ANALYSIS OF TEST RESULTS

TABLE OF CONTENT

1. PURPOSE

1.1. The guideline is to provide & control mixed designs in accordance with:

1.1.1. Customer requirements for different grades & types of concrete;

1.1.2. Company quality standards & business objectives and

1.1.3. Sarma Requirements.

2. SCOPE

2.1. This procedure covers designing and downloading mixes to plant batch computer systems & manual batching:

2.1.1. A standard set of mixes for each ready mix plant and

2.1.2. Special mixes for specific plants.

3. RESPONSIBILITY AND ACCOUNTABILITY

3.1. The General Manager approves/ authorizes mix designs;

3.2. The Technical Manager is responsible for:

3.2.1. Generating;

3.2.2. Revising and

3.2.3. Issuing mix designs for all plants;

3.3. The Plant Manager is responsible for ensuring that concrete is produced in accordance with current active mix designs for the plant and

3.4. The Batcher is responsible for ensuring that actual masses of raw material batched are within specified tolerance of the mix design masses (*theoretical*) see **QPP03** – releasing loads procedure.

4. DEFINITION AND ABBREVIATION

4.1. **Mix design:** A mix design specifies the proportions of mix constituents to produce concrete of the required fresh & hardened properties, & to comply with other specific requirements. Note that, due to different raw materials at the plant, mix designs are plant-specific;

4.2. **Mix Code:** A code used to identify a mix design. On the Delivery Note this code is accompanied by a description. (***Note:*** *Mix proportions for the same Mix Code at different plants may differ re supply of aggregates with different grading & RDs*);

4.3. **Trial mixes:** Laboratory mixes produced using the same materials, where possible, & under controlled conditions to validate a mix design or develop a mix design for specific requirements

4.4. **Standard mix designs:** A set of mixes available from all plants;

4.5. **Special mix designs:** In response to special requirements or as specified by the customer or in contract documentation/specifications;

4.6. **Batcher:** Staff member in charge of batching concrete and

4.7. **Plant Manager:** Staff member in charge of all activities taking place at a plant.

5. LEGAL & OTHER REQUIREMENTS

5.1. General

ENTRY NUMBER	ENTRY REFERENCE NUMBER	ENTRY DESCRIPTION
5.1.1.		

5.2. Legal Reference

5.2.1. Legal Register.

5.3. Other requirements

5.3.1. SANS 878 & Client Requirements.

6. RECORDS

ENTRY NUMBER	ENTRY REFERENCE NUMBER	LOCATION/ CUSTODIAN	MINIMUM RETENTION TIME	DISPOSAL
6.1.	**QTF01**	Mix designs. – Technical Manager	Electronic	
6.2.	**QMF16**	Approved suppliers list – See **QMP05**		
6.3.	**QPF11**	Batchers Log - See **QPP03**		

7. PROCEDURE

7.1. Generating Mix Designs

7.1.1. **Mix design identification:**

7.1.1.1. Mix designs (*see **QTF01***) are generated on a customized computer system or on spread sheets (*e.g. for manual batching*) AND

7.1.1.2. After approval/ authorization, the mix designs, each identified by a unique Mix Code, are downloaded or imported to the batch computer at the relevant plant, and/or forwarded to the plant.

7.1.2. **Mix design process: Standard Mixes:**

7.1.2.1. For each plant, a set of mix designs is provided for standard Mix Codes against the approved raw materials for that plant (*see **QMF16***).

7.1.2.2. The Technical Manager:

- ☑ Calculates proportions of approved raw materials against W:C ratio;
- ☑ Forwards material costs/m^3 per mix design for each plant to the General Manager and Sales Manager who discuss bin prices, after which the Sales Manager generates a price list (*see **QPP06***);
- ☑ Saves the mix designs for each plant to a dedicated server;
- ☑ Ensures that a designated staff member captures/ imports the mix designs to the batch computer against a new/ existing Mix Code and
- ☑ Forwards the mix designs to the Plant Manager

7.1.2.3. Standard mix designs may be revised when required:

- ☑ In accordance with predetermined parameters. E.g. if cube results from the plant indicate a general downward trend in compressive strength results (*see **QTP02***), binder content may be adjusted to stabilise the trend and avoid potential strength non-conformances.
- ☑ When raw materials change (new product or new supplier).
- ☑ In response to plant or customer requirements or complaints (*see **QMP06***)

7.1.2.4. In response to a global change *(e.g. changes to raw material cos*ts), the revised material costs are forwarded to the General Manager, for pricing as above.

7.1.3. **Mix design process: Special Products:**

7.1.3.1. In response to customer requirements, mix designs not already downloaded are designed on an *ad hoc* basis, using where possible the approved materials for that plant;

7.1.3.2. The process is typically initiated by the Sales Representative, who forwards requirements to the Technical Manager for further discussion, potential laboratory trial mixes and generation of the required mix/mixes as given in 7.1.2 and

7.1.3.3. As soon as a confirmed order is placed on the system for the mix (*see* ***QPP07***), the Orders Clerk contacts the Technical Manager who authorizes download of the mix design and/ or ensures that the plant has the latest version of the new mix.

7.1.4. **Additional raw materials added manually at plant:**

7.1.4.1. Additional raw materials (*e.g. fibres, special admixtures*) may be added manually at the plant (*i.e. not automatically batched by the batch computer*) or on site in response to:

- ☑ Customer requirements as detailed by the Sales Representative on the quotation (*see* ***QPP06***) and
- ☑ Special production instructions detailed by the Technical Manager

7.1.4.2. Materials to be added manually: see **QPP03** and **QPP08**.

7.1.5. **Mix Design Management:**

7.1.5.1. Initiating mix designs for new/moved plant. The **General Manager** requests the Technical Manager to design a set of standard mixes when:

- ☑ A new ready mix plant is commissioned and
- ☑ An existing mobile plant is moved to an alternative site.

7.1.5.2. A soon as raw material test results & specifications for the required grades of concrete have been received, mix designs are generated & saved awaiting commissioning of the plant.

7.1.5.3. Revising existing mix designs. The **Plant Manager** requests changes to mix designs in response to:

- ☑ Revisions required to standard mix designs re additional customer requirements or plant changes and
- ☑ Product non-conformances (*e.g. consistently high/low slumps, low cube strengths*).

7.1.5.4. The **Technical Manager**:

- ☑ Revises the required mixes against the current date;
- ☑ Downloads these to plant;
- ☑ Informs the Plant Manager that the new mix/mixes are in place and
- ☑ E-mails revised mix designs (*e.g. Zip file*) to the Plant Manager

7.1.5.5. The **Plant Manager** ensures that any printed copies of non-current mix designs at the plant are destroyed and

7.1.5.6. Copies of super ceded **QTF01** Mix Designs and test results relating to these are retained by the Technical Manager for reference purposes, e.g. in case of queries, or for future product development.

7.1.6. **Validating Existing Mix Designs:**

7.1.6.1. As required, existing mix designs are validated under laboratory conditions by carrying out trial mixes using the plant materials;

7.1.6.2. The Technical Manager follows up any anomalies, e.g. excessive/ on-conforming strengths, & institutes corrective/ preventive action, e.g. by inspecting relevant potential problem areas at the plant, checking raw materials against the approved materials, or checking the Batchers Logs (**QPF11**).

7.1.6.3. If necessary, based on trial mix results, mix designs are revised.

7.1.7. **Copies of mix designs and/ or test results for customers:**

7.1.7.1. The Sales Representative informs the Technical Manager if a customer requests details of mix proportions, or process control slump/ compressive strength test results (*if available or as per special arrangement*) and

7.1.7.2. The Technical Manager sends the relevant information to the customer. Reports on test results include a standard disclaimer: “These test results relate only to samples tested.”

7.2. Review of Design Changes

7.2.1. The Technical Manager & General Manager review & analyse plant cost of sales.

7.2.2. Results of this analysis are typically input to:

7.2.2.1. Financial reports;

7.2.2.2. Analysis of continuous improvement;

7.2.2.3. Regular production management meetings;

7.2.2.4. Management Review meetings (*see* ***QMP01***) and

7.2.2.5. Trouble-shooting in response to plant/customer complaints (*see* ***QMP06***).

8. APPENDIX & ASSOCIATED DOCUMENTATION

ENTRY NUMBER	ENTRY DESCRIPTION	ENTRY DOCUMENT NUMBER
8.1.	Releasing loads procedure	**QPP03**
8.2.	Management review	**QMP01**
8.3.	Internal quality audits	**QMP02**
8.4.	Approved suppliers	**QMP05**
8.5.	Production	**QPP03**
8.6.	Sales	**QPP06**
8.7.	Delivery	**QPP08**
8.8.	Analysis of test results	**QTP02**
8.9.	Customer complaints and incidents	**QMP06**

NAME		**DESIGNATION**	
SURNAME		**DATE**	
SIGNATURE			