QSRMC

The Quality Scheme
for
Ready Mixed Concrete

QUALITY AND PRODUCT CONFORMITY

REGULATIONS 2024

Issue 1. May 2024

INCORPORATING THE REQUIREMENTS OF:
BS EN 206, BS 8500-1,
BS 8500-2 and BS EN ISO 9001

QSRMC Quality and Product Conformity Regulations

OVERVIEW

The QSRMC Quality and Product Conformity Regulations incorporate the requirements of ISO 9001 as applicable to ready mixed concrete and, in combination with BS EN 206, BS 8500-1 and BS 8500-2, provide an additional assurance that concrete will conform to the specification agreed with the specifier/user.

Companies that are members of the Scheme have demonstrated to the satisfaction of the UKAS accredited third-party assessment and certification body their commitment and ability to provide concrete which consistently meets their specifier/users' requirements.

These Regulations are concerned with all elements of the systems necessary to achieve product conformity, but they do not include commercial matters, which will form part of the supply agreement, and health and safety issues which are addressed in the appropriate product standard and National legislation. They are structured to follow the format of ISO 9001.

Appendix A lists specific industry definitions.

Appendix B defines the industry interpretation of terminology or vocabulary used in ISO 9001 does not represent that used commonly within the ready mixed concrete industry

Appendix C lists reference documents.

Appendix D sets out the QSRMC Certification and Administrative Procedures.

These Regulations have been prepared following consultation with concrete producers and users and approved and issued under the authority of the QSRMC Governing Board on which the following organisations are represented:

- Balfour Beatty Civil Engineering Ltd
- Institution of Structural Engineers
- Institute of Concrete Technology
- Laing O'Rourke Group
- Mineral Products Association
- Mott MacDonald Group
- National Highways

This overview is not part of the Regulations.

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When required, reference may be made to the supplementary QSRMC/CPC/SpeCC Disputes & Appeals Procedure

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PART 1 – SCOPE, PART 2 – NORMATIVE REFERENCES, PART 3 – TERMS AND DEFINITIONS

PART 1 - SCOPE

1.1 GENERAL

These Product Conformity Regulations specify the requirements of Members' management systems to conform to ISO 9001, and of the performance, production and conformity of ready mixed concrete to be compliant with the relevant parts of BS EN 206, BS 8500-1, BS 8500-2 and/or the customer's requirements, as well as meeting applicable statutory and regulatory requirements.

The structure of these Regulations is based upon that of ISO 9001 at the level of the primary section headings subject to alteration of wording to reflect terminology common in the ready mixed concrete industry.

Concrete is defined within the scope of BS EN 206 with further national provisions given in BS 8500.

1.2 APPLICATION

All Members shall comply with the Scheme, as required in the Articles of Association of QSRMC.
Servicing of the product does not fall within the scope of these Regulations.

PART 2 - NORMATIVE REFERENCES

These are included within Appendix C. For undated references the latest edition of the reference document, including any amendments, applies.

Servicing of the product does not fall within the scope of these Regulations. However, post-delivery activities shall be managed in accordance with ISO 9001:2015 Clause 8.5.5 where applicable.

PART 3 - TERMS AND DEFINITIONS

For the purposes of these Regulations, the terms and definitions given in Appendix A apply together with those applicable definitions provided by ISO 9000, BS EN 206, BS 8500-1 and BS 8500-2.
Specific industry terminology used as an alternative to that provided by ISO 9001 is set out in Appendix B.

PART 4 – CONTEXT OF THE ORGANIZATION

4.1 UNDERSTANDING THE ORGANIZATION AND ITS CONTEXT

Members shall determine external and internal issues that are relevant to its purpose and its strategic direction and that affect its ability to achieve the intended result(s) of its quality management system.

Members shall monitor and review information about these external and internal issues

4.2 UNDERSTANDING THE NEEDS AND EXPECTATIONS OF INTERESTED PARTIES

Due to their effect, or potential effect, on the members' ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements, the member shall determine:

- the interested parties that are relevant to the quality management system
- the requirements of these interested parties that are relevant to the quality management system

The member shall monitor and review information about these interested parties and their relevant requirements

4.3 DETERMINING THE SCOPE OF THE QUALITY MANAGEMENT SYSTEM

The member shall determine the boundaries and applicability of the quality management system to establish its scope.
When determining this scope, the member shall consider:

- the external and internal issues referred to in 4.1
- the requirements of relevant interested parties referred to in 4.2
- the products and services of the member

The member shall apply all the requirements of ISO 9001 and these Regulations if they are applicable within the determined scope of its quality management system.

The scope of the member's quality management system shall be available and maintained as documented information. The scope shall state the types of products and services covered and provide justification for any requirement of ISO 9001 or these Regulations that the member determines is not applicable to the scope of its quality management system.

4.4 QUALITY MANAGEMENT SYSTEM AND ITS PROCESSES

The member shall operate an effective quality management system which shall be established, implemented, maintained and continually improved in accordance with these Regulations to ensure that concrete conforms to the specifications agreed with the customer.

PART 4 – CONTEXT OF THE ORGANIZATION

4.4 QUALITY MANAGEMENT SYSTEM AND ITS PROCESSES (continued)

The member shall determine the key processes of the quality management system and shall:

- determine the required inputs and expected outputs of the processes
- determine the relationships and interactions of the processes
- determine and apply the criteria and methods (including monitoring, measuring and performance indicators) needed to ensure the effective operation and control of the processes
- determine the resources needed for the processes and ensure their availability
- assign the responsibilities and authorities for the processes
- address the risks and opportunities as determined in accordance with the requirements of Regulation 6.1
- evaluate the processes and implement any changes needed to ensure that the processes achieve their intended results
- improve the processes and the quality management system

The processes shall include:

- management activities including those of member's senior management
- provision of resources
- setting of quality objectives
- order processing
- concrete design
- purchase and control of constituents
- production and supply
- calibration
- measurement and monitoring of management systems
- measurement and monitoring of the product
- continual improvement.

If any process that may affect product conformity is externally provided the Member shall ensure appropriate control over the process and conformity with Regulation 8.4. The type and extent of the control shall be defined within the quality management system.

Where these Regulations contain specific procedures to meet technical requirements, members may adopt alternative procedures to satisfy those requirements. Such procedures shall be fully documented and approved by QSRMC as providing the same degree of assurance as those contained in these Regulations.

The member shall maintain documented information to support the operation of its processes and retain documented information to have confidence that the processes are being carried out as planned.

PART 5 - LEADERSHIP

5.1 LEADERSHIP AND COMMITMENT

5.1.1 General

Top management shall demonstrate leadership and commitment with respect to the quality management system.
This shall include:

- taking accountability for the effectiveness of the quality management system
- ensuring that the quality policy and quality objectives are established for the quality management system and are compatible with the context and strategic direction of the member
- ensuring the integration of the quality management system requirements into the member's business processes
- promoting the use of the process approach and risk-based thinking
- ensuring the availability of necessary resources for the quality management system.
- communicating the importance of effective quality management and of conforming to the quality management system requirements
- ensuring that the quality management system achieves its intended results
- engaging, directing and supporting persons to contribute to the effectiveness of the quality management system
- promoting improvement
- supporting other relevant management roles to demonstrate their leadership as it applies to their areas of responsibility

5.1.2 Customer Focus

Top management shall demonstrate leadership and commitment with respect to customer focus by ensuring that:

- customer and applicable statutory and regulatory requirements are determined, understood and consistently met
- the risks and opportunities that can affect conformity of products and services and the ability to enhance customer satisfaction are determined and addressed
- the focus on enhancing customer satisfaction is maintained. See Regulations 8.2.2 and 9.1.2.

5.2 POLICY

5.2.1 Establishing the Quality Policy

Top management shall establish, implement and maintain a quality policy.
This shall:

- be appropriate to the purpose and context of the member and supports its strategic direction
- provide a framework for setting quality objectives
- include a commitment to satisfy applicable requirements
- includes a commitment to continually improve the quality management system

PART 5 - LEADERSHIP

5.2.2 Communicating the Quality Policy

The quality policy shall:

- be available and be maintained as documented information
- be communicated, understood and applied within the member's organisation
- be available to relevant interested parties, as appropriate

5.3 ORGANIZATIONAL ROLES, RESPONSIBILITIES AND AUTHORITIES

Top management shall ensure that the responsibilities and authorities for relevant roles are communicated and understood within their organisation.

Top management shall assign the responsibility and authority for:

- ensuring that the quality management system conforms to the requirements of ISO 9001
- ensuring the processes are delivering the intended outputs
- reporting to top management on the performance of the quality management system and any need for improvement
- ensuring the promotion of customer focus throughout the organisation
- ensuring the integrity of the quality management system is maintained when changes to the quality management system are planned and implemented
- ensuring internal quality audits are planned, actioned and reviewed
- ensuring staff are appropriately trained for their responsibilities
- liaison with external parties on quality matters
- ensuring that effective corrective actions are taken
- provision of adequate resources to operate and maintain the quality management system

Where any responsibilities and authorities are assigned, this shall be clearly defined and shall include reporting and monitoring protocols.

PART 6 - PLANNING

6.1 ACTIONS TO ADDRESS RISKS AND OPPORTUNITIES

When planning for the quality management system, the member shall consider the issues referred to in 4.1 and the requirements referred to in 4.2 and determine the risks and opportunities that need to be addressed to:

- give assurance that the quality management system can achieve its intended results
- enhance desirable effects
- prevent, or reduce, undesirable effects
- achieve improvement

The member shall plan:

- actions to address these risks and opportunities
- how to integrate and implement the actions into its quality management system processes and evaluate the effectiveness of these actions

6.2 QUALITY OBJECTIVES AND PLANNING TO ACHIEVE THEM

The member shall establish quality objectives at relevant functions, levels and processes needed for the quality management system, See 8.1.

The quality objectives shall:

- be consistent with the quality policy
- be measurable
- take into account applicable requirements
- be relevant to conformity of products and services and to enhancement of customer satisfaction
- be monitored
- be communicated
- be updated as appropriate

When planning how to achieve its quality objectives, the member shall determine:

- what will be done
- what resources will be required
- who will be responsible
- when will it be completed
- how the results will be evaluated

The member shall maintain documented information on the quality objectives.

PART 6 - PLANNING

6.3 PLANNING OF CHANGES

When a member determines the need for changes to the quality management system, the changes shall be carried out in a planned manner, see 4.4. The member shall consider:

- the purpose of the change and the potential consequences
- the integrity of the quality management system
- the availability of resources
- the allocation or reallocation of responsibilities and authorities

PART 7 - SUPPORT

7.1 RESOURCES

7.1.1 General

The member shall determine and provide the resources needed to establish, implement, maintain and continually improve the effectiveness of the quality management system, to ensure that customer needs and expectations are met. The member shall consider:

- the capabilities of, and constraints on, existing internal resources
- what needs to be obtained from external providers

7.1.2 People

The member shall determine and provide the persons necessary for the effective implementation of its quality management system and for the operation and control of its processes. The level of knowledge and skill required to operate the quality management system effectively shall be identified and documented information retained. Where required by these Regulations, personnel responsible for specific activities shall be identified.

7.1.3 Infrastructure

The member shall determine, provide and maintain the infrastructure needed to achieve conformity to product and service requirements.

Note: This may include:

- buildings, workspace and associated utilities
- process equipment, both hardware and software
- supporting services, such as transport, and communication and information systems

7.1.4 Environment for the Operation of Processes

The member shall determine, provide and maintain a suitable environment for the operation of its processes to ensure that product and service conformity are not adversely affected.

Note: This includes the physical environment and factors such as noise, temperature, humidity, lighting and weather as well as human factors such as social and psychological.

7.1.5 Monitoring and Measuring Resources

7.1.5.1 General

The member shall determine and provide the resources needed to ensure valid and reliable results when monitoring or measuring is used to verify the conformity of products and services to requirements.
The member shall ensure that the resources provided:

- are suitable for the specific type of monitoring and measurement activities being undertaken
- are maintained to ensure their continuing fitness for their purpose

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The member shall retain appropriate documented information as evidence of fitness for purpose of the monitoring and measurement resources.

7.1.5.2 Measurement traceability

7.1.5.2.1 Objective

The objective of this process is to ensure that all weighing and measuring equipment used in the production of concrete, and the equipment used to test concrete and its constituents, is maintained in an appropriate state of calibration or check status.

7.1.5.2.2 Performance Criteria for Concrete Plant Weighing and Volume Measuring Systems

General

Members shall establish documented calibration procedures including a plant specific method statement that incorporates a plan of test load application points and, if fitted, individual load cells and ensure that calibration of plant weighing and measuring systems by a specialist is carried out in accordance with the agreed documented procedures.

The witnessing and auditing of each engineer employed by the calibration agency on an annual basis with the outcome being recorded shall be undertaken.

Weighing and measuring equipment shall conform to the requirements of Clause 9.6.2.2 of BS EN 206 in respect of accuracy, sensitivity and arrangements of the weighing devices.

The weighing system shall be capable of conforming to the calibration requirements of these Regulations both at the time of initial installation and in subsequent operation. In the procurement of new equipment, consideration shall be given to the effects on the stability and security of the system of:

- temperature variations on the output from load cells
- load cell linearity
- external electrical interference
- the capacity of the load cells relative to the working load
- structural stability of all elements of the weighing system
- access to calibration adjustments
- the stability and cleanliness of compressed air supply for pneumatic weighing systems
- adequate calibration facilities.

The system used for measuring quantities of water and other liquids shall be capable of meeting the calibration requirements of these Regulations.

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7.1.5.2 Measurement traceability (continued)

In the procurement of new equipment consideration shall be given to:

- the stability of calibration when constituents are measured on a time/flow basis
- systems to ensure that devices are primed throughout the measurement process.

Note: Guidance on design and control of weighing equipment is contained in BS EN 45501 Metrological Aspects of Non-automatic Weighing Instruments.

Accuracy Requirements for Weighing and Volume Measuring Equipment

The scale increments shall not exceed 10 kg for cement and additions, 50 kg for aggregate and 10 kg (litres) for water. Pre-set controls shall be divided in increments not exceeding 5 kg for cements and additions, 25 kg for aggregate and 10 kg (litres) for water, and for continuous mixer plants 10 kg/m^3 for cements and additions, 25 kg/m^3 for aggregate and 10 kg (litres)/m^3 for water.

Digital displays shall have increments not exceeding 5 kg for cements and additions, 25 kg for aggregate and 10 kg (litres) for water.

The accuracy, at any time during operation, of the indicated weight at any point on the scale shall be within 0.5% of the full-scale reading.

Mechanisms employed for the continuous weighing of constituents (in continuous mixing plants) shall weigh to an accuracy of within 3% of the amount to be batched when verified on 1 m^3 batch weights and above.

Admixture dispensers shall have scale increments which enable constituents to be batched within a tolerance of 5% of the scale reading.

7.1.5.2.3 Calibration of Weighing and Volume Measuring Equipment

1 - General Requirements:

All weighing and measuring equipment shall be tested and calibrated, over its full working range, by a relevant specialist every three months and immediately following any modification or repair that could have affected its accuracy.

Calibration points shall be clearly identified. In the case of batch weighing systems, testing and calibration shall be by the application of test loads to the weigh hoppers.

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7.1.5.2 Measurement traceability (continued)

Checks on continuous weigh systems shall be based on a comparison of pre-set quantities with those actually produced.

Except for lever based aggregate weighing systems, the load shall be applied to the system in such a manner that the centre of effort of the applied load is at or about the geometric centre of the weighing machine.

For systems using more than one load cell per hopper, calibrations shall include load checks on individual load cells. If a load cell is inaccessible, an effective alternative method shall be identified and documented to ensure that all load cells are included in the process. Where load cells are accessible, these shall be tested individually.

Analogue scales shall be read to the nearest 0.5 of a scale division and digital displays to the smallest integer increment displayed or one fifth of the minimum increment required by the Regulations, whichever is the smaller.

Calibrations shall include primary and secondary displays.

The applied weights or test load shall be:

- at least 1000 kg for scales with divisions greater than 20 kg
- at least 500 kg for scales with divisions of 20 kg or less
- except that for scales with a capacity of 3000 kg or less the applied weights or test load may be less than 500 kg provided they are at least one sixth of the scale capacity, and not less than 100 kg.

All scales shall be tested at a minimum of five increments uniformly distributed through the full working range with an additional test at 10% of the scale capacity.

2 - Special Requirements for the Calibration of Continuous Weighing Systems:

Calibration of continuous weighing systems shall be by use of a suitable vehicle and a stamped weighbridge.

The quantity of material batched for weigh checks shall be at least 2000 kg.

Check weighing shall be made on each feeder, and over a range of pre-set quantities per metre of concrete; in the case of cement at 150, 300 and 450 kg/m^3. The 2000 kg shall be obtained in a series of individual runs of size equal to the quantity for 1 m^3 of concrete.

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7.1.5.2 Measurement traceability (continued)

3 Special Requirements for the Calibration of Back Weigh Systems
Systems shall be calibrated over their full range subject to the following special conditions:

- the 'scale capacity' is defined as the normal maximum amount to be batched per hopper
- any 'scale capacity' portion of the scale shall have a maximum error of 0.5%, of that capacity

4 - Security of Batching Systems
Plant Calibration Systems. The calibration facilities of plant weighing and batch recording shall be protected from unauthorised adjustment. Where electronic systems are adjusted through variable resistors, unique seals shall protect the facility. In the case of systems accessed through a keypad or computer keyboard, this shall include a non-resettable event number. Security seal numbers and for process control computers, calibration event numbers, shall be recorded on calibration records

Automatic Batching/Recording Equipment Suppliers and Calibration Specialists

Members shall provide assurance of the integrity of auto batching and batch recording systems to consistently and accurately display and record the actual amounts batched.

Note: This assurance may be provided by the supplier of the equipment signing a 'Certificate of Product Integrity' or by other means providing adequate assurance. Examples of suitable Certificates are held by QSRMC, the wording of which may be adopted or modified to suit particular needs.

5 - Criteria for Calibration of Weigh Systems by use of Weights
On an annual basis weights used to calibrate batch-weighing systems shall be stamped to 'Traders Weight' standard or shall be certificated to the lower standard of 0.2% by a route traceable to National Standards. Where routine inspection of weights reveals damage and/or deterioration the affected weights shall be recalibrated.

6 - Criteria for Calibration of Weigh Systems other than by use of Weights
When weighing systems are calibrated by use of load cells or other systems of external loading, either in compression or in tension:

- the calibration system shall be calibrated annually by an accredited UKAS Calibration Laboratory or in accordance with a documented method agreed with the Certification Manager.
- on calibration, the equipment (weighing system) shall not exhibit errors greater than 0.25% of the full scale reading of the calibration equipment
- in cases where the capacity of the calibration equipment exceeds that of the weighing equipment under test, the maximum calibration error shall not be greater than 0.25% of the full scale reading of the weighing equipment

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7.1.5.2 Measurement traceability (continued)

- when hydraulic systems are used to apply the test load, before commencement the system shall be verified as being capable of maintaining the test load for 1 minute within 0.25% of the capacity of the loading system. The results shall be recorded.

The application of the loading system to the weigh hopper shall ensure that the hopper or weighing system is not locally overloaded or distorted.

7 - Intermediate Verification of Weighing Systems for Cement and Aggregates
Producers shall monitor the performance of weighing systems on an ongoing basis.

8 - Data to be included in Calibration Records
The following shall be included on calibration reports as appropriate:

- name of client
- location of plant
- serial number of reports with each sheet numbered
- date of calibration, date of issue of report if different
- name and signature of person carrying out calibration
- name and signature of person accepting report for the Member
- identification or serial number of equipment calibrated
- confirmation that calibrations were carried out in accordance with the calibration organisation's procedures
- a record of the full scale reading/capacity/scale divisions
- a record for each increment of loading, the amount of load or weights applied, the scale reading and any error found (the error shall be reported as a percentage so that a comparison to the target can be made). On addition of materials, the scale reading and the calculated weight of those materials if scale errors exist
- a statement that the required calibration standard was/was not met
- the identification of the test equipment used
- date of last calibration of the test equipment
- authority carrying out the calibration of the test equipment
- time of commencement and finish of calibration
- observations made during the calibration in respect of matters which may affect the accuracy of the weighing equipment
- any errors or corrective actions
- results of loading checks on individual load cells
- where appropriate seal numbers and/or event log numbers
- where admixtures are metered results of no flow checks

Note: Handwritten calibration reports should be legible.

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7.1.5.2.3 Concrete and Materials Test Equipment

Equipment used for testing concrete and its constituents shall be calibrated or checked as appropriate in accordance with the requirements of BS EN 206 and/or any relevant European or British Standard. All equipment shall be identified and maintained in a clean and efficient condition.

Any equipment which fails to conform to the calibration requirement shall be removed from service or rectified immediately.

Major errors arising from calibrations or checks shall be reviewed to determine any effect that the error may have had upon the test results.

7.1.5.2.4 Nonconformity

When any measuring equipment is found not to conform to calibration requirements action shall be taken:

- to assess and record the validity of measurements made since the previous calibration and identify the cause of the nonconformity with requirements
- to rectify any deficiencies identified in the measurement systems
- to assess the impact on product conformity.

7.1.5.2.5 Computer software

When used in the monitoring and measurement of specified requirements, the ability of computer software to satisfy the intended application shall be confirmed. This shall be undertaken prior to initial use and reconfirmed as necessary. Documented information shall be maintained.

Note: This should include verification and configuration management as well as checking system outputs against expected outcomes using standard data input.

7.1.6 Organizational Knowledge

The member shall determine the knowledge necessary for the operation of its processes and to achieve conformity of products and services.

This knowledge shall be maintained and be made available to the extent necessary.

When addressing changing needs and trends, the member shall consider its current knowledge and determine how to acquire or access any necessary additional knowledge and required updates.

Note: Organizational knowledge is knowledge specific to the member; it is generally gained by experience. It is information that is used and shared to achieve the member's objectives. Organizational knowledge can be based on internal and external sources.

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7.2 COMPETENCE

Personnel affecting product quality and conformity shall be competent on the basis of appropriate education, training, skills and experience.

The member shall:

- determine the necessary competence criteria for persons doing work under its control
- ensure that relevant staff are competent to perform their functions
- ensure that personnel have been adequately trained in the procedures for the activities for which they have responsibility and/or authority
- review the training requirements for staff, particularly when processes are updated
- ensure that the testing of constituents, design and control of concretes, and their constituents, are under the supervision of experienced technical management who shall be trained to a standard. As exampled by ICT Concrete Technology and Construction Stage 3
- ensure their technical management take actions to acquire the necessary competence, and evaluate the effectiveness of the actions taken
- maintain and retain appropriate documented information of education, training, skills or experience as evidence of competence.

7.3 AWARENESS

The member shall ensure that all persons doing work under the member's control are aware of:

- the quality policy
- relevant quality objectives
- their contribution to the effectiveness of the quality management system, including the benefits of improved performance
- the implications of not conforming with the quality management system requirements

7.4 COMMUNICATION

The member shall determine the internal and external communications relevant to the quality management system, including:

- on what it will communicate
- when to communicate
- with whom to communicate
- how to communicate
- who communicates

PART 7 - SUPPORT

7.5 DOCUMENTED INFORMATION

7.5.1 General

The quality management system documentation shall include:

- documented information required by ISO 9001 and these Regulations
- documented information determined by the member as being necessary for the effectiveness of the quality management system

The extent of the quality management system documented information shall reflect the following:

- the size and type of the member
- the complexity and interaction of the processes
- the competence of personnel.

7.5.2 Creating and Updating

When creating and updating documented information, the member shall ensure appropriate:

- identification and description
- format and media
- review and approval for suitability and adequacy

7.5.3 Control of Documented Information

The member shall identify the documented information required by ISO 9001 and these Regulations and it shall be controlled to ensure:

- it is available and suitable for use, where and when it is needed
- it is adequately protected from loss of confidentiality, improper use or loss of integrity

For control of documented information, the member shall address the following activities, as applicable:

- preparation and amendment of internally generated documented information including unique identification of title, pagination, current revision number/status, date of issue and authorising personnel, or a suitably controlled computer based system
- identification of the current issue of externally generated documented information
- review and approval of documented information, including amendments, for adequacy prior to issue by authorised personnel. Where practicable, the nature of any amendments shall be identified
- if centrally controlled computer based systems are not used, then control lists which identify all personnel/positions to whom any controlled documented information have been issued, what has been issued and when, including the level of control
- methods to ensure that the appropriate controlled documented information is available in a legible state at all locations where operations essential to the effective functioning of the quality management system are performed

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7.5.3 Control of Documented Information - continued

- notification to authorising personnel of the need for review of, or change to, documented information arising from corrective actions
- identification of obsolete documented information, the date of their withdrawal and the method of effective removal from the point of use and should be recorded.

Superseded records to be available for audit cycle and/or as required by company retention period.

The requirements for control of documented information shall apply to data and information stored or transmitted by electronic computer based systems. Where controlled data and/or relationships are transferred between systems, they shall be verified, and a record of verification shall be maintained.

The following shall be included (but not limited to) in a controlled documentation system (the level of control being identified):

- authorised constituents, see Regulation 8.4.3
- relevant national specifications
- relevant International, European and British Standards
- properties and characteristics of constituents as required for concrete design
- batch weights and strength lists
- cement content of concretes and water/cement ratio lists
- new constituent combinations following revalidations
- alkali, chloride and sulfate limits for concrete
- information on available resources
- adjustments between concretes so that a range of concretes may be included in the control system
- cement contents of prescribed concretes.

Controlled documented information shall be traceable to plants and concrete/constituent references, where appropriate.

The documented information identified in Regulation 7.5.3 Tables 7.1 – 7.8 shall be retained for at least the identified periods or such periods as are defined in any contractual records or company requirements, including any applicable standards and/or specifications.

The term medium term means at least three years after the cessation of use of constituents, or change of personnel in respect of training records, or at least six years in the case of concrete designs.

Documentation relating to contracts ‘not won’ and ‘casual collects’ need not be retained.

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7.5.3 Control of Documented Information - continued

Table 7.1 - Quality Management System		
Documented information	**= 18 Months**	**Medium Term**
Competence criteria		✓
Competence for all personnel directly concerned with the QMS		✓
Complaints, including cause analysis and corrective action		✓
Nonconformity, including cause analysis and corrective actions		✓
Audit outputs		✓
Management review		✓

Table 7.2 - Controlled Documented Information		
Documented information	**= 18 Months**	**Medium Term**
Receipt of controlled documented information by recipient	✓	
Master list(s) of issued control documented information		✓
Lists of recipients of documented information, together with dates of issue and withdrawal **Note:** There is no necessity to retain each individual receipt beyond the date of return of the last receipt providing a record that all receipts have been received is maintained.		✓

Table 7.3 - Order Processing		
Documented information	**= 18 Months**	**Medium Term**
Documented information used in the review of the enquiry and/or the order	✓	
Enquiry documented information		✓
The documented information bearing the result of the review of the enquiry and/or the order		✓
Quotations		✓
Additional information provided in response to enquiries		✓
Orders and associated documented information		✓
Resolution of any anomalies		✓
Batch instructions		✓
Authorisation of issued documented information		✓

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7.5.3 Control of Documented Information - continued

Table 7.4 – Purchasing		
Documented information	**= 18 Months**	**Medium Term**
Evaluation of external providers and supporting documented information	✓	
Data relating to customer supplied product	✓	
Quality requirements for constituents		✓
Authorised constituents' lists		✓
Test data or summary data of constituents		✓
Certificates of Conformity		✓
Documented information of calibrations of in-house test equipment		✓
Re-evaluation and corrective actions		✓

Table 7.5 - Concrete Design		
Documented information	**= 18 Months**	**Medium Term**
Initial testing data including date of trials, details of equipment used, its calibration and personnel responsible		✓
Change control documented information (except master lists)	✓	
Concrete designs and validation		✓
Data to support justification of classification of constituents into demonstrably similar groups		✓
Summaries of concrete design data relating cement content to water, density of fresh concrete, aggregate content		✓
Calculations supporting design of prescribed concretes		✓
Supporting documented information for design of propriety concretes		✓
Data to support cement content to strength relationships		✓
Data for correction factors, e.g. consistence, aggregate size, pumping, use of admixtures, etc		✓
Individual concrete designs and associated batching data		✓

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7.5.3 Control of Documented Information - continued

Table 7.6 - Production and Supply		
Documented information	**= 18 Months**	**Medium Term**
Shipping		
Batching instructions		✓
Daily record of orders (the despatch, programming or shipping sheet) with a clear description of the concrete		✓
Calibration		
Calibrations of plant weighing and measuring equipment	✓	
Equipment Maintenance		
Daily inspection of plant weighing and measuring equipment	✓	
Inspection of silo and aggregate bin dividing walls	✓	
Concrete Production and Material Purchase, Usage and Stocks		
Quantities of constituents used in products other than ready mixed concrete for the purpose of stock reconciliation	✓	
Summaries of constituents used	✓	
Summaries of deliveries to plants of cement, additions and admixtures	✓	
Constituents' delivery tickets, including part load credit notes, for cement, additions and admixtures	✓	
Estimates of actual cement stocks at minimum monthly intervals, additions and admixtures	✓	
An accountable sequence of concrete delivery tickets	✓	
Corrective actions on stock reconciliation discrepancies	✓	
Batching		
Aggregate water contents		✓
Target consistence or consistence class		✓
Time of batching		✓
Traceability to delivery ticket		✓
Any water in the drum before loading		✓
Added water at plant		✓
Fibre content		✓
Documented information of reworking		✓
Documented information of final inspections at the plant		✓
Addition of constituents on site, where applicable in the members procedures		✓
Delivery Ticket		
Copies of delivery tickets signed by a representative of the customer		✓

PART 7 - SUPPORT

7.5.3 Control of Documented Information - continued

Table 7.7 - Control of Concrete		
Documented information	**=18 Months**	**Medium Term**
Control Test Results		
Aggregate loose bulk density		✓
Production Control Systems Analysis		
Data analysis related to production control, see BS EN 206: :2013+A2:2021 Tables 28 and 29		✓
Test rates		✓
Compressive strength control systems		✓
Design margins		✓
Changes in concrete design proportions or constituents		✓
Summary of changes in strength control parameters		✓
Justification of initial cement contents		✓
Yield analysis		✓
Testing of concrete		
Laboratory accreditation (where applicable)		✓
Calibration records		✓
Technician authorisation		✓
Certificates of sampling and testing		✓
Alkali Silica Reaction		
Alkali data for constituents and calculations or confirmation of non-reactivity of the aggregate combination in use		✓
Control of Chlorides		
Chloride data for constituents and calculations		✓
Control of Other Specified Characteristics		
Test results or information		✓

PART 7 - SUPPORT

7.5.3 Control of Documented Information - continued

Table 7.8 – Conformity		
Documented information	**= 18 Months**	**Medium Term**
Compressive strength		✓
Consistence	✓	
Density of fresh concrete	✓	
Temperature of fresh concrete	✓	
Air entrainment		✓
Cement content		✓
Water/cement ratio		✓
Fibre content		✓
Chloride content	✓	
Nonconformity documented information for management review		✓
Test results excluded from the conformity system	✓	

PART 8 - OPERATION

8.1 OPERATIONAL PLANNING AND CONTROL

The member shall plan, implement and control the processes needed to ensure that concrete is supplied having the requirements agreed with the customer. This shall include any outsourced processes.

Verification, validation, monitoring, measurement, inspection and testing activities, shall be set for the following processes:

- order processing
- concrete design
- purchasing including control of constituents
- production control and supply
- calibration
- control of concrete
- conformity

The production of concrete at each plant shall be controlled to provide assurance that the quality, conformity and quantity of all concrete is supplied in accordance with the requirements of these Regulations and with the customer's specification, and/or BS EN 206 and BS 8500-2 and/or the agreed description.

Documented information shall be retained as necessary to provide confidence that the processes have been carried out as planned and to demonstrate the conformity of the concrete.

The outputs of the planning shall be in a form suitable to the member

The member shall control planned changes and review the consequences of any unintended changes, taking action to mitigate any adverse effects.

8.2 ORDER PROCESSING - REQUIREMENTS FOR PRODUCTS AND SERVICES

8.2.1 Customer Communication

8.2.1.1 Exchange of Information

When requested members shall provide the information required in BS EN 206:2013+A2:2021 clause 7 and BS 8500-1:2023 clause 5 and/or any requirements set out within contract documentation.

PART 8 - OPERATION

8.2.1.2 Amendments

Prior to any proposed changes in the constituents, the customer shall be informed where:

- the purchase agreement contains a requirement for the customer to be advised of, or agree to, changes to the source or nature of the constituents, or
- the purchase agreement contains an explicit constituents' approval clause.

Note: It is the responsibility of the customer to define in the purchase contract all necessary properties of constituents as stated in BS EN 206 and BS 8500-1.

Where the provision of information relating to the status of quality assurance of constituents has been specified or agreed with the customer, the member shall inform the customer of any change in status during the period of supply.

8.2.1.3 Complaints

Members shall investigate customer complaints and liaise with the customer accordingly.

The process shall include:

- the resolution of customer complaints
- a Cause Analysis of the reasons for the production of non-conforming product
- corrective action.

8.2.1.4 Customer Property

Members shall communicate and retain records with the customer regarding the handling and controlling of customer property, where appropriate.

8.2.1.5 Contingency Plans

Where relevant, the member shall communicate with the customer the specific requirements for the establishment of contingency plans.

8.2.2 Review of Enquiries - Determining the requirements for products and services

8.2.2.1 Objectives

The objective of this process is the review and interpretation of customers' enquiries, leading to batch instructions.

8.2.2.2 Sub-Processes

Sub-processes shall be established in respect of the following activities:

- review of written enquiries, this shall include:
- statutory and regulatory requirements where applicable
- recording enquiry documents
- reviewing and identifying customer's requirements
- preparation of the offer with identified alternatives
- preparation and issue of the quotation

PART 8 - OPERATION

8.2.2 Review of Enquiries - Determining the requirements for products and services (continued)

- review of verbal enquiries, this shall include:
- statutory and regulatory requirements where applicable
- recording customer details and concrete requirements
- preparation of the offer with identified alternatives
- preparation and issue of the quotation.

8.2.2.3 Personnel

The personnel responsible for the following functions shall be identified:
General:

- order processing system
- specialist technical services.

Specific:

- identifying and allocating resources for:
- an adequate supply of constituents
- delivery vehicles
- interpreting routine enquiries
- interpreting complex enquiries
- authorising the issue of:
- quotations
- additional documented information requested by the customer
- storage and retrievability of documented information.

8.2.2.4 Requirements for Constituents and Concrete

The process of review shall ensure that constituent and concrete requirements quoted and converted into batch instructions are in accordance with these Regulations and are either in accordance with:

- the customer's enquiry, or
- BS EN 206, BS 8500-1 and BS 8500-2

except that the member may offer and seek agreement to supply concrete or constituents which are alternatives to those of BS EN 206, BS 8500-1 and BS 8500-2 or the enquiry.

However, concrete described as Standardized Prescribed concretes or Designated concretes shall conform to all the appropriate requirements of BS EN 206 and BS 8500-2.

Where, in enquiries or orders, concrete is identified by design chemical class, it shall be quoted and supplied in accordance with BS 8500-2:2023 Table 10, or latest technical information.

PART 8 - OPERATION

8.2.2.5 Permitted Constituents

Except in cases restricted by BS EN 206 and BS 8500-2 or by the customer's enquiry or order, the member may use admixtures at its discretion.

Where a specific constituent is agreed with the customer this constituent shall be declared on the delivery ticket.

Coarse crushed concrete aggregates (CCA) and coarse recycled aggregates (RA) may be used in accordance with the requirements of BS 8500-2 except where the customer has excluded their use.

8.2.2.6 Enquiries

A system shall be adopted to:

- provide unique identification of the enquiry

And for written enquiries to:

- provide documented information of what was received
- record the date the documented information was received.

And for verbal enquiries to:

- record details of any concrete specification and any additional information supplied
- record the customer's name, address, site
- record the date documented information was received, from whom and by whom.

8.2.2.7 Review

Personnel competent to prepare quotations and batch instructions shall review enquiries. The documented information bearing the results of the review of the enquiry shall be authorized and monitored.

Any anomalies arising from the review of the customer's requirements shall be resolved with the customer or shall be identified in the quotation.

8.2.2.8 Quotations

Quotations shall contain identification traceable to the enquiry.

Quotations shall identify whether or not a written enquiry was received. In the case of a quotation following a written enquiry, the quotation shall identify the specification received and where this is not a complete document the page numbers or sections received. Where only a list of concretes or descriptions in extracts from bills of quantities is provided the quotation shall identify this information.

PART 8 - OPERATION

8.2.2 Review of Enquiries - Determining the requirements for products and services (continued)

A quotation in response to a verbal enquiry shall identify the document the information provided against which the offer is made and record the name of the individual who provided the documented information.

Where subsequent to the issue of the quotation/offer the customer provides additional documented information relevant to the concrete specification, this shall be reviewed by a technically competent person and included on contractual documentation.

Alternatives to the customer's specifications shall be clearly identified in the quotation provided to the customer. Quotations and any associated documented information shall be reviewed and approved by a competent person.

Quotations shall:

- contain identification traceable to the enquiry.
- identify whether or not a written enquiry was received.
- where required be reviewed by a technically competent person.
- clearly identify alternatives to the customer's specification

A quotation in response to a written enquiry shall identify the specification received and where this is not a complete document the page numbers or sections received. Where only a list of concretes or descriptions in extracts from bills of quantities is provided the quotation shall identify this information.

A quotation in response to a verbal enquiry shall identify and document the information provided against which the offer is made and record the name of the individual who provided the documented information.

Where subsequent to the issue of the quotation/offer the customer provides additional documented information relevant to the concrete specification, this shall be reviewed by a technically competent person and included on contractual documentation.

Quotations and any documented contractual information shall be suitably authorised.

8.2.2.9 Offer of Alternative to Customer's Specification

Where the member has offered to supply:

- alternative concretes
- alternative constituents
- constituents not covered by BS EN 206 and BS 8500-2

such concrete and/or constituents shall only be supplied by agreement with the customer.

PART 8 - OPERATION

8.2.2 Review of Enquiries - Determining the requirements for products and services (continued)

The Confirmation documented information of this agreement shall be retained as documented information either the written purchase order and include:

- what was agreed
- the traceable name of the customer's representative making the agreement
- the traceable name of the Members representative
- the date of the agreement.

The requirement for this documented information is in addition to the agreement provided by the declaration and signature on the delivery ticket.

8.2.3 Review of Orders - Review of the Requirements for Products and Services

8.2.3.1 Objectives

The objective of this process is the review and interpretation of customers' orders, including the resolution of any anomalies, prior to production and supply.

8.2.3.2 Sub-Processes

Sub-processes shall be established in respect of the following activities:

- review of written orders, which shall include:
- recording and cross referencing the order to the original enquiry
- identification of anomalies between order and quotation
- resolution of anomalies and recording customer's authority for changes
- preparation of batch instructions,
- review of verbal orders, which shall include where relevant:
- verifying whether the requested concrete has been quoted
- recording the name of the customer requesting the concrete
- obtaining requirements for non-quoted concretes
- verification of requirements against original specification
- resolution of anomalies between verbal order and specification
- preparation of batch instructions.

8.2.3.3 Personnel

Personnel responsible for the following functions shall be identified:
General:

- order processing system
- specialist technical services.

Specific:

- verifying orders against quotations
- resolving anomalies
- authorising the issue of batch instructions
- storage and retrievability of documented information.

PART 8 - OPERATION

8.2.3.4 Orders

The receipt of an order, including any specification details not received at the enquiry stage, shall be retained as documented information recorded and identified, including the name of the customer requesting the concrete and the order number if applicable. The member shall identify if a quotation/offer exists for the specific concrete requested.

Orders shall be reviewed to identify any anomalies between the quotation/offer and the order.

Anomalies arising from this review shall be resolved with the customer. The outcome of this review shall be retained as documented information recorded together with the name of the customer's representative with whom the anomaly was resolved.

If a quotation/offer for the concrete does not exist, the following information shall be requested, and the outcome recorded:

- the name of the customer and the traceable name of the customer's representative requesting the concrete and the order number if applicable.
- the identity of the concrete including:
- strength class, designation or prescription
- consistence.

Other documented information provided by the customer relevant to the supply of the concrete type shall also be maintained, e.g. exposure class, chloride class, limiting values, consistence retention, minimum cement content, cement type or combination, maximum water/cement ratio, maximum aggregate size, pumped concrete, concrete rheology for specific applications e.g. pumped concrete, restrictions on delivery, such as inclement weather or size of load.

If the request is for an extra concrete type on an existing site, the customer shall be advised that this is an additional concrete and asked to confirm if any specific requirements are applicable.

When all the queries have been resolved, a batch instruction shall be prepared. If there are queries which cannot be resolved immediately, they shall be referred to the appropriate management representative as defined by the member and resolved by them prior to supply of the concrete.

Documented information shall be maintained as evidence of review of orders.

8.2.3.5 Resources

The member shall review its capability, in terms of the availability of both constituents and transport, to supply all orders called off by the customer.

PART 8 - OPERATION

8.2.4 Changes to requirements for products and services

The Member shall ensure that relevant documented information is amended, and that relevant persons are made aware of the changed requirements, when the requirements for products and services are changed.

8.3 CONCRETE DESIGN - DESIGN AND DEVELOPMENT OF PRODUCTS AND SERVICES

8.3.1 General

The member shall establish, implement and maintain a design and development process that is appropriate to ensure the subsequent provision of products and services.

8.3.2 Initial Test Planning - Design and development planning

8.3.2.1. Objective

The objective of this process is the initial testing of concrete in accordance with BS EN 206:2013+A2:2021 Annex A to provide appropriate concrete designs, together with the establishment of relationships between family members.

8.3.2.2 Sub-Processes

Sub-processes shall be established in respect of the activities shown in Figure 1.

8.3.2.3 Personnel

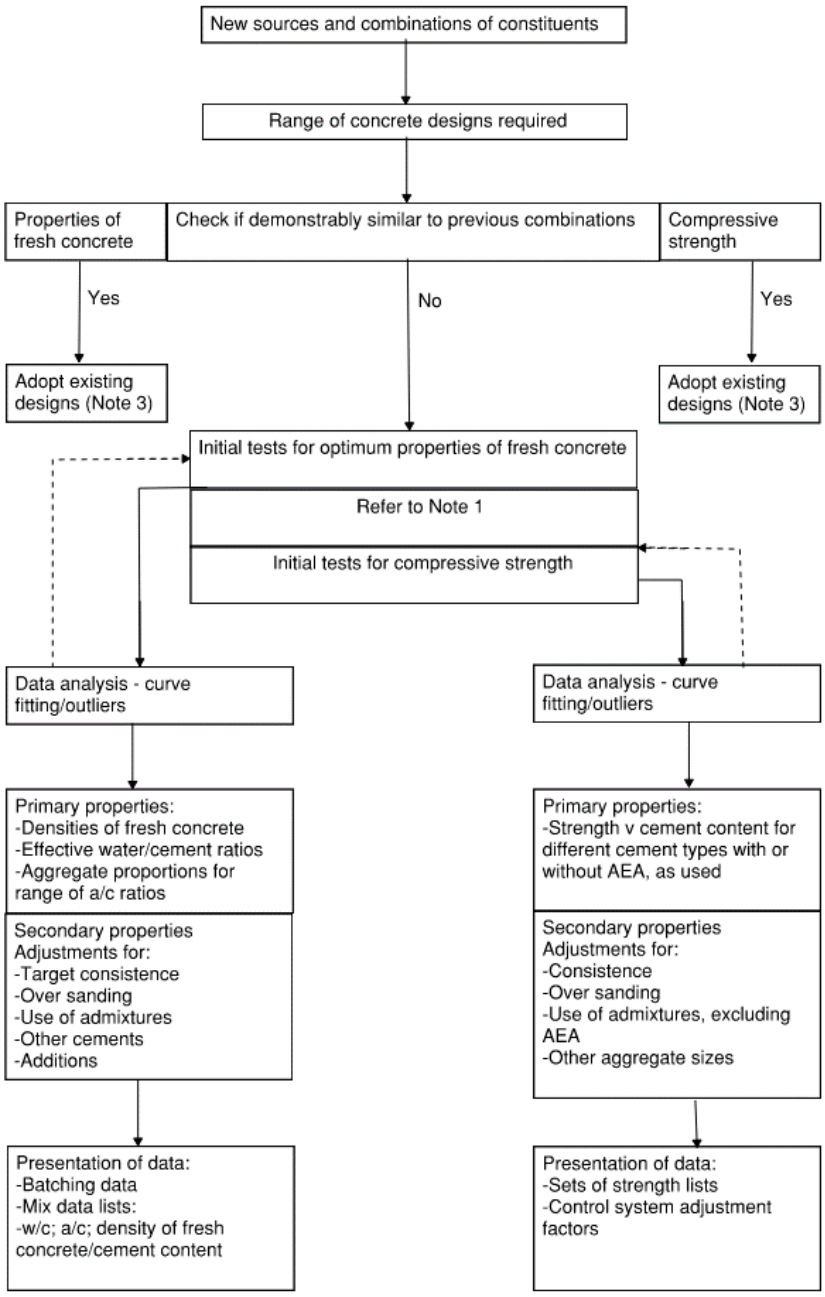
The personnel responsible for the following functions shall be identified:

- initial testing for new constituents and combinations of constituents before use
- assessment of relationships in accordance with BS EN 206
- examining basic data and authorising the preparation of instructions
- reviewing completed instructions to confirm their validity and authorising their issue.

PART 8 - OPERATION

8.3.2 Initial Test Planning - Design and development planning - continued

Figure 1 - Outline of the general process for the initial testing of concrete



Note 1: Where the optimum properties of fresh concrete are assessable from previous experience, the trials for such properties and compressive strength can be combined.
Note 2: Arrowed dotted lines are followed when data analysis indicates inconsistencies in results obtained.
Note 3: Check compressive strength design.
Note 4: Check properties of fresh concrete

PART 8 - OPERATION

8.3.2.4 General

The initial testing process required by these Regulations provides information on both the properties of fresh concrete and the compressive strength of concrete over a wide range of cement contents for all constituents' combinations in use at a plant. A batch can be considered to be the quantity of fresh concrete mixed in one cycle of operations.

The assessment of relationships required by BS EN 206 represents a continual review of the design information in use for both the properties of fresh concrete and the compressive strength of concrete. These concrete designs shall be validated when a nonconformity is identified in:

- the loose bulk density of the aggregate
- the density of concrete
- or other significant change in the concrete or its constituents occurs.

The design principle is based on the establishment of a **Primary Concrete Design Type** from which **Secondary Concrete Designs** are developed.

Initial test requirements for the design process are given in Table 8.3.

For design purposes, aggregates may be combined into **Demonstrably Similar Groups** or **Broadly Similar Groups.**

Where groups of aggregates can be shown to be **Demonstrably Similar,** a common concrete design may be used. The requirements of demonstrably similar aggregates are defined in Table 8.1. The loose bulk density of each aggregate shall be determined at intervals not exceeding 12 months.

Where groups of aggregates can be shown to be **Broadly Similar** as defined in Table 8.2 a common relationship can be used for secondary concrete designs. Initial test requirements for broadly similar aggregates are defined in Table 8.3.

Table 8.1 Requirements for Demonstrably Similar Aggregates

Property/Characteristic	Coarse Aggregate	Fine Aggregate
Particle density	± 0.04 Mg/m^3	± 0.04 Mg/m^3
Loose bulk density	± 0.08 Mg/m^3	± 0.08 Mg/m^3
Los Angeles coefficient value, only applicable for low strength aggregates or high strength concretes	Similar	-
Geological source	* Similar	Similar

* Note This only applies where there is no previous performance data

PART 8 - OPERATION

8.3.2 Initial Test Planning - Design and development planning - continued

Table 8.2 Requirements for Broadly Similar Aggregates		
Property/Characteristic	**Coarse Aggregate**	**Fine Aggregate**
Los Angeles coefficient value, only applicable for low strength aggregates or high strength concretes	Similar	-
Aggregate shape	Similar	-
Aggregate texture	Similar	-
Grading	-	Similar

Computer concrete design simulation systems approved by QSRMC may be used as an alternative to trials. However, for initial designs the data shall be supported by a minimum of three trials covering the lower, middle and upper points of the cement content range. After normalisation of the resulting curve about the middle point, the upper and lower points shall not be more than ± 7.5% or ± 2.5 N/mm^2, whichever is the greater, from the simulated curve.

8.3.2.5 Planning

Members shall operate a process and maintain documented information to ensure that new constituents' combinations are not used in production concrete designs unless and until:

- initial testing in accordance with BS EN 206:2013+A2:2021 Annex A has been carried out; or
- they are shown to be demonstrably similar to existing constituents' combinations

unless otherwise agreed with the customer.

The member shall ensure that the assessment of relationships is in accordance with BS EN 206 and that the personnel responsible for each stage of the initial testing and review of concrete designs have access to the relevant documented information to carry out these processes.

Documented information shall be maintained to demonstrate that the requirements for design and development planning have been met.

PART 8 - OPERATION

8.3.2 Initial Test Planning - Design and development planning – continued

Table 8.3 –Initial Test Requirements		
Design Type	Fresh Concrete Properties	Compressive Strength Properties
	Data Source	Data Source
Primary Design for CEM I, CEM II, CEM III, CEM IV & CEM VI. A	For each **Demonstrably Similar Group**: A minimum of 5 mixes spread across the cement content range with single consistence and density determinations See Note 1	For each **Demonstrably Similar Group**: A minimum of 5 mixes spread across the cement content range with 3 cubes per mix or alternatively see Note 3
CEM I with combinations up to two of the following additions: Fly ash to EN 450-1 GGBS to EN 15167-1 Limestone fines to BS7979 Natural pozzolana to BS 8615-1 & BS 8615-2	For each **Demonstrably Similar Group**: As primary design or same properties as primary can be assumed	For each **Demonstrably Similar Group**: As primary design for cement or combination
CEM II/A-L or LL with one of the following additions or one of the following additions and Limestone fines to BS7979: Fly ash to EN 450-1 GGBS to EN 15167-1 Natural pozzolana to BS 8615-1 & BS 8615-2	For each **Demonstrably Similar Group:** As primary design but a minimum of 5 mixes See Note 2	For each **Demonstrably Similar Group**: As primary design
CEM II/B-V with one of the following additions: GGBS to EN 15167-1 Limestone fines to BS7979	For each **Demonstrably Similar Group:** As primary design but a minimum of 5 mixes See Note 2	For each **Demonstrably Similar Group**: As primary design
CEM III/A with one of the following additions: Fly ash to EN 450-1 Limestone fines to BS7979	For each **Demonstrably Similar Group:** As primary design but a minimum of 5 mixes See Note 2	For each **Demonstrably Similar Group**: As primary design
Air Entrained Concretes	For each **Broadly Similar Group:** As primary design but a minimum of 5 mixes See Note 2	For each **Broadly Similar Group:** As primary design but a minimum of 5 mixes See Note 4
Different Aggregate Sizes	For each **Broadly Similar Group:** As primary design but a minimum of 3 mixes See Notes 2 & 5	For each **Broadly Similar Group:** As primary design but a minimum of 3 mixes See Note 2
Concretes containing WRA	For each **Broadly Similar Group:** To establish water demand and density a minimum of 3 mixes See Note 5	For each **Broadly Similar Group:** As primary design but only 3 mixes or periodically via works data
Over sanded Concrete and Consistence	For each **Broadly Similar Group:** As primary design but a minimum of 2 mixes (normally within the range 250 - 450 kg/m^3)	Strength trial mixes not required. Adjustments to cement content can be via water demands or periodically via works data

PART 8 - OPERATION

8.3.2 Initial Test Planning - Design and development planning – continued

Notes to table 8.3

Note 1: This may be reduced to 3 if concrete design simulation is used to determine intermediate values, see 7.3.1.

Note 2: Density determination is not required if mix is designed as a theoretical extension of the primary mix using the new water demand and in the case of an air entrained concrete the design air content allowing for entrapped air

Note 3: Alternatively works results forming 5 bands spread across the cement content range (at least 16 results per band) the mean strength of the highest band being not less than 5 N/mm^2 below the highest required characteristic strength plus 2 x SD

Note 4: The relationship needs to be established for primary combinations of sources of cement to CEM I, CEM II/A-L(LL), CEM II/B-V & CEM III/A with GGBS, fly ash, natural pozzolana and natural calcined pozzolana, high reactivity natural calcined pozzolana and limestone fines.

Note 5: Where only 3 mixes are called for these will normally be within the range 200-450 kg/m^3

Note 6: When planning the initial test programme consideration should be given to establishing any effects on designs of steel and/or polymer fibres if used.

8.3.3 Initial Test Inputs Design and Development Inputs

8.3.3.1 Design Requirements

Prior to production, the proportions of the concrete(s) constituents shall be established for every plant to cover quality and quantity requirements. The process shall result in the production of concretes which have been evaluated for cohesiveness within the range of the producer's design description.

Data shall be established for the range of constituents and concrete in normal use and shall be reviewed in accordance with BS EN 206

Constituents used in trials shall be obtained from the same source/location as constituents used in production as determined by the tests defined in Regulation 8.4.3. They shall be tested to determine the properties required to demonstrate similarity.

8.3.3.2. Properties of Fresh Concrete

8.3.3.2.1 General Requirements

For each primary concrete design, the properties of fresh concrete shall be determined either from a combination of trial mixes, or an approved computer design simulation programme, carried out across the range of cement contents to be produced. Data shall also be available to identify the effect on the properties of fresh concrete of:

- different aggregate sizes
- different target consistence
- admixtures
- cements and combinations other than those used for the determination of primary relationships.

PART 8 - OPERATION

8.3.3 Initial Test Planning - Design and development planning – continued

Data relating to concrete designs utilising constituents or combinations of constituents outside the normal range of constituents shall be established as required.

Where a concrete design is an extension of, or modification to, an existing concrete design, recognised theoretical procedures may be used for the establishment of other relationships.

8.3.3.2.2 Design Process

Results from initial tests shall be compared with expected values. Any anomalous results shall be evaluated and if rejected, new initial tests carried out where necessary. Documented information on the results of these comparisons shall be maintained.

Values of the density of fresh concrete and effective water content within the range of the initial tests shall be established by interpolations or from 'best fit' curves.

Where relationships are required for individual concretes outside the range of the initial tests, or families covered by initial tests:

- trials shall be carried out on the selected proportions
- determinations of consistence and density shall be conducted for each trial.

For semi-dry concrete the density shall be determined in accordance with BS 1881:Part 129.

For cement bound materials the density shall be determined in accordance with BS EN 13286-2.

Concrete batch weights for concretes may be determined by absolute volume calculations when:

- required by the customer, or
- a required concrete design is an extension, or a minor modification, of an existing concrete design based on, or confirmed by, actual measurements of the density of fresh concrete and effective water content, or
- measurements are made of density and effective water content to confirm the calculated values.

Where the calculation of batch weights is permitted, the air content used in the calculations shall not exceed:

- 1.5% for non-air entrained concrete, or
- the target air content for air entrained concrete.

8.3.3.2.3 Nominal Proportions

Nominal Proportions of concrete, batched by volume, shall conform to BS 8500-1:2023 Annex C Table C2.

PART 8 - OPERATION

8.3.3.2.4 Prescribed Concrete

Where specifications indicate quantities of constituents to produce approximately one cubic metre of concrete then the implied or nominated cement content shall be used and aggregate weights adjusted to yield one cubic metre.

8.3.3.2.5 Standardized Prescribed Concrete

Standardized Prescribed Concrete shall be designed to conform to the requirements of BS 8500-2:2023 clause 9.

8.3.3.2.6 Designed Concretes

Where relationships are used, they shall enable the determination of the constituent proportions for a concrete family including the data to operate a control system for a range of concretes.

The initial test process for the concrete shall result in cement content to strength relationships being established for each family of concrete designs.

Where the concrete design is an extension, or modification, of an existing concrete design, relationships may be established by use of established theoretical procedures.

8.3.3.2.7 Proprietary Concretes

Proprietary concrete shall meet the requirements of BS 8500-2:2015 clause 10. The producer shall substantiate to QSRMC that proprietary concrete satisfies any performance requirements and any limiting values that are specified or declared.

8.3.3.2.8 Primary Relationships

Combinations of aggregates from different sources may be considered to have the same relationship where they can be shown to be demonstrably similar, see Table 8.1.

For each demonstrably similar aggregate type combination a primary relationship shall be available for each of the cement types in use or intended to be in use.

8.3.3.2.9 Relationships for Air Entrained Concrete

Cement content to strength relationships are only required where air entrainment is in use or intended to be in use. For each broadly similar aggregate group the required relationship may be established for any aggregate type combination within the group. A relationship shall be available for each of the cement types identified for primary relationships.

PART 8 - OPERATION

8.3.3.2.10 Compressive Strength - Cement Content to Strength Relationships

Primary and Secondary relationships of cement content to 28 day strength shall be established and reviewed in accordance with the requirements of Regulation 8.3.3.1 and Table 8.3. Cement content to other age strength relationships may be established.

Trial data may be extrapolated in accordance with BS EN 206.

8.3.3.2.11 Family of Relationships

In addition to the primary cement content to strength relationship, a family of relationships shall be established to take account of changes in the performance of the constituents.

Where families are used, the relationship shall be established to take account of changes in performance of constituents. The following assumptions can be made:

- the relationship is considered to diverge on the basis of a constant water/cement ratio for a given strength, but account shall be taken of the actual change in water content arising from the change in cement content; or
- for a target mean strength below 27 N/mm^2 the relationship is considered to converge uniformly to 0 N/mm^2; and
- for a target mean strength of 27 N/mm^2 or above the relationship is considered to be equidistant from the main relationships in respect of the strength axis

Unless an alternative method has been approved.

In developing the relationships, account shall be taken of factors having a limiting effect on strength including bond failure, aggregate failure and the effect of air entrainment.

The system shall ensure that prior to the commencement of the initial test process:

- sufficient constituents or data which are typical of and traceable to the identified sources are available
- all equipment is in a satisfactory state of calibration.

Samples of constituents for use in laboratory trials shall be packed, handled and stored to:

- maintain traceability to source
- maintain the characteristics of the source constituent.

8.3.4 Design and Development Controls

All initial test data shall be subject to review before issue, to ensure that the data are valid and will meet the design criteria.

Initial test data shall be checked and authorised before issue.

PART 8 - OPERATION

8.3.4 Design and Development Controls (continued)

Members shall monitor the output of control systems that cover both fresh and hardened properties of concrete and compare this with the anticipated outcome based upon issued designs and batch data.

Where differences are identified that are outside the member's defined limits, the concrete design shall be subject to review.

Data arising during the validation process shall be compared against the original design data and the conclusion of the comparison shall be recorded and authorised.

Where review shows a significant difference from the original, a new concrete design shall be issued. See Regulation 8.3.2 Table 8.2.

8.3.5 Initial Test Outputs (Design and Development Outputs)

For each constituent combination and range of cement contents in use, data derived from the initial test process shall be provided for:

- batch weights
- effective water/binder ratio
- strength lists, where applicable
- correction adjustments used in the control system

taking account of:

- differing consistencies
- use of admixtures
- aggregate sizes

for the range of cement and combination types.

For all concretes, the constituent batch weights shall be presented clearly in not greater than half cubic metre batch increments up to and not exceeding the capacity of the batching plant. Batch weights shall not require interpolation on weigh scales to less than half a scale division. Where cumulative values are required, they shall be included within the batch data.

The batch data shall state the typical water addition for the target consistence at a stated aggregate water content.

PART 8 - OPERATION

8.3.6 Design and Development Changes

Design changes shall be identified and documented information maintained; all such changes shall be subject to review, verification and validation.

8.4 PURCHASING INCLUDING CONTROL OF CONSTITUENTS - CONTROL OF EXTERNALLY PROVIDED PROCESSES, PRODUCTS AND SERVICES

8.4.1 Purchasing Process - General

8.4.1.1 Objective

The objective of this process is the evaluation of suppliers together with the purchase and control of constituents and services to meet agreed standards.

8.4.1.2 Sub-Processes

Sub-processes shall be established in respect of the following activities:

- review of the purchasing system for constituents
- establishing quality standards
- assessment of suppliers
- constituent purchase documented information
- control of constituents, this shall include:
- constituents' testing
- obtaining manufacturers' data, including assessment of testing facilities
- nonconforming material
- externally provided services
- customer supplied product (where applicable).

8.4.1.3. Personnel

The personnel responsible for the following functions shall be identified:

- establishing quality criteria for constituents and testing
- selecting suppliers on the basis of their ability to meet the criteria
- establishing and maintaining effective control systems for constituents
- ensuring that necessary corrective actions are taken and that they are effective
- storage and retrievability of documented information

The member shall determine and apply criteria for the evaluation, selection, monitoring of performance, and re-evaluation of external providers, based on their ability to provide processes or products and services in accordance with requirements. The member shall retain documented information of these activities and any necessary actions arising from the evaluations.

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8.4.2 Type and Extent of Control

8.4.2.1 Externally Provided Services

Where a member utilises externally provided processes for any aspects of its operations, it remains responsible for ensuring that those operations comply with these Regulations. See in particular Regulation 4.4

The member shall determine the controls to be applied to externally provided processes, products or services when they are intended to be incorporated into the member's own products or services or are supplied direct to the customer.

Where technical services for the purpose of concrete design, testing and the control of the properties of fresh and hardened concrete are externally provided, the personnel and facilities of the external provider shall be subject to assessment by QSRMC to ensure compliance with these Regulations unless the external provider holds appropriate UKAS accreditation.

8.4.2.2 Assessment of Constituents' Suppliers and Testing Facilities

The member shall establish an effective system to ensure that its suppliers have the capability to continue to meet its quality requirements. Where test data provided by suppliers or where tests on constituents are carried out in laboratories not within the member's quality management system, the member shall satisfy itself that the testing capability is adequate.

Note: The required capability may be demonstrated by independent third party certification, by second party audit, by a history of satisfactory performance or by a combination of these activities.

Where there is no evidence of satisfactory performance of the constituents, the member shall establish for each constituent a review process to ensure that all appropriate quality requirements are defined and agreed and advised to the supplier.

Suppliers of constituents shall be required to advise the concrete producer of any changes in status of any third party certification held.

The member shall maintain documented information of its suppliers' ability to meet its quality and testing requirements which shall include as appropriate:

- copies of third party certificates or directories
- records of audits and confirmation of corrective actions
- test data supporting historic performance.

8.4.2.3 Quality Requirements for Constituents

Constituents shall be in accordance with BS EN 206 and BS 8500-2, or as otherwise agreed with the customer. Constituents shall be stored in a manner that minimises the risk of contamination or deterioration.

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8.4.2 Type and Extent of Control - continued

Control systems shall be operated to provide assurance that all constituents purchased for, and used in the production of concrete, conform to the specification agreed with the constituents' supplier and the requirements of these Regulations.

Certificates or test results for all constituents shall be monitored.

8.4.2.4 Additions as part of the Cement Content

Where additions are not used under the k-value concept and the certification of the blend level to BS 8500-2:2023 Annex A as appropriate is not available, the member shall establish systems to provide assurance that the selected blend level for batching combinations will comply with the required blend levels. These systems shall include an analysis of past data and the adoption of conservative values for new sources and combinations.

8.4.2.5 Aggregates

Test data for aggregates shall be monitored to verify that the properties remain similar to those adopted at the time of the initial design of the concrete, and/or as declared by the aggregate producer, to identify significant changes.

8.4.2.5.1 Reclaimed Aggregates, Crushed Concrete Aggregates (CCA) and Recycled Aggregates (RA)

Aggregate recovered from wash water or fresh concrete shall conform to the requirements of BS EN 206:2013+A2:2021 Clause 5.2.3.3 and BS 8500-2.

8.4.2.5.2 Coarse Crushed Concrete Aggregates (CCA) and Recycled Aggregates (RA)

Crushed concrete aggregates and recycled aggregates shall conform to the requirements of BS 8500-2.

Fine CCA and RA shall only be used in concretes assessed on a case by case basis taking in to account the particular source of CCA and RA and to be agreed by the specifier and producer.

8.4.2.6 Recycled Water

Recycled water shall comply with the requirements of BS EN 1008.

8.4.2.7 Testing

8.4.2.7.1 Procedures

All testing procedures for constituents shall conform to the appropriate International, European or British Standard or other specified requirements.

8.4.2.7.2 Equipment

Equipment used for testing all constituents shall conform to the appropriate International, European or British Standard. All equipment shall be maintained in a clean and operational condition and if subject to calibration shall be identified.

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8.4.2.7.3 Aggregates

Tests on aggregates shall be carried out no less frequently than the rates set out in BS EN 12620. Tests in respect of other properties shall be carried out at the rate agreed with the customer.

The composition of crushed concrete aggregates or recycled aggregates shall be determined monthly.

8.4.2.7.4 Water

Non-potable, non-mains, or recycled water shall be tested in accordance with BS EN 1008 at least once a year.

8.4.2.8 Inspection and Test Status

Constituents shall be deemed to be conforming unless otherwise identified.

For deliveries during normal working hours the constituent's delivery information shall be verified against the record of approved constituents before discharge at the plant. The member's systems shall define the action to be taken when differences arise.

Where deliveries out of normal working hours occur, supply arrangements shall ensure that the constituent delivered is as authorised, and that cement and additions constituent materials are discharged into the correct silo storage facility.

At least once a day, aggregates shall be inspected visually for quality, abnormalities and correct storage.

Where cements and additions are stored in silos for periods in excess of six months without usage action shall be taken to verify the quality of the material and a record of the verification shall be kept.

8.4.2.9 Control of Nonconforming Constituents

Where valid test data indicate nonconformity with the appropriate quality requirements the constituents' supplier shall be instructed to take corrective action. If nonconformity continues, the quality standard shall be redefined, as appropriate, or the use of the constituent discontinued.

Where the change in the property tested has an effect upon the assumptions of similarity between groups of constituent's immediate action shall be taken to protect the properties of the concrete. When corrective actions by the constituents' supplier are ineffective, the concrete design shall be reviewed and validated if appropriate.

8.4.3 Purchasing Information - Information for External Providers

Note: Within this section the definitions of "supplier, factory, intermediary and dispatching c entre" are set out within BS EN 197-2.

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8.4.3.1 Cements

The Member shall maintain a list of documented information for cements, that are authorised for use. The list shall identify:

- "factory", "distributor" or "importer"
- type
- class and, where required, the sub class and additional characteristics.

Cements shall have certification to the appropriate standard.

Where cement is purchased from a distributer, the member shall ensure that the distributer operates effective measures to maintain the quality of the certified cement in accordance with BS EN 197-2.

The member shall take reasonable action to satisfy itself as to the accuracy of the manufacturer's declaration of mean alkali content.

8.4.3.2 Additions for use as part of the Cement Content

The Member shall maintain a list of documented information for additions, that are authorised for use as part of the cement content. The list shall identify:

- supplier and source
- type
- description for traceability.

Where:

- Fly ash is supplied in accordance with BS EN 450-1
- Limestone fines are supplied in accordance BS 7979
- GGBS is supplied in in accordance BS EN 15167-1
- Natural pozzolana and natural calcined pozzolana is supplied in accordance with BS 8615-1
- high reactivity natural calcined pozzolana is supplied in accordance with BS 8615-2

the lists shall also include "supplier", "factory" and "distribution facility".

Additions such shall be purchased from sources:

- which hold current third party certification incorporating Factory Production Control requirements or
- which hold current third party certification of the quality system to ISO 9001 or
- where conformity of the quality system to ISO 9001 is subject to assessment and routine audit by a Member

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8.4.3 Purchasing Information - Information for External Providers (continued)

Where additions are purchased from an intermediary distributer or importer, the member shall ensure that the intermediary distributer or importer operates effective measures to maintain the quality of the addition in accordance with the above standards. The use of additions shall conform to the requirements of BS 8500-2 or be in accordance with customer agreement.

The tests for blend level certification in accordance with the requirements of Annex B2 of BS 8500-2023 shall be carried out by an organisation either holding third party certification of its quality system to ISO 9001 or which has its laboratory facilities open to third party surveillance under a product certification scheme. Test data shall be obtained or be available from the supplier at monthly intervals in accordance with the relevant material standard.

8.4.3.3. Additions not Used as Part of the Cement Content

The Member shall maintain a list of documented information for additions, not used as part of the cement, that are authorised for use. The list shall identify:

- supplier and source
- type of material
- requirements for conformity to a European or British Standard and/or any other specific quality criteria such as alkali or chloride content and any testing requirements
- description for traceability.

Test data shall be obtained or be available from suppliers at appropriate intervals.

8.4.3.4 Aggregates

The Member shall maintain a list of documented information for aggregates, that are authorised for use. The list shall identify:

- supplier and source
- requirements for conformity to a European or British Standard and/or any other specific quality criteria including any additional testing
- description for traceability.

Test data shall be obtained or be available at the frequency identified in clause 8.4.2.5

8.4.3.5 Admixtures

The Member shall maintain a list of documented information for admixtures, that are authorised for use. The list shall identify:

- supplier
- type
- requirements for conformity to a European Standard and/or any other specific quality criteria including testing
- description for traceability.

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8.4.3 Purchasing Information - Information for External Providers (continued)

Test data shall be obtained or be available from the supplier in respect of the material delivered. This shall provide information on the:

- chloride content
- alkali content.

A certificate stating compliance with the relevant part of BS EN 934 shall be obtained, or be available, where appropriate, for the material delivered.

8.4.3.6 Water

Water shall:

- be mains or potable, or
- where non-potable, non mains or recycled, conform to the requirements set out in BS EN 1008, and where recycled, be controlled in accordance with Regulation 8.5.1.4.2

8.4.3.7 Fibres

The Member shall maintain a list of documented information for fibres, that are authorised for use. The list shall identify:

- supplier
- type – steel, polymer, or other as defined
- requirements for conformity to BS EN 14889-1 (steel fibres), or BS EN 14889-2 (polymer fibres), and/or any other criteria
- description for traceability.

A certificate stating conformity to the relevant part of BS EN 14889 shall be obtained, or be available, where appropriate, for the fibres delivered.

8.4.3.8 Non-constituent external providers

The member shall communicate to all its external providers its requirements for the processes, products or services to be provided. The communication shall include the member's requirements for:

- approval of products and services, including methods, processes and equipment and the release of products and services
- competence, including any required qualifications
- the external provider's interactions with the member
- control and monitoring of the external provider's performance to be applied by the member
- verification or validation activities that the member or its customer, intends to perform at the external provider's premises.

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8.4.3 Purchasing Information - Information for External Providers (continued)

Non-constituent external providers may include:

- IT services
- transportation
- calibration services
- plant maintenance
- accounting services
- Technical services

8.5 PRODUCTION AND SERVICE PROVISION

8.5.1 Control of Production and Service Provision

8.5.1.1 Objective

The objective of this process is the production and supply of concrete in accordance with the customer requirements.

Where a member wishes to produce concrete using a road vehicle designed to batch, mix and deliver concrete with batching of the ingredients by volumetric and/or timed batching from integral pre-loaded containers, the member shall ensure that its procedures additionally comply with the requirements set out within part 11.1 of the Regulations.

8.5.1.2 Sub-Processes

Sub-processes shall be established and personnel responsible identified in respect of the following activities:

- Shipping, this shall include:
- identification of back-up plants
- identification of the concrete being called off
- verifying the ability to meet order requirements
- calling off constituents to meet batching requirements
- selection of constituents and batching codes.
- control of production when temperatures are outside defined limits

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8.5.1 Control of Production and Service Provision - continued

Plant and equipment, this shall include:

- establishing an inspection and maintenance routine
- establishing calibration programmes
- verifying that all identified corrective actions have been taken and that they are effective
- Production process, this shall include:
- receipt of constituents
- inspection, acceptance/rejection, including storage of incoming constituents
- batching and delivery documented information
- plant operators' instructions
- stock control
- truck mixer operators' instructions, including loading, mixing and addition of water on site
- reworking and regrading fresh concrete
- additional requirements for special concrete.

inspection, maintenance and calibration of digital monitoring and measurement systems

8.5.1.3 Production

8.5.1.3.1 Shipping

Members shall ensure that the personnel responsible for shipping have access to adequate and current information to enable them to convert batch instructions into batch codes or batch data. The information shall provide or take account of:

- batching instructions
- approved plant constituents
- cement contents of concrete
- alkali and chloride limits
- sulfate levels for recycled aggregates
- other specified characteristics
- information on available resources to meet contract requirements.

An effective system shall be established to transmit the following information to the plant:

- identification traceable to batch instructions
- customer name and delivery address
- concrete and constituent descriptions for delivery ticket
- quantity
- delivery requirements
- batch codes
- batch data.

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8.5.1.3.2 Stock Control

Members shall establish and maintain a system to demonstrate that stocks of constituents are controlled within defined limits by comparison of purchases against theoretical usage. Visual Estimates of stocks shall be made, and the stock verified on at least a monthly basis. Corrective action shall be taken when the defined limits are exceeded.

8.5.1.3.3 Requirements for Equipment - in addition to those of BS EN 206 and BS 8500-2

Where a process control computer operates a plant, the producer shall establish a password protocol system to ensure that only authorised personnel have access to any menus or sub-menus that control operating characteristics and batching data.

In addition, where a process control computer has the facility for the creation of back up data the producer shall establish a system to restore process control after a malfunction that ensures essential operating characteristics and technical data are current.

Hoppers Silos used for the storage of cements and additions shall have seals fitted between the loading mechanism and weigh hopper or mechanism, which shall not affect the weighing accuracy. The device or mechanism shall be vented to permit the release of air.

Scale displays shall be legible from the operating position.

Weighing devices for cements and additions shall not be used for other materials unless it can be demonstrated that there is no risk of contamination of subsequent production.

Where pump systems are provided to dispense admixtures, these shall incorporate an appropriate no flow-indicating device, which should be tested at regular intervals.

Fully automatic production systems shall be fitted with control equipment to allow the correct operation of the plant to be monitored during weighing and batching. Automatic control systems on batching plants shall not permit batching to commence until all weigh devices have been emptied and/or tared and the scales zeroed.

The weighing hoppers shall be constructed to discharge efficiently and minimise the build-up of constituents. A tare adjustment shall be provided on the weighing mechanism.

Vibrators and other attachments, where fitted, shall not affect the accuracy of weighing.

There shall be sufficient protection of all weigh devices and weighing mechanisms to prevent interference with weighing accuracy, external factors, weather conditions or external build-up of materials.

Back-weigh systems shall be fitted with warning lights to indicate constituent weighing is in progress and to ensure that no further constituents shall be added until the weighing is complete.

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8.5.1 Control of Production and Service Provision - continued

Adequate permanent facilities shall be provided for the application of test loads to the weighing device or system. These facilities shall consist of anchor/suspension points, or trays, or platforms, hangers, or other equipment as required, together with any necessary access facilities such as holes in floors and shall be identified in the written procedure. These facilities shall be identified on the plant.

When the plant weighing system permits the weighing of more than one type of cement and additions in the same device then the system shall be constructed to ensure that the weighing device and discharge screw or other parts of the transfer system are empty when the weighing system has returned to a zero reading or completed the batch.

Continuous weighing systems shall be designed and operated to have an overall accuracy and reliability of weighing at least comparable to that specified for batch weighing systems taking account of the accuracy of the weigh system and operator.

To ensure that the correct constituents are used in concrete, all stored constituents shall be effectively and uniquely identified at each of the key stages between delivery and incorporation into the concrete.

Each control on the batching console or display shall bear a label which identifies its function, and, where it is concerned with the batching of constituents, the type of the constituent.

Where products other than ready mixed concrete are produced at a plant, specific instructions and arrangements shall be in place to ensure that the quality, quantity and the conformity of the concrete are not adversely affected. Instructions should include, but not be limited to; material storage and arrangements for ensuring weighing devices are empty before being used for concrete production.

8.5.1.4 Use of Reclaimed/Recycled Constituents

8.5.1.4.1 General Requirements

Reclaimed and recycled aggregates may be used in the production of concrete in accordance with BS EN 206:2013+A2:2021 clauses 5.2.3.3, 5.2.3.4 and BS 8500-2:2023 clause 4.3.

Water recovered at the plant may be used in the production of concrete in accordance with BS EN 206:2013+A2:2021 clause 5.2.4.

8.5.1.4.2 Use of Recycled Water

Where recycled water is recovered by separation from the solids element of cementitious products, the separation system shall be effective and shall provide recycled water that complies with BS EN 1008.

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8.5.1 Control of Production and Service Provision - continued

Where the system is designed to recycle water with the fines content in excess of 5% by mass of the added water, the system shall be provided with a method of agitation to disperse the fine material.

Where the fines content is likely to exceed 5%, provision shall be made to control the maximum fines content of the recycled water. Examples of suitable systems include:

- a rate of use of recycled water selected to ensure conformity with the upper limit of fines
- continuous or regular monitoring of the fines content
- a device to signal when the upper limit has been reached.

8.5.1.4.3 Control of Contamination - Recycled Water Systems

The discharge into the recycling system of cementitious products which incorporate a retarding admixture, foaming agents, pigments or other deleterious materials shall be recorded and mixing water containing these materials shall not be added at a level which may cause the properties of subsequent batches of concrete to be adversely affected. Measures shall be taken to ensure that:

- accidental spillage of admixtures
- fuel oil
- road de-icing salts
- foaming agents
- other contaminants cannot drain into the mixing water system.

8.5.1.4.4 Plant Operation where Recycled Water Systems are in Operation

The process for handling and measuring recycled water shall prevent the build-up of fine material within the measuring systems or pipe work associated with the measuring system.

8.5.1.4.5 Use of Recycled Constituents - Chemical Drum Wash or Chemical Set Delay Systems

Where a Member uses a chemical drum wash or chemical set delay system a procedure covering its usage shall be produced. The procedure shall include:

- the manufacturer's guidance on the use of the material
- records of dosage and stock.

8.5.1.4.6 Batching Data

The plant operator shall be provided with a clear display of the quantities of constituents to be batched for each concrete batch and with information identifying the display to be selected for each concrete produced. Batch records shall be maintained to demonstrate conformity.

8.5.1.4.7 Batching

Before loading, any water retained in the mixer or truck mixer shall be discharged, or measured water shall be recorded, and due allowance made for this water.

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8.5.2 Identification and Traceability

8.5.2.1 Description of Concretes

Concrete shall be described in documentation by one of the following, as applicable:

- Designated concrete conforming to BS 8500-2, e.g. FND2
- Designed concrete
- Prescribed concrete conforming to BS 8500-2 using masses per cubic metre
- Prescribed concrete conforming to BS 8500-2 using the letter P and the content of the cement or combination in kilograms per cubic metre, e.g. P300
- Prescribed concrete using nominal proportions
- Standardized prescribed concrete to BS 8500-2, e.g. ST3
- Proprietary concrete conforming to BS 8500-2
- Other descriptions as defined in national or recognised specifications
- The description specified by or agreed with the customer of the concrete, but it shall also include a full description in terms of strength or proportions or other additional requirements.

8.5.2.2 Constituents Description

8.5.2.2.1 General

Delivery tickets documentation shall make appropriate reference to constituents of the concrete except in the case of proprietary concretes, where exclusions are permitted, unless otherwise required by the customer and agreed prior to the commencement of the supply. Suitable delivery information that meets the requirements of BS 8500-2 shall accompany all deliveries. Delivery documented information shall include a declaration of conformity to BS 8500-2.

8.5.2.2.2 Cements and Combinations

Abbreviations used to describe cements and combinations shall be those set out in BS 850021:2023 Table 1.

8.5.2.2.3 Admixtures

Admixtures shall be declared by word or code, which clearly identifies its type or name.

8.5.2.2.4 Additions, Including Mineral Fillers and Pigments

Additions shall be declared by word or code, which clearly identifies its type or name. Their use shall conform to BS EN 206 and BS 8500-2.

8.5.2.2.5 Fibres for Concrete

Where fibres are to be incorporated into concrete, they shall be identified by the generic type on delivery information and quotations. Where the type and content of fibres have been specified this shall be identified on delivery information and quotations in accordance with BS EN 206: :2013+A2:2021 clause 7.3.

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8.5.2.3 Traceability

The system of description of constituents shall provide traceability between suppliers' descriptions and those used elsewhere in the quality management system.

The system shall identify and provide traceability between the documented information which have been received and those which have been issued as follows:

- verbal or written enquiry documentation
- review
- quotations and additional documented information provided
- orders
- batching instructions
- delivery information.

8.5.3 Property Belonging to Customers or External Providers

Where constituents are supplied by the customer for incorporation into concrete, the organization shall establish a system to ensure that instructions for the use and disposal of the constituents are provided.

8.5.4 Preservation and Concrete Delivery

The organization shall preserve the outputs during production and service provision to the extent necessary to ensure conformity to requirements.

Delivery of fresh concrete shall be in accordance with BS 8500-2:2023 Annex A clause A.3 Clause 11 and Clause 14.

Concrete and its constituents shall be described on the delivery information in accordance with BS EN 206 Clause 7.3 and BS 8500-2:2023 Annex A clause A.3.

8.5.5 Post-Delivery Activities

The Member shall meet requirements for post-delivery activities associated with its products and services

8.5.6 Control of Changes

The Member shall review and control changes for production or service provision to the extent necessary to ensure continuing conformity with requirements.

The Member shall retain documented information describing the results of review of changes, the person(s) authorizing the change and any necessary actions arising from the review.

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8.6 RELEASE OF PRODUCTS AND SERVICES

8.6.1 Objectives

The objective of this process is to monitor and control the fresh properties, compressive strength and other specified characteristics of ready mixed concrete.

8.6.2 Sub-Processes

Sub-processes shall be established in respect of the following activities:

- control of strength, this shall include:
- concrete families (where used)
- individual concretes
- control of other properties, this shall include:
- consistence, consistence retention testing, temperature, design yield, density and air content of fresh concrete
- laboratory operation and calibration of testing equipment
- minimising the risk of alkali silica reaction
- chlorides.

The sub-processes shall indicate the actions that are to be taken when analysis of test data indicates a change from the expected or target values.

8.6.3 Personnel

The personnel responsible for the following functions shall be identified:

- providing and maintaining adequate testing facilities
- establishing the regimes and monitoring the properties of fresh concrete and compressive strength of concrete
- analysing test data
- taking action when significant changes in concrete characteristics occur
- issuing and authorising instructions.

8.6.4 Testing

Testing shall be carried out in accordance with applicable standards for the specified characteristics of concrete and its constituents.

Where the testing facility does not hold accreditation for conformity with ISO IEC 17025 in respect of the curing of concrete cubes from receipt and the determination of density and compressive strength, QSRMC will apply a system of audit testing of concrete cubes for density and compressive strength.

The moving of concrete specimens or samples shall be based upon the principles of BS EN 12390-2 and shall comply with BS 8500-2:2015+A2:2019 clause 12.2. BS 8500-2:2023 Annex A.2

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8.6.4 Testing- continued

Other procedures may only be adopted where it has been shown that the integrity of the test results is not impaired.

8.6.5 Final Inspection

An authorised signature on a delivery ticket shall identify concrete passing final inspection.

8.6.6 Control of Strength

An effective system shall be adopted for the control of all concrete to be supplied to a specified characteristic strength.

8.6.7 Requirements for the Monitoring and Control of Design Yield / Fresh Concrete Density

An effective system shall be established to assess the design yield / fresh density of concrete either by direct measurement in accordance with BS EN 12350-6 or from the density of hardened cubes (water displacement method) in accordance with BS EN 12390-7.

8.6.8 Requirements for Digital Monitoring other Specified Characteristics

Where characteristics other than those previously referred to are specified, systems shall be adopted to monitor such characteristics. Specified consistence retention testing shall be in accordance with BS 8500-1:2023 Annex B.8. Digital monitoring and measurement shall be carried out in accordance with BS 8500-1:2023 Annex A.10.3.

Digital monitoring of additional properties including strength and temperature may be used to supplement factory production control data, but not for conformity purposes, and may not to be considered a substitute for accredited third-party product conformity certification. It may be used to supplement factory production control on a case by case basis with agreement between specifier and producer.

If product conformity is assessed by such a method, this will be outside the scope of both current conformity Standards and these Regulations, and the specifier or end user shall be advised.

8.6.9 Requirements for Product Conformity

8.6.9.1 General

Producers shall establish and operate production control in accordance with BS EN 206 clause 9 to ensure that any specified characteristics of the concrete satisfy the conformity criteria as set out within BS EN 206:2013+A2:2021 clause 8 and BS 8500-2 clause 12 Annex A.4

Procedures shall document the actions to be taken whenever nonconformity is identified including communicating the outcome to the customer.

The selection of concrete for testing shall be across the range of production, output, geographic location of purchaser’s sites, weather conditions and availability of resources.

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8.6.9 Requirements for Product Conformity - continued

All test results shall be recorded and shall be used for product conformity evaluation, except that where the test results:

- arise from samples taken specifically for:
- the resolution of problems arising from production control
- product development
- the fulfilment of special agreements made with customers
- introduce statistical bias or high levels of autocorrelation, these shall be separately identified and may be excluded. Justification for excluding such results from the conformity system shall be recorded.

Results obtained from a third party or from identity testing may be used for the evaluation of conformity. Management shall review records of nonconformity.

8.6.9.2 Consistence and additional properties of SCC

Conformity shall be assessed on individual results. If the measured value is within the maximum allowed deviation given in BS EN 206:2013+A2:2021 Table 21, the result meets the conformity criteria.

Where a result fails to meet the conformity requirements the circumstances shall be recorded, and this shall be communicated to the customer in accordance with documented procedures.

8.6.9.3 Air Content of Air Entrained Concrete

Conformity shall be assessed on individual test results. If the measured value is within the maximum allowed deviation given in BS EN 206:2013+A2:2021 Table 21, the result meets the conformity criteria. If appropriate the test may be carried out on a spot sample.

Where a result fails to meet the conformity criteria the circumstances shall be recorded, and this shall be communicated to the customer in accordance with documented procedures.

8.6.9.4 Density of Heavy-Weight Concrete and Density of Lightweight Concrete

Conformity shall be assessed on individual test results. If the value is within the maximum allowed deviation given in BS EN 206:2013+A2:2021 Table 22, the result meets the conformity criteria.

Where a result fails to meet the conformity requirements the circumstances shall be recorded, and this shall be communicated to the customer in accordance with documented procedures.

8.6.9.5 Chloride Content of Concrete

The chloride content of each concrete shall be calculated in accordance with BS EN 206:2013+A2:2021 clause 5.2.8 and BS 8500-2:2023 clause 5.2.

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Whenever an increase in the chloride content of any concrete constituents occurs, the chloride content of the concrete shall be recalculated or the limiting cement content for the chloride class shall be determined.

Where a result fails to meet the conformity requirements of the specified chloride content class the circumstances shall be recorded, and it shall be communicated to the customer in accordance with documented procedures.

8.6.9.6 Fibre Content of Concrete

The determination of steel or polymer fibre content of batched concrete shall be carried out at the frequency given in BS EN 206:2013+A2:2021 Table 22 for designed concrete and clause 8.3 for prescribed and standardized prescribed concretes.

Conformity shall be assessed on individual results. If the value is within the maximum allowed deviation given in BS EN 206:2013+A2:2021 Table 22 for designed concrete and clause 8.3 for prescribed and standardized prescribed concretes, the result meets the conformity criteria.

Where a result fails to meet the conformity requirements the circumstances shall be recorded, and it shall be communicated to the customer in accordance with documented procedures.

8.6.9.7 Cement Content, Water/Cement Ratio

The determination of cement content and water/cement ratio of batched concrete shall be carried out at the frequency given in BS EN 206:2013+A2:2021 Table 22 for designed and designated concrete and clause 8.3 for prescribed and standardized prescribed concretes.

Conformity shall be assessed on individual results. If the value is within the maximum allowed deviation given in BS EN 206:2013+A2:2021 Table 22 for designed and designated concrete and clause 8.3 for prescribed and standardized prescribed concretes, the result meets the conformity criteria. Where a result fails to meet the conformity criteria the circumstances shall be recorded, and this shall be communicated to the customer in accordance with documented procedures

8.6.9.8 Compressive Strength

In adopting the family concept to the establishment of conformity of compressive strength, producers shall establish and maintain valid concrete mix adjustment factors. Where producers have little experience of using the family concept the members of the family shall normally be restricted to those set out in BS EN 206:2013+A2:2021 Annex K. Producers shall maintain a list of concretes that are treated as individual concretes for conformity.

In judging conformity during continuous production conditions, the producer shall define the conformity criteria to be used in accordance with Method B or Method C described in BS EN 2062013+A2:2021 clause 8.2.1 (3.2) as amended by BS 8500-2:2023 Annex A.4.2. Uniform conditions of production may be assumed. Where nonconformity over an assessment period is detected, the validity of this assumption shall be verified.

PART 8 - OPERATION

8.6.9 Requirements for Product Conformity - continued

In establishing whether uniform conditions of production apply to a given conformity period, the producer shall consider all relevant factors. These could include, but are not necessarily restricted to, changes in:

- plant performance
- plant operation
- constituents
- calibration.

The minimum rate of sampling shall be assessed on a weekly basis. Where the minimum rate of sampling is not achieved the target number of test results for the following week shall be increased to incorporate the shortfall. The standard deviation shall be verified in accordance with BS EN 206:2013+A2:2021 clause 8.2.1.3.2 (8).

The process of evaluating strength conformity in accordance with Method B shall be completed within a four-week/monthly period from when the last result for the conformity period becomes available and shall include appropriate documented information to support conclusions and actions taken.

The process of evaluating strength conformity in accordance with Method C shall be continuous and documented information of analysis shall be maintained in order that continuous conformity evaluation can be demonstrated.

Where nonconformity is identified the circumstances shall be recorded, and it shall be communicated to the customer in accordance with documented processes.

8.7 CONTROL OF NONCONFORMING CONCRETE - OUTPUTS

The producer shall ensure that concrete which does not conform to requirements obvious at or before delivery is identified and controlled to prevent its unintended use or delivery.

When nonconforming concrete is corrected it shall be subject to verification to demonstrate conformity to the requirements.

Where at a later stage the concrete is found to be nonconforming, action in accordance with the producer's procedure (see Regulation 8.6.9.1) and BS EN 206:2013+A2:2021 clause 8.4 shall be taken. The member shall ensure that all non-product nonconformities are identified, and appropriate action taken.

Documented information shall be retained that describes the nonconformity, the actions taken, any concessions obtained and identifies the authority deciding the action.

PART 9 - PERFORMANCE EVALUATION

9.1 MONITORING, MEASUREMENT, ANALYSIS AND EVALUATION

9.1.1 General

The member shall plan and implement the monitoring, measurement, analysis and evaluation of processes needed:

- to demonstrate conformity of the product
- to ensure conformity of the quality management system to these Regulations
- to continually improve the effectiveness of the quality management system.

This shall include determination of applicable methods, including statistical techniques and the extent of their use.

The member shall apply suitable methods for monitoring and, where applicable, measurement of the quality management system processes.

These methods shall demonstrate the ability of the processes to achieve planned results.

When planned results are not achieved the cause shall be established; correction and corrective action shall be taken, as appropriate, to ensure conformity.

Note: This could be achieved by monitoring the output from the audit process.

9.1.2 Customer Satisfaction

As one of the measurements of the quality management system, the member shall monitor information relating to customer perception as to whether the member has fulfilled customer requirements. The methods for obtaining and using this information shall be determined.

Note: This could be achieved by:

- customer satisfaction surveys / questionnaires
- feedback on product quality
- user opinion surveys
- an analysis of lost business
- an appropriate analysis of customer complaints

9.1.3 Analysis and Evaluation

The member shall determine, collect and analyse appropriate data to demonstrate the suitability and effectiveness of the quality management system and to evaluate where continual improvement of the quality management system can be made. This shall include data generated as a result of monitoring and measurement and from other relevant sources.

PART 9 - PERFORMANCE EVALUATION

9.1.3 Analysis and Evaluation – continued

The analysis of the data shall provide information relating to:

- customer satisfaction, see Regulation 9.1.2.
- conformance to product requirements, see Regulation 8.2.2 and 8.6.1
- characteristics and trends of processes and product
- external providers
- concrete family relationships.
- improvements to the quality management system
- effective implementation planned changes
- risks & opportunities

9.2 INTERNAL AUDIT

Audit processes shall be established, and quality objectives set, this shall include:

- the conduct of the audit
- the frequency of monitoring
- the responsibilities for corrective actions.

The member shall audit all the processes of the quality management system annually. Locations and activities shall be audited on a documented risk based approach taking into consideration the importance of the processes concerned.

The member shall undertake internal quality audits to verify whether quality activities comply with planned arrangements and to determine the effectiveness of the quality management system.

Auditors shall, irrespective of being familiar with the activity being audited, act independently on behalf of the top management when carrying out and reporting audits. Auditors shall have received appropriate training and be guided by a structured process.

On completion of an audit the member shall:

- identify and implement corrective action without undue delay
- verify that the corrective actions taken have been effective.

Where audits or routine checks identify a risk of continuing error, corrective action shall be taken. The frequency and intensity of further checks shall be appropriate to the level of risk and the degree of errors found. Documented information shall be maintained of audit outputs.

PART 9 - PERFORMANCE EVALUATION

9.3 MANAGEMENT REVIEW

9.3.1 General

Top management shall review, at least annually, the quality management system established in accordance with these Regulations to ensure the continued suitability, adequacy, effectiveness and its alignment with the strategic direction of the member. The process shall assess opportunities for improvement and the need for any change to the quality management system and resources needed.

9.3.2 Management Review Inputs

In its management review, the member shall take into consideration:

- follow-up actions from earlier management reviews
- changes in external and internal issues that could affect the quality management system
- customer satisfaction and feedback from interested parties, including an analysis of complaints
- the extent to which quality objectives have been met
- process performance and product conformity assessment, including recurring errors
- nonconformities and corrective actions
- trends in monitoring and measuring results
- results of audits
- performance of external providers
- the adequacy of resources
- effectiveness of actions taken to address risks and opportunities, see 6.1
- recommendations for improvement.

9.3.3 Management Review Outputs

Outputs from the management review shall include actions related to:

- opportunities for improvement
- any need for changes the quality management system
- resource needs

The member shall retain documented information as evidence of the result of management reviews.

PART 10 – IMPROVEMENT

10. IMPROVEMENT

10.1 GENERAL

The member shall determine and select opportunities for improvement and implement any necessary actions to meet customer requirements and enhance customer satisfaction. These shall include:

- improving products and services to meet requirements as well as to address future needs and expectations
- correcting, preventing or reducing undesired effects
- improving the performance and effectiveness of the quality management system

10.2 NONCONFORMITY AND CORRECTIVE ACTION

The member shall take action to eliminate the cause of nonconformities in order to prevent recurrence.

Corrective actions shall be appropriate to the effects of the nonconformities encountered.

Where audits or routine checks identify a risk of continuing error, corrective action shall be taken. The frequency and intensity of further checks shall be appropriate to the level of risk and the degree of errors found.

When nonconformity with these Regulations or the customer's specification has occurred, action shall be to a degree appropriate to the magnitude of problems and commensurate with the risks encountered.

The member shall investigate the reason for the production of any nonconforming concrete.

The member shall investigate any customer complaint and liaise with the customer accordingly.

When a control system identifies a significant change in the product characteristics, the Member shall take immediate action to restore the required property of the concrete.

Following each corrective action to restore product quality, member ns shall examine the data and systems to investigate the cause of the occurrence and make any necessary change to the system in order to reduce the risk of a recurrence.

The Member shall maintain documented information as evidence of the nature of all nonconformities and any subsequent actions and the results of any corrective action

PART 10 – IMPROVEMENT

10.3 CONTINUAL IMPROVEMENT

The member shall continually improve the suitability, adequacy and effectiveness of the quality management system through the use of:

- the quality policy
- quality objectives
- audit results
- analysis of data
- corrective actions
- management review.

PART 11 – SUPPLEMENTARY REGULATIONS

11.1 MOBILE BATCHING VEHICLE (MBV's) - ROAD VEHICLES DESIGNED TO BATCH, MIX AND DELIVER CONCRETE WITH BATCHING OF THE CONSTITUENTS BY VOLUMETRIC AND/OR TIMED BATCHING.

11.1.1 Introduction

These Supplementary Regulations set out the additional requirements that apply to a member producing concrete using an "MBV" and the vehicle itself.

Members shall ensure that their quality system extends to all aspects of concrete produced by such vehicles.

11.1.2 Competence and Awareness

Operators shall be trained in all relevant aspects of the member 's process control system applying to mobile concrete batching vehicles., See also Regulation 7.2

11.1.3 Constituents

Constituents shall conform to the Regulations, and relevant standards, and shall be loaded into the vehicle's storage hoppers in such a manner to prevent overspill and any contamination.
See also Regulations 8.4.1 to 8.4.3

11.1.4 Concrete

Concrete shall be supplied having the description, quality and in the quantity agreed with the customer. For each truck the producer shall define the minimum quantity of concrete that can be produced and delivered; this shall reflect the operational characteristics of the truck as established and justified by the calibration process; however, this shall not be less than $0.2m^3$.

11.1.5 Design

All concretes produced shall be supported by an appropriate batch instruction that is traceable to an appropriate concrete design.

In preparing batch instructions due allowance shall be taken of the effect of the aggregates' water content.

Where the production, control, testing and/or conformity process indicate an anomaly, the concrete design shall be validated and if required revised batch instructions issued.
See also Regulations 8.3.2 to 8.3.6

11.1.6 Plant and Equipment -

See also Regulations 8.5.1 to 8.5.2

The recommendations of the equipment manufacturer in the operation of the equipment shall be followed.

Constituent materials storage compartments shall be identified with their content.

PART 11 – SUPPLEMENTARY REGULATIONS

11.1.6 Plant and Equipment (Continued)

The quantity below which constituent materials within a given storage compartment should not fall shall be identified and defined within work instructions, see also calibration section.

Devices such as counters, calibrated gate openings and/or flow meters shall be available for controlling and determining the quantities of the ingredients discharged.

The equipment shall include a water-measuring device and a measuring device for admixtures, if used. Such equipment shall be capable of measuring the quantity actually added to each delivery and so arranged that the measurement will not be affected by variable pressures in the supply line.

All indicating devices that affect the accuracy of proportioning and mixing shall be designed and installed to minimise the effects of parallax and be in full view and legible to the operator, and customer (if so requested), while concrete is being produced.

Mechanisms fitted to drive the mechanical feed system such as discharge belt feeds or screws shall operate in such a manner to prevent slippage.

Facilities shall be provided to enable the operator to visually assess constituent flow to the mixing screw during production.

Note: Ideally each unit should be fitted with a metal plate, which is clearly marked with the gross volume of the unit in terms of mixed concrete and discharge speed, where appropriate this should reflect high and low range cement flow.

Maintenance and inspection procedures shall be established to ensure that discharge, measuring and mixing equipment work effectively. This shall be monitored and assessed during the regular calibration procedures. Following repair or replacement of equipment associated with the delivery and/or hydraulic drive systems calibration checks shall be made to establish the trucks operational characteristics.

Particular attention shall be paid to gate devices fitted to control aggregate discharge to ensure that any wear does not adversely affect accuracy. Gates shall always be set from a lower value to ensure that any mechanism slack is taken up in the same way for each batch. In addition, such gates shall have uniform movement and once set, sufficient restraint to ensure that they will not move significantly during discharge, to minimise any variation. When fully closed the gate shall not permit any aggregate to discharge with the setting dial pointer returned to zero.

Any build up that could affect the discharge/mixing process shall be removed.

Appropriate maintenance and inspection records shall be maintained for each vehicle.

PART 11 – SUPPLEMENTARY REGULATIONS

11.1.6 Plant and Equipment (Continued)

Note: Members should assess any potential safety risks that MBV's could represent to the operator and customer, particularly during mixing/discharge operations, and equip them with suitable safety devices.

11.1.7 Calibration

Members shall document a calibration system covering all the measuring equipment fitted.

The operational characteristics of each vehicle shall be established by an appropriate initial calibration methodology, for EACH proposed materials package, to enable comparisons to be made with subsequent calibration outputs. The calibration procedure shall cover each constituent and take into account all the errors of observation, sampling and measurement. All checks shall be carried out at the normal engine operating speed for the production mode; this speed shall be recorded.

The initial calibration procedure shall define the quantity of cement and aggregate to be discharged and subsequently weighed to establish the relationship between mass and volume, due consideration being taken of the fine aggregate's water content. It shall cover cement, fine aggregate, coarse aggregate, water and where used admixture(s), and be carried out with all hoppers and containers filled to the normal operating level for the particular vehicle.

The process shall determine the point at which the constituents' levels in the bins and hoppers reach the point at which reliable accuracy CANNOT be assured; this point shall be recorded and incorporated in the associated work instructions and training process.

In the case of aggregate, at least three determinations shall be made at five differing gate settings which cover the full operational range of the unit; extrapolation is not permitted. The measured variation at each gate setting shall not exceed ± 3%. As part of the calibration process the aggregate setting dial pointers shall be checked for return to zero and this fact recorded in the calibration record.

For cement at least three determinations shall be made at five differing event counts. The measured variation at each differing event count shall not exceed ± 3% of the mean.

As consistent delivery of water and admixtures is dependent upon a consistent discharge belt speed, this shall be established by running the belt for a known time and recording the number of belt revolutions. At least three checks shall be made to ensure that a reliable value is established. This relationship shall be confirmed at each routine calibration.

PART 11 – SUPPLEMENTARY REGULATIONS

11.1.7 Calibration - continued

The quantities of constituents used shall be consistent with the resolution of the counting device relative to one revolution of the drive shaft connected to the delivery system, together with the weighing equipment used as part of the calibration process but shall not be less than 25kg for cement and 50kg for fine or coarse aggregate.

Subsequent routine calibrations shall be monthly until such time that a lower frequency of calibration can be justified, although calibration periods shall not exceed three months.

When carrying out routine calibrations not less than three individual determinations shall be made for each constituent at a single gate setting and event count, representing typical production cement contents, to confirm that the operational characteristics have not changed significantly. If the mean of the measured results varies by more than ± 3% for a given feeder(s), from that expected from the initial calibration process, indicating a change in the operational characteristics of the truck, the full initial calibration process for the feeder(s) shall be repeated to establish revised operational characteristics.

If an aggregate setting pointer fails to return to zero when the discharge gate is fully closed, the pointer/indicator must be reset, and a full initial calibration carried out on the affected aggregate feeder.

Justification for reducing the calibration frequency would be the output of at least three months calibrations consistently demonstrating less than ± 3% variation from expected values for all the feeders.

Calibrations shall be carried out with all hoppers and containers commencing from a full condition and full records of each calibration check shall be made.

11.1.8 Production Control

Members shall establish an appropriate system of process control. See also Regulation 8.5.1

11.1.9 Conformity Control

Members shall define and operate appropriate conformity systems as required by BS EN 206 covering each truck. See also Regulation 8.6.

11.1.10 Stock Control

Members shall operate an effective stock control system to monitor the validity o concrete designs, batch instructions and the accuracy of the batching process. Permitted variance limits shall be defined and where these are exceeded this shall be investigated and the outcome recorded together with any corrective action. Where the stock control process covers more than one MBV any investigation shall ensure that each and every MBV is examined.

See also Regulation 8.5.1 (3.2)

PART 11 – SUPPLEMENTARY REGULATIONS

11.1.11 Delivery Tickets

A suitable delivery ticket that shows documented information shall meet the requirements of BS 8500-2 shall accompany all deliveries.

Copies shall be maintained in the member's documented information system. See also Regulation 8.5.4

11.1.12 Audit

The quality and process control system applying to the use of these vehicles shall be subject to annual internal audit carried out by the producer; the process shall include specific audits of operator competence. All audit outcomes shall be monitored and reviewed by management.

Where corrective action is identified this shall be completed in a timely manner, with consideration given to preventive action to avoid recurrence.

Records of the audit process shall be maintained, See also Regulation 9.2.

PART 11 – SUPPLEMENTARY REGULATIONS

11.2 ALTERNATIVE BINDER SYSTEM CONCRETE

Shall be supplied in accordance with the customer's enquiry, as Regulations 8.2.2.4 & 8.2.2.9, with constituent and concrete requirements converted into batch instructions.

11.2.1 General

Lower carbon concrete containing Alternative Binder Systems (ABS) should be specified following the principals of EN 206 and BS 8500-1, as a designed concrete with a minimum of compressive strength class, exposure class and a target value for consistence. Requirements for maximum aggregate size, chloride class and target density may also be specified.

In addition to achieving the basic performance requirements, ABS concrete should demonstrate acceptable performance with respect to the range of fresh and hardened properties required by these Regulations, EN 206 and BS 8500 parts 1 & 2. These requirements should be agreed between the producer and the specifier.

Alternative binder system concrete should demonstrate acceptable performance with respect to the range of fresh and hardened properties required by these Regulations, EN 206 and BS 8500 parts 1& 2.

Note: *adequate performance of ABS concrete may be established using BSI Flex 350.*

11.2.2 Purchasing

The Member shall maintain a list of documented information detailing the constituents to be used in alternative binder system concrete. The supplier/manufacturer shall supply test data for mechanical and physical properties of ABS for use in concrete.

11.2.3 Compressive strength class

When determined statistically from compressive strength tests in accordance with EN 12350-3 and a method conforming to BS 8500-2, the characteristic strength (f_{ck}) shall be measured at 28 days or 56 days as appropriate.

11.2.4 Consistence

Target values for consistence at delivery shall be established via trials and include tolerances allowed in EN 206:2013+A2:2021 Table 23. The appropriate consistence class shall be determined after establishing a target value. Consistence retention may be specified and shall be assessed following the procedure in BS 8500-1:2023, B.8.

11.2.5. Supply of Alternative Binder Concretes

Producers of alternative binder system concretes should comply with the requirements of these Regulations, EN 206 and BS 8500-2 with respect to production, transport, delivery, quality control and conformity.

PART 11 – SUPPLEMENTARY REGULATIONS

***Note**: Where these Regulations, EN 206 and BS 8500 make reference to cement and additions in the context of production requirements, it can be taken that these apply to alternative binder system concretes.*

11.2.6 Plant and equipment

Preblended activator powders and other constituent materials for alternative binder system concretes should be discharged in a similar manner to BS EN 197 cements.

Dispensing equipment should be capable of consistently measuring the volume or weight of activators to be added to the concrete with an accuracy conforming to these Regulations and BS 8500-2.

A cleaning system should be in place to ensure that plant and equipment that may have been in contact with CEM I cement powder or concrete is cleaned before batching alternative binder system concretes.

11.2.7 Batching Alternative Binder System Concretes

For one part pre-blended alternative binder system, the water should be added to other components of the concrete as soon as practicable to facilitate a proper mixing similar to the procedure for Portland cement based concrete.

For liquid activators alternative binder system concretes, the liquid activator component should be added to the other components as soon as practicable.

Only specific admixtures confirmed to be compatible with the proposed alternative binder system concrete should be used as their effectiveness may differ from the expected performance for admixtures in Portland cement based cements.

Plant trials should be carried out to confirm that the fresh and hardened concrete properties required are achieved and to determine the technical upper limit for water addition.

PART 11 – SUPPLEMENTARY REGULATIONS

11.3 CONCRETE PRODUCED FOR THE NUCLEAR INDUSTRY - ISO 19443 Quality Management Systems – Specific requirements for the Application of ISO 9001:2015 by Organisation in the Supply Chain of the Nuclear Sector Supplying Products and Services Important to Nuclear safety (ITNS). These clauses supplement those in the main requirements parts 4, 5, 6, 7, 8, 9 & 10. The numbering relates to the main section numbering.

PART 4 CONTEXT AND ORGANISATION

4.1 UNDERSTANDING THE ORGANISATION AND ITS CONTEXT

External and internal issues shall include nuclear safety considerations. The member should consider any risks and the nuclear safety implications of its activities and/or products.

4.4.3 Quality management system and its processes

The member shall maintain documented information that includes a description of how the requirements of this International Standard are met (e.g. quality manual or quality plan).

PART 5 LEADERSHIP

Demonstrating the above leadership and commitment, top management shall ensure that nuclear safety is taken into account in decision making and is not compromised by any decisions taken.

5.1.3 Nuclear safety culture

The member shall ensure an appropriate nuclear safety culture by consideration of:

- leadership and commitment of top and line management to nuclear safety, ensuring awareness by all personnel of nuclear safety and encouraging a questioning attitude, see 5.1 and 7.3,
- a balanced, rigorous and prudent approach to decision making with respect to quality, cost and schedule such that nuclear safety is not compromised, see 5.1,
- transparency in communication, see 7.4,
- the use of suitable documented information, see 7.5,
- reporting of human, technical and organisational issues, see 9.3 and 10.2,
- lessons learned, see 10.1, and
- challenging unsafe acts, behaviours and conditions, see 10.2 and 10.3.

5.2 POLICY

5.2.1 Establishing the quality policy

The member shall ensure the policy:

- includes appropriate nuclear safety considerations
- includes a commitment to ensure that nuclear safety is not compromised by other priorities.

PART 11 – SUPPLEMENTARY REGULATIONS

Note: Members may develop separated policies for quality and safety or an integrated one.

5.3.1 Organisational roles, responsibilities and authorities

Top management shall appoint a member of the member's management who has the organisational independence and authority to manage nuclear safety and quality issues

PART 6 PLANNING

6.1 ACTIONS TO ADDRESS RISKS AND OPPORTUNITIES

6.1.1 Risk Management

The member shall maintain and retain related documented information and should develop a documented risk management method, related to the achievement of applicable requirements. This includes, as appropriate to the member and the product:

- assignment of responsibilities for risk management
- definition of risk criteria (e.g., likelihood, consequences, risk acceptance), which could require use of probabilistic model
- identification, assessment and communication of risks throughout product realization including supply chain
- identification, implementation and management of actions to mitigate risks that exceed the defined risk acceptance criteria
- tolerability of risks remaining after implementation of mitigating actions.

6.1.3 Determination of ITNS items and activities

The member shall:

- break down ITNS products and services into items and activities, and
- determine the items and activities, i.e., those whose potential failure or malfunction may jeopardize the products and/or services safety function(s) specified by the customer in line with Licensee’s safety classification of Systems, Structures and Components.
- The member shall maintain and retain related documented information.

6.1.4 Graded approach to the application of quality requirements

For items and activities, the member shall grade the application of requirements related to quality management, documentation, monitoring and measurement taking account of the:

- requirements for ITNS products or services as specified by the customer,
- complexity of each item or activity, and
- organisational aspects.
- The Member shall maintain and retain related documented information.

Guidance: PD ISO/TR 4450:2020 Quality management systems — Guidance for the application of ISO 19443:2018 clause 6.1.3, Annex B&C - informative

PART 11 – SUPPLEMENTARY REGULATIONS

6.2 QUALITY OBJECTIVES AND PLANNING TO ACHIEVE THEM

Quality objectives should address nuclear safety.

6.3 PLANNING OF CHANGES

Changes to the quality management system shall be managed and communicated to ensure nuclear safety is not compromised.

PART 7 SUPPORT

7.3 AWARENESS

Persons involved in the realization of ITNS products or services shall be trained on the importance of their tasks, including the potential nuclear safety consequences of errors in their activities.

PART 8 OPERATION

8.1.1 Provisions for counterfeit, fraudulent or suspect (CFS) items

The member shall prevent CFS items at all levels of operations including:

- selection of external providers
- specific information to external providers including requirements for control of their sub tier providers,
- control of externally provided processes, products and services, see 8.4.2, and
- monitoring and measurement activities, see 8.5.1.2.

When CFS items are detected, they shall be managed as nonconformities (see 10.2) and relevant parties, including the customer, shall be informed without delay.

PART 9 PERFORMANCE EVALUATION

9.1.3 Analysis and Evaluation

The results of analysis shall also be used to evaluate nuclear safety culture aspects.

9.3.2 Management review inputs

Opportunities shall include lessons learned from nuclear experience.

PART 10 IMPROVEMENT

10.1 GENERAL

The following applies:

- lessons learned from experience
- risk mitigation
- The following can also apply:
- technical advances and research and development

- methods for identifying good practices.
- The member shall provide adequate resources for improvement plans.
- The member shall share with its customer and disseminate to its supply chain organizations relevant learning from experience.

10.2 NONCONFORMITY AND CORRECTIVE ACTION

When nonconformity occurs, including any arising from complaints, the member shall analyse the impact assessment of the nonconformity.

10.3 CONTINUAL IMPROVEMENT

Continual improvement shall encompass nuclear safety culture.

APPENDIX A: DEFINITIONS

For the purpose of these Regulations the definitions given in EN 206, BS 8500-1 and BS 8500-2 together with the following terminology shall apply:

0 Activator
Source of one or more elements in the alkali metals group, and/or magnesium, and/or calcium, and/or other, which when incorporated in aqueous or solid form, induces a reaction, setting and hardening of an ABS.

1 Alkali activated material - AAM
Type of alternative binder system consisting of one or more powders containing both oxides of aluminium and silicon which can be induced to react and harden through the action of an alkali activator.

2 Alternative binder system - ABS
Substance formed by a combination of one or more constituent materials together with chemicals or activators which react to form hardened monolithic material analogous to cement.

3 Alternative Binder System (ABS) Concrete
Substance formed by combining ABS with fine and coarse aggregates and water, with or without the incorporation of admixtures.

4 Authorised
The Approval by an identified person of the adequacy of documented information prior to issue.

5 Back Weigh Systems
Constituent weighing systems where the weigh hoppers remain permanently charged and the required weight is determined by the reduction in weight of the contents of the hopper.

6 Batch Code
The unique code, if used, which can be applied to each concrete contained on the batch instruction, and which identifies a unique set of batch data.

7 Batch Data
The quantities of each constituent in the batch.

8 Batch Instructions
The summary of information from an enquiry presented in a form that identifies constituents and concrete requirements together with any job specific requirements. The batch instruction is the output of the contract review process, i.e. the contract quality plan.

9 Organization
In these Regulations the term ‘member’ is used for QSRMC member companies where ISO 9001 uses ‘organization’ and is synonymous with the term ‘producer’ as defined in EN 206.

APPENDIX A: DEFINITIONS

10 Compliance with EN 206 and BS 8500-2

The requirement within these Regulations to comply with EN 206 and BS 8500-2 shall be limited to the requirements set out in the standards relevant to the definition of constituents and concretes, production requirements and general obligations to meet conformity criteria. Any sections of the standards which specifically require the selection of criteria by the customer, or which are subject to special knowledge not normally within the knowledge of the producer are excluded.

11 Concrete Design

This relates to Initial Testing of Concrete set out within Annex A of EN 206 and is the act of determining the characteristics, in respect of fresh and hardened concrete, of a particular combination of constituents across a range of cement contents in order to be able to provide concrete of the specified characteristics.

12 Contract Quality Plan

The information contained in the 'Batch Instructions' taken together with the general requirements of the system.

13 Customer

See Section28

14 Demonstrably Similar Aggregates

Sets of aggregates that can be interchanged without affecting the properties or design of the concrete as defined in Regulation 8.3.2.4.

15 Digital monitoring and measurement

The real-time measurement and recording of the fresh concrete properties such as temperature, air content and consistence by calibrated systems installed on the delivery vehicle, after the time of loading and before discharge on site.

16 Family Member

A concrete whose relationship to the parent concrete has been verified.

17 Guidance Notes

Notes issued from time to time, after authorisation by the Governing Board, providing advice to Members. The adoption of the procedures described in Guidance Notes is not mandatory.

18 ITNS

Important to nuclear safety

19 Main Relationship

The relationship established between cement content and strength. It will normally be the relationship arising from fitting a curve to data arising from a series of trial concrete mixes.

APPENDIX A: DEFINITIONS

20 Over-sanding
The controlled increase in sand content to improve the characteristics of concrete.

21 Purchaser
See Section 28

22 Quantity (Yield)
The basis of supply shall be the cubic metre of fully compacted fresh concrete determined in accordance with BS EN 12350-6. For lean concrete/cement bound material, full compaction is considered to be compaction to refusal.

Notwithstanding concrete described as 'semi-dry', with a designed consistence less than 10 mm slump, the density of fresh concrete used in the calculation of yield shall be not less than that which would be determined by the method prescribed in BS 1881: Part 129.

23 Reclaimed Washed Aggregates
Natural aggregates recovered from fresh concrete, and which meet the requirements of BS EN 12620.

24 Recycled Aggregates - RA
Aggregate resulting from the reprocessing of inorganic material previously used in construction.

25 Recovered Unbound Aggregates
Natural aggregates recovered from a previous use in an unbound form, and which meet the requirements of BS EN 12620.

26 Regrading
Adjustments made under controlled conditions to a concrete mix, in which the initial proportions are known, to modify its characteristics.

27 Shipping
The function of receiving and agreeing 'call off' details from customers against their order. It includes the allocation of resources to meet the requirement and to provide the batcher with the relevant batch instruction.

28 Specifier/User
In these Regulations the term "customer" is used synonymously with the terms "purchaser", "specifier" and "user" as defined in BS EN 206 and ISO 9000.

APPENDIX B: QUALITY MANAGEMENT SYSTEMS INTERPRETATIONS

In preparing these Regulations to meet the requirements of ISO 9001, QSRMC has recognised that some of the terminology and vocabulary used within the Standard does not represent that used commonly within the ready mixed concrete industry. The following is a list that shall apply and identifies these specific interpretations.

ISO 9001 TERMINOLOGY	QSRMC TERMINOLOGY
Control of Design and Development Changes	Control of Concrete Design Changes
Control of Monitoring and Measuring Devices	Calibration
Control of Nonconforming Product	Control of Nonconforming Concrete
Customer	Specifier/User*
Customer-Related Processes	Order Processing
Design and Development	Concrete Design
Design and Development Inputs	Initial Test Inputs
Design and Development Outputs	Initial Test Outputs
Design and Development Planning	Initial Test Planning
Design and Development Review	Initial Test Review
Design and Development Verification	Design Verification
Determination of Requirements Related to the Product	Review of Enquiries
Monitoring and Measurement of Product	Control of Concrete
Organisation	Member
Preservation of Product	Concrete Delivery
Purchasing	Purchasing including Control of Constituents
Review of Requirements Related to the Product	Review of Orders
Validation of Processes for Production and Service Provision	Validation of Concrete and Service Provision Processes

*** See also Appendix A definition 28**

APPENDIX C: REFERENCES

Standards and Other Reference Documents:

BS EN ISO 9001	Quality management systems – Requirements
BS EN ISO 9000	Quality management systems - Fundamentals and vocabulary
BS EN ISO 19443	Quality Management Systems – Specific requirements for the Application of ISO 9001:2015 by Organisation in the Supply Chain of the Nuclear Sector Supplying Products and Services Important to Nuclear safety (ITNS)
EN 206	Concrete – Specification, performance, production and conformity
BS 8500-1	Concrete – Complementary British Standard to BS EN 206 – Part 1: Method of specifying and guidance for the specifier
BS 8500-2	Concrete – Complementary British Standard to BS EN 206 – Part 2: Specification for constituent materials and concrete
BS EN ISO 17021-1	Conformity assessment – Requirements for bodies providing audit and certification of management systems
BS EN ISO 17025	General requirements for the competence of testing and calibration laboratories
BS EN ISO 17065	Conformity assessment. Requirements for bodies certifying products, processes and services
BS EN 197-1	Cement - Composition, specifications and conformity criteria for common cements
BS EN 197-2	Cement - Conformity evaluation
BS EN 197-5	Portland Composite Cements CEM II/C-M & Composite Cement CEM VI
BS EN 450-1	Fly ash for concrete – Definition, specifications and conformity criteria
BS EN 450-2	Fly ash for concrete – Conformity evaluation
BS EN 934-2	Admixtures for concrete, mortar and grout - Concrete admixtures - Definitions and requirements
BS EN 934-6	Admixtures for concrete, mortar and grout - Sampling, conformity control, evaluation of conformity, marking and labelling

APPENDIX C: REFERENCES

BS EN 1008	Mixing water for concrete – Specification for sampling, testing and assessing the suitability of water, including water recovered from processes in the concrete industry, as mixing water for concrete.
BS EN 12350 series	Testing fresh concrete
BS EN 12390 series	Testing hardened concrete
BS EN 13791	Assessment of in-situ Compressive Strength in structures and precast concrete components
BS EN 12620	Aggregates for concrete
BS EN 13286-2	Unbound and hydraulically bound mixtures. Test methods for laboratory reference density and water content. Proctor compaction.
BS EN 14889-1	Fibres for concrete. Steel fibres. Definitions, specifications and conformity
BS EN 14889-2	Fibres for concrete. Polymer fibres. Definitions, specifications and conformity
BS EN 15167-1	Ground granulated blast furnace slag for use in concrete, mortar and grout - Definitions, specifications and conformity criteria
BS EN 15167-2	Ground granulated blast furnace slag for use in concrete, mortar and grout - Conformity evaluation
BS EN 45501	Specification for metrological aspects of non-automatic weighing instruments
BS 1881-129	Testing concrete - Method for determination of density of partially compacted semi-dry fresh concrete
BS 8615-1	Specification for pozzolanic materials for use with Portland cement – Part 1: Natural pozzolana and natural calcined pozzolana
BS 8615-2	Specification for pozzolanic materials for use with Portland cement – Part 2: High reactivity natural calcined pozzolana

National Highways ‘Manual of Contract Documents for Highway Works, Volume One - Specification for Highway Works’.

All documents referred to are current. Where a date is shown this represents the specific issue of the document upon which the Regulations are based or make specific reference.

Other references are included within BS EN 206, BS 8500-1, BS 8500-2, ISO 9000 and ISO 9001

APPENDIX D: CERTIFICATION AND ADMINISTRATIVE PROCEDURES

CONTENTS

APPENDIX D: CERTIFICATION AND ADMINISTRATIVE PROCEDURES

1 INTRODUCTION

The Quality Scheme for Ready Mixed Concrete (QSRMC) is a Company limited by guarantee. Companies registered by QSRMC as conforming to the Quality and Product Conformity Regulations become the Members of QSRMC.

The following documents set out the rights and obligations of Members of QSRMC:

- the Memorandum and Articles of Association which establish the rights and obligations of the Members of QSRMC
- the Quality and Product Conformity Regulations which set out the technical requirements for the manufacture and supply of ready mixed concrete and detail the requirements for the certification of member s. The Quality and Product Conformity Regulations incorporate the requirements of ISO 9001 and the objectives of BS EN 206, BS 8500-1 and BS 8500-2.

Members are required to comply with the requirements of these documents. The term 'Members' is used within the Memorandum and Articles and these Regulations in place of the ISO9001 term 'Organizations'. These terms shall be regarded as having the same meaning.

These Regulations serve to supplement the Articles of Association of The Quality Scheme for Ready Mixed Concrete but do not modify them. For completeness some parts of these Regulations repeat points covered in the Articles; in any interpretation, the wording of the Articles shall prevail.

QSRMC operates in accordance with the criteria of ISO 17021 (Certification of Management Systems), and ISO 17065 (Product Certification), and the IAF Mandatory Documents associated with these standards and holds accreditation from UKAS. The scope of the accreditation of QSRMC includes the certification of quality management systems for compliance with ISO 9001 and product conformity certification in respect of compliance with the Quality and Product Conformity Regulations. Members are required to use the QSRMC Certification Mark, which incorporates the National Accreditation Mark, on all quotations and delivery documentation.

The QSRMC Regulations are made by and remain under the control of the Governing Board. The constitution and operation of the Board are set out in the Articles of Association. The Governing Board is broadly representative of both ready mixed concrete producers and a range of specifiers and purchasers of concrete with a chairman, who is independent of the ready mixed concrete industry.

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2 GENERAL DEFINITIONS

2.1 Assessment
An in-depth appraisal of a Members's processes at a plant or quality centre against the standards of the Quality and Product Conformity Regulations.

2.2 Assessor
A person appointed by QSRMC to assess plants and quality centres against the standards of the Quality and Product Conformity Regulations.

2.3 Board
The Governing Board for the time being of The Quality Scheme for Ready Mixed Concrete.

2.4 Certificate of Conformity
A certificate issued by QSRMC to an individual plant confirming that it has been certificated for compliance with the Quality and Product Conformity Regulations.

2.5 Certificate of Registration
The certificate issued by QSRMC to a person, firm or organization accepted as a Member of the Scheme.

2.6 Certification
Approval by QSRMC that the plant and operation of the quality systems and product conformity procedures comply with the Quality and Product Conformity Regulations.

2.7 Certification Mark
The QSRMC Mark which Members are licensed to use on delivery tickets, stationery, brochures and advertising media in accordance with the conditions of the Licence.

2.8 Discrepancy
An identified requirement of these Regulations, which has not been met.

2.9 Licensing Agreement
The authority under which Members may use the QSRMC Certification Mark.

2.10 Plant
A plant for the production of ready mixed concrete involving batching and/or mixing.

2.11 Plant Register
The Register of plants for which Certificates of Conformity have been issued, together with locations at which quality related activities are carried out.

APPENDIX D: CERTIFICATION AND ADMINISTRATIVE PROCEDURES

2.12 Quality Activities

Activities undertaken by the member to implement the Quality and Product Conformity Regulations.

2.13 Quality Location

A location where any quality activities of the member are undertaken, for example:

- production plants:
- enquiry and order processing records centres
- laboratories and technical records centres.

2.14 Quality Documentation

A document or documents containing statements of the member's quality management system and procedures to meet the objectives and requirements of the Quality and Product Conformity Regulations.

2.15 Quality Management System

The general system's requirements to provide conformity with ISO 9001.

2.16 Register

The Register of Members of QSRMC.

3 REQUIREMENTS FOR MEMBERSHIP

3.1 Eligibility

Any individual, firm or organization engaged in the manufacture and supply of ready mixed concrete shall be eligible to apply for QSRMC certification.

3.2 Conformity with Regulations

Members shall, at all times, comply with these Regulations and in particular shall:

- install and operate plant and equipment which comply with the Quality and Product Conformity Regulations
- establish and maintain an effective quality management system
- implement and monitor the effectiveness of the system
- ensure that testing of the specified characteristics of concrete and its constituents conform to the principles of ISO 17025. Where curing of concrete cubes from receipt in the testing laboratory, the determination of density and compressive strength of cubes is not accredited by a third party, QSRMC will arrange for audit testing.
- maintain documented information to demonstrate that the required quality has been achieved
- maintain documented information of all written complaints and remedial actions.

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3.3 Member's Representative

Members shall appoint a 'Member's Representative' to represent it in accordance with Article 21 of the QSRMC Articles of Association.

3.4 Applicants who were previously Members

Where an organization, which has previously been a Member of QSRMC, re-applies for membership, the applicant shall, prior to re-election into membership, demonstrate full compliance with the Quality and Product Conformity Regulations for a period of not less than 12 months following the date of re-application.

3.5 Continuing Obligations

Following election to membership, organizations shall continue to comply with the Articles of Association and with these Regulations.

4 APPLICATION FOR MEMBERSHIP

4.1 General

Applicants for membership of QSRMC shall:

- submit a completed Membership Application Form
- register all plants utilised in the manufacture and supply of ready mixed concrete
- submit for assessment appropriate company quality documentation
- submit for assessment all plants and quality locations
- carry out all necessary corrective actions following assessments to demonstrate compliance with the Quality and Product Conformity Regulations
- pay the appropriate fees.

All information regarding applications shall be treated in confidence by QSRMC until a recommendation for certification is made following assessment.

4.2 Application Form

Applicants for membership of QSRMC shall complete the Membership Application Form and submit it together with the organization's quality documentation and the appropriate fees. The application shall include any parent or controlling organization or subsidiary, or controlled organizations engaged in the manufacture and supply of ready mixed concrete, as defined in the Memorandum and Articles of Association.

The completed form shall provide QSRMC with such basic information as title and address of the applicant and experience in the ready mixed concrete industry, name and position of the signatory and the proposed Member's Representative and details of the accreditation status of the applicant's testing facilities.

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In addition, the applicant shall sign a declaration that the organization undertakes to abide by the QSRMC Articles of Association and Regulations thereunder and to maintain the required standards of the Scheme for all its plants and associated quality centres, to notify The Quality Scheme for Ready Mixed Concrete forthwith of any breaches of applicable law or changes to the information given in this application form and/or changes which could affect the company's capability to comply with the certification requirements, including organisational (legal, commercial, company ownership, key management or technical staff), contact or site addresses, scope of certified activities, major system or process changes.

4.3 Registration Form

Applicants shall submit a completed QSRMC Registration Form providing the required details of all the following:

- plants and MBV at which ready mixed concrete is produced
- order processing centres
- technical centres, including locations responsible for the purchase and control of constituents and concrete design and control
- laboratories.

The applicant shall sign a declaration on the Registration Form that the organization shall comply with the Quality and Product and Conformity Regulations and that any discrepancies shall be promptly corrected.

4.4 Application Assessment

On receipt of the Membership Application Form, Registration Form, quality documentation and fees, the application and the quality documentation will be assessed for compliance with the Quality and Product Conformity Regulations.

4.5 Initial Assessment

Following acceptance of the quality documentation each plant and associated quality location shall be assessed for compliance with the Quality and Product Conformity Regulations by an assessment team.

At the completion of the assessment, the Assessor shall report any discrepancies, and obtain the local management's acknowledgement of these, and shall indicate his recommendations for registration and certification which shall be confirmed subsequently in writing.

There are four possible recommendations:

- **Unconditional Acceptance:** When there are no discrepancies. A recommendation for registration and certification will be made.
- **Acceptance with Comment:** When there are only minor discrepancies. A recommendation for registration and certification will be made subject to written confirmation of corrective actions.

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- **Conditional Acceptance:** When there are a number of discrepancies, which must be corrected before a recommendation for registration and certification can be made. This will necessitate a further visit and assessment.
- **Rejection:** When the nature of the discrepancies requires extensive corrective action. A recommendation for Acceptance is not possible and a complete reassessment is required.

4.6 Time Limits

Whereas there are no time limits which apply to the period between the approval of the documented system and the submission of the plants and locations for initial assessment, once a full initial assessment has taken place and a recommendation made for either Acceptance with Comment or Conditional Acceptance then all outstanding items shall be resolved within three months. Failure to meet this time limit will necessitate a further full assessment for which an additional assessment fee will be payable. The initial assessment fee covers the first initial assessment and one revisit within three months to confirm that discrepancies have been corrected. Minor discrepancies may be cleared by written declaration or by submission of evidence.

4.7 Registration and Certification

On the basis of the Assessor's recommendation for Acceptance, the Chief Executive shall submit a report to the Board for its consideration. The report shall be limited to the information contained on the application form plus a statement of the applicant's compliance with the Articles of Association and the Quality and Product Conformity Regulations and shall contain a recommendation for acceptance or rejection of the application for membership.

Before submitting his report to the Board, the Chief Executive shall verify the status of accreditation of the cube testing facilities.

On election to membership of QSRMC by resolution of the Governing Board and when all assessment and other fees have been paid, a Company Registration Certificate (Certificate M) and Certificates of Conformity (Certificate PR) shall be issued.

Details of the Member shall be included in the QSRMC Register and certificated plants listed in the Plant Register.

Where an application for membership is rejected, the applicant shall have the right of representation to an Appeals Committee.

4.8 Certification Mark

On election to membership, the organization shall sign the QSRMC Licensing Agreement and QSRMC shall grant to the organization licence to use the QSRMC Certification Mark.

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5 REGISTRATION, INITIAL ASSESSMENT AND CERTIFICATION OF MEMBERS' PLANT

5.1 Plants to be Registered

All plants operated by Members including those located on a customer's site, shall be registered in accordance with the following timescales:

5.1.1 New and Replacement Plants

The Subsidiary Registration Form and initial assessment fee shall be submitted to QSRMC not later than 21 days before the proposed date of the plant coming into operation. Immediately prior to the QSRMC assessment, the organization shall carry out a full plant audit. The organization shall record any discrepancies noted during the audit and the corrective actions, which it has taken. This record shall be available to the Assessor at the time of the initial assessment.

The assessment shall normally be carried out prior to the plant coming into production. Where the technical data for the constituents' combinations have not been seen at a previous assessment then an assessment of the data shall be required before certification can be confirmed. A copy of the weigh hopper calibration certificates is also required prior to the issue of certification.

Where there are no discrepancies or the organization has provided written assurance of intended corrective action in respect of minor discrepancies and the organization has submitted to QSRMC copies of satisfactory plant calibration certificates, the plant shall be certificated. Where the Certification Manager confirms the Assessor's conclusions that discrepancies are not solely of a minor nature the plant shall not be certificated and shall be reassessed at periods not exceeding six weeks until the plant can be certificated.

Where the plant was assessed prior to witnessed production a further assessment shall be carried out within three months of the date of the plant being certified. If the Member demonstrates via electronic batching records that the plant is producing concrete in accordance with requirements during this time the Certification Manager may accept the records and cancel the three month visit.

5.1.2 Certificated Plants acquired from other QSRMC Registered Members

Where the acquiring organization wishes certification to be continuous across the transfer, QSRMC will confirm the continuity of certification subject to:

- having been advised within one working day after the transfer
- having received the completed Registration Form within 7 working days of acquisition
- satisfactory transfer of appropriate existing, or implementation, of records and systems which provide the necessary assurance of the continuity of product conformity.

If on assessment the documented information and systems do not provide the required assurance of the continuity of product conformity action against the plant certificate shall be taken in accordance with these Regulations.

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5.1.3 Acquired Plants - not previously Certificated

A Registration Form shall be submitted within 14 days of the date of acquisition of the plant. The plant shall be assessed within 28 days of acquisition and shall comply with the Quality and Product Conformity Regulations within three months. A plant, which fails to comply with these Regulations after three months, shall be reassessed at periods not exceeding six weeks until the plant can be certificated.

5.2 Declaration to Comply

Top Management shall sign a declaration on each Registration Form that the organization shall comply with the Quality and Product Conformity Regulations and that any discrepancies shall be promptly corrected.

5.3 Recommendation for Certification

On completion of the assessment, the Assessor shall prepare a report detailing any discrepancies against specified Regulations and shall obtain the local management's acknowledgement of these. The Assessor shall indicate his recommendation for certification, which shall be subject to confirmation by the Certification Manager. There are four possible recommendations:

- **Unconditional Acceptance:** When there are no discrepancies. A recommendation for certification will be made.
- **Acceptance with Comment:** When there are only minor discrepancies. A recommendation for certification will be made subject to written confirmation of corrective actions.
- **Conditional Acceptance:** When there are a number of minor discrepancies or outstanding items, which require correction before a recommendation for certification can be made. This will necessitate a further visit and assessment.
- **Rejection:** When the nature of the discrepancies requires extensive corrective action. A recommendation for Acceptance is not possible and a complete reassessment is required.

5.4 Failure to Comply

The Chief Executive shall report a plant, which has not been submitted for assessment within the specified time or fails to comply with the Quality and Product Conformity Regulations on reassessment, to the Board.

5.5 Closure of Plants

The closure of plants shall be notified within one month of closure.

5.6 Reopening of Plants

The reopening of plants shall be notified within one month of reopening.

5.7 Temporary Closure

Plants, which are closed on a temporary basis, may be retained on the Plant Register for a period not exceeding six months.

APPENDIX D: CERTIFICATION AND ADMINISTRATIVE PROCEDURES

6 ASSESSMENTS AND REPORTING

6.1 Scheme Assessors

QSRMC Assessors who have received formal training, and who have demonstrated their competence in respect of the elements of the system to be assessed, shall carry out assessments. Training shall be in accordance with the QSRMC Training Manual and shall include:

- B.Tec. Higher Qualification or Degree in an appropriate discipline, or equivalent
- a minimum of 5 years relevant construction industry experience
- successful completion of an IRCA certified auditor training course
- attendance at a UKAS assessor training course, if appropriate
- training in ISO 9001, quality management systems requirements including its application to the ready mixed concrete industry
- training in respect of the application of the Quality and Product Conformity Regulations including, order processing, purchase and control of constituents, concrete design, concrete production and control of concrete
- training in additional specialist areas including concrete technology, specifications, statistical techniques and practical training in materials and concrete testing to a standard at least equivalent to the applicable parts of the ICT Concrete Technology and Construction Certificates Stages 2 & 3.

Assessors shall not be permitted to lead a team of assessors or conduct assessments as a one-man team until they have demonstrated their competence through satisfactory evaluation.

6.2 Assessments

Following election to membership of QSRMC, the following routine assessments shall be made in respect of each certificated plant:

- plant and equipment, normally ONCE in every 12 months
- elements of the quality management system together with product conformity requirements, normally TWICE in every 12 months, with all Parts of the Quality and Product Conformity Regulations being covered every 12 months
- testing facilities, normally ONCE in every 12 months
- on a random basis, not exceeding 12 months, assessments shall be made of the knowledge and training of technicians on the procedures adopted for site sampling and testing.

Following assessments which have identified discrepancies from the Quality and Product Conformity Regulations, the Certification Manager may in appropriate situations require the member to supply documented information or may direct that additional assessments be carried out. Where certification is placed Under Review or Suspended reassessment(s) shall be carried out at the stated intervals.

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6.3 Reporting

After each assessment, a report shall be prepared for the Certification Manager with three possible recommendations:

Certification Confirmed:
when the plant and/or its associated quality activities comply with the requirements of the Quality and Product Conformity Regulations, or:

- when there are minor discrepancies, the organization shall give written assurance that these have been corrected, or
- when there is a major or a number of minor discrepancies and a revisit is required within six weeks to confirm that the discrepancies have been corrected.

Certification Under Review:
when there are a number of discrepancies, which may be individually or cumulatively serious, and a further assessment is required to confirm that the discrepancies have been corrected. Pending a satisfactory report from the reassessment the Certification of the Plant shall be held Under Review. Reassessments shall normally be carried out at six weekly intervals, or:

- when there have been continuing discrepancies of a serious nature, or on a limited number of occasions major discrepancies, which could affect the quality or quantity of the concrete produced, and a full reassessment is required to provide the necessary assurance that the system is capable of achieving product conformity. Pending a satisfactory report from the reassessment, the Certification of the Plant shall be held Under Review with a warning of possible Suspension if the discrepancies remain uncorrected. Reassessments shall normally be carried out at six weekly intervals.

Suspension:
when there are major discrepancies, or minor discrepancies which cumulatively equate to a major discrepancy, in either product conformity or the quality management system. Reinstatement of certification shall be subject to full reassessment.

6.4 Access to carry out Assessments

In accordance with the assessment requirements of these Regulations, QSRMC Assessors have the authority to enter any plant or other nominated centre at which documented information required by the Quality and Product Conformity Regulations are maintained or quality activities are carried out. Assessments shall take place, where practicable, in the presence of a member of the organization's management but may be made at any time during normal working hours. In addition, QSRMC may carry out unannounced assessment visits in accordance with ISO 17021.

Where necessary, as part of the assessment of QSRMC by UKAS, subject to the member's reasonable grounds for objection, they shall give access to the assessors of UKAS. Assessors of QSRMC and UKAS shall, at all times, comply with the member's instructions regarding Health and Safety.

APPENDIX D: CERTIFICATION AND ADMINISTRATIVE PROCEDURES

In the event of dispute between a member and QSRMC Assessors, which results in the member seeking to restrict the authority contained in this Regulation, the member shall set out the grounds of its complaint as a matter of urgency. The making of such a complaint shall not release the member from the requirement to comply with the Quality and Product Conformity Regulations.

Where the member maintains or operates in accordance with Rules, Regulations, Procedures, Work Instructions, References or Records, which are additional to the requirements of the Quality, and Product Conformity Regulations these additional elements shall not be subject to assessment.

6.5 Access by Customers

The member shall provide adequate facilities for the inspection of concrete quality systems and production in accordance with these Regulations, BS EN 206, BS 8500-1 and BS 8500-2.

7 CERTIFICATION, USE OF CERTIFICATION MARK AND FEES

7.1 Certificate of Registration

A Certificate of Registration shall be issued annually to a person, firm or organization accepted as a Member of QSRMC.

7.2 Certificate of Conformity

A Certificate of Conformity shall be issued annually for each plant following approval by QSRMC that the plant and its associated quality systems comply with the Quality and Product Conformity Regulations.

7.3 Register of Certificated Plants

The Certification Manager shall maintain the Register of certificated plants.

7.4 Action against Certification

Following reports made to him in respect of the status of plants, subject to any Appeal, the Certification Manager shall, at his discretion:

- refuse to grant a Certificate of Conformity
- suspend a Certificate of Conformity
- withdraw a Certificate of Registration and/or Certificate of Conformity if the certificate
- holder persistently fails to comply with these Regulations or becomes liable to cease to be a Member in accordance with the Articles of Association.

In the event of a Suspension or Withdrawal of certification, the Board shall be entitled to make this public with a news update item on the QSRMC website.

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7.5 Action following Suspension or Withdrawal of Certification

If a Certificate is suspended or withdrawn, the reinstatement of certification shall be subject to a reassessment and confirmation of full compliance with the Quality and Product Conformity Regulations. If the Board has exercised its right to make this public on the QSRMC website the decision to suspend or withdraw the Certificate, the reinstatement shall, at the request of the member also be made public with a news update item on the QSRMC website.

Where, following suspension or withdrawal of a Certificate of Conformity, reinstatement cannot be made because of continued non-compliance with the Quality and Product Conformity Regulations, a report shall be submitted to the Board.

7.6 Licence to use the QSRMC Certification Mark

A Licence to use the QSRMC Certification Mark shall be granted to a person, firm or organization accepted as a Member of QSRMC.

A holder of a QSRMC Licence shall use the Certification Mark on all quotations and delivery tickets in respect of certificated plants and products and may use the Mark on stationery, brochures and advertising media, subject to the conditions set out in the Licence.

The use of the Certification Mark on quotations confirms that the Member holds QSRMC Registration. Where a quotation references a plant, which is to be erected for a specific contract, the quotation shall state that concrete will be supplied 'from a plant which will be certificated by QSRMC'. Where a quotation references a plant, which does not hold a Certificate of Conformity, but in respect of which a Plant Registration Form has been submitted to QSRMC, the statement 'QSRMC certification currently being processed' shall be made.

7.7. Use of Certificates and Certification Mark

A holder of a Certificate or a Licence to use the Certification Mark issued by QSRMC shall:

- not use a Certificate of Registration or Certificate of Conformity or the Certification Mark in any manner to which the Board might reasonably object and shall not make any statement relevant to the authority of the holder in a way which, in the opinion of the Board, may be misleading or bring QSRMC into disrepute
- upon the termination of a Certificate of Registration or Certificate of Conformity, discontinue its use
- following determination of a Licence, howsoever determined, forthwith discontinue use of the Certification Mark
- on ceasing to be a Member of QSRMC return the Certificate of Registration and any Certificates of Conformity and the Licence to use the Certification Mark and shall cease to be entitled to claim QSRMC registration or certification.

If a Certificate of Conformity of a plant is suspended or withdrawn, the member shall cease to be entitled to use the Certification Mark in documentation relating to and/or bearing the address of that plant.

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If a Certificate of Registration of a Member is withdrawn, membership of QSRMC is automatically suspended and the organization shall cease to be entitled to use the Certification Mark or to make any reference to QSRMC certification, registration or membership in any documentation.

7.8 Fees

Applicants shall pay:

- on application, an application fee which shall cover the assessment of manuals and procedures
- prior to initial assessment, a fee for each plant registered which shall cover an initial assessment of all plants, quality centres and non UKAS laboratory facilities. This fee shall include one revisit to clear discrepancies
- on certification, a registration fee, which shall cover the issue of certificates and registration of the plants.

7.9 Assessment Fees

Members shall pay:

- an initial assessment fee for each Certificate of Conformity granted for each plant and associated quality system
- a reassessment fee in the event of reassessment being necessary to confirm compliance with the Quality and Product Conformity Regulations
- an annual renewal fee for assessment, surveillance and administration
- a plant transfer fee in cases where a certificated plant is acquired from another registered organization.

The level of all fees shall be subject to periodic review by the Governing Board.

Where plants are closed on a temporary basis, i.e. a period not exceeding six months, the plant shall be retained on the Plant Register and included in the Directory and a full Annual Renewal Fee shall be paid.

8 INFORMATION ON PLANT STATUS

8.1 Information to the Construction Industry

The Plant Register is provided on the “Directory” tab of the QSRMC website; searchable by location within the UK. This Register is always up to date for plants where the most recent assessment of the plant or elements of the Member’s activities confirmed that the plant complied with the QSRMC Quality and Product Conformity Regulations and any minor discrepancies were under control.

8.2 Information on Request

Upon request the Certification Manager shall provide verbal and/or written confirmation of the status of certification of any plant in accordance with Table 1 of this Appendix.

APPENDIX D: CERTIFICATION AND ADMINISTRATIVE PROCEDURES

9 NOTIFICATIONS OF CHANGES

9.1 General

A Member shall inform the Board immediately of any changes bearing on its compliance with these Regulations or otherwise affecting its registration, or the certification of its plants.

9.2 Review of Regulations

The QSRMC Governing Board shall appoint a Regulations Review Group whose constitution shall be representative of the structure of the Board.

The Group shall be responsible for the conduct of an annual review of these Regulations. Exceptionally, at the direction of the Board, the Group shall consider any immediate action necessary to maintain the integrity of these Regulations.

On completion of the review process the Group shall submit to the Board a report, which shall include, where appropriate, its recommendation for changes to these Regulations.

9.3 Changes to Regulations

The Board shall consider the report of the Review Group and may make changes to these Regulations.

9.4 Notice of Changes to Regulations

QSRMC shall give due notice of any intended changes relating to these Regulations or other matters affecting Members' registration and shall give such time as, in the opinion of the Board, is reasonable to allow Members to carry out any necessary adjustments to their procedures.

Notices of changes to these Regulations shall be sent by email or post to members.

A copy of the current Regulations is freely available from the QSRMC website www.qsrmc.co.uk.

Uncontrolled hard copies of the Regulations are only issued on request.

Any notice or other communication required to be given or sent under these Regulations shall be deemed to be duly given or sent when sent to the Member's Representative and shall be deemed to be given at the documented time of the communication. when the same would have been delivered in the ordinary course of the post.

9.5 Changes to Member's Documented Systems

Members shall submit to QSRMC details of significant changes to their approved quality management systems for confirmation of continuing compliance with these Regulations.

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10 CONFIDENTIALITY OF INFORMATION

All information gained by the Board and its agents in the granting, maintenance and renewal of certification shall be treated as confidential between companies and the Board. Such information shall not be divulged without the express written consent of the Member concerned, subject to any direction by the Courts. Access to confidential information shall be allowed to assessors appointed by UKAS in pursuance of their accreditation functions.

APPENDIX D: CERTIFICATION AND ADMINISTRATIVE PROCEDURES

Table 1 - Information on Certification Status

On enquiry, or following investigation of a complaint, the following information may be made available for each category of certification status.

Plant Not Certificated

- Plant not operated by a QSRMC Member, or
- Plant operated by a QSRMC Member, assessment due on [date], or
- Plant operated by a QSRMC Member, which did not comply on initial assessment, the next assessment due on [date].

Certification Confirmed

- The assessment of the plant or elements of the Member n's activities on [date] confirmed that the plant complied with the QSRMC Quality and Product Conformity Regulations and any minor discrepancies are under control.

Certification Under Review

- The assessment of the plant or elements of the Member's activities on [date] found a number of discrepancies from the QSRMC Quality and Product Conformity Regulations and a further assessment is required to confirm that the discrepancies have been corrected. This assessment is due on [date], or
- The assessment of the plant or elements of the Member's activities on [date] found discrepancies from the QSRMC Quality and Product Conformity Regulations which could affect the quality or quantity of concrete produced. A further full reassessment of the total system is required to confirm that these discrepancies have been corrected. This assessment is due on [date]. The notice placing the Certification Under Review included a formal warning that failure to correct the discrepancies would result in suspension of the Certificate of Conformity.

Certification Suspended

- The assessment of the plant or elements of the Member's activities on [date] found major discrepancies, or minor discrepancies which cumulatively equate to a major discrepancy, from the QSRMC Quality and Product Conformity Regulations concerning the quality or quantity of concrete produced. A further full reassessment to confirm that these discrepancies have been corrected is due on [date].

Certification Withdrawn

- As a result of persistent failure to comply with the QSRMC Quality and Product Conformity Regulations the Certificate of (Conformity/Registration) has been withdrawn, or
- The organization has ceased to be a Member of QSRMC and the Certificates of Registration and Conformity have therefore been withdrawn.