

## FLEX TROUGH PROVIDES FURNACE SOLUTION FOR CONTINUOUS SHEET CASTER

Nichols Aluminum, established in 1991, and located in Davenport, Iowa, is a leading manufacturer of coated and mill finish aluminium sheet for a wide variety of markets. The company operates four facilities in three states and is a key customer for Pyrotek. The main operation in Davenport is a state-of-the-art, scrap based aluminium mini-mill, continuously casting a variety of common alloy sheet including 3004, 3105, and 5052 alloy. This sheet is processed to the desired gauge, width and temper by one of three finishing plants. Coil coating is provided at two of the finishing plants, including both wide (to 52.5 in) and narrow (to 38.25 in). Utilizing the Hazelett continuous casting process at the facility, aluminum sheet is hot rolled to gauge and then cold rolled and finished to customer specifications at the Davenport, Iowa, Decatur, Alabama, and Lincolnshire, Illinois locations. Nichols Aluminum products serve customers in building and construction, transportation, machinery and equipment, consumer durables, and electrical industries.

### CHALLENGE

Nichols Aluminum was having challenges keeping a molten metal seal at the cast iron knuckle joints where the tilting holding furnaces mate to the casting launder system. The cast iron knuckle joint design was a poor fit. The cast iron furnace section fit extremely tight inside the cast iron launder section that would not allow a proper rope gasket to be used for sealing the two mating surfaces. As a result, the operators would line the interior of both spout sections with 1 inch thick ceramic fiber blanket and seal both ends of the blanket with moldable material. Sealing the end of the blanket inside the furnace with burners firing and random molten metal leaks required an alternative solution. Reaching inside the hot spout and sealing the blanket with the hot patch subjected employees to unacceptable risk. Due to the continuous casting operation, an aborted cast due to a leaking furnace knuckle joint leaking is disastrous, causing downtime and safety issues due to molten metal spillage. Molten metal leaks over time generate build-up of frozen metal under the holding furnaces which must be lanced, resulting in even more plant downtime.

### CUSTOMER PAIN

Nichols Aluminum is currently operating at full capacity, and they are pushing to produce more. Downtime in the casthouse is detrimental in reaching production goals and the company's casthouse team is set on identifying and eliminating potential causes of downtime.

### PYROTEK SOLUTION

Nichols Aluminum explained these issues to Pyrotek's Ed Jackson, Aluminium Sales Engineer, and asked him to review the situation. Ed subsequently presented the concept of a possible flex trough application to Nichols Aluminum casting management and plant engineers. The flex trough concept incorporated some design changes to the current furnace spout, including completely removing the cast iron two-piece knuckle joints and the first casting launder section just past the knuckle joint. The flex trough would serve as the transition between the holding furnace and the casting launders and would flex when the holding furnace tilted. The new design would incorporate multiple layers of paper and robust fabrics and blanket.

Nichols Aluminum supplied the furnace and launder adapter sections and steel collars used to mount the flex trough. The customer was mostly responsible for supplying the design criteria for the flex trough and the new solution was engineered working closely with Pyrotek.

## CUSTOMER BENEFITS

Nichols Aluminum has been able to successfully eliminate molten metal spills as a result of the Pyrotek flex trough application. The flex trough is user friendly to install with the “bolt-to” design versus the old knuckle joint/fiber blanket version. The total changeout time is now around 10–15 minutes. Only one of the two tilting furnaces has so far been converted, but there are plans to convert the other unit in the near future.

Nichols Aluminum reported an average of one aborted cast per month, with associated costs, as a result of leaks in the former holding furnace knuckle joint. A key benefit is related to the safety of the casthouse personnel. Molten metal leaks are extremely dangerous and casting operators are no longer required to reach inside the furnace spouts to seal the fiber blanket.

Nichols Aluminum is pleased with the Pyrotek support throughout this project and will likely look to Pyrotek for other solutions in future projects.



*Old Knuckle Joint Design*



*New Flex Trough*



*New Flex Trough*



*Flex Trough During Casting*