

Hydrogen determination in steel samples



Suitable analyzers

- ELEMENTRAC ONH-p
- ELEMENTRAC OH-p

Used accessories

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



Application Settings

I) General

Furnace mode: OH

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	4000	27
Stabilizing	75	3600	27

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

III) Analysis

Power duration: 80 sec

Drift compensation: on

Power: 3600 W

Open furnace: yes

Flow: 27 l/h

Channel	Minimum time [sec]	Maximum time [sec]	Integration delay [sec]	Comperator factor [%]
Low and High H	50	80	15	0,5

IV) Postwaiting

Postwaiting time: 25 sec

Furnace clean up: No

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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 anhydron, 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.



Typical results	
Steel ELTRA 91400-1003 (LOT 812 C)	
Weight (mg)	ppm H
1010.2	6.5
1004.3	6.4
1004.5	6.1
1005.6	6.0
1005.9	5.7
1004.3	6.3
1003.6	5.8
1012.1	5.8
1004.1	5.8
1003.9	5.6
Average values	
	6.0
Deviation	
	0.3 / 4.9 %

Typical results	
ZRM Stahl H1 (BAM)	
Weight (mg)	ppm H
994.0	1.0
999.2	0.9
992.2	0.8
997.6	0.9
995.0	1.1
994.5	1.0
992.8	0.8
989.2	0.9
996.7	1.0
995.7	1.1
Average values	
	1.0
Deviation	
	0.1 / 10 %