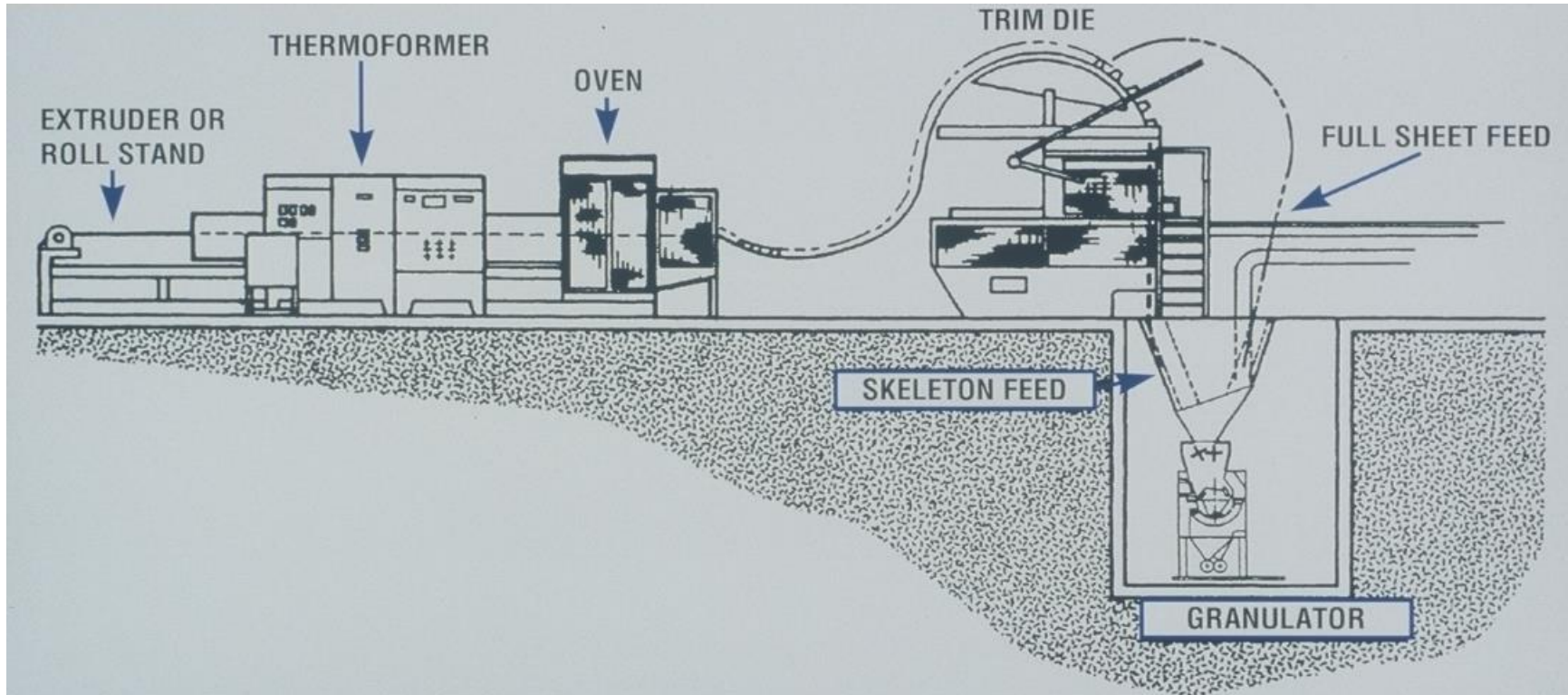


Typical Injection Molding System



APPLICATIONS

- TCU's will provide different process temperatures as required at each use point.



WHAT DOES A TCU DO?

- Provides a constant flow of pressurized water at a fixed temperature to remove heat from a process or to add heat to a process. A TCU can control water up to 180°F, 250°F (as standard), and 300°F as an option (with a pressurized loop we can increase this temperature to 250°F and higher).

TCU's may be used anytime a customer wants:

- Constant flow
- Increased flow and or pressure
- Constant temperature
- Multiple temperatures
- Higher temperatures than the cooling water available



HOW DOES A TCU WORK

- A TCU pump circulates water at a high flow and pressure. The control monitors the To Process temperature and turns on heaters if too cold or opens the cooling water valve if too hot.
- Approach temperature (the difference between cooling water in and desired To Process fluid temperature) may be reduced to within 5°F by utilizing large cooling valves.
- The optional heat exchanger separates cooling water from the process loop.



HOW DOES A TCU WORK

TCU's relies on an outside source for cool water; either city water, well water, cooling towers, or chillers. It is not generally possible to get the same process temperature as the cooling water temperature because:

- Solenoid valves restrict the flow of cooling water into the process flow.
- The process flow is greater in volume than the cooling water available.
- The process pressure is greater than the cooling water source.
- Return line (back) pressure may prohibit the TCU from dumping hot water fast enough.

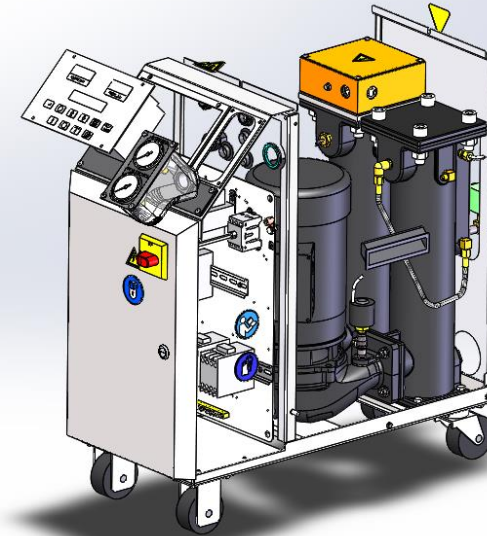


HOW DOES A TCU WORK

Main Components:

- Pump – sizes from $\frac{3}{4}$ -10HP
- Heaters – 3kW to 48kW std.
- Cooling Valve – $\frac{1}{4}$ " – $1\frac{1}{2}$ " solenoid or $\frac{1}{2}$ " – $1\frac{1}{4}$ " modulating
- Control – 1/16 DIN, M2C, M5

Optional: Heat exchanger
U-tube or Shell and Tube



APPLICATION DETAILS

- Material Data

- Type
- Bulk Density
- Specific Heat
- Processing Rate/Material Speed
- Material Width/Thickness
- Temperature of Material

- Roll Data

- Material Temperature To/From
- Cored/Hollow Shell/Jacketed
- Rotary Union Data
- Roll Wrap

- Process Data

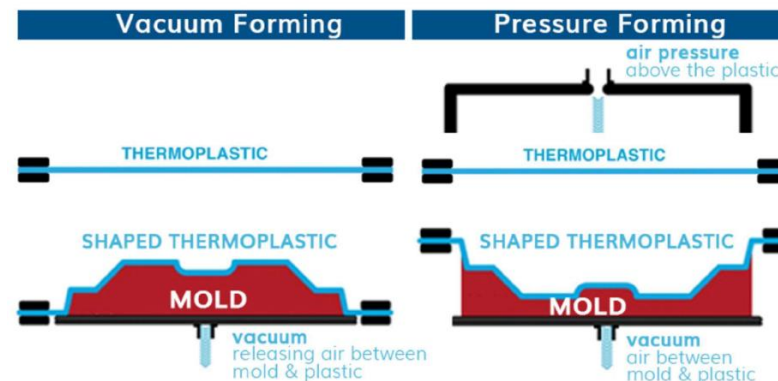
- Heat/Cool
- BTU Load
- Start up time
- Cooling Circuit
 - Direct Injection
 - Closed Circuit
 - Supply Water Temp/Pressure



FLOWS AND PRESSURES

What is the benefit of lower temperature rise of cooling water in plastic molds?

- Less stress, higher quality
- Less warpage, fewer rejects
- Lower injection pressure, smaller machine
- Full shots, fewer rejects
- Faster cycles, more product



WHAT DOES A CHILLER DO?

- Moves heat from one source to another.
- Provides water at a constant fixed temperature to remove heat from a mold and formed plastic to solidify the shape quickly. A Chiller can control water temperature from 20 ° F up to 80°F (as standard)
- Air Cooled
- Water Cooled
- Portable
- Central

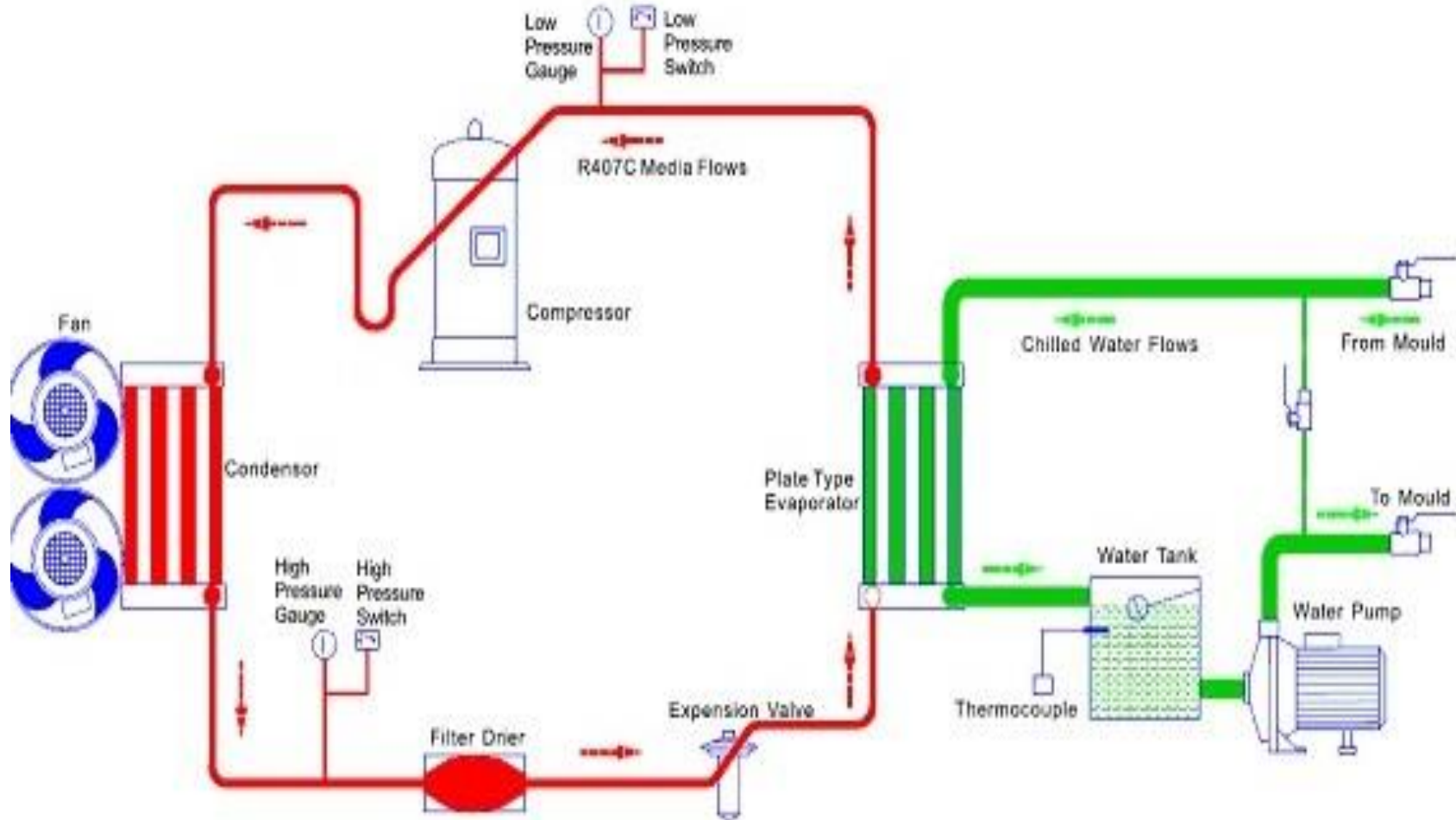


HOW DOES A CHILLER WORK

- A pump circulates water or a water/glycol mix to the process. This removes heat from the process/mold and returns the warm fluid back to the chiller.
- The refrigeration loop begins at the evaporator then through the compressor to the condenser. The condenser removes the heat either with an air or water cooled condenser.
- The pressurized refrigerant then passes back through an expansion valve and to the evaporator to again remove heat from the process loop.



HOW DOES A CHILLER WORK



APPLICATION DETAILS

- Material Data

- Type
- Bulk Density
- Specific Heat
- Processing Rate/Material Speed
- Temperature of Material

- Process Data

- Temperature of Water/Mold
- Flow Rate
- BTU Load
- Start Up Time
- Location of Chiller

Basic Thermal Calculations

$$Q = W \times \text{SP HT.} \times \Delta T / \text{TIME}$$

- Q = BTUs
- W = Weight or Mass
- SP.HT. = SPECIFIC HEAT
- ΔT = Temperature Differential



APPLICATIONS

- Injection Molding:
- Extrusion:
 - Die Heating
 - Barrel Heating
 - Laminating rolls
- Thermosets:
 - Mold Heating
 - Rubber: Injection, Mixers, mills or tooling
- Die Casting
- Food / Sanitary processing
- Converting applications



QUESTIONS?





THANK YOU

