

# GROUNDWATER QUALITY FOR PRODUCTION OF READY MIX CONCRETE

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**Abstract:** *This paper manages the nature of water utilized for making concrete cement by Ready-Mix Concrete (RMC) makers in Chennai. Water tests gathered from three diverse RMC plants situated in Chennai and the water tests are evaluated for compound properties as per significant Indian guidelines and the broke down technique for their Growth are gathered. The constraints of compound properties according to Indian principles are introduced and results are examined for the appropriateness of water tests for the creation of Ready-Mix Concrete for the development business. The usage of contaminated water for strong mixing is seen unreasonably incredible for quality headway at early ages and abatement in long stretch quality. All the parameter values were within the permissible range, hence the ground water from the said areas is suitable for construction.*

**Keywords:** *pH, Acidity, Alkalinity, Chlorides as Cl, Sulphates as SO<sub>3</sub>, Organic & Inorganic matters and Suspended matters.*

## 1. Introduction:

Water is one of the main significant components in development and is required for the planning of mortar, mixing of solid concrete and for assuaging work, etc. The idea of water used straightforwardly influences the quality of the steel and concrete cement in the progress work. The water utilized for restoring and blending must be liberated from high amounts of soluble bases, harsh, oils, salt, sugar, normal materials, vegetable turn of events, and so forth that may be damaging to blocks, concrete or iron. Disgraces in water can cause metal corrosion, bring undesirable residue and clay into the solid, unfavourably influence the solidifying procedure of cement and furthermore diminish the quality by even 25%. In this way the need to guarantee the nature of water utilized during development is indispensable. The nature of ground water is critical in deciding the appropriateness of specific ground water for a specific utilize, for example, for open water supply, water system, latrine flushing, mechanical applications, constructional use and so on. The study area (location (A), Malayambakkam near Kundrathur, location (B), Gerugambakkam near Porur, and location (C), in Poonamallee.) The nature of ground water changes all around, with the profundity of water table, and from season to season and is essentially represented by the degree and arrangement of broke up solids present in it. To overcome the shortcomings the water to be tested and value has to coincide the IS limitations for construction purpose.

## 2. Study Area:

The study area is located on (Plant (A) is located in Malayambakkam near Kundrathur, Plant (B) is located in Gerugambakkam near Porur, Plant (C) is located in near Poonamallee).



**Figure 1:** plant A  
Located at  
Malayambakkam



**Figure 2:** plant B  
Located at  
Gerugambakkam



**Figure 3:** plant C  
Located at Poonamallee

The above are the three different locations where the Groundwater samples are collected and analysed for the chemical test results for the suitability of concrete mix.

### 3. Materials and methods:

The material utilized for gathering water tests is perfect Polyethylene Cans and this examination is clarifying about the ground water quality in and around Chennai city, for the appraisal of ground water quality. The aggregate of three groundwater tests were gathered from the chosen areas in like manner. The gathered water tests will be tried their appropriateness for creation of Ready Mix Concrete as per IS 456-2000 and IS 3025.

#### 3.1 Sampling:

The groundwater samples collected from each location. The bore wells should not be less than 50 feet for avoiding the salty nature of water. The bore wells are made with inserting PVC Pipes to eliminate other contamination from the cement made platform. The groundwater samples were collected from each location with clean polyethylene cans of 2-litres capacity. The water samples will be tested in accordance with Ten parameters such as pH, Acidity, Alkalinity, Chlorides as Cl, Sulphates as SO<sub>3</sub>, Organic & Inorganic matters and Suspended matters. The analysis of Groundwater has done by using procedure of 'Indian standard method'. Utmost care was taken during the collection of samples to avoid any kind of contamination.

#### 3.2 Groundwater Quality:

For the Nation with everything taken into account, the creation and characteristic character of ground water is satisfactory for most livelihoods. The nature of ground water in certain places of the nation, particularly above ground water, is shifting a direct result of public activities.

Ground water is less weak to bacterial sully than surface water considering the way that the soil and shakes through which ground water streams screen out most of the tiny life forms. Microscopic living things, in any case, every so often discover their way into ground water, once in a while in hazardously high fixations. In any case, open entryway from bacterial spoiling alone doesn't propose that the water is fit to drink. Different shrouded isolated mineral and typical constituents are available in ground water in different center interests. Most are innocuous or even supportive; at any rate happening conflictingly, others are malevolent, and a couple might be fundamentally harmful. Water is a dissolvable and separates minerals from the stones with which it comes in contact. Ground water may contain separated minerals and gases that give it the tart taste savored the experience of by various people. Lacking these minerals and gases, the water would taste level. The most notable split up mineral substances are sodium, calcium, magnesium, potassium, chloride, bicarbonate, and sulfate. In water science, these substances are called standard constituents. Water consistently isn't seen as charming for drinking if the measure of split up minerals outperforms 1,000 mg/L (milligrams per liter).

#### **4. Literature Survey:**

M. Ghrair (2016) the request for clean water by means of the construction quarter is predicted to growth because of the high increment in the development of development exercises in Jordan. This investigate expects to assess the capability of scale-up of the utility of managed local wastewater in concrete from seat scale to a full-scale.

AM. Shafeek. (2017) This study discuss approximately the effect of chilling water sorts on the concrete residue living arrangements. Groundwater will be a significant wellspring of forthcoming water flexibly. The centralizations of anions and cations in the surface Nile water are fit with as far as possible, while they are over the allowable stages in groundwater and are not reasonable for potable water for drinking and local uses.

Mona EL-Sayed et al.,. (2014) This examine was performed on eleven Ground Nile water test sand eight ground water tests. The floor water tests were amassed by means of overlaying the place among ElTibbin and El-Maasara on the Helwan Governorate and the shallow waters are from the River Nile.

Sivasankaret al.,. (2013) The existing studies is donated on groundwater wonderful, its decay and assessment essentially dependent on potable water, water system, and creation norms. The analyze territory chose for examination on water highquality is the Tirunagar (TN)vicinity, placed in the southwest of Madurai City.

#### **5. Result and Discussion:**

##### **5.1 Suitability of Groundwater for construction**

Table.1 plant A Parameters and its values to check the suitability for construction

Plant A Located at Malayambakkam near Kundrathur	Parameters	Result values	Limitations
	pH	7.04	More than 6.0
	Electrical conductivity	982	
	Acidity	0.60	5ml (0.02 normality of NaOH)
	Alkalinity	4.15	25ml (0.02 normality of H <sub>2</sub> SO <sub>4</sub> )
	Chloride	71	2000mg/l
	Sulphate	121.03	400 mg/l
	Organic Matter	348	200 mg/l
	Inorganic Matter	368	3000 mg/l
	Total Suspended Solids	683	2000 mg/l
	Total Dissolved Solids	618	2000 mg/l

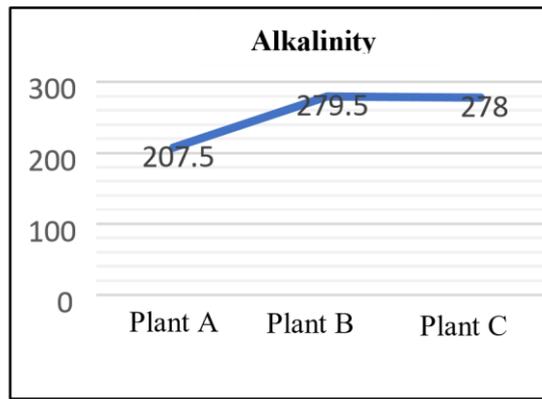
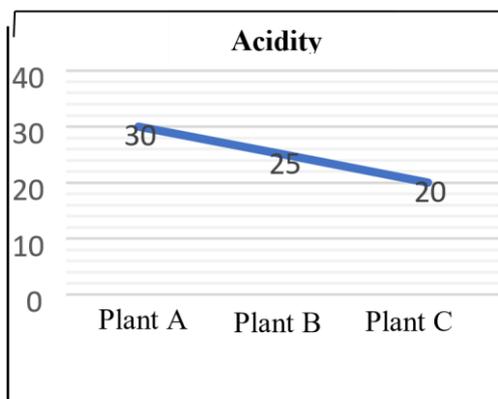
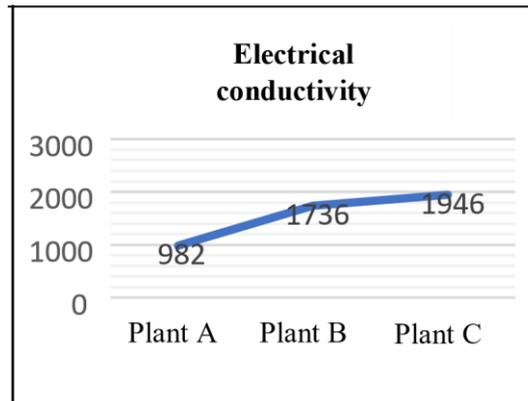
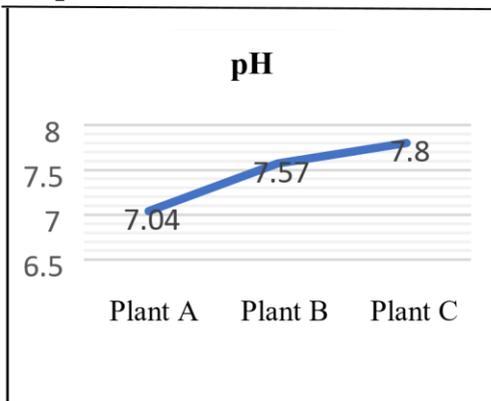
Table.2 plant B Parameters and its values to check the suitability for construction

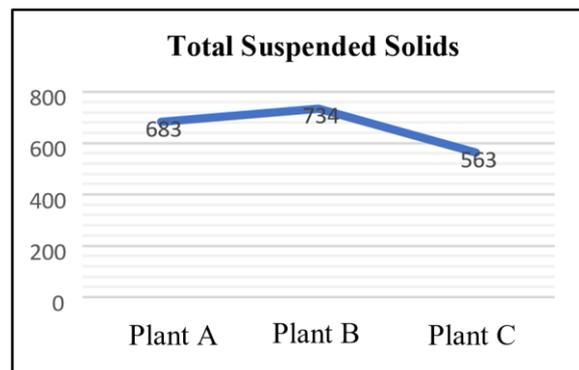
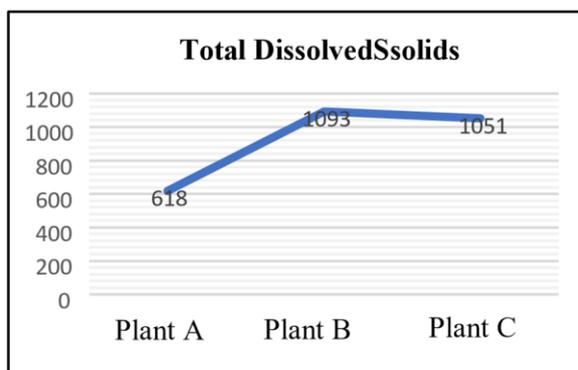
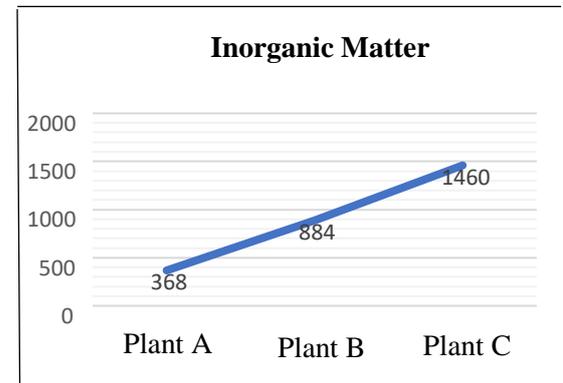
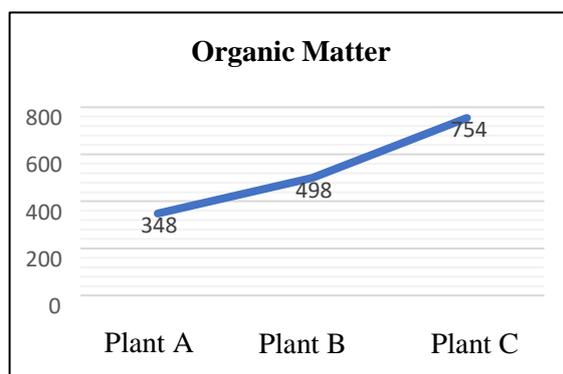
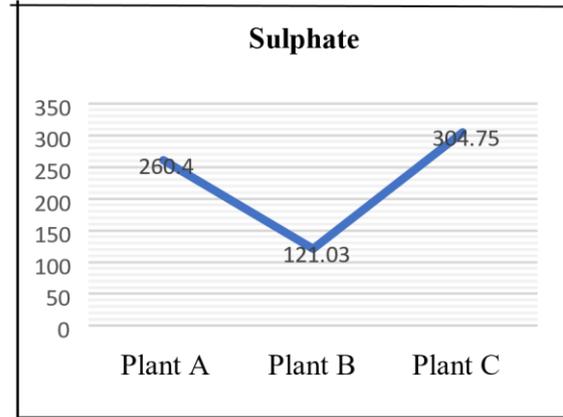
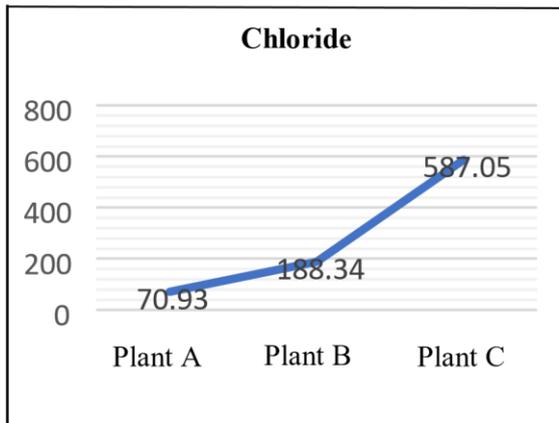
Plant B Located at Gerugambakkam near Porur	Parameters	Result values	Limitations
	pH	7.57	More than 6.0
	Electrical conductivity	1736	
	Alkalinity	279.5	5ml (0.02 normality of NaOH)
	Acidity	25	25ml (0.02 normality of H <sub>2</sub> SO <sub>4</sub> )
	Chloride	188.34	2000mg/l
	Sulphate	260.4	400 mg/l
	Organic Matter	498	200 mg/l
	Inorganic Matter	884	3000 mg/l
	Total Suspended Solids	734	2000 mg/l
	Total Dissolved Solids	1093	2000 mg/l

Table.3 plant C parameters and its values to check the suitability for construction

Plant C Located at poonamalle	Parameters	Result values	Limitations
	pH	7.08	More than 6.0
	Electrical conductivity	20	
	Acidity	0.5	5ml (0.02 normality of NaOH)
	Alkalinity	0.4	25ml (0.02 normality of H <sub>2</sub> SO <sub>4</sub> )
	Chloride	587.05	2000mg/l
	Sulphate	304.75	400 mg/l
	Organic Matter	754	200 mg/l
	Inorganic Matter	1460	3000 mg/l
	Total Suspended Solids	563	2000 mg/l
	Total Dissolved Solids	1051	2000 mg/l

### 5.2 Graphs:





## 6. Conclusion:

Ground water is commonly used in all the places. In this review paper, different journals are referred. The various sources of ground water is studied. Polluting influences present in water are responding contrastingly with various constituent of concrete. These responses generally influence the setting time, compressive quality and ought to likewise cause stressing of solid surface. All contaminations might not effectively affect the properties of cement. A few polluting influences respond such net outcome could likewise be innocuous or improve solid properties. Likewise the pollutions present in water changes relying on places, time, condition and human impedance. On the other hand, there is a danger of steel consumption in fortified solid, which is likewise a significant worry for inquire about the steels. In this project the test

results of water samples are obtained from three RMC plants are meeting the requirements of IS 456-2000 hence, the three plant water samples are suitable for producing ready mix concrete for reinforced cement concrete (rcc) and plain cement concrete (pcc).

#### 7. Reference:

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