Quality Control in the Brick Industry

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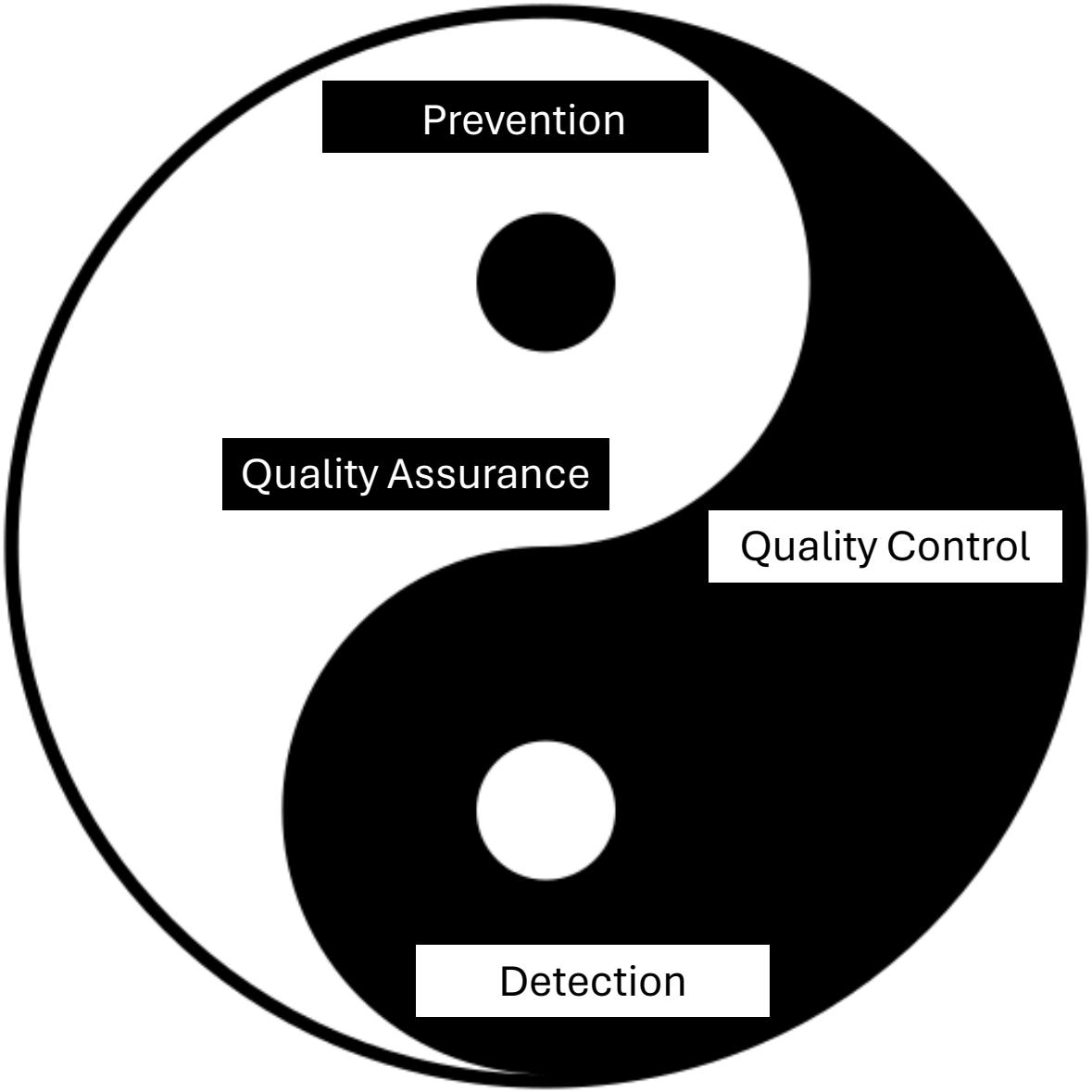
What is Quality Control?

A system of maintaining standards in manufactured products by testing a sample of the output against the specification.

It's a process that helps a company make sure it creates quality products and that staff and management alike make minimal mistakes.


Prevention
Quality Assurance
Quality Control
Detection

The total quality control process consists of:

Plan - It is the stage where the Quality control processes are planned

Do - Use a defined parameter to develop the quality

Check - Stage to verify if the quality of the parameters are met

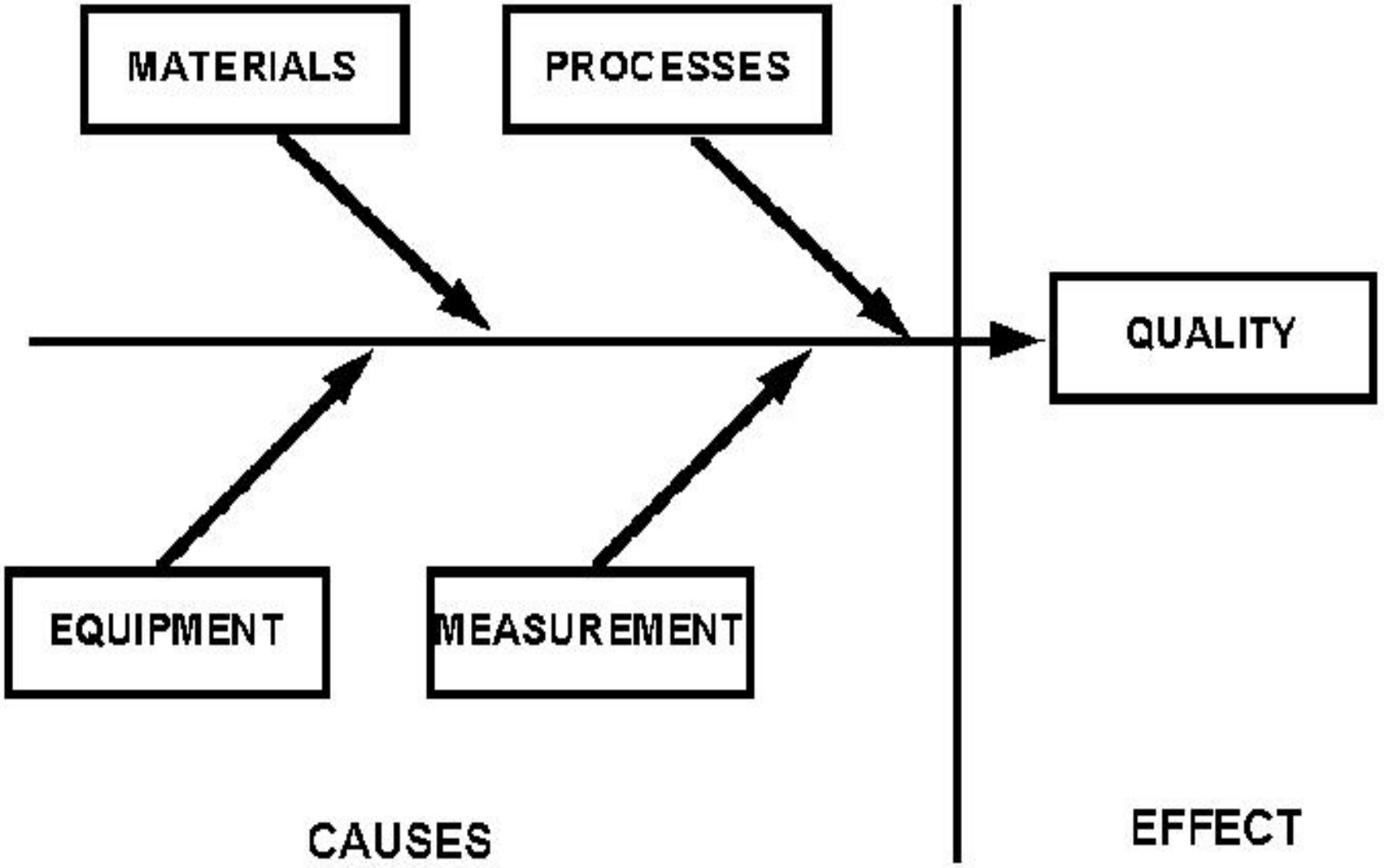
Act - Take corrective action if needed and repeat the work

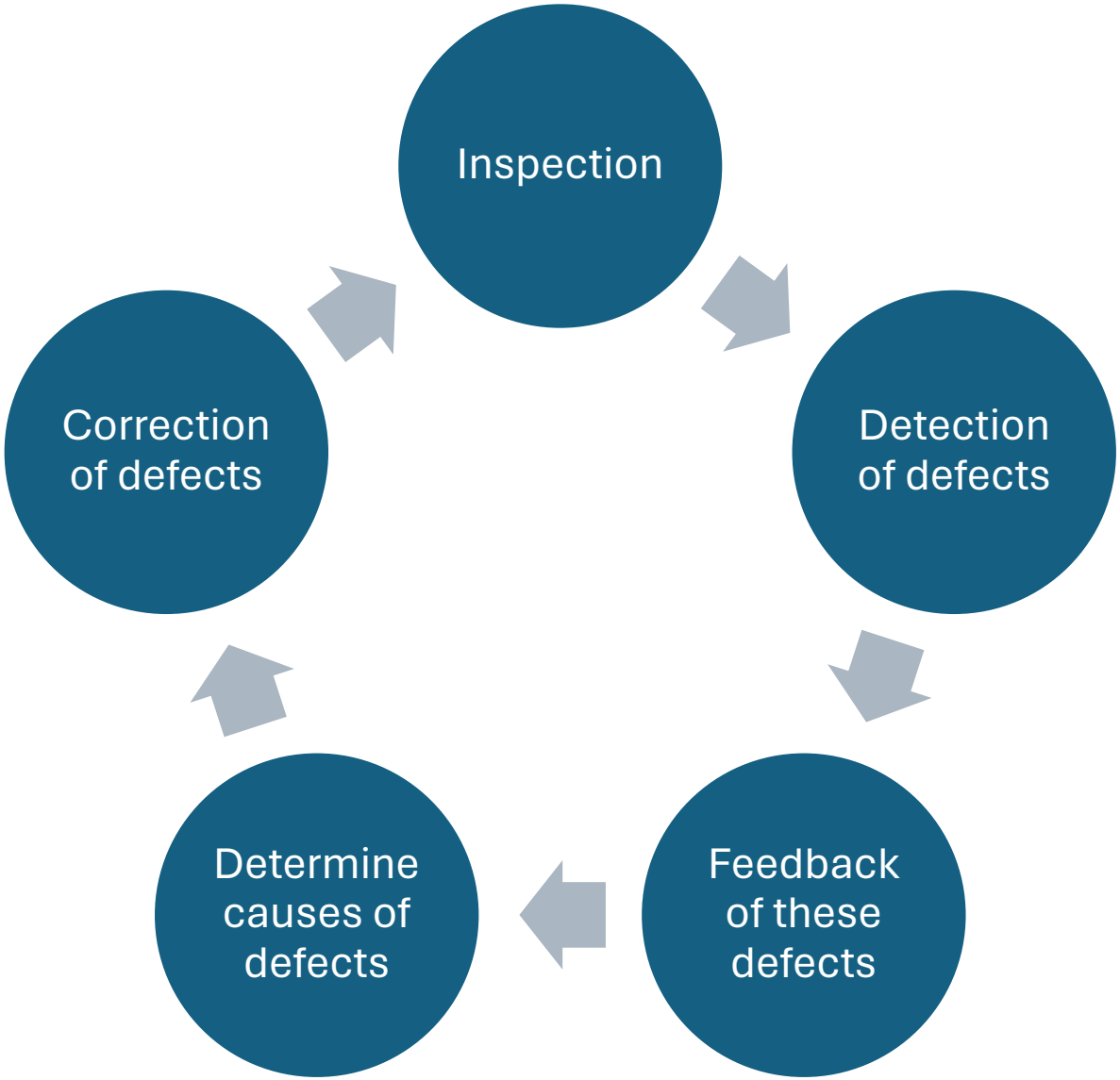
Quality Control characteristics:

Process adopted to deliver a quality product to the clients at best cost.

Goal is to learn from other organizations so that quality would be better each time.

To avoid making errors by proper planning and execution with correct review process.


MATERIALS
PROCESSES
QUALITY
EQUIPMENT
MEASUREMENT
CAUSES
EFFECT


Inspection
Detection of defects
Feedback of these defects
Determine causes of defects
Correction of defects

Parameters	Quality Assurance	Quality Control
Definition	QA is a set of activities for ensuring quality in the processes by which products are developed.	QC is a set of activities for ensuring quality in the products. The activities focus on identifying defects in the actual products produced.
Focus On	QA aims to prevent defects with a focus on the process used to make the product. It is a proactive process.	QC aims to identify (and correct) defects in the finished product. Quality Control, therefore is a reactive process.
Goal	The goal of QA is to improve development and test processes so that defects do not arise when the product is being developed.	The goal of QC is to identify defects and after a product is developed and before it it is released.

Flow Chart for Quality Control in Brick Manufacturing:

1.) Evaluation of clay at quarry for suitability

2.) Excavation of clay according to types

3.) Storage of Clays according to their types

3.1) Lab test to confirm the properties of clay

4.) Mixing and processing of clays according to tested formula

5.) Lab test to confirm proper mixing

No

5.1) Remixing and Re-processing of clays

Yes

6.) Brick Making

6.1) Automatic moisture content regulation during extrusion

7.) Drying in Tunnel Dryers

7.1) Automatic temperature and humidity regulation of tunnel dryers

8.) Firing in Tunnel Kiln

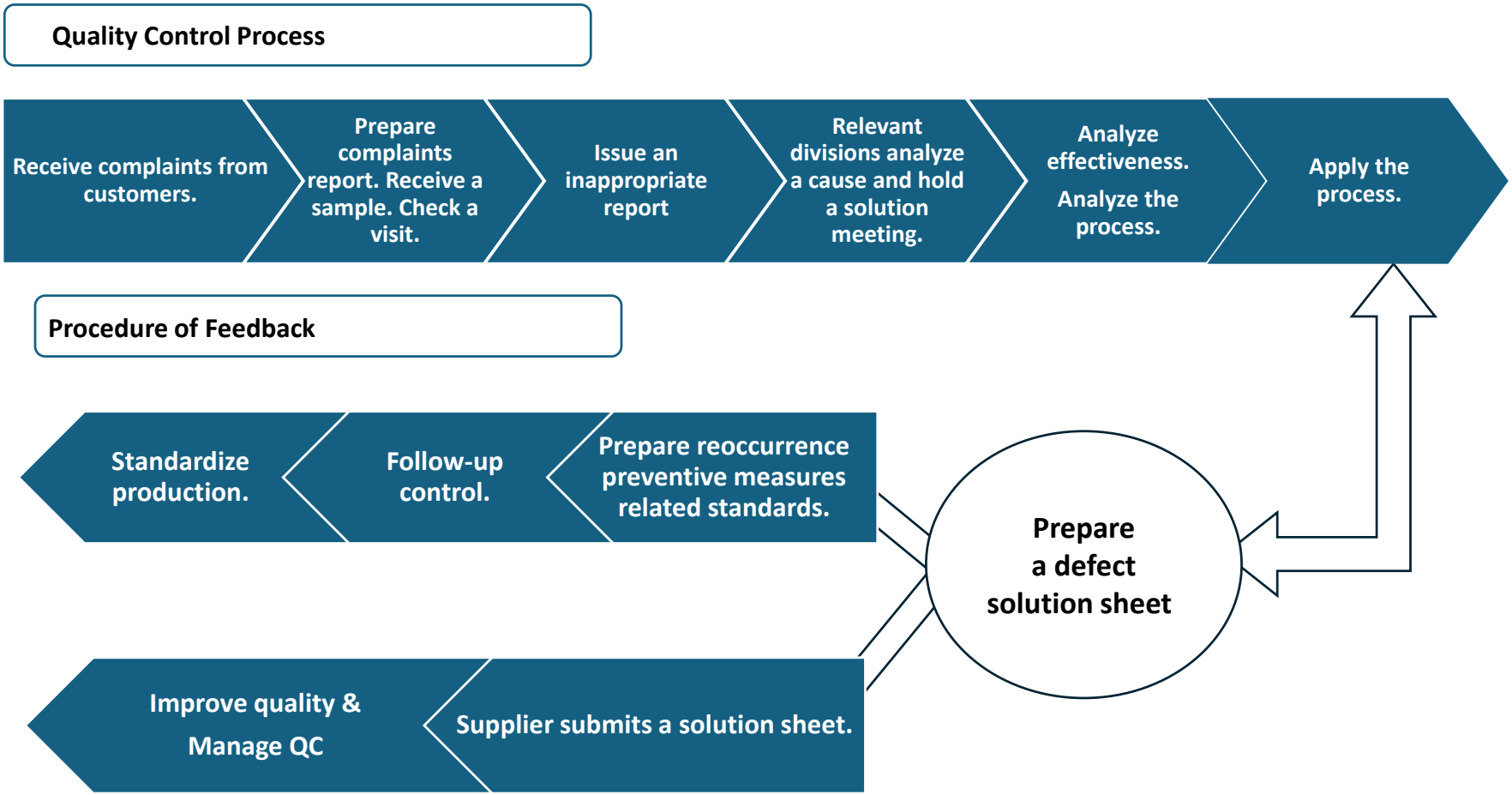
8.1) Automatic regulation of temperatures by temperature controllers

9.) Fired products

9.1) Daily routine lab test for compressive strength and water absorption of products

10.) Grading and sorting of final products

11.) Packing of final products


Quality Control Process
Receive complaints from customers.
Prepare complaints report. Receive a sample. Check a visit.
Issue an inappropriate report
Relevant divisions analyze a cause and hold a solution meeting.
Analyze effectiveness.
Analyze the process.
Apply the process.
Procedure of Feedback
Standardize production.
Follow-up control.
Prepare reoccurrence preventive measures related standards.
Prepare a defect solution sheet
Improve quality & Manage QC
Supplier submits a solution sheet.

What is Quality Management?

- Quality is defined by customer's requirements.
- The act of overseeing all activities and tasks needed to maintain a desired level of excellence.
- Discipline for ensuring that outputs, benefits and the processes by which they are delivered meet customer's requirements and are fit for the purpose.
- Top Management has direct responsibility for quality improvement.
- Increased quality comes from systematic analysis and improvement of work processes.
- Ensures that a company product is consistent
- Quality improvement is a continuous effort and conducted throughout the company and focused on the means to achieve it.


People
Deliverables
Constraints & Risk
Schedule
Budget
Communication
Metrics & Measurements
Quality

S.No.	Quality Control	Quality Assurance
1	The process by which product quality is compared with applicable standards; and the action taken when nonconformance is detected.	A planned and systematic set of activities necessary to provide adequate confidence that requirements are properly established and products or services conform to specified requirements.
2	An activity which verifies if the product meets pre-defined standards.	An activity that establishes and evaluates the processes to produce the products.
3	Implements the process.	Helps establish processes.
4	Verifies if specific attribute(s) are in a specific product or service.	Sets up measurements programs to evaluate processes.
5	Identifies defects for the primary purpose of correcting defects.	Identifies weaknesses in processes and improves them.
6	QC is the responsibility of the tester.	QA is the responsibility of the entire team.
7	Detects, reports and corrects defects. QC adopt Detective approach.	Prevents the introduction of issues or defects. QA adopt Preventive approach.
8	QC evaluates if the application is working for the primary purpose of determining if there is a flaw/defect in the functionalities.	QA evaluates whether or not quality control is working for the primary purpose of determining whether or not there is a weakness in the process.
9	QC improves the development of a specific product or service.	QA improves the process that is applied to multiple products that will ever be produced by a process.
10	QC personnel may perform quality assurance tasks if and when required.	QA personnel should not perform quality control unless doing it to validate quality control is working.

Quality Standards:

Rwanda Bureau of Standards (RBS) has developed a quality specification for Burnt Clay Bricks under RS 359:2009, which is adopted from East African Standards, EAS 54:1999

The Standard tests the bricks for:

Dimensional Tolerance

Compressive Strength

Water Absorption

Efflorescence

Some Important Formulae (useful in Quality Control exercise)

Moisture Content:

Moisture Content (%) $= \frac{\text{(Wet Weight - Dry Weight)}}{\text{Dry Weight}} \times 100$

Dry Shrinkage:

Dry Shrinkage (%) $= \frac{\text{(Wet Length - Dry Length)}}{\text{Wet Length}} \times 100$

Fired Shrinkage:

Fired Shrinkage (%) $= \frac{\text{(Dry Length - Fired Length)}}{\text{Dry Length}} \times 100$

Total Shrinkage:

Total Shrinkage (%) : $\frac{\text{(Wet Length - Fired Length) x 100}}{\text{Wet Length}}$

Loss On Ignition:

Loss On Ignition (%) : $\frac{\text{(Dry Weight - Fired Weight) x 100}}{\text{Fired Weight}}$

Water Absorption:

Water Absorption(%): $\frac{\text{(Weight after immersion in water for 24 hrs – Fired Weight) x 100}}{\text{Fired Weight}}$

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