Oxygen and nitrogen determination in steel samples

Oxygen   Nitrogen

Suitable analyzers
- ELEMENTRAC ONH-*p*
- ELEMENTRAC ON-*p*

Used accessories
- Graphite crucibles (90180 and 90185)
- Suitable calibration material (NIST or other)

Impuls furnace

ELEMENTRAC ONH-*p*

Application Settings

I) General
Furnace mode: ON
Furnace cooling: 35/45 °C
Standby Flow: 0
A flow of 10 l/h could improve precision when there is a long time distance between 2 measurements.

II) Outgasing and stabilizing

Setting / Phase	Time [sec]	Power [W]	Flow [l/h]
Outgasing	60	4600	27
Stabilizing	60	4400	27

A second outgasing cycle or an increased outgasing time could improve the precision for very low oxygen and nitrogen contents.

III) Analysis
Power duration: 80 sec   Drift compensation: on
Power: 4400 W   Open furnace: yes
Flow: 27 l/h

Channel	Minimum time [sec]	Maximum time [sec]	Integration delay [sec]	Comparator factor [%]
Low and High O	35	80	5	0.5
Low and High N	35	80	10	0.5

IV) Postwaiting
Postwaiting time: 15 sec
Furnace clean up: No

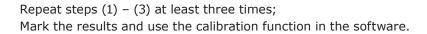# Oxygen and nitrogen determination in steel samples

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Sample preparation

Make sure that the surface of the steel is free from contaminations; otherwise clean the sample with acetone p.a. and let dry at atmosphere.

Procedure

- Prepare ELTRA analyzer (exchange anhydrone, sodium hydroxide, Schuetze reagent if necessary), clean furnace, sample drop mechanism, electrode tip (if necessary)
- Run three blanks with empty crucibles
- Calibrate the analyzer with suitable calibration material (NIST or other)
  (1) Fill one empty inner crucible (90180) in one outer crucible (90185) and place them on the electrode tip, close furnace
  (2) Weigh calibration material and place it in the sample drop mechanism and start analysis
  (3) After analysis give the inner crucible into waste and fill in a new one. The outer crucibles can be used approximately 10 times

Repeat steps (1) – (3) at least three times;
Mark the results and use the calibration function in the software.

-> Now start with the actual analysis.

Impuls furnace

ELEMENTRAC ONH-*p*

Typical results		
Steel ELTRA 91100-1001 (LOT 714 A)		
Weight (mg)	**ppm O**	**ppm N**
994.9	6.1	18.8
999.0	5.1	18.0
1000.2	5.7	17.8
997.6	6.3	18.4
1000.4	6.9	18.6
997.4	5.9	17.8
997.5	7.1	19.4
994.7	5.6	18.4
996.9	5.6	19.4
998.1	5.8	18.4
Average values		
	6.0	18.5
Deviation / Relative deviation (%)		
	0.6 / 10.3%	0.6 / 3.1%

Typical results		
Steel ELTRA 91100-1004 (LOT 914 F)		
Weight (mg)	**ppm O**	**ppm N**
1005.4	108.3	54.8
994.3	116.2	56.1
970.4	112.2	53.7
994.6	116.4	56.6
997.5	113.6	56.1
1000.9	111.6	56.1
1000.3	114.4	54.1
1001.4	108.4	56.2
1004	107	56.8
996.1	111.8	55.1
Average values		
	111.99	55.56
Deviation / Relative deviation (%)		
	3.29 / 2.93%	1.07 / 1.92%