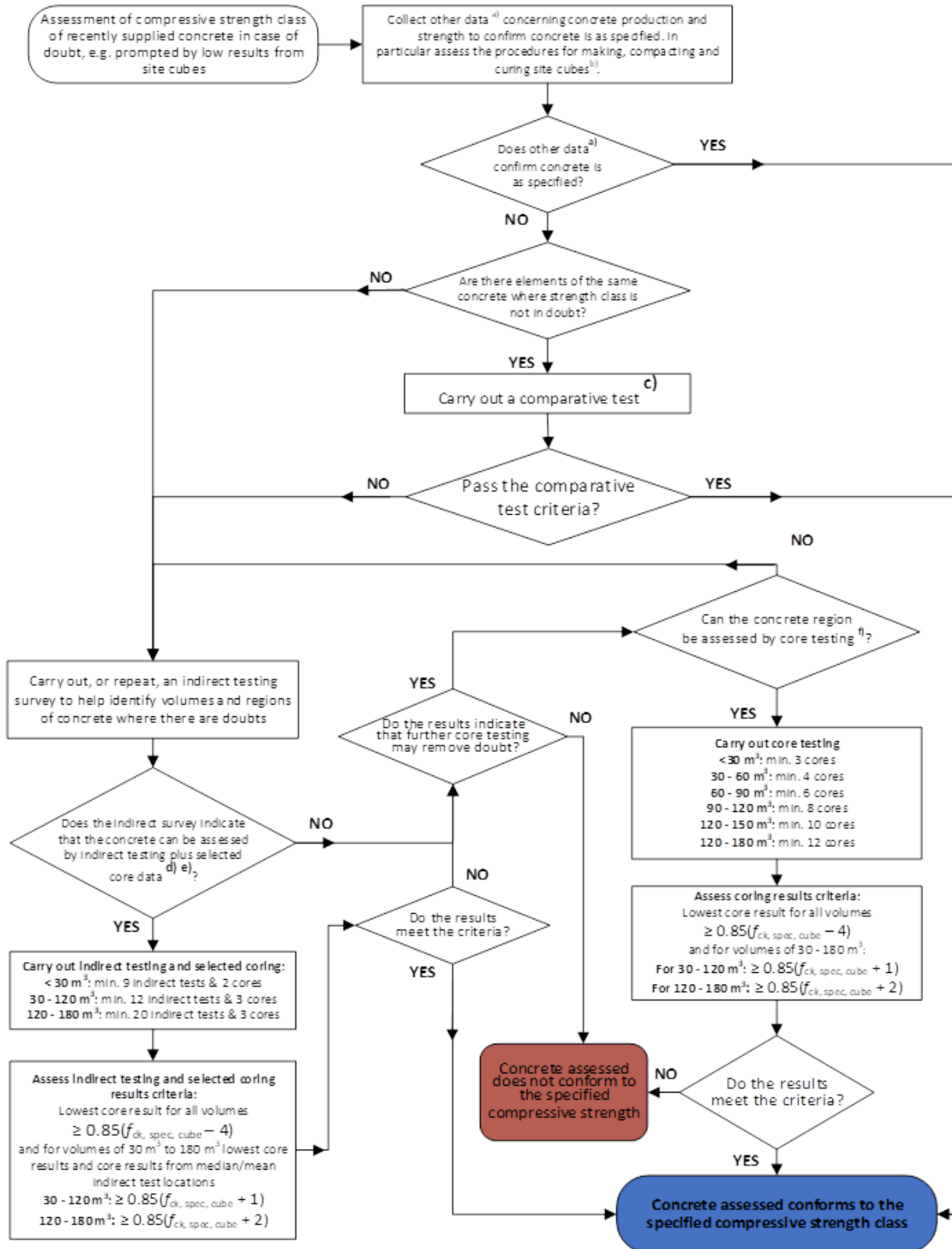


00 BRMCA GUIDE Flowchart to BS EN 13791:2019, Clause 9
Assessment of compressive strength class of concrete in case of doubt



Notes to flow chart	
a)	Other data includes the producer's results or batching records. Other data also includes the possibility that site cubes results may be in doubt.
b)	Site cubes should be made from composite samples of concrete in accordance with BS EN 12350-1 and BS 8500-1. Concrete shall be made into compressive strength test specimens and cured in accordance with BS EN 12390-2, that is the concrete shall be compacted and then left in the moulds for at least 16 h, but not longer than 3 days, at a temperature of $(20 \pm 5) ^\circ\text{C}$ and protected against shock, vibration and dehydration. Subsequently the cubes shall be cured in water at a temperature of $(20 \pm 2) ^\circ\text{C}$, or in chamber at $(20 \pm 2) ^\circ\text{C}$ and relative humidity $\geq 95\%$ until tested for compressive strength in accordance with BS EN 12390-3
c)	Comparative testing is carried out using either a rebound hammer to BS EN 12504-2 or using Ultrasonic Pulse velocity to EN 12504-4. Guidance on the comparative testing to PD CEN/TR 17086 is set out BRMCA Guide <i>Assessment of compressive strength class of recently supplied concrete using comparative testing</i>
d)	Coring to be in accordance with BS EN 12504-1. In particular: <ul style="list-style-type: none"> – BS EN 13791 requires the cores to be cured with sealed curing rather than water curing. This is primarily to ensure that the core to be tested is at a moisture condition similar to the in-situ moisture condition. Further background is given in PD CEN/TR 17086. – Cores containing reinforcing bars should be avoided wherever possible by the selection of the core diameter and the use of cover meters when deciding where to cut the cores. In general reinforcement reduces the strength of a core, the exceptions being 1:1 cores with not more than 2.0% volume fraction of reinforcement and 2:1 cores where the reinforcement is completely within 30 mm of the ends of the core and the volume fraction of reinforcement is not more than 2.0%. In these cases, the presence of reinforcement may be regarded as having no impact on the core strength. For other cases the impact of reinforcement on core strength is variable and any result is unlikely to represent the strength of the concrete and for this reason the result shall be rejected. – To be classified as a 1:1 core, where a 1:1 core is required if assessing the characteristic cube strength, the capped or ground length to diameter ratio shall be within the range between 0.90 to 1 and 1.10 to 1. – End preparation by grinding is a requirement where concrete strengths greater than 50 MPa are anticipated and highly recommended for the whole range of strengths as it is the most precise method of preparing the ends of specimens. – an estimation of the cores' excess voidage and its effect on strength shall be made by reference to BS EN 12504-1.
e)	See BRMCA Guide <i>Assessment of compressive strength class of recently supplied concrete using in-situ indirect testing plus selected core test data.</i>
f)	See BRMCA Guide <i>Assessment of compressive strength class of recently supplied concrete using in-situ core testing.</i>

Standards

BS EN 12350-1	Testing fresh concrete – Part 1: Sampling
BS EN 12390-2	Testing hardened concrete – Part 2: Making and curing specimens for strength testing
BS EN 12390-3	Testing hardened concrete – Part 3: Compressive strength of test specimens
BS EN 12504-1	Testing concrete in structures – Part 1: Cored specimens - Taking, examining and testing in compression
BS EN 12504-2	Testing concrete in structures – Part 2: Non-destructive testing - Determination of rebound number
BS EN 12504-4	Testing concrete in structures – Part 4: Determination of ultrasonic pulse velocity
BS EN 13791	Assessment of in-situ compressive strength in structures and precast concrete components
PD CEN/TR 17086	Further guidance on the application of EN 13791: 2019 and background to provisions
BS 8500-1	Concrete - Complementary British Standard to BS EN 206. Part 1: Method of specifying and guidance for the specifier

Enquiries: Chris A Clear, chris.clear@mineralproducts.com