

## Analytical Service Report

Analytical Service N° GTSA-023, 2011

<b>Company</b>	Aluminum Trading & Consulting Inc.	<b>Date:</b>	November 24, 2011
<b>Client</b>	José Mustafá		
<b>Dept or Service</b>			
<b>Telephone/Fax</b>	0286 950-3219		
<b>Offer No.</b>	ORNI-Z09-02 v2		
<b>Activity</b>	Technical assistance in the determination of the chemical composition of a Iron Mineral sample.		

### Description of the Analytical Service

#### 1. OBJECTIVE

Supply an analytical service for the study of the chemical composition of a sample of Mill Scale.

#### 2. METHODOLOGY

In Table 1 the testing methods are indicated on the analysis performed on the sample of mill scale delivered to our laboratory.

Table 1 Analysis Methods

Parameters	Method
Preparation of our sample for the analysis of the metals	Digestion and fusion ISO 2598
Si Content expressed as SiO <sub>2</sub>	ISO 2598
Carbon Content By LECO	ISO 9686
Sulfur Content by LECO	ISO 9686
Metals: Mn, Fe, Al, P, Ca, Mg, V, Ti y K by Inductively Coupled Plasma (ICP).	SMWW 3120 / COVENIN 3566 / ASTM D 1976
Rockwell Hardness C	ASTM A370

#### 3. REPORT RESULTS

In Table 2 the chemical characteristics results are shown of the sample identified as "Ferrous Material"



**Tabla 2.** The Chemical characteristics of the “Ferrous Material” sample

Parameter	% Weight
Mn as Manganese oxide, MnO	0,23
Al as Aluminum oxide, Al <sub>2</sub> O <sub>3</sub>	0,52
P as Phosphorous oxide, P <sub>2</sub> O <sub>5</sub>	0,00
Ca as Calcium oxide, CaO	0,91
Mg as Magnesium oxide, MgO	0,40
V as Vanadium oxide, V <sub>2</sub> O <sub>5</sub>	0,00
Si as Silicon oxide, SiO <sub>2</sub>	0,41
Ti as Titanium oxide, TiO <sub>2</sub>	0,00
K as Potassium oxide, K <sub>2</sub> O	1,76
Total Fe	77,6
Fe as FeO	99,83
Carbon content, C	1,10
Sulfur content, S	0,11

**Tabla 3.** The Physical characteristics of the material identified as “Ferrous Material”

Property	Magnitud
Average Thickness <sup>1</sup>	13 ± 8 mm
Rockwell C , Hardness <sup>2</sup>	35 ± 3

<sup>1</sup> The average thickness of the material was a result of 10 measurements.

<sup>2</sup> The Rockwell Hardness was measured on Wolpert Hardness Tester with a 120°, pyramid indenture, preliminary load of 10 Kg.

Kp and 100 Kp load, is the result of the average of two measurements

**NOTE: Chemiconsult laboratory is registered in the Enviroment Ministry of Venezuela, under the number 01-066.**

Yasmina Mujica  
Coordinadora de Laboratorio

Anix Díaz  
Comité Técnico