Q4 TASMAN

Analysis of cast iron with Q4 TASMAN

To master the "Accuracy" challenge

Carbon as the most important element in the cast iron production comes along with some challenging characteristics. Graphite and its formulation are of utmost importance for cast iron products. Depending on the appearance it changes the mechanical properties drastically and improves or in worst cases ruins the positive effects of castability, machinability and decreases the structural properties.

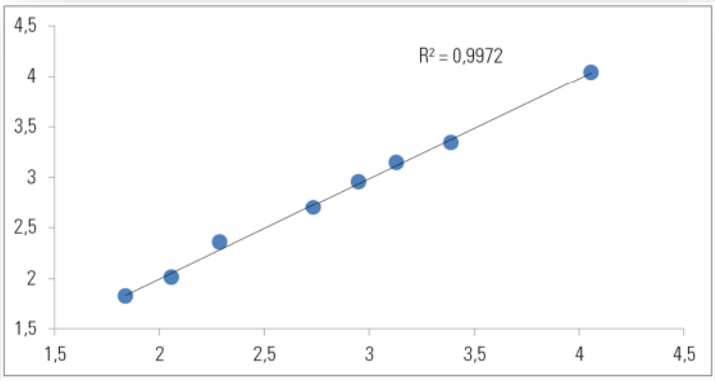
The role of carbon often leads to one of the most important questions from operators:
How accurate and reliable are carbon results analyzed by spark emission equipment?

This relevant question has its cause in the past, when optical emission spectrometers were introduced to foundries. The benchmarks for accurate results were and are still the results of combustion analyzer and thermal analysis which guarantee reliable carbon results. Beginning of the 80's the spark emission was introduced in foundries and had to prove its analytical capabilities.

Spectrometer hardware, such as excitation source, spark-stand and gas supply were not capable for achieving reliable results in the early days.

Due to technical development the accuracy in cast iron analysis by spark emission spectrometry improved over the last 35 years.

As a result of the different graphite formations in cast iron, sampling quality and preparation is still challenging analyzing accurate with spark emission. Excitation parameters, evaporation and ablation of carbon and graphite can lead to discrepancies of results when comparing combustion with spark emission. Even when achieving perfect results on internationally certified cast iron standards, samples taken during the cast iron production processes can show significantly differences for carbon.



	C	C	C	C	C	C	C	C
Sample	241 B	242 B	243 B	246 B	245 B	247 C	248 C	249 C
Certified	1,84	2,06	2,29	2,74	2,95	3,13	3,39	4,06
Measured	1,83	2,01	2,36	2,70	2,95	3,14	3,34	4,04

Correlation of certified values of cast iron CRM with measured values (absolute concentration in weight %)

The aim is to find the right settings and providing same accurate results for standards as for production samples.

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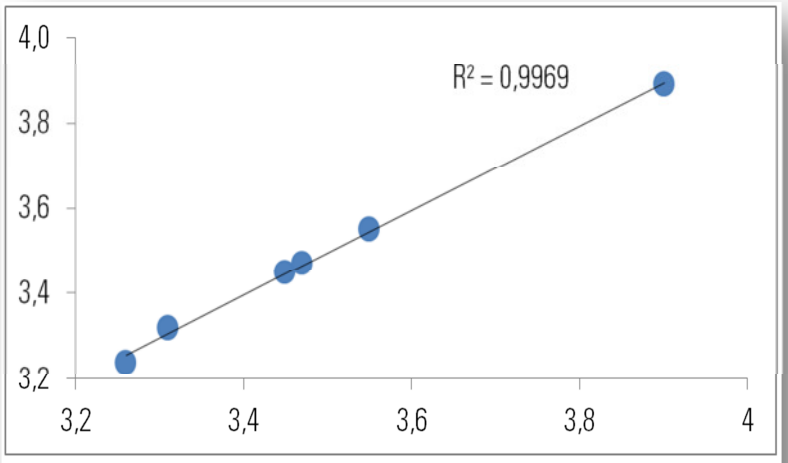
And this is where the Q4 TASMAN can point out its outstanding, in its class unique, performance. With decades of experience in development of hardware, optic and application Bruker Elemental achieved for the Q4 TASMAN a reliable and accurate analytical performance for cast iron applications.

This leads finally to results that can stand the comparison of combustion and thermal analysis with those of the spark emission.

When comparing results of certified standards and its perfect correlation, the next step is to prove that the same correlation is being achieved on production process samples and the reference values from carbon achieved by combustion analysis.



Sample	1	2	3	4	5	6
Combustion	3,26	3,31	3,45	3,47	3,55	3,90
Q4 TASMAN	3,24	3,32	3,45	3,47	3,55	3,89

Correlation of combustion results of cast iron process samples with measured values (absolute concentration in weight %)

That's where the real capabilities will show up. This is the challenge.

With Q4 TASMAN Bruker Elemental can provide the right tool which gives you these accurate results.

Excellent correlations between combustion and spark emission prove that with Q4 TASMAN the required performance can be achieved and the melting process in foundries can be confidently controlled.

Coming back to the common question if spark emission is capable for the job in foundries:
Yes, Q4 TASMAN provides accurate and reliable results required in foundries.