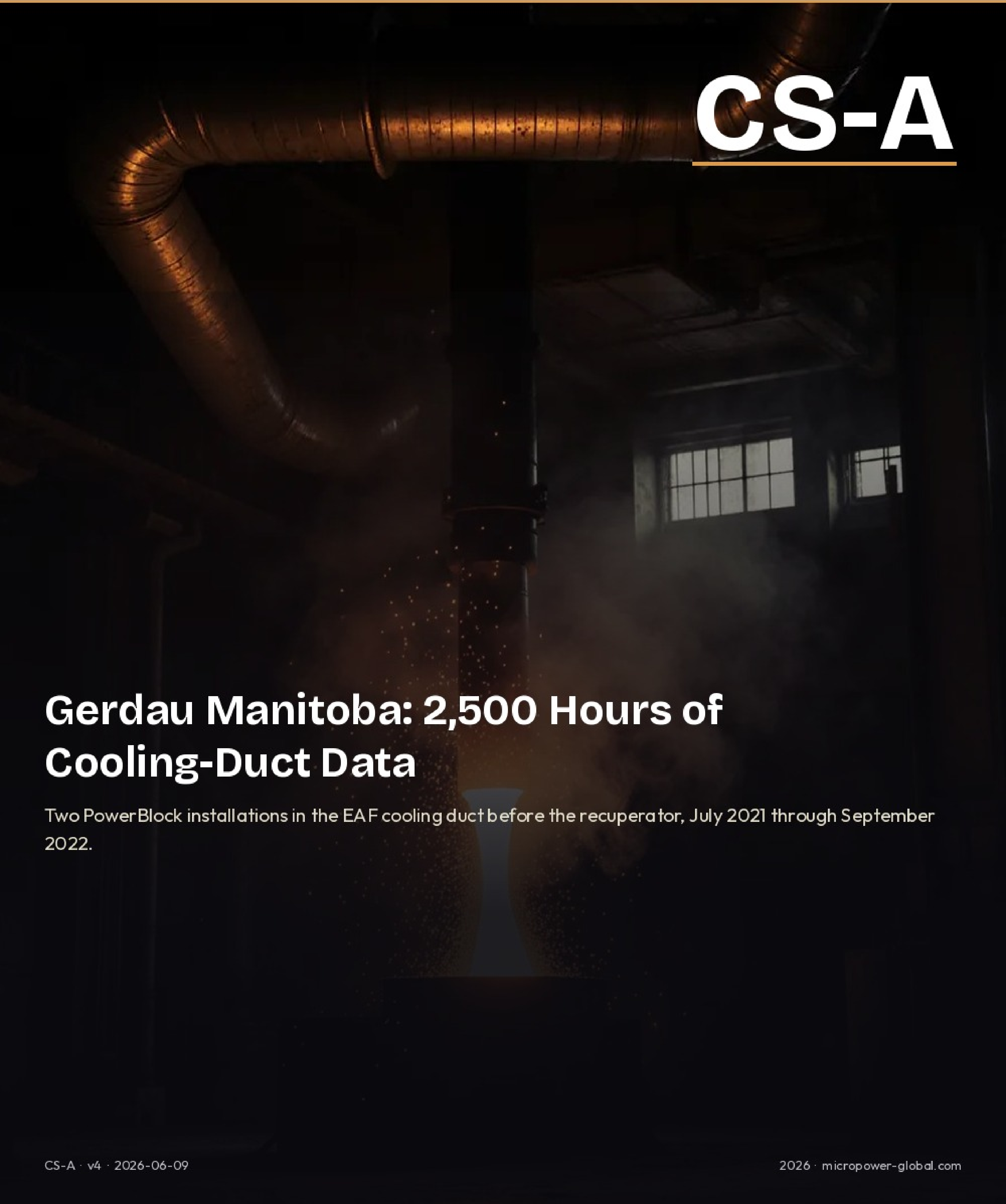

CS-A

Gerdau Manitoba: 2,500 Hours of Cooling-Duct Data

Two PowerBlock installations in the EAF cooling duct before the recuperator, July 2021 through September 2022.

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This is the longest-running MicroPower field pilot on an operating steel mill. Two PowerBlock units, two installations across 14 months, recovering temperature and voltage data consistent with module performance expectations. The results below are drawn directly from the October 2022 MicroPower field report to Gerdau.

At a glance

Parameter	Value
Site	Gerdau steel mill, Selkirk, Manitoba, Canada
Install location	Access hatch on EAF cooling duct, upstream of recuperator
Modules deployed	Two PowerBlocks per unit (thermal-focused configuration)
First installation	July 2021, removed October 2021
Second installation	December 2021, removed September 2022
Total operating hours	~2,500+ hours of analysed data
Duct temperature range	420–460 °C, approx. 40% of the time
Duct lining	Refractory brick
Cold-side temperature	Consistent range across both installations

1 · The project

Gerdau's Selkirk, Manitoba plant is an electric-arc-furnace (EAF) steelmaking mill. Like every EAF mini-mill, a large fraction of the input energy leaves the melt as waste heat – in this case through water-cooled ductwork between the furnace and the recuperator. MicroPower and Gerdau agreed to pilot a PowerBlock unit in the access hatch of that duct, to measure the thermal conditions inside and to demonstrate module-level performance under real operating conditions.

The March 2021 pre-design feasibility phase established thermal-availability, geometry, mechanical-stress, and cooling-source requirements; the July 2021 first installation delivered the first month-plus of continuous data; the December 2021 second installation delivered nine months of continuous data. Both units were designed, built, and installed by MicroPower in collaboration with the Gerdau Selkirk engineering team.

2 · Installation 1 – July through October 2021

The first installation was intended primarily as a thermal-profiling exercise. Two PowerBlocks were fitted into the access hatch; temperature and open-circuit voltage were logged. Over 500 hours of temperature data was analysed from this installation. Additional logged data showed similar results.

A leak developed early in the first installation. The leak affected the measurement instrument mounted outside the duct (voltage-logging device exposed to excessive moisture after collecting data for over a month). The PowerBlock units themselves were not compromised; temperature data continued to be collected through the full deployment. The unit was removed in October 2021 after the cold-weather window closed off the annual maintenance window.

The temperature range and fluctuation recorded during Installation 1 were within the expectation MicroPower had set for the cooling-duct position. The voltage data – though not the primary focus – showed behaviour consistent with module performance expectations over the period before the moisture issue disabled the external logger.

3 · Installation 2 – December 2021 through September 2022

The second installation incorporated two design improvements from the first: additional protection for measurement instruments against moisture exposure, and features that sustained through the full duration of deployment. The unit operated continuously for approximately nine months.

Over 2,000 hours of data were analysed from this second deployment. Temperature range and fluctuation again remained within expectation. Voltage data continued to show behaviour consistent with module-performance expectations, across the full nine-month period. The unit was removed and returned to the MicroPower facility for inspection in September 2022.

4 · What the data actually showed

Three findings with direct design relevance to subsequent MicroPower deployments.

4.1 Duration of exposure at 420–460 °C is approximately 40% of the time. This is below the 24/7 hot-side exposure a steady-state thermal model would assume. Design-time energy budgets for waste-heat-recovery economics at EAF cooling-duct positions should anchor to a ~40% duty cycle, not 100%. Additional thermal energy delivery to modules is possible with heat-exchange features on the hot side.

4.2 PowerBlock units survived the full duration. After both installations, the PowerBlock units themselves remained functional when the deployments ended. The failure modes observed were in the peripheral measurement instrumentation (moisture-exposure on the external voltage logger), not the module assemblies. This has direct bearing on next-generation design – the engineering priority is on sealing the measurement and control instrumentation, not on the module packaging.

4.3 Cold-side temperature range held steady across both installations. The air-assisted cooling architecture maintained a consistent cold-side temperature range across both installations. The cold-side design did not require adjustment between July 2021 and September 2022, across a full Manitoba climate cycle.

5 · What we learned for next-generation design

The October 2022 field report closes with four design-revision priorities that flow directly out of the 14-month programme:

- Additional protection for measurement instrumentation located outside the duct, against moisture and seasonal humidity.
- Additional features to improve thermal-energy delivery to the modules in order to increase power generation.
- Many of the original design features can be scaled up directly into the next installation.
- The installation architecture (access-hatch mounting, collaborative in-situ fabrication with the operator's engineering team) is reusable at other EAF sites.

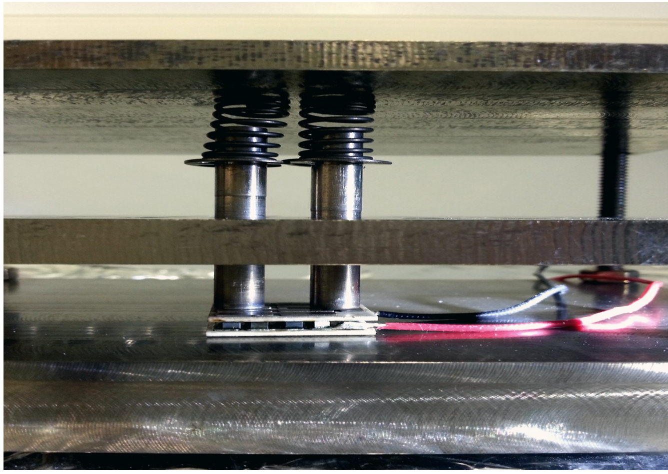
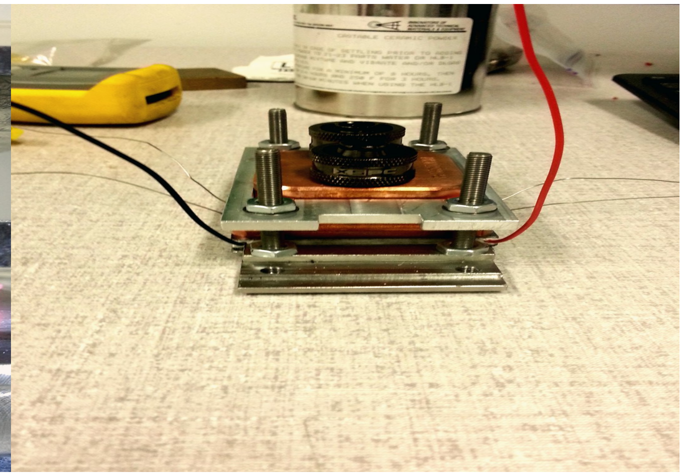
6 · Why this matters

Gerdau Manitoba is the MicroPower platform's longest-duration, most data-rich real-world deployment on an operating industrial site. The pilot was explicitly framed as a thermal-characterisation and performance-consistency test, not a commercial power-delivery demonstration – the modules fitted were thermal-focused configurations chosen for thermal data collection rather than peak power generation. What the pilot proves is that the access-hatch-mounted architecture works, survives the EAF environment for months without intervention, and returns data consistent with MicroPower's own chip-level and module-level performance expectations.

This is the foundation the current MicroPower steel-sector work builds on. Subsequent CMC Texas, ArcelorMittal Dofasco, and GTW Brasil engagements have referenced the Gerdau pilot as precedent for their own programmes.

Closing

The Gerdau Selkirk cooling-duct programme is an operating-site validation of the MicroPower PowerBlock architecture in an EAF mini-mill waste-heat environment. It was a proof-of-concept exercise, not a commercial power-delivery deployment, and was never intended as one. The validation stands. Taking the architecture on to multi-module commercial power recovery is a future step that depends on MicroPower building the manufacturing capability and the capital it does not yet have – the focus of the company's current reactivation – rather than on any open question about whether the technology works.



Sources & notice

Source: MicroPower in Steel Manufacturing – Cooling Duct Installations – Gerdau Manitoba, October 2022 field report, MicroPower Global, Proprietary & Confidential. Archived in the MicroPower customer records.