



Hydris®
Measuring System for Quick Determination of Hydrogen

Introduction

Hydrogen entrapped in steel can cause blowholes, micro-cracks and embrittlement in the final product. Hydrogen can also cause breakouts in the continuous casting machine by reacting with mold powder.

The **Hydrogen Direct Reading Immersion System (Hydris®)** system determines the hydrogen content by means of a Sieverts' equilibrium measurement in a **closed circulation system**.

Benefits

Hydris' precision is today the **industrial standard of hydrogen measurement in liquid metals**, operator independent and free from previous sample preparation and analysis errors. A reported Hydris certificate is worldwide accepted as best method.

The system



Hydris® system with (1) Processor Unit, (2) Pneumatic Unit, (3) Pneumatic cable, (4) Pneumatic lance, (5) Hydris® Probe

The Measuring System for High-Quality Requirements

In particular, the Hydris® measurement system also covers the low hydrogen application range down to below 1 ppm. The measuring accuracy required in this range is accomplished by the technical features below.

- Pressure compensation
- ΔT compensation of the TCD
- Enhanced zero adjustment
- Automatic immersion depth compensation

Hydris® probes

The Hydris® probe is immersed into the steel melt by means of a manual or automatic immersion lance.

Features

- Closed loop method
- Measurement range: 0.5 to 20 ppm
- Accuracy: +/- 0.1 ppm



Pneumatic unit

The pneumatic unit is installed on site at the place of measurement. Its robust design is suitable for steel mill applications and ensures reliable operation even under extreme environmental conditions.

The front of the instrument houses three signal lights for the measurement sequence, a start push button, and a display for measurement results.

The housing is provided with plug-in connections for immersion lances, moisture filter and carrier gas.

Functional units, such as valves, pumps, conductivity detector and the electronic unit, are accommodated and protected inside the pneumatic unit.

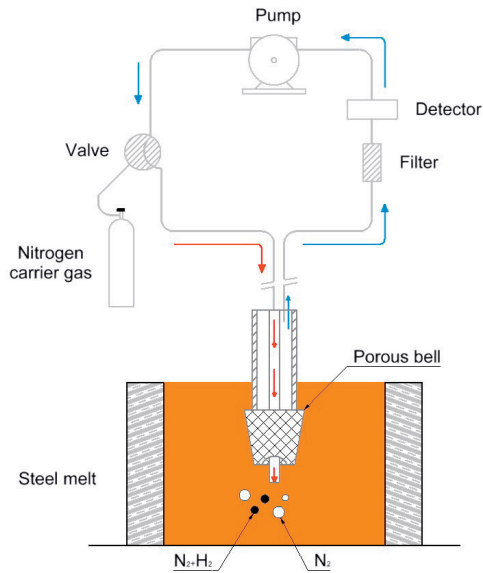
Processor unit

The processor unit, also designed for the harsh conditions in a steel mill, is either a unit with a built-in display with touch screen operating function or a desktop processor unit with separate touch screen.

Measuring principle Hydris®

- The Hydris® probe is immersed into the steel melt by means of a manual or automatic immersion lance.
- A pneumatic cable links the Hydris® lance with the Hydris® pneumatic unit.
- The Hydris® pneumatic unit conveys a carrier gas through the Hydris® pneumatic lance and attached Hydris® probe into the steel melt. Here, the gas absorbs the hydrogen contained in the steel melt.

- The carrier gas is continuously circulated through the measuring system until a Sieverts' equilibrium is reached between the hydrogen content in the steel melt and the carrier gas.
- The hydrogen content is measured and displayed as the result, when the equilibrium has been reached.

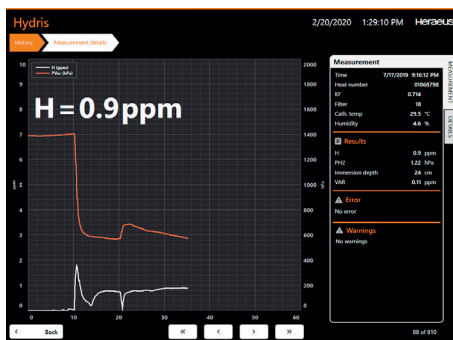


Measurement modes

Equilibrium only

The Equilibrium method is the standard measurement mode.

The following graph shows the result of a typical equilibrium measurement:

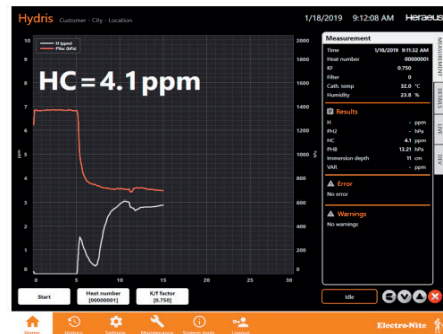


Quick-Check

Additional option for fast measurements in the middle and high hydrogen ppm-range.

The software enables a quick hydrogen determination of relatively high hydrogen levels (> 4 ppm) using the existing measuring equipment.

- Time saving
- Increased operating convenience
- Less maintenance on the immersion lances and pneumatic unit



Curve grading

Curve grading is part of the newest Hydris® version (V2). By assessing measurement traces, it is able to identify and eliminate erratic measurements. Curve grading is available in Quick-Check mode.

Such measurements are displayed to the operator as a clear warning.



Ordering information

Processor unit		Hydris probes	
Hydris EU/ROW		packed in boxes of 12 pcs. each, and 16 boxes per pallet	
Hydris PR2 EU/ROW	31010000	a. Ladle type	
Hydris PR2 EU/ROW + Serial	31110000	900mm/500mm NS	HS50020900R
Hydris PR2 EU/ROW + Profibus	31110001	900mm/750mm NS	HS50040900R
Hydris PR2 EU/ROW + Profinet	31110002	b. Tundish type	
Hydris PR2 EU/ROW + Modbus RTU	31110003	900mm	HS50000901R
Hydris PR2 EU/ROW + Modbus TCP	31110004	500mm (24pcs/box)	HS50000511R
Hydris PR2 EU/ROW + Ethernet IP	31110005	c. Ingot type	
Hydris PR2 EU/ROW + Serial + Profibus	31110006	900mm	HS50010901R
Hydris PR2 EU/ROW + Serial + Profinet	31110007	Immersion lance	
Hydris PR2 EU/ROW + Serial + Modbus RTU	31110008	Hydris lance with 900 mm Probe holder tube	
Hydris PR2 EU/ROW + Serial + Modbus TCP	31110009	a. Straight	
Hydris PR2 EU/ROW + Serial + Ethernet IP	31110010	2m	HL20090B00
Hydris US (without screen)		3m	HL30090B00
Hydris PR2 US	31010004	4m	HL40090B00
Hydris PR2 US + Serial	31110020	5m	HL50090B00
Hydris PR2 US + Profibus	31110021	6m	HL60090B00
Hydris PR2 US + Profinet	31110022	b. Bent	
Hydris PR2 US + Modbus RTU	31110023	(specify 30, 45, 60 or 90°)	
Hydris PR2 US + Modbus TCP	31110024	2m	HL20090B30
Hydris PR2 US + Ethernet IP	31110025	3m	HL30090B45
Hydris PR2 US + Serial + Profibus	31110026	4m	HL40090B60
Hydris PR2 US + Serial + Profinet	31110027	5m	HL50090B90
Hydris PR2 US + Modbus RTU	31110028	6m	HL60090B30
Hydris PR2 US + Modbus TCP	31110029	Hydris lance with 500 mm Probe holder tube (Tundish application)	
Hydris PR2 US + Ethernet IP	31110030	Bent 90°	
Pneumatic unit		2m	HL20050B90
Pneumatic cable assembly		3m	HL20050B90
5m	LC30050605	4m	HL40050B90
10m	LC30050610	Circuit filter	
		set of 10 pcs.	LC28099000

