ELTRA®
ELEMENTAL ANALYZERS

Oxygen and nitrogen determination in steel granulates

Suitable analyzers

- ELEMENTRAC ONH-*p*
- ELEMENTRAC ON-*p*

Used accessories

- Graphite crucibles (90180 and 90185)
- Suitable calibration material (NIST or other)
- Weighing boat for granulates (88400-0477)

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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 (1 Cycle)	30	0	27
Outgasing (2 Cycle)	30	4400	27
Stabilizing	60	4200	27

An increased outgasing time (2. Cycle) could improve the precision for very low oxygen and nitrogen contents.

III) Analysis

Power duration: 70 sec
Power: 4200 W
Flow: 27 l/h
Drift compensation: on
Open furnace: yes

Channel	Minimum time [sec]	Maximum time [sec]	Integration delay [sec]	Comparator factor [%]
Low and High O	30	60	7	0,5
Low and High N	35	70	15	0,5

IV) Postwaiting

Postwaiting time: 20 sec
Furnace clean up: yes

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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, if necessary), sample dropmechanism, 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 (e.g. with the help of 88400-0477 weighing boat) 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.

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Typical results		
Euronorm ZRM 284-2[1)]		
Weight (mg)	**ppm O**	**ppm N**
1010.2	98.1	151.4
996.2	98.9	152.9
991.3	98.2	148.2
1004.6	100.5	151.8
1028.5	97.2	149.3
1021.1	99.4	150.8
1023.6	98.7	147.9
1034.3	97.1	151.1
1014.1	96.5	149.2
1022.1	100.2	153.3
Average values		
	98.5	150.6
Deviation / Relative deviation (%)		
	±1.3 / 1.3%	±1.9 / 1.2%

[1)] certified: ppm O : 99 (±12 / 12.1%)
ppm N : 151 (±5 / 3.3%)

Typical results		
Euronorm ZRM 194-2[2)]		
Weight (mg)	**ppm O**	**ppm N**
1001.7	113.9	32.9
1000.1	119.0	32.6
1006.7	115.3	32.4
1016.4	122.0	32.0
998.1	109.5	32.1
1017.1	115.3	31.7
1018.7	114.3	31.9
989.5	115.4	32.0
991.0	116.4	33.3
1019.8	126.2	32.6
Average values		
	116.7	32.3
Deviation / Relative deviation (%)		
	±3.4 / 2.9%	±0.52 / 1.6%

[2)] certified: ppm O : -
ppm N : 31.9 (±2.4 / 7.5%)