

# Inorganic Application Note

## Determination of Oxygen and Nitrogen in Steel, Iron, Nickel, and Cobalt Alloys

### Approval

ASTM E-1019 Oxygen and Nitrogen in Steel, Iron, Nickel, and Cobalt Alloys  
ASTM E-1587 Oxygen and Nitrogen in Refined Nickel

### Sample Preparation

A clean representative sample is required in order to obtain optimum results. Solid samples are prepared and should be abraded with a clean file, rinsed in acetone, and dried with warm air immediately prior to analysis.

### Accessories

LECO 776-247 Graphite Crucible

### Calibration Standard

LECO, NIST, or other suitable calibration sample

### Method Parameters

#### Analysis Parameters

Outgas Cycles	2
Analysis Delay	15 seconds
Analysis Delay Comparator	1
Analysis Type	Auto Analysis

#### Element Parameters

	Oxygen	Nitrogen
Minimum Analysis Time	35 seconds	55 seconds
Significant Digits	4	4
Conversion Factor	1	1
Integration Delay	5 seconds	15 seconds
Comparator Level	1.0	1.0

#### Furnace Parameters

Furnace Control Mode	Current
Purge Time	15 seconds
Outgas Time	20 seconds
Outgas Cool Time	8 seconds
Outgas Power	1100 amps
Analyze Power	975 amps



# TC500

## Procedure

1. Prepare the instrument as outlined in the operator's instruction manual.
2. Determine the blank.
3. Calibrate as outlined in the operator's instruction manual.
4. To analyze samples:
  - a. Weigh ~1 g of a prepared sample and enter the weight.
  - b. Continue with analysis as outlined in the operator's instruction manual.

## Typical Results

Steel Pin	Mass (g)	Oxygen (%)	Nitrogen (%)
	0.4979	0.00163	0.00307
	0.4975	0.00151	0.00304
	0.4990	0.00156	0.00335
	0.4963	0.00154	0.00299
	0.4970	0.00174	0.00295
	<b>Average</b>	<b>0.00160</b>	<b>0.00308</b>
	<b>Std. Dev.</b>	<b>0.000092</b>	<b>0.000158</b>

Steel Wire	Mass (g)	Oxygen (%)	Nitrogen (%)
	0.9988	0.01035	0.04958
	1.0079	0.01042	0.04936
	1.0008	0.01064	0.04908
	0.9982	0.01041	0.04938
	0.9982	0.01082	0.04934
	<b>Average</b>	<b>0.01053</b>	<b>0.04935</b>
	<b>Std. Dev.</b>	<b>0.000197</b>	<b>0.000178</b>

Steel Wire	Mass (g)	Oxygen (%)	Nitrogen (%)
	1.0006	0.00657	0.01195
	1.0026	0.00639	0.01223
	1.0006	0.00614	0.01217
	1.0018	0.00627	0.01260
	1.0024	0.00654	0.01202
	<b>Average</b>	<b>0.00638</b>	<b>0.01219</b>
	<b>Std. Dev.</b>	<b>0.000183</b>	<b>0.000255</b>



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