



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

Doc. No. : PRTD/AR/PF:01	Issue No. : 1	Issue Date 11 Feb 2020	PROPOSAL FOR ACTION RESEARCH
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DDGS By. No. 6235
Dated. 6/3/2020

1.	Name & Designation of Officer	Hari Mohan Meena, Sc- B
2.	Qualification	Master of Science
3.	Discipline with area of specialization, if any	Chemistry
4.	Deptt./BO/RO & Place of Posting	SRO / CNBO-II, CHENNAI
5.	Title of Action Research Project	Determination of total dissolved solid by instrumental method
6.	Objective of the Project	To analyze suitability/applicability of the method (TDS Meter) for determination of total dissolved solids in water.
7.	Relevance of the Project to BIS	Standard formulation
8.	Background of the Project (Give current status, based on Literature Survey or any other means, in about 500 words)	Attach separate sheet as Annex 1 - Enclosed
9.	Research Methodology (Any or combination of Desktop, Field, Laboratory work etc., with Sampling Plan for Data Collection/ Generation, Places to be visited with Purpose etc.)	Attach separate sheet as Annex 2 - Enclosed
10.	Key Deliverables with Timelines	Test results and data collection from Labs (Test results derived from both test methods) – 2 months Analysis – 10 days Report preparation – 7 days
11.	Support required from BIS (such as Funds for purchase of books & Technical journals, Cost of materials & consumables, etc.)	Attach separate sheet as Annex 3 - Enclosed
12.	Any other information relevant to the Project	Nil

6/3/2020

Hari Mohan Meena
Scientist - B

Head (CNBO-II)

DDGS

DDG(PRT)

6/3/20
16/02/2020

Annex- 1

Background of the Project:

There is a test method (gravimetric method for the determination of Total Dissolved Solids) available as per IS 3025 (part 16) : 1984. This method is applicable to all types of water and waste water. The precision of the method is about 5 percent. Accuracy can not be estimated because filterable residue as determined by this method is a quantity defined by the procedure followed. Testing time of this method is approx 7 hours. No instrumental method is prescribed in Indian standards. This project report may help to establish an instrumental method as routine method or referee method. It may help to reduce the testing time with more precision and accuracy.

Annexure – 2

Research Methodology

1. Consent from lab to test the PDW Sample as per Instrumental Method (TDS Meter) for the requirement of total dissolved solids.
2. Testing of sample by lab.
3. Collection of data.
4. Comparison of data
 - Samples drawn during factory surveillance / market surveillance shall be used for this purpose.
 - Test facilities where samples are being tested shall be used after their consent.

Annex – 3

Support required from BIS

1. Permission may be granted to get the samples tested at SROL / OSL.
2. Permission to access the lab and witness the testing may be granted.
3. Permission to use a little quantity of sample (drawn during factory surveillance / market surveillance) for this purpose.
4. Funds to purchase consumables such as buffer solutions, chemicals etc.
5. Funds for purchase of books and technical journals to study and analyse the applicability of test method.
6. Funds for travelling to labs (if required).

Annex
6/3/2020



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

APPENDIX - IV

Doc. No. : PRTD/AR/PF:03	Issue No. : 2	Issue Date 30 Sept. 2020	Report of Action Research
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1.	Action Research Project No. (as assigned by PRTD)	AR-0034
2.	Title of the Action Research Project	Determination of total dissolved solids by instrumental method
3.	Name & Designation of Officer	Hari Mohan Meena, Scientist -B
4.	Employee No.	063746
5.	Deptt./BO/RO & Place of Posting	SRO / CNBO-II, Chennai
6.	Date of Approval of the Project	Approval information received vide e-mail dated 8 th September 2020
7.	Objective of the Project	To analyze suitability/applicability of the method (TDS Meter) for determination of total dissolved solids in water
8.	Report of Action Research Activities	Attached as per annexure A-F
9.	Conclusion & Recommendations	<p>Conclusion:</p> <p>(A) On the basis of comparison of data (test results, Annexure C/1) received from various laboratories, it is observed that there is maximum variation between results received from both test methods (i.e. IS 3025 (part 16): 1984 and TDS Meter is up to 3.2 percent which is not significant.</p> <p>(B) On the basis of repeatability study report (Annexure -C/2), it is observed that there is no significant variation between results received in repeatability study using TDS Meter. All results are repeatable.</p> <p>In view of (A) & (B), it may please be construed that TDS Meter is also suitable for determination of total dissolved solids in Packaged Drinking Water.</p> <p>Recommendation: it is thus recommended to issue an amendment to IS 14543:2016 (Table 1, sr.no. v, method of test) indicating necessary incorporation of the TDS Meter as a method of test for determination of total dissolved solids in Packaged Drinking Water.</p>
10.	Any other relevant information	Nil

[Signature]
4-1-2021

Hari Mohan Meena
Scientist -B

DDG (PRT) Dy. No. 23 'DDGS' DESPATCH No. 1265.
 (Outgoing) Date 08/10/2021 (Incoming) Date 05/10/2021
 DDG (PRT) Dy. No. 7
 (Outgoing) Date 11/11/2021 (Incoming) Date 11/11/2021

Head CNBO-II
 DDGS
 DDG (PRT) (11/11/2021)
[Signatures]
 4/1/2021
 MS Rueder 04/01/21
 H (PRTD)
 SCD (SKS) - pl examine put up
 Remu Gupta 11/11/2021

Annexure

- a) Introduction
- b) Methods & Materials, Data, Details of Field Visits for studies & research etc.
- c) Results & Analysis
- d) Summary and Conclusions
- e) Recommendations
- f) List of References

Amra
4/11/2021



भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS

Doc. No. : PRTD/AR/PF:04	Issue No. : 1	Issue Date 28 Apr 2020	DECLARATION OF ORIGINAL WORK
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DECLARATION OF ORIGINAL WORK

I, Hari Mohan Meena, Scientist-B, Employee No 063746 hereby declare that the Action Research Project titled "DETERMINATION OF TOTAL DISSOLVED SOLIDS BY INSTRUMENTAL METHOD" is the original research work done by me. I have not copied from any other Action Research Project or any other work of similar nature and topic done by any person/institution/body either published or yet to be published. Data and information from other sources, used if any, have been with prior permission, wherever required and is duly acknowledged appropriately in the project report submitted by me.

This declaration is made on the 4th day of January 2021.

Hari Mohan Meena
4/1/2021

Hari Mohan Meena

Sc-B CNBO-II



भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

Doc. No. : PRTD/AR/PF:01	Issue No. : 1	Issue Date 11 Feb 2020	PROPOSAL FOR ACTION RESEARCH
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DDGS By. No. 625
Dated. 6/3/2020

1.	Name & Designation of Officer	Hari Mohan Meena, Sc- B
2.	Qualification	Master of Science
3.	Discipline with area of specialization, if any	Chemistry
4.	Deptt./BO/RO & Place of Posting	SRO / CNBO-II, CHENNAI
5.	Title of Action Research Project	Determination of total dissolved solid by instrumental method
6.	Objective of the Project	To analyze suitability/applicability of the method (TDS Meter) for determination of total dissolved solids in water.
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11.	Support required from BIS (such as Funds for purchase of books & Technical journals, Cost of materials & consumables, etc.)	Attach separate sheet as Annex 3 - Enclosed
12.	Any other information relevant to the Project	Nil

[Signature]
6/3/2020

Hari Mohan Meena
Scientist - B

Head (CNBO-II)

DDGS

DDG(PRT)

[Handwritten signature]
6/3/20
[Handwritten signature]
16/02/2020

[Handwritten signature]
4/11/2021

Annex- 1

Background of the Project:

There is a test method (gravimetric method for the determination of Total Dissolved Solids) available as per IS 3025 (part 16) : 1984. This method is applicable to all types of water and waste water. The precision of the method is about 5 percent. Accuracy can not be estimated because filterable residue as determined by this method is a quantity defined by the procedure followed. Testing time of this method is approx 7 hours. No instrumental method is prescribed in Indian standards. This project report may help to establish an instrumental method as routine method or referee method. It may help to reduce the testing time with more precision and accuracy.

Annexure – 2

Research Methodology

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2. Testing of sample by lab.
3. Collection of data.
4. Comparison of data
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Annex – 3

Support required from BIS

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2. Permission to access the lab and witness the testing may be granted.
3. Permission to use a little quantity of sample (drawn during factory surveillance / market surveillance) for this purpose.
4. Funds to purchase consumables such as buffer solutions, chemicals etc.
5. Funds for purchase of books and technical journals to study and analyse the applicability of test method.
6. Funds for travelling to labs (if required).

Amhs
6/3/2020

Amhs
4/1/2021

Fwd: TDS Testing Data

From : Muninarayana R <muni@bis.gov.in>
Subject : Fwd: TDS Testing Data
To : Hari Mohan Meena <hari@bis.gov.in>

Sun, Dec 13, 2020 05:44 PM
1 attachment

RegardsMuninarayana RSc.C, SROL

----- Forwarded Message -----

From: BISWAJIT GOPE <biswajit@bis.gov.in>
To: Muninarayana R <muni@bis.gov.in>
Sent: Fri, 11 Dec 2020 17:45:02 +0530 (IST)
Subject: TDS Testing Data

Sir,
Please find attached file.

--
Regards,

Biswajit Gope
Bureau of Indian Standards,
Southern Regional office Laboratory,
Taramani, Chennai-600113

— **DATA REPORTING FORMATE Meena Sir.xlsx**
9 KB

Janha
4/11/2021

ACTION RESEARCH PROJECT DETERMINATION OF TOTAL DISSOLVED SOLIDS BY INSTRUMENTAL METHC
 BIS Action Research Project AR/0034
 Unique Identification Number
 Name of the laboratory : BIS/SROL/CHEMICAL
 Code of the laboratory : -----

Sr. No.	Description of sample	TEST RESULT (obtained by using test method IS 3025 PART 16) - up to 4 decimal	TEST RESULT (obtained by using a TDS METER) - up to maximum decimal as possible	Method/Procedure followed by using TDS Meter (including type of TDS Meter)
1	Sample-1	30.8	30.0	TDS Meter, Make : Systronics, Model MK-509
2	Sample-2	110.4	110.3	
3	Sample-3	62.4	64.5	
4	Sample-4	87.6	85.3	
5	Sample-5	58.4	58.1	

TESTED BY

AUTHORISED SIGNATORY

* Use a portion of sample / remnant of sample of Packaged Drinking Water as per IS 14543:2016

Janp...
11/11/2021

FW: Determination of Total Dissolved Solids by Instrumental Method-ACTION RESEARCH PROJECT - AR/0034

From : velusamyvc@aquafinachennai.com

Fri, Dec 11, 2020 10:00 AM

Subject : FW: Determination of Total Dissolved Solids by Instrumental Method-ACTION RESEARCH PROJECT - AR/0034

2 attachments

To : Hari Mohan Meena <hari@bis.gov.in>**Cc :** sundhar@aquafinachennai.com,
sunilkumar@aquafinachennai.com

Dear Sir,

Please find attached TDS results as per new project proposal along with Procedure is followed

If any further clarification, please write to us. We are in pleasure to submit.

Regards

Velusamy V C
9600020899

From: Sundhar : Sindya Aqua [mailto:sundhar@aquafinachennai.com]**Sent:** 10 December 2020 PM 12:59**To:** 'Velusamy V C'**Cc:** 'Sunil Kumar'**Subject:** RE: Determination of Total Dissolved Solids by Instrumental Method-ACTION RESEARCH PROJECT - AR/0034

Dear Sir,

Please find the attached updated details and our testing production.

Kind Regards,
Sundhar

From: Velusamy V C [mailto:velusamyvc@aquafinachennai.com]**Sent:** Tuesday, December 01, 2020 5:28 PM**To:** 'Hari Mohan Meena'; sindyaaqua@gmail.com; sundhar@aquafinachennai.com;
sunilkumar@aquafinachennai.com**Subject:** RE: Determination of Total Dissolved Solids by Instrumental Method-ACTION RESEARCH PROJECT - AR/0034

Dear Sir,

Received the format. We will proceed the same and submit the report. if any clarification we will be in touch with you

Amber
4/11/2021

Regards
Velusamy V C

From: Hari Mohan Meena [mailto:hari@bis.gov.in]

Sent: 01 December 2020 PM 05:08

To: sindyaaqua@gmail.com; velusamyvc@aquafinachennai.com; sundhar@aquafinachennai.com;
sunilkumar@aquafinachennai.com

Subject: Determination of Total Dissolved Solids by Instrumental Method-ACTION RESEARCH PROJECT - AR/0034

Dear Sir/ Madam,

Thanks for your quick response and giving your willingness to participate in the Action Research Project - AR/0034. Please find the attachment for further action. It is requested to use your laboratory code along with lab name in further communication.

Name of Lab : SINDYA AQUA MINERAL P LTD, TIRUVALLORE

Code of laboratory: BIS/HMM/NM87

I would request you to provide the required data (refer to attached sheet) by 10 December 2020.

Thanking You,

With warm regards –

Hari Mohan Meena

Scientist -B (CNBO-II)

Bureau of Indian Standards, Southern Regional Office,

CIT Campus, IV Cross Road, Taramani, Chennai- 6000113

Mob. No. 9711204429

E-mail : hari@bis.gov.in

यदि आवश्यक नहीं हो तो कृपया इस परिपत्र को मुद्रित नहीं करे – पर्यावरण संरक्षण में अपना योगदान दें ।

Do not print this mail, if you can avoid it- Help in conserving the environment.

— **DATA REPORTING FORMATE.xlsx**

10 KB

— **12- TDS Checking Procedure.docx**

34 KB

Hari Mohan Meena
4/1/2021

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ACTION RESEARCH PROJECT

DETERMINATION OF TOTAL DISSOLVED SOLIDS BY INSTRUMENTAL METHOD

BIS Action Research Project Unique
Identification Number

AR/0034

Name of the laboratory : SINDYA AQUA MINERALE PVT LTD, TIRUVALLORE

Code of the laboratory : BIS/HMM/NM87

Sr. No.	Description of sample	TEST RESULT (obtained by using test method IS 3025 PART 16) - up to 4 decimal	TEST RESULT (obtained by using a TDS METER) - up to maximum decimal as possible	Method/Procedure followed by using TDS Meter (including type of TDS Meter)
	*PACKAGED DRINKING WATER	mg/l	PPM	Please enclose a separate sheet
1	*PACKAGED DRINKING WATER	8.0415	8.1	
2	*PACKAGED DRINKING WATER	8.0457	8.1	TDS Meter type: HACH- Sension5
3	*PACKAGED DRINKING WATER	8.0412	8.2	
4	*PACKAGED DRINKING WATER	8.1224	8.3	

R.Sundhar
TESTED BY

B.Sunil Kumar
AUTHORISED SIGNATORY

* Use a portion of sample / remnant of sample of Packaged Drinking Water as per IS 14543:2016

Jeeprasa
11/11/2021

Subject : RE: Consent to participate in Research Project -
Determination of Total Dissolved Solids by
Instrumental Method in Packaged Drinking Water as
per IS 14543:2016

To : Hari Mohan Meena <hari@bis.gov.in>,
sundhar@aquafinachennai.com,
sunilkumar@aquafinachennai.com

Dear Sir,

We Sindya Aqua Minerale Pvt Ltd., (Brand Name – Aquafina) have received the proposal for participating the research project as per details given below. We are willing to participate in this project. kindly send us further procedure to be followed in order to complete the project work in the right direction.

@ Mr.Sunil Kumar- Plant Manager & Mr.Sundhar – Quality Manager shall co-ordinate with you on the subject matter & complete the project as per your guidelines.

Regards

Velusamy V C

9600020899

From: Hari Mohan Meena [mailto:hari@bis.gov.in]

Sent: 09 November 2020 PM 12:57

To: balagopalan@bisleri.co.in; sindyaaqua@gmail.com; velusamyvc@aquafinachennai.com; saravanankavitha02092011@gmail.com; kannanrosa@gmail.com; dietaqua@gmail.com; jkr@drroaholding.com; rajam@drroaholdings.com

Subject: Consent to participate in Research Project - Determination of Total Dissolved Solids by Instrumental Method in Packaged Drinking Water as per IS 14543:2016

Dear Sir/ Madam,

Bureau of Indian Standards is the National Standard Body of India established under the BIS Act 2016 for the harmonious development of the activities of standardization, marking and quality certification of goods and for matters connected therewith or incidental thereto. BIS has been providing traceability and tangibility benefits to the national economy in a number of ways – providing safe reliable quality goods; minimizing health hazards to consumers; promoting exports and imports substitute; control over proliferation of varieties etc. through standardization, certification and testing.

Keeping in view, the interest of consumers as well as the industry, BIS is involved in various activities such as Standards Formulation, Product Certification Scheme, Compulsory Registration Scheme, Foreign Manufacturers Certification Scheme, Hall Marking Scheme, Laboratory Services, Laboratory Recognition Scheme, Sale of Indian Standards, Consumer Affairs Activities, Promotional Activities, Training Services at National & International level and Information Services. BIS Officials are doing various action research projects to meet the objectives. In order to above, undersigned is working on a research project which is approved by Assessment

Ambra
4/11/2021

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Committee of Bureau of Indian Standards and registered as Unique Project Number: AR /0034.
Project detail is mentioned below -

Title of the Action Research Project	Determination of total dissolved solid by instrumental method
Unique Identification Number of Project	AR /0034
Objective of the Projects	To Analyse suitability/ applicability of the TDS Meter Method for determination of Total Dissolved Solids in water to develop evidence-based strategies and mechanisms for the standards formulation.
Background of the Project	There is a test method (Gravimetric Method for determination of Total Dissolved Solids) available as per IS 3025 (part 16): 1984. This method is applicable to all type of water and waste water. The precision of the method about 5 percent. Accuracy can not be estimated because filtrable residue as determined by this method is a quantity defined. Testing time of the method is very high and no instrumental test method is prescribed in Indian Standards. This Project may help to establish an instrumental method as routine method or referee method and may help to reduce the testing time with more precision and accuracy.

It may please be noted that sample or/and remnant of sample of Packaged Drinking Water (as available with you) as per IS 14543:2016 shall be used for this purpose and testing charges shall not be paid. Laboratory should be equipped with TDS Meter and no charges shall be paid for consumables and utilization of manpower.

Therefore, **I would request you to send your willingness/consent to participate in the above said Research Project.**

Thanking You,

With warm regards –

Hari Mohan Meena
Scientist -B (CNBO-II)
Bureau of Indian Standards, Southern Regional Office,
CIT Campus, IV Cross Road, Taramani, Chennai- 6000113
Mob. No. 9711204429
E-mail : hari@bis.gov.in

यदि आवश्यक नहीं हो तो कृपया इस परिपत्र को मुद्रित नहीं करे – पर्यावरण संरक्षण में अपना योगदान दें ।

Do not print this mail, if you can avoid it- Help in conserving the environment.


4/11/2021

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Re: Determination of Total Dissolved Solids by Instrumental Method-ACTION RESEARCH PROJECT - AR/0034

From : test@mettexlab.com

Tue, Nov 10, 2020 06:47 PM

Subject : Re: Determination of Total Dissolved Solids by Instrumental Method-ACTION RESEARCH PROJECT - AR/0034

1 attachment

To : Hari Mohan Meena <hari@bis.gov.in>**Reply To :** test@mettexlab.com

Dear Sir,

Herewith we have attached the required data as per the provided format pertaining to the determination of TDS by instrumental method for the action research project - AR/0034 to your kind perusal and reference.

Thanking you

With kind regards

Mrs Kavitha

Technical Manager - Water department

Chennai Mettex Lab Pvt Ltd

9841559716

On Thu, Nov 5, 2020 at 1:01 AM Hari Mohan Meena <hari@bis.gov.in> wrote:

Dear Sir/ Madam,

Thanks for your quick response and giving your willingness to participate in the Action Research Project - AR/0034. Please find the attachment for further action. It is requested to use your laboratory code along with lab name in further communication.

Name of Lab : Chennai mettex lab pvt ltd, chennai

Code of laboratory: BIS/HMM/XC97

I would request you to provide the required data (refer to attached sheet) by 10 November 2020.

Thanking You,

With warm regards –

Hari Mohan Meena

Scientist -B (CNBO-II)

Bureau of Indian Standards, Southern Regional Office,

CIT Campus, IV Cross Road, Taramani, Chennai- 6000113

Mob. No. 9711204429

E-mail : hari@bis.gov.in


4/11/2021

Page 13 of 33

यदि आवश्यक नहीं हो तो कृपया इस परिपत्र को मुद्रित नहीं करे – पर्यावरण संरक्षण में अपना योगदान दें ।

Do not print this mail, if you can avoid it- Help in conserving the environment.

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From : Hari Mohan Meena <hari@bis.gov.in>

Thu, Nov 05, 2020 01:01 AM

Subject : Determination of Total Dissolved Solids by
Instrumental Method-ACTION RESEARCH PROJECT -
AR/0034

1 attachment

To : test@mettexlab.com

Dear Sir/ Madam,

Thanks for your quick response and giving your willingness to participate in the Action Research Project - AR/0034. Please find the attachment for further action. It is requested to use your laboratory code along with lab name in further communication.

Name of Lab : Chennai mettex lab pvt ltd, chennai

Code of laboratory: BIS/HMM/XC97

I would request you to provide the required data (refer to attached sheet) by 10 November 2020.

Thanking You,

With warm regards –

Hari Mohan Meena

Scientist -B (CNBO-II)

Bureau of Indian Standards, Southern Regional Office,

CIT Campus, IV Cross Road, Taramani, Chennai- 6000113

Mob. No. 9711204429

E-mail : hari@bis.gov.in

यदि आवश्यक नहीं हो तो कृपया इस परिपत्र को मुद्रित नहीं करे – पर्यावरण संरक्षण में अपना योगदान दें ।

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4/11/2021

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ACTION RESEARCH PROJECT	DETERMINATION OF TOTAL DISSOLVED SOLIDS BY INSTRUMENTAL METHOD	
BIS Action Research Project Unique Identification Number	AR/0034	
Name of the laboratory	M/s. Chennai Mettlex Lab (P) Ltd., Chennai	
Code of the laboratory	BIS/HMM/XC97	

Sr. No.	Description of sample	TEST RESULT (obtained by using test method IS 3025 PART 16)	TEST RESULT (obtained by using a TDS METER)	Method/Procedure followed by using TDS Meter (including type of TDS Meter)
1	*PACKAGED DRINKING WATER	106 mg/l	106 mg/l	Direct Measurement using Conductivity Meter (Hanna - edge) (TDS conversion factor is 0.50 (default) from the conductivity value of 212 µS/cm) is applied

TESTED BY
Mr Gajendiran

AUTHORISED SIGNATORY
Mrs Kavitha

* Use a portion of sample / remnant of sample of Packaged Drinking Water as per IS 14543:2016
Note : TDS conversion factor is used to mathematically convert conductivity to a TDS value


11/1/2021

Page 15 of 33

Re: Consent to participate in Research Project - Determination of Total Dissolved Solids by Instrumental Method in Packaged Drinking Water as per IS 14543:2016**From :** test@mettexlab.com

Sun, Oct 18, 2020 05:32 PM

Subject : Re: Consent to participate in Research Project -
Determination of Total Dissolved Solids by
Instrumental Method in Packaged Drinking Water as
per IS 14543:2016**To :** Hari Mohan Meena <hari@bis.gov.in>**Reply To :** test@mettexlab.com

Respected Madam,

We accept to participate in the said project (Unique Project Number : AR/0034).

We would like to express our opinion here to your kind note that the TDS meter (using conductivity cell) is working on the same principle as conductivity meter works , and the difference is only the displayed reading in terms of mg/l which is arrived from the TDS-to-EC ratio (between 0.55 to 0.7) depends upon the source/nature of water, which is preset or operator can set.

alternatively

(i) the TDS can be calculated from the measured constituents (alkalinity,Na,K, Ca,Mg,Chloride,Sulphate,Silica,Nitrate and Fluoride, and can be considered/accepted if it satisfies the calculated TDS/conductivity = 0.55 - 0.7 (formula given in Standard Methods for the examination of Water and Waste water (APHA).

Thanking You

with kind regards,

Dr.D. Sathiya Narayanan
TM | Head
07299056233
Chennai mettex lab pvt ltd
83, MKN Road, Jothy complex,

Guindy, Chennai - 32

On Thu, Oct 15, 2020 at 1:22 AM Hari Mohan Meena <hari@bis.gov.in> wrote:

Dear Sir/ Madam,

Bureau of Indian Standards is the National Standard Body of India established under the BIS Act 2016 for the harmonious development of the activities of standardization, marking and quality

Handwritten signature
4/11/2021

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certification of goods and for matters connected therewith or incidental thereto. BIS has been providing traceability and tangibility benefits to the national economy in a number of ways – providing safe reliable quality goods; minimizing health hazards to consumers; promoting exports and imports substitute; control over proliferation of varieties etc. through standardization, certification and testing.

Keeping in view, the interest of consumers as well as the industry, BIS is involved in various activities such as Standards Formulation, Product Certification Scheme, Compulsory Registration Scheme, Foreign Manufacturers Certification Scheme, Hall Marking Scheme, Laboratory Services, Laboratory Recognition Scheme, Sale of Indian Standards, Consumer Affairs Activities, Promotional Activities, Training Services at National & International level and Information Services. BIS Officials are doing various action research projects to meet the above objectives.

In order to above, undersigned is working on a project which is approved by Assessment committee of Bureau of Indian Standards and registered as Unique Project Number: AR /0034. Project detail is mentioned below -

Title of the Action Research Project	Determination of Total Dissolved Solids by Instrumental Method
Unique Identification Number of Project	AR /0034
Objective of the Projects	To analyse suitability/ applicability of the TDS Meter Method for determination of Total Dissolved Solids in water to develop evidence-based strategies and mechanisms for the standards formulation.
Background of the Project	There is a test method (Gravimetric Method for determination of Total Dissolved Solids) available as per IS 3025 (part 16): 1984. This method is applicable to all type of water and waste water. The precision of the method about 5 percent. Accuracy can not be estimated because filtrable residue as determined by this method is a quantity defined. Testing time of the method is very high and no instrumental test method is prescribed in Indian Standards. This Project may help to establish an instrumental method as routine method or referee method and may help to reduce the testing time with more precision and accuracy.

Your laboratory is recognized under BIS LRS scheme for the product Packaged Drinking Water (OTPNMW) as per IS 14543:2016. It may please be noted that sample or/and remnant of sample of Packaged Drinking Water which was sent by BIS under the certification scheme for testing as per IS 14543:2016 shall be used for this purpose and testing charges shall not be paid separately. Laboratory should be equipped with TDS Meter and no charges shall be paid for consumables and utilization of manpower.

Therefore, I would request you to send your willingness/consent to participate in the above said project by 18 Oct 2020 to enable us for further action. A response from your office in confirmation will be highly appreciated.

Thanking You,
With warm regards –
Hari Mohan Meena
Scientist -B (CNBO-II)
Bureau of Indian Standards, Southern Regional Office,

Amha
4/11/2021

TDS ANALYSIS-REPORT-SUBMITTED-REG

From : kannanrosa@gmail.com

Tue, Dec 08, 2020 08:34 AM

Subject : TDS ANALYSIS-REPORT-SUBMITTED-REG

2 attachments

To : Hari Mohan Meena <hari@bis.gov.in>

SIR,
KINDLY DOWNLOAD THE ATTACHMENT
N.KANNAN,M.Sc.,(Agri), M.B.A.
Deputy Director (Seed Inspection) .
TRICHY-620020
+91 94431-45768
+91 93451-01064

— **DATA REPORTING FORMATE (2).xlsx**
10 KB

— **ist98301n_09_18.pdf**
250 KB

Amma
4/11/2021


ACTION RESEARCH PROJECT

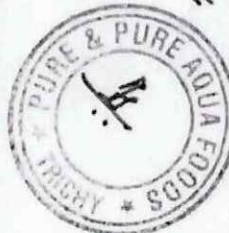
DETERMINATION OF TOTAL DISSOLVED SOLIDS BY INSTRUMENTAL METHOD


BIS Action Research Project Unique Identification: AR/0034 Number
 Name of the laboratory : PURE AND PURE AQUA FOODS, TIRUCHIRAPALLI
 Code of the laboratory : BIS/HMM/MN86

. No.	Description of sample	TEST RESULT (obtained by using test method IS 3025 PART 16) - up to 4 decimal	TEST RESULT (obtained by using a TDS METER) - up to maximum decimal as possible	Method/Procedure followed by using TDS Meter (including type of TDS Meter)
	*PACKAGED DRINKING WATER	39.175	40	Method/Procedure followed by using TDS Meter (including type of TDS Meter) enclosed in separate sheet

For Pure & Pure Aqua Foods


 Managing Partner
AUTHORISED SIGNATORY




 TESTED BY *Chief Chemist*

* Use a portion of sample / remnant of sample of Packaged Drinking Water as per IS 14543:2016


 11/11/2021

Re: Determination of Total Dissolved Solids by Instrumental Method-ACTION RESEARCH PROJECT - AR/0034

From : kannanrosa@gmail.com

Tue, Dec 01, 2020 03:52 PM

Subject : Re: Determination of Total Dissolved Solids by Instrumental Method-ACTION RESEARCH PROJECT - AR/0034

To : Hari Mohan Meena <hari@bis.gov.in>

Cc : saravanankavitha02092011@gmail.com

Kannanrosa
4/1/2021

Thank you for your mail.
N.KANNAN,M.Sc.,(Agri), M.B.A.
Deputy Director (Seed Inspection) .
TRICHY-620020
+91 94431-45768
+91 93451-01064

On Tue, Dec 1, 2020 at 3:47 PM Hari Mohan Meena <hari@bis.gov.in> wrote:

Dear Sir/ Madam,

Thanks for your quick response and giving your willingness to participate in the Action Research Project - AR/0034. Please find the attachment for further action. It is requested to use your laboratory code along with lab name in further communication.

Name of Lab : PURE AND QURE AQUAA FOODS, TIRUCHIRAPALLI

Code of laboratory: BIS/HMM/MN86

I would request you to provide the required data (refer to attached sheet) by 10 December 2020.

Thanking You,

With warm regards –

Hari Mohan Meena

Scientist -B (CNBO-II)

Bureau of Indian Standards, Southern Regional Office,

CIT Campus, IV Cross Road, Taramani, Chennai- 6000113

Mob. No. 9711204429

E-mail : hari@bis.gov.in

यदि आवश्यक नहीं हो तो कृपया इस परिपत्र को मुद्रित नहीं करे – पर्यावरण संरक्षण में अपना योगदान दें ।

Do not print this mail, if you can avoid it- Help in conserving the environment.

From : Hari Mohan Meena <hari@bis.gov.in>
Subject : Fwd: Determination of Total Dissolved Solids by Instrumental Method-ACTION RESEARCH PROJECT - AR/0034

Tue, Dec 01, 2020 03:52 PM

1 attachment

To : saravanankavitha02092011@gmail.com,
kannanrosa@gmail.com

From: "Hari Mohan Meena" <hari@bis.gov.in>

To: kannanrosa@gmail.com, saravanankavitha02092011@gmail.com

Sarav
4/11/2021

From : kannanrosa@gmail.com

Mon, Nov 09, 2020 01:33 PM

Subject : Re: Consent to participate in Research Project -
Determination of Total Dissolved Solids by
Instrumental Method in Packaged Drinking Water as
per IS 14543:2016

To : Hari Mohan Meena <hari@bis.gov.in>

Sir submitted 🙏

I here by accepting the willingness to join the project 🙏

Sent from my iPhone

On 09-Nov-2020, at 12:57 PM, Hari Mohan Meena <hari@bis.gov.in> wrote:

Dear Sir/ Madam,

Bureau of Indian Standards is the National Standard Body of India established under the BIS Act 2016 for the harmonious development of the activities of standardization, marking and quality certification of goods and for matters connected therewith or incidental thereto. BIS has been providing traceability and tangibility benefits to the national economy in a number of ways – providing safe reliable quality goods; minimizing health hazards to consumers; promoting exports and imports substitute; control over proliferation of varieties etc. through standardization, certification and testing.

Keeping in view, the interest of consumers as well as the industry, BIS is involved in various activities such as Standards Formulation, Product Certification Scheme, Compulsory Registration Scheme, Foreign Manufacturers Certification Scheme, Hall Marking Scheme, Laboratory Services, Laboratory Recognition Scheme, Sale of Indian Standards, Consumer Affairs Activities, Promotional Activities, Training Services at National & International level and Information Services. BIS Officials are doing various action research projects to meet the objectives.

In order to above, undersigned is working on a research project which is approved by Assessment Committee of Bureau of Indian Standards and registered as Unique Project Number: AR /0034. Project detail is mentioned below -

Title of the Action Research Project	Determination of total dissolved solid by instrumental method
Unique Identification Number of Project	AR /0034
Objective of the Projects	To Analyse suitability/ applicability of the TDS Meter Method for determination of Total Dissolved Solids in water to develop evidence-based strategies and mechanisms for the standards formulation.
Background of the Project	There is a test method (Gravimetric Method for determination of Total Dissolved Solids) available as per IS 3025 (part 16): 1984. This method is applicable

[Handwritten Signature]
4/11/2021

to all type of water and waste water. The precision of the method about 5 percent. Accuracy can not be estimated because filtrable residue as determined by this method is a quantity defined. Testing time of the method is very high and no instrumental test method is prescribed in Indian Standards. This Project may help to establish an instrumental method as routine method or referee method and may help to reduce the testing time with more precision and accuracy.

It may please be noted that sample or/and remnant of sample of Packaged Drinking Water (as available with you) as per IS 14543:2016 shall be used for this purpose and testing charges shall not be paid. Laboratory should be equipped with TDS Meter and no charges shall be paid for consumables and utilization of manpower.

Therefore, **I would request you to send your willingness/consent to participate in the above said Research Project.**

Thanking You,

With warm regards –

Hari Mohan Meena
Scientist -B (CNBO-II)
Bureau of Indian Standards, Southern Regional Office,
CIT Campus, IV Cross Road, Taramani, Chennai- 6000113
Mob. No. 9711204429
E-mail : hari@bis.gov.in

यदि आवश्यक नहीं हो तो कृपया इस परिपत्र को मुद्रित नहीं करे – पर्यावरण संरक्षण में अपना योगदान दें ।

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4/11/2021

Page 23 of 33

Re: Consent to participate in Research Project - Determination of Total Dissolved Solids by Instrumental Method in Packaged Drinking Water as per IS 14543:2016

From : ganesaaqua@gmail.com

Thu, Dec 03, 2020 10:08 AM

Subject : Re: Consent to participate in Research Project -
Determination of Total Dissolved Solids by
Instrumental Method in Packaged Drinking Water as
per IS 14543:2016

1 attachment

To : Hari Mohan Meena <hari@bis.gov.in>

Dear Sir

As participated in this research project Determination of Total Dissolved Solids by Instrumental Method in Packaged Drinking Water as per IS 14543:2016. we had enclosed our laboratory report.

Kindly find the attachment

With regards

G.Vinoth

Himalaya Products

Cm/I No: 6100054078

Vellore

On Tue, Dec 1, 2020 at 4:02 PM Hari Mohan Meena <hari@bis.gov.in> wrote:

Dear Sir/ Madam,

Thanks for your quick response and giving your willingness to participate in the Action Research Project - AR/0034. Please find the attachment for further action. It is requested to use your laboratory code along with lab name in further communication.

Name of Lab : Himalaya Products, Villupuram

Code of laboratory: BIS/HMM/IR82

I would request you to provide the required data (refer to attached sheet) by 10 December 2020.

Thanking You,

With warm regards –

Hari Mohan Meena

Scientist -B (CNBO-II)

Bureau of Indian Standards, Southern Regional Office,

CIT Campus, IV Cross Road, Taramani, Chennai- 6000113

Mob. No. 9711204429

E-mail : hari@bis.gov.in

From: ganesaaqua@gmail.com**To:** "Hari Mohan Meena" <hari@bis.gov.in>**Sent:** Monday, November 9, 2020 4:30:14 PM**Subject:** Re: Consent to participate in Research Project - Determination of Total

ganesaaqua
4/11/2021

Dissolved Solids by Instrumental Method in Packaged Drinking Water as per IS 14543:2016

Dear sir

With reference to the above subject matter we are agreed to participate in the Research Project - Determination of Total Dissolved Solids by Instrumental Method in Packaged Drinking Water as per IS 14543:2016.

Thanking you

With Regards

G.Vinoth

Partner

Himalaya Products

CM/L: 6100054078

No.158/8 ATD Nagar,

Arapakkam Village

Wallajah T.K

Ranipet DT

On Mon, Nov 9, 2020 at 1:46 PM Hari Mohan Meena <hari@bis.gov.in> wrote:

Dear Sir/ Madam,

Bureau of Indian Standards is the National Standard Body of India established under the BIS Act 2016 for the harmonious development of the activities of standardization, marking and quality certification of goods and for matters connected therewith or incidental thereto. BIS has been providing traceability and tangibility benefits to the national economy in a number of ways – providing safe reliable quality goods; minimizing health hazards to consumers; promoting exports and imports substitute; control over proliferation of varieties etc. through standardization, certification and testing.

Keeping in view, the interest of consumers as well as the industry, BIS is involved in various activities such as Standards Formulation, Product Certification Scheme, Compulsory Registration Scheme, Foreign Manufacturers Certification Scheme, Hall Marking Scheme, Laboratory Services, Laboratory Recognition Scheme, Sale of Indian Standards, Consumer Affairs Activities, Promotional Activities, Training Services at National & International level and Information Services. BIS Officials are doing various action research projects to meet the objectives.

In order to above, undersigned is working on a research project which is approved by Assessment Committee of Bureau of Indian Standards and registered as Unique Project Number: AR /0034. Project detail is mentioned below -

Title of the Action Research Project	Determination of total dissolved solid by instrumental method
Unique Identification Number of Project	AR /0034
Objective of the Projects	To Analyze suitability/ applicability of the TDS Meter Method for determination of Total Dissolved Solids in water to develop evidence-based strategies and mechanisms for the standards formulation.

[Handwritten Signature]
4/11/2021

ACTION RESEARCH PROJECT

BIS Action Research Project Unique Identification Number AR/0034

Name of the laboratory: HIMSON PRODUCTS, VELLORE

Code of the laboratory: BIS/HM/12.82

DETERMINATION OF TOTAL DISSOLVED SOLIDS BY INSTRUMENTAL METHOD

Sr. No.	Description of sample	TEST RESULT (obtained by using test method IS 3025 PART 16) - up to 4 decimal	TEST RESULT (obtained by using a TDS METER) - up to maximum decimal as possible	Method/Procedure followed by using TDS Meter (including type of TDS Meter)
	*PACKAGED DRINKING WATER	27	26.8	Please enclose a separate sheet

Alan B
TESTED BY

Use a portion of sample / remnant of sample of Packaged Drinking Water as per IS 14543:2016

[Signature]
AUTHORISED SIGNATORY
G. VISHWANATH (PRENSO),

[Signature]
11/11/2021

Re: Consent to participate in Research Project - Determination of Total Dissolved Solids by Instrumental Method in Packaged Drinking Water as per IS 14543:2016**From :** ganesaaqua@gmail.com

Mon, Nov 09, 2020 04:31 PM

Subject : Re: Consent to participate in Research Project -
Determination of Total Dissolved Solids by
Instrumental Method in Packaged Drinking Water as
per IS 14543:2016**To :** Hari Mohan Meena <hari@bis.gov.in>

Dear sir

With reference to the above subject matter we are agreed to participate in the Research Project - Determination of Total Dissolved Solids by Instrumental Method in Packaged Drinking Water as per IS 14543:2016.

Thanking you

With Regards

G.Vinoth

Partner

Himalaya Products

CM/L: 6100054078

No.158/8 ATD Nagar,

Arapakkam Village

Wallajah T.K

Ranipet DT

On Mon, Nov 9, 2020 at 1:46 PM Hari Mohan Meena <hari@bis.gov.in> wrote:

Dear Sir/ Madam,

Bureau of Indian Standards is the National Standard Body of India established under the BIS Act 2016 for the harmonious development of the activities of standardization, marking and quality certification of goods and for matters connected therewith or incidental thereto. BIS has been providing traceability and tangibility benefits to the national economy in a number of ways – providing safe reliable quality goods; minimizing health hazards to consumers; promoting exports and imports substitute; control over proliferation of varieties etc. through standardization, certification and testing.

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In order to above, undersigned is working on a research project which is approved by Assessment

[Handwritten Signature]
4/11/2021

Committee of Bureau of Indian Standards and registered as Unique Project Number: AR /0034.
Project detail is mentioned below -

Title of the Action Research Project	Determination of total dissolved solid by instrumental method
Unique Identification Number of Project	AR /0034
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It may please be noted that sample or/and remnant of sample of Packaged Drinking Water (as available with you) as per IS 14543:2016 shall be used for this purpose and testing charges shall not be paid. Laboratory should be equipped with TDS Meter and no charges shall be paid for consumables and utilization of manpower.

Therefore, I would request you to send your willingness/consent to participate in the above said Research Project.

Thanking You,

With warm regards –

Hari Mohan Meena

Scientist -B (CNBO-II)

Bureau of Indian Standards, Southern Regional Office,

CIT Campus, IV Cross Road, Taramani, Chennai- 6000113

Mob. No. 9711204429

E-mail : hari@bis.gov.in


यदि आवश्यक नहीं हो तो कृपया इस परिपत्र को मुद्रित नहीं करे – पर्यावरण संरक्षण में अपना योगदान दें ।

Do not print this mail, if you can avoid it- Help in conserving the environment.

From : Hari Mohan Meena <hari@bis.gov.in>

Mon, Nov 09, 2020 01:46 PM

Subject : Consent to participate in Research Project -
Determination of Total Dissolved Solids by
Instrumental Method in Packaged Drinking Water as


4/11/2021

Page 28 of 33

COMPARISON BETWEEN TEST RESULTS RECEIVED FROM TEST METHOD IS 3025 (PART16) & TDS METER

Type of Laboratories	Name of Laboratory	Sample	TEST RESULT (obtained by using test method IS 3025 PART 16)- mg/l	TEST RESULT (obtained by using a TDS METER)- mg/l	Variation in results (Percent)
Bureau of Indian Standards (SROL)	Southern Regional Office Laboratory, Chemical Lab	Sample 1	110.4	110.3	0.09
		Sample 2	58.4	58.1	0.51
		Sample 3	30.8	30.0	2.59
		Sample 4	87.6	85.3	2.62
		Sample 5	62.4	64.4	3.20
Manufacturer of Packaged Drinking Water	SINDYA AQUA MINERALE PVT LTD, TIRUVALLORE	Sample 1	8.0415	8.1	0.73
		Sample 2	8.0457	8.1	0.67
		Sample 3	8.0412	8.2	1.97
		Sample 4	8.1224	8.3	2.19
BIS-OSLs recognized for Packaged Drinking Water	Chennai Mettex Lab (P) Ltd., Chennai	Sample 1	106	106	0.0
Manufacturer of Packaged Drinking Water	Pure & Qure Aqua foods, Tiruchirappalli	Sample 1	39.175	40	2.10
Manufacturer of Packaged Drinking Water	HIMALAYA PRODUCTS, VELLORE	Sample 1	27	26.8	0.74

- Variation between test results reported by BIS- SROL is up to 3.2 percent.
- Variation between test results reported by SINDYA AQUA MINERALE PVT LTD is up to 2.19 percent.
- Variation between test results reported by Chennai Mettex Lab (P) Ltd. is up to –NIL
- Variation between test results reported by Pure & Qure Aqua foods is up to 2.10 percent.
- Variation between test results reported by HIMALAYA PRODUCTS is up to 0.74 percent.

Deepa
4/1/2021

REPEATABILITY OF TEST RESULTS RECEIVED USING TDS METER

Name of Laboratory	Sample code	Original test result (mg/l)	Repeated test result (mg/l)	Variation (mg/l)
BIS - SROL	Sample 1	30.0	30.0	0.0
BIS - SROL	Sample 2	64.4	64.4	0.0
BIS - SROL	Sample 3	58.1	58.0	0.1
BIS - SROL	Sample 4	85.3	85.0	0.3
BIS - SROL	Sample 5	110.3	109.9	0.4

As per
4/1/2021

Summary:

To identify suitability / applicability of TDS Meter for determination of total dissolved solids, study carried out among various laboratories i.e. BIS Labs, OSLs and manufacturers laboratories as mentioned below.

1. BIS, Southern Regional Office Laboratory, Chemical Lab
2. SINDYA AQUA MINERALE PVT LTD
3. Chennai Mettlex Lab (P) Ltd.
4. Pure & Qure Aqua foods
5. HIMALAYA PRODUCTS

Samples of packaged drinking water, which were already available with them, were tested by above laboratories for determination of total dissolved solids using test method available in Indian Standards i.e. 3025 (part 16) :1984 and using TDS meter. Test results comparing both methods collected from laboratories and analyzed to find out variation between results received from both methods. Detail of analysis mentioned in Annexure C/1.

A repeatability study also carried out in BIS, Southern Regional Office Laboratory (Chemical Lab) and detail of study report mentioned in Annexure C/2

Conclusion:

(A) On the basis of comparison of data (test results, Annexure C/1) received from various laboratories, it is observed that there is maximum variation between results received from both test methods (i.e. IS 3025 (part 16): 1984 and TDS Meter is up to 3.2 percent which is not significant.

(B) On the basis of repeatability study report (Annexure -C/2), it is observed that there is no significant variation between results received in repeatability study using TDS Meter. All results are repeatable.

In view of (A) & (B), it may please be construed that TDS Meter is suitable for determination of total dissolved solids in Packaged Drinking Water.

Signature
4/11/2021

Recommendation:

It is thus recommended to issue an amendment to IS 14543:2016 (Table 1, sr.no. v, method of test) indicating necessary incorporation of the TDS Meter as a method of test for determination of total dissolved solids in Packaged Drinking Water.

Joseph
4/1/2021

List of References

1. Indian Standards IS 14543:2016
2. Indian Standards IS 3025 (part 16):1984
3. Southern Regional Office Laboratory (Chemical Lab)
Bureau of Indian Standards, Chennai, Tamil Nadu
4. Chennai Mettlex Lab (P) Ltd
Guindy, Chennai, Tamil Nadu
5. SINDYA AQUA MINERALE PVT LTD,
Tiruvallur, Tamil Nadu
6. Pure & Qure Aqua foods,
Tiruchirappalli, Tamil Nadu
7. Himalaya Products,
Vellore, Tamil Nadu

Amma
4/1/2021