

tes reactivity, ASTM C1260, C1293, C295, C586, C1105, C1567 standards are used in Poland as well (Table 2).

Summary

Durability of concrete related to probability of corrosion due to reactivity of aggregates is, next to freeze-thaw resistance [12], another example where the special requirements from RCC-CW need to be adapted. It is because, there is no full compatibility between Polish, RILEM and ASTM requirements and RCC-CW published by AFCEN – as it is based partially on French experience and French National Standards [11].

The RCC-CW code is aware of this issue so it adds that „National standards and practices can replace the French ones, provided that they are equivalent and accepted by the Project”. That’s why a Project in Poland must be evaluated and adapted to the local Standards on a case by case basis, as it has recently been done in UK.

W artykule wykorzystano studium literaturowe wykonane w ramach projektu NGS-Concrete realizowanego w programie Lider IV (LIDER/033/639/L-4/12/NRDC/2013) finansowanego przez NCBiR. Artykuł powstał dzięki współpracy z Instytutem Techniki Budowlanej w ramach konsorcjum Pol-Nuclear BCC, którego działalność jest współfinansowana z pracy statutowej realizowanej na WIL PW w latach 2014-2016.

Table 2. American normative methods for identifying aggregates reactivity [2]

Tabela 2. Normy amerykańskie do oznaczania reaktywności kruszywa [2]

Name of the test	Period of the test	Comments
ASTM C227: Standard Test Method for Potential Alkali Reactivity of Cement Aggregate Combinations (Mortar-Bar Method)	Varies: first measurement at 14 days, then at 1, 2, 3, 4, 6, 9 and 12 months, then every 6 months	The test must not cause significant expansion of carbonated aggregates. Long test period. The expansion is not necessarily caused by the alkali reaction of the aggregate
ASTM C289: Determination of the silica alkali reactivity of aggregates (chemical method)	24 hours	Rapid results. Certain aggregates give low expansion, even if they have a high silica content. Not very reliable
ASTM C294: Natural mineral components of aggregates	Short period – as long as the visual examination takes	These descriptions are used to characterise the natural minerals forming the aggregates’ sources
ASTM C295: Petrographic examination of the aggregates in the concrete	Short period – visual examination, not requiring long test periods	Generally includes an optical microscopy. May also include an X-ray, thermal or infra-red analysis - ASTM C294
ASTM C441: Effectiveness of mineral or slag additions in concrete expansion prevention due to silica alkali reaction	Varies: first measurement at 14 days, then at 1, 2, 3, 4, 5, 9 and 12 months, then every 6 months	Highly-reactive artificial aggregate, may not represent real aggregates Pyrex contains alkalis
ASTM C856: Petrographic examination of hardened concrete	Short period - including the preparation of the samples and the visual and microscopic examinations	Samples may be examined with a stereo microscope, a polarising microscope, a metallographic microscope and a scanning electron microscope
ASTM C856: Uranium acetate treatment procedure	Immediate results	Identifies small quantities of gel which may or may not cause expansion Opal, a natural aggregate, and carbonated paste may light up – the results must be interpreted accordingly. The tests may be supplemented by a petrographic examination and a physical test in order to determine the expansion of the concrete
ASTM C1260 Potential alkali reactivity of aggregates (mortar bar method)	16 days	More rapid alternative to ASTM C227. Used for aggregates reacting slowly or those whose expansion is delayed in relation to the reaction
ASTM C1293: Determination of Length Change of Concrete Due to Alkali-Silica Reaction (concrete prism test)	Varies: first measurements at 7 days, then 28 and 56 days, then at 3, 6, 9 and 12 months, then every 6 months	Requires a long test period to give significant results. To be used to supplement ASTM C227, C295, C289 and C1260
ASTM C1567: Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)	16 days	More rapid alternative to ASTM C1293. Used for aggregates reacting slowly or those whose expansion is delayed in relation to the reaction

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