



Company Information

Company Name	<i>Hydac</i>	Date Submitted	<i>3/26/2024</i>
Project Title	<i>Design of a Heat Exchanger Packaging Line (HYDAC_PACK)</i>	Planned Starting Semester	<i>Fall 2024</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	1	Electrical	
Computer		Systems	4

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.

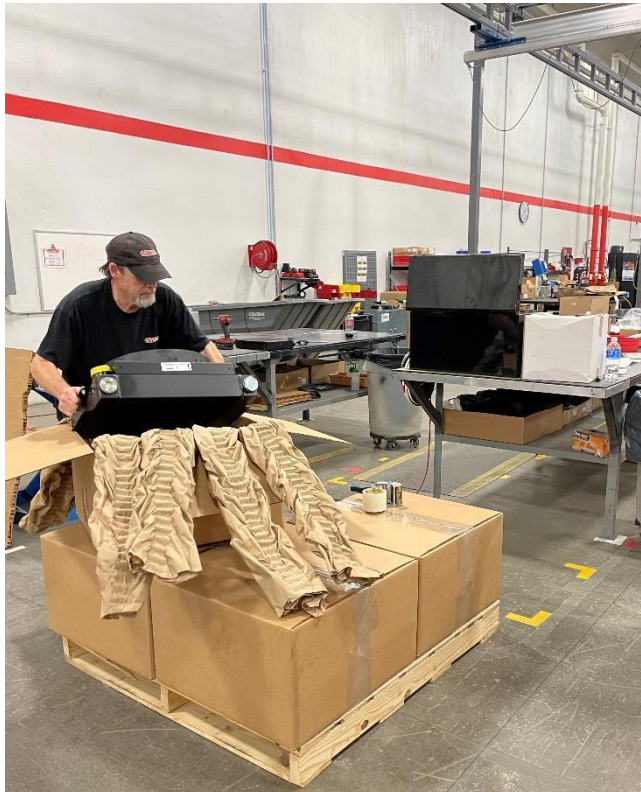
At its Denver, NC location, Hydac produces a variety of industrial grade heat exchangers for a variety of product applications. Sample products are shown below:



Some of these products use plate heat exchangers that are sold as individually packaged units as well as bulk packs with multiple individual boxes bundled inside a larger box on a pallet. The project is to set up an efficient, ergonomic and flow oriented packaging station to pack the individual heat exchanger into its box then master packing several individual cartons into a larger box. Both the individual box and the bulk box need to have identification labels.

Project Requirements:

Heat exchangers are assembled at the Denver location on three separate assembly tables next to each other. Generally, each assembly table is set up to assemble a small range of sizes (Single fan Heat Exchangers, Dual fan Heat Exchangers Medium and Large). Each heat exchanger requires a box and some packaging material to protect the product from shipping damage. Each individual box is then placed on a pallet to be shipped by itself or together with more units of the same part or in a larger box that contains multiple units (bulk box) which also goes on a pallet. Each individual box has a product identification label. Each bulk box also has its own identification label. Assemblers build the box from cardboard on a makeshift open surface or on their assembly table, prepare the packaging fillers (sealed air bags, bubble wrap or corrugated paper), drop the heat exchanger in the box by hand or with a crane, seal the box with clear packing tape with a tape dispensing gun, apply the identification label to the box and either place the box on a pallet or into a larger bulk box. Once the pallet is complete, a warehouse employee brings the pallet to the scale to get shrink wrapped and weighted.



The objective of this project will be to analyze the boxes and packaging fillers currently used and streamline as much as possible to reduce the number of different parts purchased and used for packaging. Once the number of items needed to safely package the product has been optimized, design a packaging station/line that can support the projected daily volumes of heat exchangers getting assembled on the three assembly tables.

Expected Deliverables/Results:

- Packaging line/station can be added on to the output flow of the assembly tables.
- Apparatus to fit within the available footprint next to the assembly tables
- Devices to comply with applicable Hydac and OSHA safety standards, in particular weight limitation of 50lbs for manual lifting
- Packaging line/station will incorporate ergonomics best practices.
- Product at the end of the packaging line/station will be labeled, on a pallet and stable enough to be able to be moved to shipping for banding and shrink wrapping.

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
- Interest in assembly line/station design
- Ergonomics