SPECIFICATION PREFACE SHEET

DEPARTMENT: Engineering / Electrical	SHEET 1 OF 5	
AREA: Norðurál Grundartangi Reduction Plant	SPEC No: 00/07/TS003	REV: C2

STANDARD TECHNICAL SPECIFICATION FOR INSTRUMENTATION

FIELD MOUNTED INSTRUMENTS

This Standard Technical Specification is subject to change without prior notice. The most current issue will at all times be located on the Nordural web site, www.nordural.is.

REV	BY	DATE	CHK'D	APPROVED	REVISIONS
C1	HRY	01/03/1999	GP	TMS	Issued for Construction
C2	IMJ/TDS	29.3.2004	ÓJ	ÓJ	Issued for Construction

NORÐURÁL - ENGINEERING

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TECHNICAL SPECIFICATION

1.0 INTRODUCTION

In this Document the following words and expressions shall have the meaning hereby assigned to them except where the context otherwise requires:

Engineer: The Owner or any person or organization employed or engaged at any time by the Owner and authorized by the Owner, in writing, from time to time to act on behalf of the Owner in the execution of the items covered by this Document, in whole or in any part, for any or all purposes provided in this Technical Specification.

Owner: Norðurál hf (Nordic Aluminum Corporation Ltd.), an independent legal entity owned by Century Aluminum.

2.0 GENERAL

All instruments shall be protected by enclosures and positioned for ease of access and viewing to the approval of the Engineer. Cases shall have enclosure classification of IP55.

Electronic instruments shall not be located close to hot lines vessels or other hot equipment. Ambient sun temperatures exceeding 80 degrees Celsius shall not result in calibration difficulties nor rapid deterioration of electronic components. For open locations in hot climates appropriate sunshades shall be provided.

3.0 TRANSMITTERS

Transmitters shall be provided with 2 way or 3 way valve manifolds to allow for isolation and venting of the process.

All transmitters shall be supported in a vibration free manner independently of the plant connections and shall be mounted in the correct attitude. No stress shall be imposed through the connections between plant and the transmitter. Manifold mounting is preferred.

All transmitters shall be mounted in locations that allow easy and safe access for maintenance without the use of temporary ladders or similar means.

Facilities shall be provided for the connection of test instruments to the input and output of each transmitter to enable in-situ calibration to be carried out by way of the manifolds.

Bodies, primary elements, and wetted parts shall be of a material that is corrosion resistant to process fluid and environmental conditions.

Transmitters shall be electronic and of either the capacitive cell or resonant wire type.

On large installations locations for transmitters on similar plant duties shall be grouped unless this is economically unfeasible.

To maintain minimum spares holding the range of transmitters used for general pressure and differential pressure applications shall have facilities for simple on site range changing without changing of components. Each type of transmitter within the range shall exhibit a minimum of 4:1 between max and minimum spans, but preferably 6:1. In addition each transmitter shall incorporate means of zero suppression and elevation allowing zero shifts equivalent to at least 100% of maximum transmitter span.

All differential pressure transmitters shall be capable of withstanding without damage or calibration change full rated line pressure as a differential input. Pressure transmitters shall withstand at least 115% of nominal input range without damage or calibration change.

Transmitters for use on electrical input signals such as thermocouples or resistance thermometers shall allow range change on site and shall incorporate electrical isolation between input and output.

Transmitters shall meet the following minimum requirements unless agreed or specified otherwise by the Engineer.

DC Voltage Level	:	Between 22 to 50 volts
Signal current	:	Between 4 to 20 mA - 2 wire
Accuracy (of signal current with respect to measured variable)		From 0,2% to 0,5% according to the measurement range and type of instrument.
Linearity	:	0,1% of span
Repeatability	:	0,1% of span
Stability	:	$\pm$ 0,1% of nominal input range per annum
Dead Band	:	Not exceeding 0,1% of span
Hysteresis	:	Less than 0,2% of output span

Discrimination	:	A change on input of 0,02% of actual range shall produce measurable change of output.
Maximum permissible disturbance	:	± 1,0% of output span between effect of vibration 5 and 300 Hz at 10m/s2 (1G) on output signal
Maximum shock	:	1000 m/s^2 (100G) in any plane without permanent damage
Humidity range	:	5 - 100%
Ambient temperature range	:	0°C to +50°C
Ambient temperature effect	:	Not exceeding 0,5% of maximum span per 10°C change
Design pressure rating	:	Not less than 200% of max process static pressure

3.0 LOCAL INSTRUMENTATION

All major items of plant shall be equipped with suitable locally mounted directly connected pressure and temperature gauges sufficient for commissioning or general maintenance purposes.

Pressure gauges shall be provided with gauge valves and snubbers where necessary.

Temperature gauges shall be supplied with thermowells.

Where indications and controls are not directly linked to the remote control sequence and interlock system, local instrumentation may be adopted subject to the approval of the Engineer.

Local indication instruments shall only be provided where continuous supervision is unnecessary and where local indications are required for local plant commissioning and adjustment. In all cases where continuous monitoring is required a transmitter and remote monitoring shall be provided.

Subject to the qualifications set out in the Specific Requirement Section local control shall only be provided in cases where under normal circumstances no remote control is necessary within the normal load range of the units. Motorized actuators with local control shall be provided for large valves where hand operation is inappropriate. All motorized valves with integral switchgear will be provided with local controls for test purposes with a lockable local/ remote control selector switch.

All locally mounted instruments shall be located in readily viewable and accessible positions.