



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA



Milli-Pot Sintering Set-Up

Project Scope:

Introduction:

In iron ore sintering, a packed bed of iron ore fines (~6.3 mm), fluxes and coke granules (fuel) is ignited at the top while a negative pressure (suction) is applied at the bottom, which draws air from top to bottom and transfers heat through the bed, allowing the packed bed particles to fuse together. The fused structured, called "sinter product", is the most common iron burden for blast furnaces in Asia, consisting of ~70% of iron burden feed.

Problem:

Scaling down the iron ore sintering process from pilot (~85 kgs of sinter product) to lab scale (~2 kgs of sinter product).

Challenges:

- ▶ Limited information of the instruments to be used
- ▶ Limited information on the dimension of individual equipment like wind-box, pump size.
- ▶ Limited information for choosing the type of control valve for the system to control suction generated by suction pump.

TUNRA Bulk Solids (TBS) Solution:

TUNRA's highly specialised workshop staff provided the following:

- ▶ Full design within appropriate dimensions of the set-up.
- ▶ Suction pump details for the system which later can be used to scale up (~10 kgs of sinter product).
- ▶ The ignition hood for the processes attached to the set-up which makes the process easy to operate.
- ▶ Installation and tuning of pressure control valve in the system to control suction pressure.
- ▶ Assembled a data-logging system to record temperature, pressure and air flow from the system during process.
- ▶ Design, installation and commissioning of the electrical control system (VSD and PLC system)
- ▶ Development of PLC code and HMI displays



Figure 1: Milli-Pot Sintering Set-Up



Figure 2: Milli-Pot Data Logger



TUNRA Bulk Solids Workshop:

The laboratory and workshop facilities at TUNRA Bulk Solids are ISO9001, ISO14001 and ISO 45001 accredited. These facilities reside on the Newcastle Institute for Energy and Resources (NIER) site at The University of Newcastle. TUNRA is regularly involved in the design, fabrication and commissioning of custom test rigs for both industry and the University.

Through the project work completed directly to industry, TUNRA has built significant capabilities in terms of both mechanical and electrical/electronic skills.

Mechanical and Electrical Services:

- ▶ General and high-precision machining.
- ▶ Fabrication of ferrous and non-ferrous materials, excluding pressure welding.
- ▶ High level technical advice and installation of specialised equipment.
- ▶ Manufacture and assembly of items as per specifications.
- ▶ Monitoring, maintenance and repair of test and laboratory equipment.
- ▶ Licensed electrical work and installations.
- ▶ Fault finding and electrical testing capabilities
- ▶ Data logging
- ▶ PLC coding and HMI screen development.

Why TUNRA Bulk Solids?

Experience and Expertise

We have provided expert solutions to industry for over 45 years and are the leading organisation for materials handling research and consulting in Australia and internationally

Research and Development

We have a proven track record in research and development through the close association with The University of Newcastle

Quality Service

We have highly qualified, well-trained and specialist staff that are committed to delivering excellence

First Class Facilities

Our laboratory is a state of the art facility located within the Newcastle Institute of Energy and Resources (NIER) at The University of Newcastle

Industry Standards

We are accredited to ISO 9001, ISO 45001 and ISO 14001

Independent

We are independent and not for profit

Advancing the Bulk Materials Handling Discipline Globally



Further information

- To access our Case Studies visit **www.bulksolids.com.au**
- To discuss your industry and business needs phone **02 4033 9055**