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Certificate of analysis

Reference Material TL-202B
Composite Cement
(CEM V/A 32,5 N)

I – General data

The table below shows the overall results obtained in the 9 laboratories which were involved in the inter-laboratory tests. Each value (mass content in %) is the average of 2 trials :

Laboratory	density (g/cm3)	Specific Surface Area (Blaine) (cm2/g)
1	2,95	4121
2	2,96	4275
4	2,94	4155
5	2,95	4054
6	2,95	4190
7	2,92	4125
8	2,89	4057
10	2,92	4005
11	2,95*	4230*
Mean **M**	**2,94**	**4135**
Standard deviation **s**	**0,02**	**88**

* Value corresponding to only 1 trial

Table I – individual data for each participating laboratory

II – Certified values

	Density (g/cm3)	Specific Surface Area (Blaine) (cm2/g)
Value[1]	**2,94**	**4135**
Uncertainty[2]	**0,02**	**68**

[1] best estimate from the average inter-laboratory test results

[2] values coming from the half width confidence interval **C**(95%). It is equal to **C**(95%) = **(txs)/√n** where **t** is the appropriate Student's value, **n** the number of acceptable mean values et **s** the standard deviation.

Statistical analysis of these Inter Laboratory trials was conducted with the assistance of ATILH. Elimination of outliers is performed at 98 by % using Student test. A reiteration is set at this threshold to keep only the values associated with the "Normal or Gaussian" distribution and completely defined by two parameters: mean and standard deviation.

III – Participating Laboratories - Traceability

An Inter-laboratory test campaign has been organized, laboratories of the Cement Industry in France and Europe as well as laboratories user of cement participated to this round robin test.
The 9 laboratories having participated are:

- CTG Italcementi rue des Technodes, 78931Guerville Cedex France
- Lafarge Centre Recherche, 95 rue du Montmurier, 38291 St Quentin Fallavier Cedex France
- LERM, 23 rue de la Madeleine, BP 60136, 13631 Arles Cedex France
- CTG Italcementi , via G Camozzi 124, 24121 Bergamo, Italie
- Ceprocim, 6 blvd Preciziei code 062203, 6 Bucharest, Roumanie
- EKET , K Pateli 19, 141 23 Lycovryssi, Attica, Grèce
- Oddzial Mineralnych Materialow, Budowlanych w Krakowie, 31983 Krakow, ul Cementowa 1, Pologne
- TFB, 10 liedenstrabe, 5103 Wildegg, Suisse
- Vicat, Centre Technique LC, BP 36, 38081 L'Isle d'Abeau Cedex France

IV – Notes on Methods used

The test method most used is the method by Blaine air permeability described in EN 196-6. The measure of density was carried out as follows:

- Laboratories 1, 2, 5, 6, 8 and 11 have used picnometer method (EN 196-6)
- Laboratory 4 has used the method described in ASTM C 188.
- Laboratories 7 and 10 have used Le Chatelier flask method.

V – Homogeneity

The batch of cement used for this campaign comes from the current production of cement. It was homogenized (Lödige mixer) and then distributed in 10 sealed drums and each containing a desiccant. Statistical analysis of laser particle size and uncorrected sulphide loss of ignition (EN 196-2), performed on samples taken from each of 10 drums, confirms its homogeneity (standard deviation of 0,018 on the loss of ignition - standard deviation of 0,49 on the mesh size of 8 micrometers).

VI – Packaging – Intended used

The sample of this reference material is packaged in 40 g glass bottle, sealed with a secure screw cap. Physico-chemical properties of the sample are stable until the bottle is closed and the cap untouched. After opening the bottle the local conditions of storage of the sample (courtroom with low humidity, maintaining in a drier, close the bottle immediately after use) will allow its potential reuse. These samples are intended to calibrate Blaine device. For the calibration of the Blaine permeability apparatus, follow the requirements of the EN 196-6 standard, paying particular attention to the temperature corrections, if any. To determine the volume of the compacted layer, it is not essential to use the Reference Material (but ensure that a sufficient quantity is taken so that the mass of the mercury does not modify the compaction of the powder layer). Reference Material should be used systematically:

a) after 1000 tests ;
b) when using another type of manometric liquid, another type of filter paper, a new manometer tube or a new perforated disc;
c) If discrepancies are systematic with the secondary reference cement.