

Is Your Heat Treatment System Treating the Atmosphere Badly?

CASE STUDY

The Project

There was awareness that releasing 1700°F (925°C) of combustion product up a stack provided for significant heat recovery and energy savings opportunities. This Continuous Heat Treat operation line consisted of a Hardening and Draw Furnace that ran at high temperatures yet it did not implement any heat recovery technology.

The Diagnosis and Findings:

- ▶ Poor control of Draw Furnace pressure
- ▶ Potential annual savings over 7 million cubic feet of natural gas on the High Heat/Draw Furnace
- ▶ Total energy savings identified by the audit was projected at \$110,000 on an annualized basis

"From waste heat to 7 million cubic feet of natural gas savings shows that hiring the experts will save you thousands in energy costs within a few years payback!"

— Russ Chapman, President, Firebridge Inc., 2019

The Firebridge Solution

Using the Six Delta™ Method to gain an optimised perspective, Firebridge identified several performance improvement opportunities. The Six Delta™ Method is a comprehensive approach through a systematic analysis which considers improvements over six interdependent focus areas. This method is data driven by metrics from each focus area which combine to drive a strong business case.

The **Six Delta™** focus areas for this project are:

Primary: Energy Consumption – Product Quality – Process Production – GHGe Emissions
Secondary: Safety & Compliance – Equipment Reliability

Solutions Implemented:

A case was made to capture the waste heat generated by the Hardening Furnace and use it to heat the Draw Furnace

- ▶ Provided the engineering, procurement, construction, and system commissioning to redirect 1700°F flue gases from the Hardening Furnace to the Draw Furnace
- ▶ Eliminate the need to dilute the exhaust with inside air, reducing the local exhaust by 1,700 SCFM
- ▶ Ducts and fan sized to minimize the negative pressure in the High Heat Furnace
- ▶ Provided internally insulated duct work to eliminate thermal expansion issues

Achieved Results

Improved results were found across all **Six Delta™** focus areas.

Safety & Compliance

- ▶ New system meets current safety and compliance standards

Quality

- ▶ Improve the cold air leaking into the High Heat Furnace by sealing

Productivity

- ▶ Installation and commissioning during summer shut-down
- ▶ Total payback period **1.8 years**

Energy Consumption

- ▶ Fuel consumption was **reduced by 31%** on the Draw Furnace

Reliability

- ▶ Minimized negative pressure in the High Heat Furnace
- ▶ Internally insulated ducting eliminated thermal expansion issues

Greenhouse Gas Emissions

- ▶ GHGe emissions **reduced by 31%**

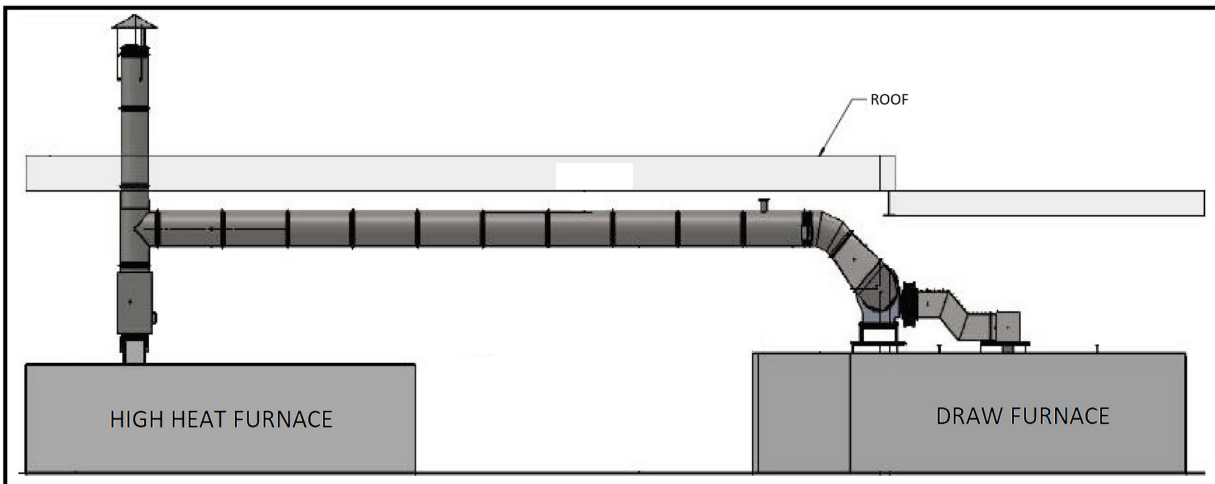


Installation of High Heat Ducting



Draw Furnace and Gas Valve Train

General Arrangement Plan View of High Heat Ducting



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