



Company Information

Company Name	<i>Hydac</i>	Date Submitted	<i>10/28/2025</i>
Project Title	<i>Design of a Weld Prep backup machine – Phase 2 (HYDAC_CHAMFER2)</i>	Planned Starting Semester	<i>Spring 2026</i>

Senior Design Project Description

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

Discipline	Number	Discipline	Number
Mechanical	5-6	Electrical	1-2
Computer	1-2	Systems	

Company and Project Overview:

Founded in Saarland in 1963 as “Gesellschaft für Hydraulikzubehör” (Company for Hydraulics Accessories) and run as a family company, HYDAC has never stopped improving. HYDAC now has 50 international subsidiaries, roughly 500 sales and service partners, 14 product lines and more than 9,500 employees worldwide.

HYDAC provides fluid power solutions to OEM’s, manufacturers and end users of a variety of heavy duty mobile and industrial equipment. These solutions increase the efficiency, longevity and safety of fluid power systems – even under extreme conditions.

Although the demands that industries place on machinery vary depending upon the application – construction and agricultural equipment; offshore; machine tools; pulp and paper industries; forging, mining; aviation; plastic injection molding machines – all types of equipment and systems share one thing in common – the need for improved performance in a cost-effective manner.

Our strategy is to anticipate the demands that will be placed on our products when they are applied in the industries we serve, rather than just react to customer demands. Through our ongoing testing and research, HYDAC is constantly and proactively looking to improve upon our current products and to place that same research and experience into our new product designs.



Many of our products satisfy ISO standards, as well as many other industry standards, certifications and benchmarks. However, the goal of our innovative product line is not just to meet these requirements – our aim is to exceed them.

At its Denver, NC location, Hydac produces a variety of industrial grade heat exchangers for a variety of product applications. Sample products are shown below:



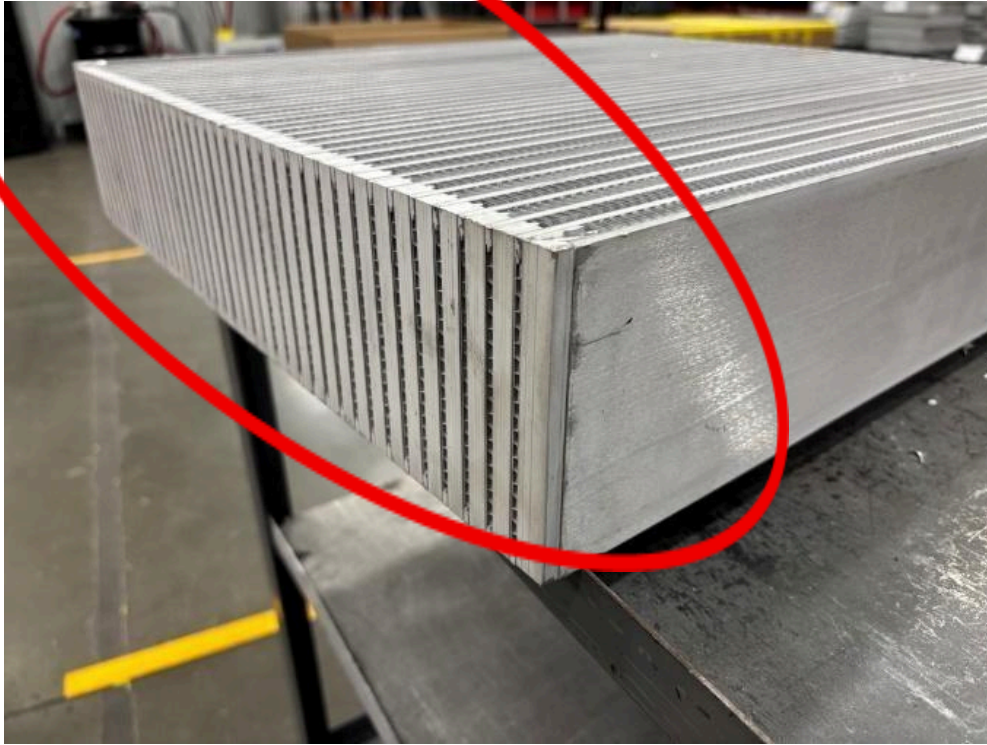
Some of these products use plate heat exchangers with different types of baffles designed to induce turbulence for greater heat transfer efficiency. This project has an objective to automate a production operation for these baffles.

Project Requirements:

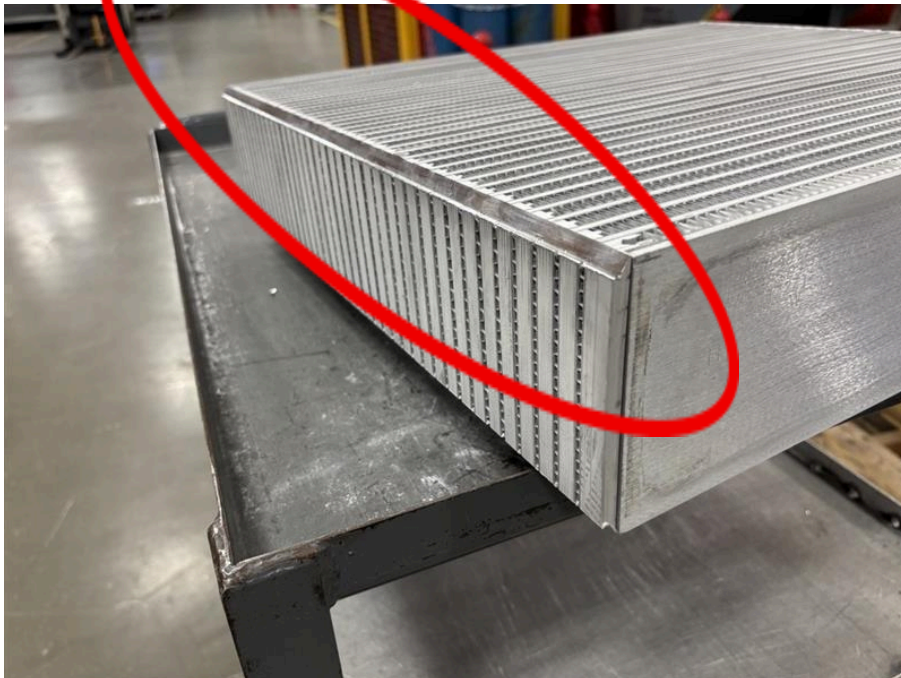
When cores come out of our brazing furnace they have square edges as shown in the image below.



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We have a machine that puts custom and standard “chamfers” on these edges (feature shown below).





Hydac has a custom designed machine that is used to make these chamfers on the A and B edges and the baffle and endplate slots. The machine is productive, but it has reliability issues. The material is 3003 aluminum. The focus on this machine will be the A, and B edges of the cores, excluding baffle slot and end plate slot. In the Fall 2025 semester, Hydac started the HYDAC_CHAMFER Phase 1 project to design a simpler backup machine/machining center that can apply these machined features. As the Phase 1 team progressed through the design process, it became clear that the scope was beyond what a single team could do, so the project was re-cast as a two phase program. The Phase 1 team will complete their design process in December 2025 and in January 2026, begin building the Phase 1 system which is a subset of the total scope.

In January 2026, the Phase 2 team will join the project and begin to design the scope that was left out of the Phase 1 effort. During the Spring 2026 overlap semester, the Phase 2 team will have the advantage of being able to collaborate with the Phase 1 team as they begin the design process for the Phase 2 scope. At the end of the Spring 2026 semester, a smooth handoff of the hardware, software and documentation from Phase 1 will be transferred to the second team. The Phase 2 team will build out their design in Fall 2026 and perform a system integration of the Phase 1 and Phase 2 projects.

Expected Deliverables/Results:

- Machine/workstation that can mill the 4 A-edges of the core, with the 4 different A-geometries. If you can mill the B edges also, that would be a great plus, but it is not required.
- Core dimensions for functionality
 - A edge 50-1330mm
 - B Edge 45, 63, 82, 94, 113, 140, 160mm
 - C edge 200-1980mm (doesn't require machining)
- Material handling provided by overhead crane
- Targeting 5 minute or less for cycle time.
- Handling/repositioning after each cut is acceptable (not optimal)
- Include a vacuum system to collect the chips
- Follow all OSHA 1910 general industry requirements, especially for machine guarding, and ergonomics.
- Increased reliability compared to current system

Disposition of Deliverables at the End of the Project:

Students are graded based on their display and presentation of their team's work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter's location, it must be returned to campus for the Expo. After the expo, the team and supporter



should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Ability to travel to companies Denver NC location as required, mileage to be reimbursed according to ISL policies.
- Interest in automation and machine design
- Interest in PLC's and Ladder logic
- Interest in Precision manufacturing