PRODUCT MANUAL
FOR PACKAGED DRINKING WATER
(OTHER THAN PACKAGED NATURAL MINERAL WATER)
ACCORDING TO IS 14543:2016

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	**Product**	:	IS 14543:2016
	Title	**:**	Packaged Drinking Water (other than Packaged Natural Mineral Water)
	No. of Amendments	:	4
2.	**Introduction and Salient changes in this version of the manual**	:	Please refer Annex -A
3.	**Product Specific Guidelines:**		
a)	**Guidelines for processing Applications for grant of licence and change in scope of licence**	:	Please refer Annex –B
b)	**Guidelines for Surveillance**	:	Please refer Annex – C
c)	**Guidelines for actions in case of non-conformity including suspension and revocation of suspension of licence**	:	Please refer Annex – D
4.	**List of Test Equipment**	:	Please refer ANNEX –E
5.	**Scheme of Inspection and Testing**	:	Please refer ANNEX –F
6.	**Guidelines for Special Situations**	:	Please refer ANNEX –G
6.	**Scope of the Licence :**		
	"Licence is granted to use Standard Mark as per IS 14543:2016 with the following scope:		
	Name of the product		Packaged Drinking Water (other than Packaged Natural Mineral Water)
	Varieties (Packaging)		Mention material (PE/PET/PVC/Glass etc.), type of containers (cup/bottles/jars etc.) and capacities in ml or litres (500 ml/1 litre/20 litres etc.) For example: PET Bottles of 500 ml, 1litre, 1.5 litre capacity and/or PET Jars of 20 litres capacity

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Annexure A
Salient changes in this version of the manual

1. The first edition Manual for Packaged Water, which provided internal guidelines to BIS Certification officers for certification of Packaged Drinking Water (Other Than Packaged Natural Mineral Water) (PDW) and Packaged Natural Mineral Water (PNMW) was issued in 2005. Following changes in the standard and feedback obtained during certification, the second and third editions of this Manual were issued in 2007 and 2013, respectively.

2. Following the revision of the BIS Act, 1986 as the BIS Act, 2016 in March 2017 and subsequent issue of general guidelines for certification based on the Act and regulations framed thereunder, it was decided to prepare a Scheme of Inspection and Testing (SIT) as per the provisions of the new regulations for both PDW/PNMW. Accordingly, SITs for both PDW and PNMW were issued in 2018-19.

3. Subsequently, it was also felt that the Manual for Packaged Water also needs to be revised to align with the provisions of the existing Indian Standard, and the BIS Act, with a view to consolidate the various guidelines for certification of packaged water in a single, user-friendly document. Accordingly, in line with the practice for other products, separate product manuals for PDW and PNMW have been framed. This document pertains only to PDW manual, the PNMW manual is being issued separately.

4. Other salient changes in this version of the PDW manual are as follows:

   i. The manual has been updated with respect to various amendments to IS 14543 and guidelines issued from time to time. The latest SIT has also been incorporated.

   ii. The list of test equipment has been updated as per revised test methods wherever applicable; and the list of test equipment for Bromate has been included.

   iii. Sample size for testing of packaging material has been revised.

   iv. As per Guidelines for Grant of Licence (GoL) as per the conformity assessment Scheme – I of Schedule – II of BIS (Conformity Assessment) Regulations, 2018, the provision for grant of licence under option 2 (simplified procedure) has been excluded.

   v. It has been specified that the compliance of source of water and process adopted by the manufacturer for treatment/disinfection of the water shall be verified and details thereof reported during preliminary inspection.

   vi. In line with CMD-2 circular dated 16.09.2019 conveying DDG (Certification)'s instructions regarding testing of market samples of reusable containers of Packaged Drinking Water, it has now been specified that separate samples of containers need not be drawn during factory and market surveillance for testing. The possible tests on containers will be carried out on the containers of the samples of packaged water drawn for chemical/microbiological/other tests during market surveillance.

   vii. In order to align with the change in scope of licence (inclusion) process, it has now been permitted that at the grant of licence stage, the applicant may offer only (at least) one sample of packaged

water in any one variety of packaging along with conforming tests reports issued by BIS recognized labs for the other varieties of packaging/containers intended to be covered in the scope of the licence. (Test reports may not be required in case containers are ISI marked)

viii. It has been decided that non-conformity of containers shall not be treated at par with non-conformity of drinking water, since the criticality of the former is lower. Accordingly, it has now been specified that although consecutive non-conformity will attract suspension in case of water sample, in case of non-conformity of containers, suspension will be attracted only in case the same variety of container (i.e. same material, type and capacity of container) fails more than two times consecutively. However, first failure will attract suspension in case of parameters concerning radioactive residues.

ix. As per the previous Water Manual, if a fresh application has been submitted after closure of earlier application or expiry/cancellation of earlier licence and the closure of application/licence was for reasons other than failure in radioactive residues, fresh sample of water need not be drawn for testing of radioactive residues, if evidence is available that the source of raw water remained the same as that in earlier application/licence, provided that radioactive residue TR of the sample drawn by BIS during verification visit passes and is not older than five years. The earlier test reports of sample drawn by BIS (not older than five years) shall be accepted within a period of five years. This provision has been removed in this version since present regulations/guidelines do not permit acceptance of applications based on old test reports.

x. Given instances of manufacturers opting for packaging of water in glass bottles as part of a shift from use of plastics, the issue of use of glass bottles has been addressed. It has been specified that as there is presently no Indian Standard for glass bottle/tumbler, such containers need not be tested. However, if any manufacturer intends to use such container, it shall be included in the licence. The separate processing line for filling the glass bottles may be verified by BIS during the next surveillance visit and necessary steps in the process for ensuring sterility of bottles may be adopted like steam sterilizing, hot water rinsing, UV sterilization or combination thereof. In case of lug caps containing plastic lining, food grade certificate or OSL report for migration testing may be accepted.

xi. In the latest SIT, the requirement of having separate chemists and microbiologist was done away with. In line with that decision, it has been specified in the product manual that separate chemist and microbiologist may not be insisted upon and one testing person may be allowed in case he/she is found competent for both chemical and microbiological testing and shall be duly recorded in PIR.

xii. Guidelines for special situations faced in certification of packaged water have been addressed (Annex G) covering aspects like change in source of raw water, shelf life, brand name/label approvals. It has been specified that in case the brand name/trademark submitted by the firm is a registered brand name/trademark, no objection to its use shall be raised even if the brand name/trademark is found to be in non-compliance to Clause 7 of IS 14543. However, in such a case, the Head BO concerned shall communicate the details of such cases to CMD-2 for taking up with the concerned authorities.

Annex B

Product Specific Guidelines for processing applications for grant of licence and change in scope of licence

B-1. Application for grant of licence

i. Domestic manufacturers of PDW shall apply for grant of licence for his unit online through the Manakonline system as per the provided application format i.e. as per Form V as specified in Scheme I of Schedule II of BIS (Conformity Assessment Regulations), 2018. (Presently foreign applications under FMCS are being processed on offline mode).

ii. Applications will only be accepted under option 1, i.e. after receipt of the application and ensuring completeness of the application, a visit will be paid by BIS to the factory of the applicant for assessment of the manufacturing infrastructure, production process, quality control and testing capabilities, and sample will be drawn for testing in third party laboratory.

B-2 Preliminary Inspection

B-2.1 During preliminary inspection, the documents/aspects as mentioned in general GoL guidelines shall be verified and the observations recorded in the Preliminary Inspection Report in the format circulated by CMD (General Format applicable for all products i.e. CM/PF 251, 201, 211 Feb 2018).

B-2.2 The actual factory layout shall be verified against the layout submitted with application. The layout should clearly indicate the different locations preferably including the following:

a) Bore well or entry point for the source of raw water, pipeline etc.
b) Raw water storage facility
c) Plant for the manufacture of the product (with various stages)
d) Filling/packing areas, change room, toilet(s),
e) Entry/exit with indications of double door/door closures/Air curtains wherever provided
f) Stores for packaging material and finished product
g) Laboratory
h) Actual boundary/perimeter of the establishment
i) If the premises are also used for residential quarters/other purposes, then specific mention of the same be made with identified locations.

B-2.3 As product is under mandatory certification, it is unlikely to be in “production” during PI. It is therefore essential to get some production & filling/packing done during the visit and then make comments on the firm’s capability for the same.

B-2.4 It should be clearly reported in the PIR as to whether the filling/packaging adopted are manually operated or automatic. It may be noted that the plastic cups, tumbler, pouch are required to be filled only through automatic machine.

B-2.5. In addition, the following product specific aspects shall also be verified and observations recorded in the Preliminary Inspection Report or in an Annexure to that report:

i. Availability of all manufacturing facilities including filling and/or packaging machinery for the varieties applied for to be verified and observations recorded;

ii. Compliance to hygienic practices as per Annex B of IS 14543, to be verified and **observations to be recorded as per Checklist at Annex C of IS 14543.**

iii. As per Cl 5.1.1 of IS 14543:2016, Water shall be derived from surface water or civic water supply or underground water or sea water or any other consistent source of water. **Source of Water shall be identified and observations reported in the Preliminary Inspection report (e.g. Civic Water supply or Borewell water)**

iv. As per Cl 5.1.1 of IS 14543:2016, source water shall be subjected to specified treatments, namely, decantation, filtration, combination of filtration, aerations, filtration with membrane filter depth filter, cartridge filter, activated carbon filtration, demineralization, remineralization, reverse osmosis and packed after disinfecting the water to a level that shall not lead to any harmful effect in the drinking water by means of chemical agents or physical methods to reduce the number of micro-organisms to a level below scientifically accepted level for food safety or its suitability: Provided that sea water, before being subjected to the above treatments, shall be subjected to desalination and related processes. **Nature of treatments/disinfection processes and observations thereon to be reported (This may be mentioned in the process flowchart submitted.)**

v. **In case the manufacturer conducts remineralization as part of treatment process, the ingredients shall be of food/pharma grade quality.** The test certificate indicating the individual ingredients and the respective compositions of each mineral/ingredient in the product shall be submitted by the applicant at the at the time of application for our examination and same shall be and enclosed with the report. If remineralization is part of treatment process, DO has to record the same to reflect in RF at the time of recommendation.

vi. Availability of required testing facilities, as per the ISS should be verified and recorded. The test equipment should have valid calibration on the day of the visit. Calibration should be done from NABL accredited laboratory or any other laboratory provided traceability to NPL is established through the calibration certificates. Calibration of Analytical Balance, temperature indicators, pressure gauge of autoclave and spectrophotometer (internal/in-house or from an outside lab.) is considered necessary at least once a year. Indicative List of test equipment and chemicals required for testing of packaged water is given at **Annex E** for guidance**. Status of test equipment calibration observed from calibration certificates should be reported.**

vii. Testing person(s) shall be science/engineering graduate from disciplines such as chemistry/chemical engineering/ microbiology/ biotechnology/ biochemistry/ food technology/ botany and other biological/ life sciences. Engineering graduates from disciplines such as chemical engineering may also be engaged as testing persons. **Availability of testing person(s), his/her competence, qualifications and experience shall be verified and reported.** One testing personnel may be allowed in case he/she is found competent for both chemical and microbiological testing and if so, this shall be duly recorded in PIR.

B-3 Factory testing

B-3.1 One sample of the product shall be tested in the factory during the preliminary inspection for preferably following requirements**:** Description, Colour, Odour, Taste, Turbidity, pH, Chloride, Alkalinity, and Residual Free Chlorine.

B-3.2 In case any non-conformity is observed during factory testing, no sample shall be drawn for independent testing in third party lab. (Please refer Annex D for guidelines to be followed in case of non conformity)

B-4 Sample for Independent Testing

B-4.1 If the sample passes in factory testing, sample of packaged drinking water shall be drawn and sent for complete testing for **all requirements** of the Indian Standard. The following details should be mentioned in the test request (generated through Manakonline):

i. Date of processing/packing and batch number;

ii. Best Before Date;

iii. Quantity (number of containers and total quantity of packaged water in litre or milliliter),

iv. Type, material and capacity of containers

v. Declared wall thickness of container(s)/width of film of pouch

B-4.2 However, in case the manufacturer intends to cover more than one variety of packaging in the scope of licence, he need not offer samples of each variety of packaging during the factory visit (preliminary inspection) for testing in third party lab. However, it shall be ensured that the manufacturing facilities for manufacturing other packing sizes (if applicable) like moulding machines, etc, are available. He may offer sample of the product in at least one variety of packaging, along with either:

a. Conforming tests reports issued by BIS recognized labs for the other varieties of packaging/containers intended to be covered in the scope of the licence. These test reports shall not be older than 90 days on the date of submission of application. OR

b. In case the applicant uses/intends to use ISI Marked Plastic Containers as per IS 15410 he may submit a consent letter from the BIS licensed manufacturer as per IS 15410 that he has agreed to supply ISI Marked plastic containers for the required varieties (to be explicitly mentioned in the letter) to the applicant firm, in that case test reports from third party labs need not be submitted for those varieties. The letter shall not be older than 90 days on the date of submission of application. The test certificates of the containers issued as per IS 15410 by BIS licensed manufacturer required to be submitted at the time of submission of application / before inspection for our examination.

B-4.3 In case the applicant is adopting more than one type of processes/sources of raw water, separate samples shall be drawn for each process/source.*(* In the event of more than one bore well /open well located in the same premises, they shall be considered as a single source for the purpose of drawing of sample of Packaged Drinking Water as well as for exercising quality control, provided there is only one processing line.)

B-4.4 The sample quantity to be sent to the third party lab for testing is as follows:

i) Packaged Water

a) For all parameters other than radioactive residues - A sample containing approximately 18 litres of packaged water (PDW) in two parts is adequate, if packed in 1 liter or smaller containers but in case the samples are available in large size packages, minimum two such packages are required as microbiological laboratory needs separate sample for ensuring aseptic handling. For example:

Capacity of the container (cup/bottle/jar) in litres	Number of containers to be drawn
1	18
2	9
5	4
10	2
20	2
25	2

For Pouches: 2 bags/cartons each containing atleast 50 pouches.

For Parameters concerning Radio-active Residue

In addition to the above, sample shall also be drawn for testing parameters concerning radioactive residues. A sample of 10 litres is adequate.

ii) **Sample of packaging material (containers)**

Bottles

200ml – 30(empty with caps) + 9(filled)+40 caps

250ml – 27 (empty with caps) + 9 (filled) + 40 (caps)

500ml – 24 (empty with caps) + 9 (filled) +40 caps

1 liter – 21 (empty with caps) + 9 (filled) + 40 caps

2 litre – 18 Empty (with caps) + 8 (filled) + 40caps

5 litre and above – 7 Empty (with caps) + 8 (filled) + 25 caps

Pouches: 1 bag of 50 filled pouches + 18 meter film+ 10 Nos. of Preformed pouches of dimension 125 mm X 200 mm.

Cup/Glass along with peelable seal: 37 (Empty) + 15 (filled) + 18 meter film of peelable seal + 8 preformed pouches of 125 mm x 200 mm of peelable seal.

Note 1: The pouches shall be made in the presence of BIS officer, during inspection, and, may be printed with only details like batch number, date of manufacturing, best before date, capacity, using ink to be used by the manufacturer for marking on the pouches. This will facilitate testing of pouches for ink adhesion

test and product resistance test. This is being allowed as manufacturer cannot get the pouch film rolls printed with all other details such as Standard Mark etc. before the GOL.

Note 2: As there is presently no Indian Standard for glass bottle/tumbler, such containers need not be tested. However, if any manufacturer intends to use such container, it shall be included in the licence. The separate processing line for filling the glass bottles may be verified by BIS during the next surveillance visit and necessary steps in the process for ensuring sterility of bottles may be adopted like steam sterilizing, hot water rinsing, UV sterilization (except in case of PNMW) or combination thereof. In case of lug caps containing plastic lining, food grade certificate or OSL report for migration testing may be accepted.

Note 3: Effort shall be made, as far as possible, to send samples without the manufacturer's identification and/or markings. Any label and/or manufacturer's identification from the bottles/Jars shall be removed or defaced.

Note 4: The manufacturer's declaration with respect to the minimum wall thickness of the container shall be obtained and shelf life of product the same mentioned in the test request.

B-5 Change in Scope of Licence

B-5.1 For the purpose of certification of PDW, change in scope of licence pertains only to addition/deletion of the varieties of packaging covered in the scope of the licence.

B-5.2In case a licensee intends to add new varieties of packaging in scope of licence, he shall submit an application in the Form – XIV along with requisite fee and relevant documents.

B-5.3 In addition, he shall submit conforming third party lab test report(s) of samples of each variety of the packaging (i.e. each material (PET/PE etc.), form or type (cup/bottle/jar) and capacity in ml or litres) intended to be added to the scope of licence.

B-5.4 In addition to these guidelines, Guidelines for Grant of Licence (GoL) and Change in Scope of Licence (CSoL) as per the conformity assessment Scheme – I of Schedule – II of BIS (Conformity Assessment) Regulations, 2018 issued by CMD-1 shall be followed.

Annexure C

Guidelines for Surveillance

Surveillance consists of two activities in case of Packaged water certification i.e. surveillance visits at factory premises (which includes testing of sample drawn from factory) and drawl of samples from the market for third party lab testing. Product Specific guidelines for these are as follows:

C-1. Factory Surveillance

C-1.1 During factory surveillance visit, the compliance to the requirements of the SIT and ISS shall be verified and the observations recorded in the Report of Periodic Inspection in the format circulated by CMD (General Format applicable for all products),

C-1.2 However, in addition, the following product specific aspects shall also be verified and observations recorded in the Report of Periodic Inspection or in an Annexure to that report:

i. Any change in manufacturing facilities including filling and/or packaging machinery for the varieties applied for to be verified and observations recorded;

ii. Compliance to hygienic practices as per Annex B of IS 14543 to be verified and observations to be recorded as per Checklist at Annex C of IS 14543.

iii. Any change in Source of Water shall be checked for and reported. Any observations including non-compliance to IS requirements to be reported (*e.g. No change in source of water OR change in source of water from borewell to civic water supply, in compliance with IS*)

iv. Any change in nature of treatments/disinfection processes to be verified and observations including compliance thereon to be reported (This may be mentioned in the process flowchart submitted.)

v. **In case the manufacturer conducts remineralization as part of treatment process, any change in the ingredients shall be checked for and reported. Further, the ingredients shall be of food/pharma grade quality.** The test certificate indicating the individual ingredients and the respective compositions of each mineral/ingredient in the product shall be obtained from the manufacturer and enclosed with the report. The licensee shall not modify the process without obtaining the consent of BIS. For obtaining consent, they shall submit process flow chart indicating the change in process and declare the addition of machineries if any. Necessary verification of process and machinery shall be done during the next surveillance visit.

vi. Availability of required testing facilities, as per the ISS should be verified and recorded. Any change in the test facilities should be checked for and reported. The test equipment should have valid calibration on the day of the visit. Calibration should be done from NABL accredited laboratory or any other laboratory provided traceability to NPL is established through the calibration certificates. Calibration of Analytical Balance, temperature indicators, pressure gauge of autoclave and spectrophotometer (internal/in-house or from outside lab.) is considered necessary at least once a year. Indicative List of test equipment and chemicals required for

testing of packaged water is given at **Annex E** for guidance**. Status of test equipment calibration observed from calibration certificates should be reported.**

vii. Any change in **testing person(s) should be checked for and reported along with comments on the competence, qualifications and experience.**

viii. Compliance to requirements of SIT shall be verified and observations reported.

C-2 Factory testing

C-2.1 One sample of the product shall be tested in the factory during the preliminary inspection for preferably following requirements**:** Colour, Odour, Taste, Turbidity, pH, Chloride, Alkalinity, and Residual Free Chlorine.

C-2.2 In case any non-conformity is observed during factory testing, no sample shall be drawn for independent testing in third party lab. (Please refer Annex D for actions to be taken in case of non-conformity)

C-3 Sample for Independent Testing

C-3.1 If the sample passes in factory testing, sample of packaged drinking water shall be drawn and sent for complete testing for **all requirements** of the Indian Standard IS 14543:2016 **except the parameters concerning radioactive residues**. The following details should be mentioned in the test request (generated through Manakonline):

i. Date of processing/packing and batch number;

ii. Best Before Date;

iii. Quantity (number of containers and total quantity of packaged water in litre or milliliter),

iv. Type, material and capacity of containers

v. Declared wall thickness of container(s)/width of film of pouch

C-3.2 In case the applicant is adopting more than one type of processes/sources of raw water, samples shall be drawn for each process/source by rotation during factory surveillance.*(* In the event of more than one bore well /open well located in the same premises, they shall be considered as a single source for the purpose of drawing of sample of Packaged Drinking Water as well as for exercising quality control, provided there is only one processing line.)

C-3.3 The sample quantity to be sent to the third party lab for testing is as follows:

i) Packaged Water

For all parameters other than radioactive residues - A sample containing approximately 18 litres of packaged water (PDW/PNMW) in two parts is adequate, if packed in 1 liter or smaller containers but in case the samples are available in large size packages, minimum two such packages are required as microbiological laboratory needs separate sample for ensuring aseptic handling. For example:

Capacity of the container (cup/bottle/jar) in litres	Number of containers to be drawn
1	18
2	9
5	4
10	2
20	2
25	2

For Pouches: 2 bags of 100 pouches each + Film. A sample of 4 bags shall be drawn in case each bag contains 50/60 pouches.

C-4 Market Surveillance

C-4.1 While obtaining samples of Packaged water from the market, it should be ensured that the samples being drawn are bearing genuine ISI mark. This may be done by checking the licence number printed on the label. In case it is found that the ISI mark is spurious, the sample shall not be drawn for testing and suitable action should be initiated for further investigation.

C-4.2 For sending the market sample to the lab for testing, the following details should be mentioned in the test request (generated through Manakonline):

i. Date of processing/packing and batch number;

ii. Best Before Date;

iii. Quantity (number of containers and total quantity of packaged water in litre or milliliter),

iv. Type, material and capacity of containers

C-4.3 Separate samples of containers need not be drawn during market surveillance for testing. The possible tests on containers (including transparency) will be carried out on the containers of the samples of packaged water drawn for testing requirements as per IS 14543 excluding PR and RAR. This shall be mentioned on the test request.

C-4.4 The sample quantity to be sent to the third party lab for testing is as follows:

i) Packaged Water

For all parameters other than radioactive residues – A sample containing approximately 18 litres of packaged water (PDW/PNMW) in two parts is adequate, if packed in 1 liter or smaller containers but in case the samples are available in large size packages, minimum two such packages are required as microbiological laboratory needs separate sample for ensuring aseptic handling. For example:

Capacity of the container (cup/bottle/jar) in litres	Number of containers to be drawn
1	18
2	9

5	4
10	2
20	2
25	2

For Pouches: 2 bags of 100 pouches each + Film. A sample of 4 bags shall be drawn in case each bag contains 50/60 pouches.

Annexure D

Guidelines for actions in case of non-conformity including suspension and revocation of suspension of licence

D-1.1 Guidelines for Suspension (SUS) and Revocation of Suspension (ROS) of Licence – For Scheme - I of Schedule - II of BIS (Conformity Assessment) Regulations, 2018 issued by CMD-1 shall apply in case of packaged water. In addition, the following product specific guidelines will apply. Wherever the general and product-specific guidelines are in conflict, the product specific guidelines will take precedence.

D-1.2 Non Conformity of Samples

Non-conformity of containers/packaging material shall not be treated at par with non-conformity of drinking water, since the criticality of the former is lower. Accordingly, non-conformity in case of drinking water and containers/packaging material shall be treated separately as follows:

D-1.2.1 **Non-conformity of drinking water (IS 14543)**

i) Suspension shall be imposed in the event of consecutive non-conformity of samples of drinking water. However, suspension shall be imposed on first non-conformity itself if the non-conformity of drinking water is in respect of parameters concerning radioactive residues or pesticide residue or toxicity.

ii) For other situations, in case of first non-conformity, the non-conformity shall be communicated to the licensee through email/speed post/IT software with a copy of the test report (as per template given in Annex I of SUS/ROS guidelines). The licensee shall be advised to take corrective action and submit reply with supporting evidence, as applicable, within 30 days (one month) of the date of communication.

iii) When the corrective actions as mentioned at para ii above, are received within 30 days (one month), the DO shall put up the case to the Head BO for nominating an officer for verification of the corrective actions preferably within 90 days through a surveillance inspection.

iv) If during the surveillance inspection, the sample is non-conforming in factory testing, it shall be treated as consecutive non-conformity and suspension shall be imposed and actions for communication of suspension as per para 10 of SUS/ROS guidelines shall be taken.

v) However, if corrective actions as mentioned at para ii are not received within 30 days (one month), the case may be processed for imposition of suspension.

D-1.2.2 Non-conformity of container or packaging material (IS 15410 etc)

i) <u>First non-conformity</u>

a) For containers/packaging material, in case of **first non-conformity**, the non-conformity shall be communicated to the licensee through email/speed post/IT software with a copy of the test report (as per template given in Annex I of SUS/ROS guidelines). The licensee shall be advised to take corrective action and submit reply with supporting evidence, as applicable, within 30 days (one month) of the date of communication and offer improved samples for testing.

b) When the corrective actions as mentioned at para (a) above, are received within 30 days (one month), the DO shall put up the case to the Head BO for nominating an officer for verification of the corrective actions preferably within 90 days through a surveillance inspection.

c) Since factory testing of containers during surveillance visit may not be feasible in most cases as most manufacturers are procuring containers from outside and do not have in-house testing facilities, the corrective action shall be verified from documents etc as far as possible and improved sample of container shall be drawn for testing for all requirements of the standard (i.e. IS 15410) in third party lab during surveillance visit.

ii) <u>Second non-conformity (First consecutive non-conformity)</u>

a) Non-conformity is to be considered as consecutive in case of containers only when the same variety of containers (i.e. the same material, type/form and capacity) is found to be non-conforming consecutively and hence suspension shall not be imposed in the first instance of consecutive non conformity in case of container. The non-conformity shall be communicated to the licensee through email/speed post/IT software with a copy of the test report (as per template given in Annex I of SUS/ROS guidelines). The licensee shall be advised to take corrective action and submit reply with supporting evidence, as applicable, within 30 days (one month) of the date of communication and offer improved samples for testing.

b) When the corrective actions as mentioned at para (a) above, are received within 30 days (one month), the DO shall put up the case to the Head BO for nominating an officer for verification of the corrective actions preferably within 90 days through a surveillance inspection.

c) Since factory testing of containers during surveillance visit may not be feasible in most cases as most manufacturers are procuring containers from outside and do not have in-house testing facilities, the corrective action shall be verified from documents etc as far as

possible and improved sample of container shall be drawn for testing for all requirements of the standard (i.e. IS 15410) in third party lab during surveillance visit.

iii) <u>Third non-conformity (Second Consecutive Non Conformity)</u>

Suspension shall be imposed in case of second instance of consecutive non-conformity of the same variety of containers i.e. third consecutive non-conformity of same variety of container and actions for communication of suspension as per para 10 of SUS/ROS guidelines shall be taken.

iv) Suspension shall also be imposed in case improved sample offered after second non conformity (first consecutive non-conformity) fails in factory or independent testing or if licensee fails to confirm corrective actions within 30 or days and/or offer improved sample during the visit, and actions for communication of suspension as per para 10 of SUS/ROS guidelines shall be taken

v) Revocation of suspension shall be done as per the general Guidelines for Suspension (SUS) and Revocation of Suspension (ROS) of Licence.

D-2 Unsatisfactory performance

D-2.1 In case the following situations are observed, it shall be treated as major modification in process without prior evaluation of the Bureau and shall attract suspension on the first instance itself:

i) Change of source of raw water without evaluation of the Bureau other than the one outside the licensed premises not evaluated by BIS (However, In the event of more than one bore well /open well located in the same premises, they shall be considered as a single source for the purpose of drawing of sample of Packaged Drinking Water as well as for exercising quality control, provided there is only one processing line.)

ii) Modification in the process with or without any change in raw water source, without prior evaluation of the Bureau. (Any addition or deletion of processing machinery eg. Tanks/RO/Filling machine, etc for capacity enhancement or otherwise, which does not change the overall manufacturing process, will not constitute as modification in the process. A declaration regarding the same may be taken during surveillance in Form-I.)

Annexure E

LIST OF TEST FACILITES

A-ORGANOLEPTIC AND PHYSICAL REQURIMENTS

SI. No.	Tests	Clause Ref. of IS 14543	Referred Method of Tests & Limit of Detection	Test /Equipment /Apparatus	Chemical/Regents
(1)	(2)	(3)	(4)	(5)	(6)
1.	**Colour**	5.3, Sl No. i) of Table 1	IS 3025 (Part 4) i) Platinum cobalt (Visual Comparison method)	Nessler cylinders,50 ml Centrifuge or filter assembly, functional pore size 0.45µm	• Potassium chloroplatinate • Cobaltous chloride, crystalline • Conc. Hydrochloric acid • Distilled water
			ii) Spectrophoto-metric method	• Spectrophotometer,400-700 nm with 10 mm absorption cell • Filteration system consisting of filteration flask with side tubes. • Crucible holder • Micrometallic filter crucible, pore 40 µm • Calcined filter aid (Celite 505 or equivalent • Vacuum system • Refrigerator (recommended) • pH meter • Centrifuge	• Conc. Sulphuric acid • Sodium hydroxide
2.	**Odour**	5.3, SI No, iii) of Table 1	IS 3025 (P 5)	• Wide mouth glass stoppered bottles (approx.1 lit. capacity)	• Odour free distilled water (or distilled water and column of granulated activated carbon) • Hydrochloric acid
3.	**Taste**	5.3, Sl. No. iii) of table 1	IS 3025 (P 8)	Breaker (50ml) Water bath Thermometer	Taste and Odour free water 2000 mg/l solution of sodium chloride
4.	**Turbidity**	5.3, Sl. No. iv) of Table 1	IS 3025 (P 10)	• Sample tubes • Turbidity meter	• Distilled water • Hexamethylene Tetramine

				• Volumetric flasks (100 ml) • Membrane filter with pore size not more than 0.45 µm	• Hydrazine sulphate
5.	**Total dissolved solids**	5.3, Sl No. v) of Table 1	IS 3025 (P 16)	• Filter: • Filtering Assembly (suitable for type of filter selected) • Drying oven (180 ± 2˚C) • Desiccator • Analytical balance (200 g capacity, l.c. 0.1 mg) • Pipettes • Evaporating dish • Magnetic stirrer, recommended • Conductivity meter.	
6	**pH**	5.3, Sl No. vi) of Table 1	IS 3025 (P 11)	• pH meter – with glass and reference electrode (saturated calomel) l.c 0.1 • Magnetic stirrer with polytetrafluoro ethylene coated stirring bar • Thermometer (l.c. 0.5°C • Beakers	• Standard pH Buffer solutions/tablets (Buffer tablets pH 4, pH 7, pH 9.2) (Minimum two different values) OR • Distilled water • Borax (for Borax buffer) • Potassium dihydrogen phosphate, Sodium hydrogen phosphate and oven (for phosphate buffer) • Potassium hydrogen tartarate (for Tartarate buffer) Potassium hydrogen phthalate (for Phthalate buffer) Potassium tetraoxalate dihydrate (for Calcium hydroxide buffer) • Calcium Carbonate • Platinum dish, • Muffle furnace, • Hot Plate, • Fritted glass filter of medium porosity, polyethylene bottle,

					Suction pump & fritted glass funnel (for Tetra oxalate buffer) • Methyl orange, methyl red, bromothymol blue, phenolphthalein and alcohol (66%) (for universal indicator) • Thymol blue indicator (acid range) Bromophenol blue indicator • Bromocresol green indicator Methyl red indicator • Bromocresol purple indicator Bromothymol blue indicator Phenol Red indicator • Cresol Red indicator • Thymol Blue (alkali range) indicator • Thymolphthalein indicator • Thymol violet indicator • Different buffer solutions of known pH

B - CHEMICAL REQUIREMENTS

SI. No.	Tests	Clause Ref. of IS 14543	Referred Method of Tests & Limit of Detection	Test /Equipment /Apparatus*	Chemical/Regents
(1)	(2)	(3)	(4)	(5)	(6)
1.	**Barium**	5.3, Sl. No i) of Table 2	i) Annex G of IS 13428	Filter paper and filtration assembly Hot plate/gas burner	• Ammonium Dichromate • Ammonium Acetate • Ammonium Hydroxide • Potassium Iodide • Sodium Thiosulphate (0.1N) • Hydrochloric Acid • Ammonium Chloride • Starch indicator
			ii) IS 15302	• Atomic Absorption Spectrophotometer and • Associated equipment (Burner, Readout mechanism, lamp for Barium, Pressure Reducing valves and vents) • Nitrous oxide burner head • T-junction valve or other switching valve • Air • Acetylene Gas • Nitrous oxide gas	• Metal free water • Hydrochloric Acid • Nitric Acid • Sulphuric Acid • Hydroflouric Acid • Potassium Chloride • Standard barium solution 100µg/ml (Barium chloride, oven, hydrochloric acid)

			iii) IS 3025 (P 2)	• Induction Coupled Plasma-Atomic Emission • Spectrometer • Sample Bottles • Glasswares • Acid Dispensers • Membrane Filtration Equipment and Filters (0.45µ) • Hot Plate • Argon Gas	• Nitric Acid • Hydrogen Peroxide • Sulphuric Acid • Hydrochloric acid • Ammonium Sulfate • Stock Solution of Barium
2.	**Copper**	5.3, Sl No. ii) of Table 2	i) IS 3025 (P 42)		
			a) Neocuproine Method **Detection range 0.05 to 5.0mg/l**	• Spectrophotometer & 1cm cell Hot plate • Separating funnels (125 ml) • Conical flasks	• Ammonium Hydroxide • Chloroform, AR Grade • Hydrochloric acid, Conc. • Hydroxylamine Hydrochloride • Isopropyl Alcohol • Neocuproine • Double Distilled water • Nitric Acid, Conc. • Sulphuric Acid, Conc. • Hydrated Sodium Citrate • Stock copper (II) solution 200µg/ml (Pure Copper Metal, hot plate) • Hydrogen Peroxide
			b) Atomic Abso-rption Method (Direct) **Detection range 0.02 to 5.0mg/l**	• Atomic Absorption Spectro- photometer with air-acetylene flame & Copper Hollow Cathode lamp	• Hydrochloric Acid, Conc • Nitric Acid, Conc. • Dilute Sulphuric Acid • Stock copper (II) solution – 1.0mg/ml • (Pure Copper metal & hot plate)

			c) Atomic Absorption Method (Chelation Extraction) **Detection range 0.02 to 5.0mg/l**	• Atomic Absorption Spectrophotometer with air-acetylene flame • Copper Hollow Cathode Lamp Separating Funnel • Volumetric Flasks • Distillation Assembly	• Hydrochloric Acid, Conc. • Nitric Acid, Conc. • Pyrrolidine • Dithiocarbamic acid • Methyl Isobutyl Ketone, AR grade • Carbon Disulphide • Sodium Hydroxide • Distilled water • Water Standard MIBK • Bromophenol Blue • Ethanol or Isopropanol • Stock copper (II) solution – 1.0mg/ml • (Pure Copper metal & hot plate)
			d) Differential Pulse Anodic Stripping Voltametry **Detection range 0.01 to 0.1mg/l**	• Polarograph capable of Performing differential pulse work • Hanging Mercury Drop electrode • Platinum Counter Electrode • Saturated Calomel Reference Electrode • Magnetic Stirrer • Control unit with Stirring Bar • Scrubber Assembly • Whatman Filter Paper No. 40 • Nitrogen Gas	• Hydrochloric Acid Conc. (Spectro Grade) • Nitric Acid-Conc. (Spectro Grade) • Sulphuric Acid Conc. • Pure Copper Metal • Granular Zinc • Mercury

			ii) IS 3025 (Part 2)	• Induction Coupled Plasma-Atomic Emission Spectrometer • Sample Bottles • Glasswares • Acid Dispensers • Membrane Filtration Equipment and Filters (0.45µ) • Hot Plate • Argon Gas	• Nitric Acid • Hydrogen Peroxide • Sulphuric Acid • Hydrochloric acid • Ammonium Sulfate • Stock Solution of Copper
3.	Iron	5.3, Sl. No iii) of Table 2	i) IS 3025 (P 53) a) 1,10 Phenanthroline Method **Detection range 0.075 to 0.5mg/l** i) **This requirement is not applicable for Packaged Natural Mineral Water**	• Spectrophotometer • Std. volumetric glass wares • Hot Plate • Fuming Hood • 0.45µ m Membrane Filter with Filtration Assembly	• Amalgamated Zinc (Granular Zinc and Mercury) • Ammonium Meta Vanadate Distilled water • Hydrochloric Acid-Conc. (Containing less than 0.00005% iron) • Hydroxylamine Hydrochloride • Ammonium Acetate • Glacial Acetic Acid • Sodium Acetate • 1,10 Phenanthroline Monohydrate • Stock Iron Solution 1ml=200µg of Fe (Conc. Sulphuric Acid, • Ferrous Ammonium Sulphate, • Potasssium Permanganate) • Std. Iron Solution (1.0 ml=1.0µg of Iron) Di-isopropyl Ether

			b) Atomic Absorption Method (DIRECT) **Detection range 0.1 to 10 mg/l**	• Atomic Absorption Spectrophotometer • Air Acetylene Flame • Iron Hollow Cathode Lamp or Electrodeless discharge lamp for use at 248.3nm • Volumetric Flasks	• Distilled water • Hydrochloric Acid, Conc. Nitric Acid, Conc. • Sulphuric Acid, Conc. • Calcium Chloride Solution (Calcium Carbonate, Hydrochloric acid) • Stock Iron Solution (1.0 ml=100µg of Fe) (Pure iron wire, Hydrochloric acid Nitric Acid)
			ii) IS 15303 Electrothermal Atomic Absorption Spectrometric Method **Minimum detection limit 0.001mg/l**	• Atomic Absorption Spectrometer • Hollow Cathode lamp for Iron • Graphite Furnace • Readout Mechanism • Sample Dispenser • Vent for fumes • Cooling device • Membrane Filter, 0.45µm	• Metal free water • Hydrochloric Acid, Conc. • Nitric Acid, Conc. • Matrix Modifier stock solutions • Matrix Modifier stock solutions • (Magnesium Nitrate, Nickel Nitrate, Phosphoric Acid, Palladium Nitrate & Citric Acid) • Stock iro**n** Solution – 100µg/ml (Iron wire) • Sodium hydroxide 10N • Chelating resin
			iii) IS 3025 (Part 2)	• Induction Coupled Plasma-Atomic Emission Spectrometer • Sample Bottles • Glasswares • Acid Dispensers • Membrane Filtration Equipment and Filters(0.45µ) • Hot Plate • Argon Gas	• Nitric Acid • Hydrogen Peroxide • Sulphuric Acid • Hydrochloric acid • Ammonium Sulfate • Stock Solution of Iron

4.	**Manganese**	5.3, SI. No. iv) Table 2	i) IS 3025 (Part 59) a) Periodate Colorimetric Method **Detection limit up to 0.2mg/l**	• Nessler's Tubes • Beakers • Hot Plate • Volumetric flask • Pipettes • Conical Flasks • Burette	• Sulphuric Acid • Hydrogen Peroxide (30%) • Nitric Acid, Conc. • Stabilized Distilled Water OR • Distillation Assembly, OR • Distilled water, • Potassium Permanganate and • Dil Sulphuric Acid • Phosphoric Acid (sp. Gr. 1.75) • Potassium Periodate • Std. Manganese Solution • (1ml=0.02 mg of Mn) (Standard 0.1 N Potassium Permanganate solution, saturated solution of sulphur dioxide)
			b) Formaldoxime Spectrometric Method **Detection limit between 0.01mg/l to 5 mg/l**	• Spectrophotometer • Glass Bottle • Autoclave	• Fluoride Free Water • Potassium Peroxodisulphate or Sodium Peroxodisulphate • EDTA Tetrasodium Salt, Solution, c(EDTA) • Sodium Hydroxide • Hydroxyl ammonium Chloride • Formaldehyde • Ammonia Solution • Ammonium Iron (II) Sulphate Hexahydrate Solution • Sulphuric Acid, conc. • Manganese Monohydrate (for Standard Mn Solution)
			ii) IS 3025 (Part 2)	• Induction Coupled Plasma-Atomic Emission Spectrometer • Sample Bottles • Glasswares • Acid Dispensers • Membrane Filtration Equipment and Filters (0.45µ) • Hot Plate • Argon gas	• Nitric Acid • Hydrogen Peroxide • Sulphuric Acid • Hydrochloric acid • Ammonium Sulfate • Stock Solution of Iron

5.	**Nitrate (as NO_3)**	5.3, Sl. No. v) of Table 2	IS 3025 (Part 34)		
			i) Cadmium Reduction Method **Detection limit maximum 0.1 mg/l**	• Reduction Column • Colorimeter OR • Spectrophotometer OR • Filter photometer Glass wool • 0.45 µm pore diameter membrane filter • Refrigerator	• Distilled water • Nitrate free water • Cadmium granules (40 – 60 mesh) • Hydrochloric Acid (6N) • Copper Sulphate Solution • Sulphanilamide • Conc. Hydrochloric Acid • N-(1-napthyl))-Ethylenediamine dihydrochloride (NED) Dihydrochloride) • Ammonium Chloride • Disodium Ethylene diamine tetra acetate • Ammonia Solution • Copper sulphate Solution – 2% Stock nitrate solution – 100µg/ml • (Potassium Nitrate & Chloroform) • Chloroform • Stock nitrite solution - 100µg/ml • (Potassium Nitrite & Chloroform) • Nitrite free water
			ii) Chromotropic Acid Method	• Spectrophotometer • Standard laboratory glasswares	• Nitrate free water • Stock Nitrate Solution - 100µg/ml (Potassium Nitrate, Chloroform) • Standard Nitrate solution – 10.0µg/ml

					• Sulphite Urea Reagent (Urea & Anhydrous sodium Sulphite) • Antimony reagent (Antimony metal, Conc. Sulphuric acid) • Chromotropic Acid Reagent (Purified chromotropic Acid crystals, Conc. Sulphuric Acid) • Sulphuric Acid, Conc. Nitrate free
			iii) Devarda's Alloy Reduction Method **Detection limit minimum 2 mg/l**	• Distillation Assembly (Kjeldahl Assembly) • Measuring Scoop spectrophotometer	• Ammonia Free Water • Borate Buffer Solution (0.1N Sodium Hydroxide, 0.025M Sodium Tetraborate) • Sodium Hydroxide – 6 N • Devarda's Alloy – 20 mesh with less than 0.005 percent Nitrogen • Mixed indicator Solution (Methyl Red indicator, Ethyl alcohol/Isopropyl alcohol, Methylene Blue) • Indicating Boric Acid Solution (Hydroboric Acid, mixed indicator solution) • Std. Sulphuric Acid Titrant - 0.02 N • Nessler's Reagent (Mercuric Iodide, Potassium Iodine. Sodium Hydroxide) • Stock Ammonia Solution -1.22mg ammonia/ ml (Anhydrous Ammonium ammonia/ ml (Anhydrous Ammonium Chloride) • Standard Ammonia Solution
6.	**Nitrite**	5.3, Sl. No. vi) of Table 2	IS 3025(Part 34)	• Spectrophotometer / Photometer OR • Nessler's cylinders method • Nessler's Tubes • 0.45 µm Membrane Filter • Distillation Assembly (borosilicate)	• Nitrite Free water (Distilled water, Hydroxide/Calcium Hydroxide Conc. Sulphuric Acid, Manganese Sulphate) • Sulphanilamide Reagent • NED Dihydrochloride • Hydrochloric Acid • Sodium Oxalate – 0.05 N.

					• Ferrous Ammonium Sulphate – 0.05N (Ferrous Ammonium Sulphate, Conc. Sulphuric Acid, Std. Dichromate solution) • Stock Nitrite Solution - 250µg of nitrogen/ml (Sodium Nitrite, Chloroform, Sodium Oxalate, Std., Potassium Permanganate solution) • Intermediate Nitrite Solution – 50.0µg/ml • Standard Nitrite Solution – 0.500µg/ml
7.	**Flouride**	5.3, Sl. No. vii) of Table 2	IS 3025(Part 60) i) Zirconium alizarin Method **Detection range 0.05 to 1.0 mg/l**	• Nessler Tubes (100ml)Distillation Apparatus • Refrigerator (Recommended) • Heating mantle	• Thiosulphate Solution (0.1 N) • Standard Sodium Fluoride Solution (1ml = 0.01 mg F) • Zirconium Oxychloride OR Zirconium Oxynitrate • Alizarin Sodium Monosulphonate (AlizarinS) • Conc. Hydrochloric Acid • Conc. Sulphuric Acid • Silver Sulphate • Perchloric Acid • Phenolphthalein Indicator • Sodium Hydroxide Solution
			ii) Electro Chemical Probe Method **Detection range 0.2mg to 2.0 g/l**	• Millivolt Meter • Fluoride Ion – Selective Electrode • Reference Electrode – Either a calomel electrode, filled with saturated Potassium Chloride (KCl) Solution or a Silver / Silver Chloride Electrode • Measuring Cells – 100ml(Polypropylene fitted with thermostated jacket) • Water Bath • Magnetic Stirrer with a polytetrafluoroethylene(PTFE) • Polyethylene Beaker • pH meter	• Sodium Hydroxide- 5 M • Total Ionic Strength Adjustment Buffer (TISAB)-[Sodium Chloride, Glacial Acetic Acid, Sodium Hydroxide, CDTA(trans -1,2- diaminocyclohexane – N,N,N',N' tetra acetic acid)] • Fluoride, Stock Solution, 1000mg/1 (Sodium Fluoride) Note :

				• Standard Volumetric • Glasswares • Desiccator • Screw Capped Polyethylene Container • Plastic Bottle	Purity of the reagent – Unless specified otherwise, only pure chemicals & Fluoride free distilled water shall be used in tests.
8.	**Zinc**	5.3, Sl. No. viii) of Table 2	IS 3025 (Part 49) with Am 1 i) Zincon Method **Detection range 0.02 to 5 mg/l**	Spectrophotometer (620 nm with 1cm cells)	• Sodium Hydroxide • Potassium Cyanide • Cyclohexanone • Distt. Water • Zincon • Methanol • Sodium Ascorbate • Borate Buffer Solution (Sodium Hydroxide, Potassium Chloride, Boric Acid) • Hydrochloric Acid, Conc. • Zinc Sulphate
			ii) Atomic Absorption Method (Direct) **Detection range 0.01 to 2.0mg/l**	• Atomic Absorption Spectrophotometer with Air-Acetylene Flame • Hollow Cathode Lamp Or Electrodeless discharge lamp	• Hydrochloric Acid, Conc. • Nitric Acid, conc. • Stock Zinc Solution – 1.0mg/m (Zinc Granules/Zinc Oxide)
			iii) Atomic Absorption Method (Chelation-Extraction) **Detection range 0.001 to 0.2mg/I**	• Atomic Absorption Spectrophotometer with Air-Acetylene Flame • Hollow Cathode Lamp	• Hydrochloric Acid, Conc. • Nitric Acid, Conc. • Pyrrolidine Dithio Carbamic Acid - Chloroform Reagent (Pyrrolidine, Chloroform, Carbon disulphide) • Sodium Hydroxide • Chloroform • Bromophenol Blue Indicator (Bromophenol Blue, Ethanol or Isopropanol) • Stock Zinc (II) Solution- 1.0 mg/ml (Zinc Oxide Granules or Zinc Oxide, Nitric Acid)

			iv) Differential Pulse Anodic Stripping Voltammetry (DPASV)Method **Detection range 0.001 to 0.1mg/l**	• Polarographic Instrumentation Capable of Performing Differential Pulse Work • Hanging Mercury Drop Electrode • Platinum Counter Electrode • Saturated Calomel Reference Electrode • Magnetic Stirrer	• Hydrochloric Acid, Conc. • Nitric Acid, Conc • Stock Zinc Solution -1.0mg/ml • Amalgamated Zinc (Granular Zinc, Conc. Hydrochloric Acid, Mercury) • Purified Nitrogen (Ammonium Meta Vanadate, Scrubber, Amalgamated Zinc, Nitrogen Gas)
9.	**Silver**	5.3, Sl. No. ix) of Table 2	Annex K of IS 13428	• Atomic Absorption Spectrophotometer with Oxidizing Air Acetylene Flame	• Deionised Distilled Water (Ion Exchange Column & Distilled Water) • Nitric Acid – Redistilled • Hydrochloric Acid – Redistilled • Silver Std. Solution (Silver Nitrate) • Lanthanum Chloride • Lanthanum Stock Solution (Lanthanum Oxide, Hydrochloric Acid) • Ammonium Pyrrolidine Dithiocarbamate solution) • Methyl isobutyl ketone
10.	**Aluminium**	5.3, Sl. No. x) of Table 2	i) IS 3025(Part 55) a) Eriochrome Cyanine R Method **Detection range 0.02 to 0.3mg/l;** **This requirement is not applicable for Packaged Natural Mineral Water**	• Spectrophotometer (535 nm with 1cm Cells) • Standard Volumetric Glasswares	• Sulphuric Acid – 0.02 N and 6 N • Ascorbic Acid Solution • Buffer Solution (Sodium Acetate & 1 N Acetic Acid) • Glacial Acetic acid 1N • Sodium Hydroxide Solution – 0.1 N and 1N • Stock Eriochrome Cyanine R Dye Solution • Stock Aluminium Solution – 500 µg/l (Aluminium Potassium Sulphate) • Methyl Orange Indicator solution

			b) Atomic Absorption Method (Director) **Detection range 5 to 100mg/l**	• Atomic Absorption Spectrophotometer with Nitrous Oxide – Acetylene Flame and Nitrous Oxide – Acetylene Flame and Hollow-Cathode Lamp- • Standard Volumetric Glasswares	• Hydrochloric Acid, Conc. • Nitric Acid, Conc. • Potassium Chloride Solution • Stock Aluminium Solution - 500 µg/l (Aluminium Potassium Sulphate)
			ii) IS 15302 Direct Nitrous Oxide – Acetylene Flame Atomic Absorption Spectrometry **Detection limit 0.1mg/l**	• Atomic Absorption Spectrometer • Burner • Read Out Mechanism • Lamp (Hollow Cathode or EDL) • Pressure Reducing Valves • Vent • Nitrous Oxide Burner Head • T-Junction Valve or Other Switching Valve • Air (Compressor or Bottled Gas) • Acetylene, Standard Commercial Grade • Nitrous Oxide Gas	• Metal Free Meter • Hydrochloric Acid – 1 N • Nitric Acid, Conc. • Sulphuric Acid • Hydrofluoric Acid – 1 N • Potassium Chloride • Aluminium Nitrate • Standard Aluminium Solution - 100 µg/l (Aluminium Metal)
11.	**Chloride**	5.3, Sl. No .xi) of Table 2	IS 3025 (Part 32) i) Argentometric Method	• Erlenmeyer Flask (250ml) • Burette	• Potassium Chromate Indicator Solution (Potassium Chromate, Silver Nitrate) • Standard Silver Nitrate Solution – 0.01 N (silver nitrate, sodium chloride) • Standard Sodium Chloride Solution – 0.01 N (Sodium Chloride) • Aluminium Hydroxide Suspension (Aluminium Potassium Sulphate or Aluminium Ammonium Sulphate, Conc Ammonium Hydroxide) • Phenolphthalein Indicator Solution • Sodium Hydroxide – 1N • Sulphuric Acid – 1N • Hydrogen Peroxide – 30%

			ii) Mercuric Nitrate Method	• Erlenmeyer Flask (250 ml) • Microburette (5 ml with l.c. 0.01ml) • Refrigerator • pH meter	• Standard Sodium Chloride Solution, 0.01N • Nitric Acid, 0.1N • Sodium Hydroxide, 0.1N • Indicator – Acidifier Reagent (S-Diphenyl- carbazone, Conc. Nitric Acid, Xylene Cyanol FF, Ethyl Alcohol or Isopropyl Alcohol) • Standard Mercuric Nitrate Solution, 0.01N (Mercuric Nitrate, Conc. Nitric Acid, Sodium Bicarbonate, Std. Sodium Chloride Solution) • Mixed Indicator Reagent (Diphenylcarbazone, Bromo Phenol Blue, Ethyl Alcohol or Isopropyl Alcohol) • Standard Mercuric Nitrate Solution – 0.1N
			iii) Potentiometric Method	• Glass and Silver- Silver Chloride Electrodes • Electronic Voltmeter • Mechanical Stirrer	• Standard Sodium Chloride Solution (0.01N) • Nitric Acid-Conc • Standard Silver Nitrate Solution (0.01N) • Pretreatment Reagent (Sulphuric Acid, Hydrogen Peroxide, Sodium Hydroxide – 1 N)
			iv) Automated Ferricyanide Method	• Automated Analytical Equipment • Filters (480nm)	• Stock Mercuric Thiocyanate Solution (Mercuric Thiocynate, Methanol) • Stock Ferric Nitrate Solution (Ferric Nitrate, Conc. Nitric Acid) • Colour Reagent (Poly oxy Ethylene 23 Lauryl Ether) • Sodium Chloride

12	**Selenium**	5.3, Sl. No. xii) of Table 2	i) IS 3025 (Part 56) a) Spectrophotometric Method (Diamino naphthalene Method) **Detection limit minimum 0.01mg/l**	• Spectrophotometer (480nm,light path of 1cm • Volumetric Glasswares • Separating Funnel (250ml) Preferably • Flourocarbon Stopcock • Water Bath – Thermostatically Controlled • pH Meter • Centrifuge • Centrifuge Bottles with Flourocarbon Screw Cap	• Stock Selenium Solution – 1.0mg/ml (Sodium Selenite, Hydrochloric Acid) • Hydrochloric Acid – 0.1N • Ammonium Hydroxide,1:1Cyclohexane • 2,3 – Diaminonaphthalene (DAN) • Hydroxylamine Hydrochloride • Sodium Salt of EDTA • Amberlite XAD -8 or Equivalent Resin • Hydrochloric Acid, Conc • Potassium Hydroxide
			b) Atomic absorption Spectrometric Method (Hydride Technique)	• Atomic Absorption Spectrometer (196.0 nm) Fitted with Hydride System and Hollow Cathode Lamp/Electrodeless Discharge Lamp • Gas (Argon or Nitrogen) • Glasswares Decomposition Apparatus (Round Bottom Flask, Reflux Condenser, Condensate Reservoir)	• Nitric Acid • Sulphuric Acid • Hydrochloric Acid • Hydrogen Peroxide • Sodium Hydroxide • Sodium Tetrahydro borate • Selenium Stock Solution (1mg/ml) (Selenium Dioxide)
13	**Sulphate**	5.3, Sl. No. xiii) of Table 2	IS 3025 (Part 24) i)Gravimetric Method **Detection limit more than 10mg/l**	• Steam Bath • Drying Oven (thermostatically controlled) • Muffle Furnace • Desiccator • Analytical Balance (l.c.0.1mg) • Filter Paper (Preferably Whatman No.42) • Silica or Porcelain Crucible (max pore size of 5 microns) • Ion Exchange Column • Filter (0.45 µ m) • Platinum Dish	• Methyl Red Indicator • Hydrochloric Acid • Barium Chloride • Silver Nitrate • Nitric Acid • Ion Exchange Resin (Amberlite IR-120 or Equivalent)

			ii) Thorin Method **Detection range 5 to 150mg/l**	• White Porcelain Basin • Burette • Ion Exchange Column • Filter – 0.45µm	• Ethyl Alcohol • Ammonium Hydroxide (Ammonia-Conc and Distilled Water) • Hydrochloric Acid • Thorin (2,2 – Hydroxy – 3,6 – Disulpho – 1 – Naphthylazo Benzene Arsenic Acid) • Ion Exchange Resin (Amberlite IR-120 or Equivalent**)** • Stock Sulphate Solution – 100 mg/l (Anhydrous Sodium Sulphate)
			iii) Turbidity Method **Detection limit 1 to 40mg/l**	• Turbidity Meter or Spectrophotometer`(420nm) • Glass Apparatus • Hot Plate • Refrigerator (recommended) • Filter – 0.45µm	• Barium Chloride – Standard Solution (Barium chloride in hydrochloric acid ammonia) • Barium Chloride • Gelatin Powder • Glycerol • Hydrochloric Acid, Conc • Sodium Chloride • Ethyl or Isopropyl Alcohol • Anhydrous Sodium Sulphate • Stock sulphate solution – 100mg/l
14	**Alkalinity**	5.3, Sl. No. xiv) of Table 2	IS 3025 (Part 23) i) Indicator Method **Detection range 0.5 to 500mg/l**	• pH Meter • Burette • Magnetic Stirrer Assembly • Beaker	Distilled Water • Sulphuric Acid, Conc • Sulphuric Acid, 0.02 N • Phenolphthalein Indicator • Mixed Indicator Solution (Methyl Red, • Bromocresol Green, Ethyl or Isoprophyl Alcohol)
			ii)Potentiometric Method **Detection range 0.5 to 500mg/l**	• Potentiometer • Glasswares	• Standard Sulphuric Acid – 0.02N

15	**Calcium**	5.3 Sl. No. xv) of Table 2	i) IS 3025 (Part 40) a) EDTA Titrimetric Method	• Hot Plate • Glassware • Polyethylene Bottle	• Sodium Hydroxide Solution – 1N • Hydrochloric Acid – 0.1N • Indicator Solution:Murexide (Ammonium Purpurate) Indicator, Absolute Ethylene Glycol • Sodium Chloride **OR** • Patton and Reeder's Indicator (Eriochrome Blue Black R, Sodium Sulphate/Potassium Sulphate) • Standard EDTA Solution – 0.01M (Disodium Ethylene Diamine Tetra – Acetate, Standard Zinc Solution, (Or Standard Calcium Solution) Buffer Solution, Eriochrome Black T Indicator Solution • Stock Calcium Solution (Calcium Carbonate, Hydrochloric Acid – 0.1N) • Nitric Acid, Conc
			b) Atomic Absorption Spectrometric Method **Detection limit maximum 50mg/l**	• Atomic Absorption Spectrometer (422.7 nm) with Air/Acetylene or Nitrous Oxide/Acetylene Flame and Hollow Cathode Lamp (Calcium)	• Hydrochloric Acid – 1N and 0.1N • Lanthanum Chloride • Cesium Chloride • Standard Calcium Solution
			c) Permanganate Titration Method	• Beakers, Cover Glass, and Glass Rod Filtration Set up (Gooch Crucible with Suction) • Hot plate	• Hydrochloric Acid – 1N • Methyl Red Indicator Solution • Ammonium Oxalate Solution • Urea • Dilute Sulphuric Acid – 1N • Sodium Oxalate • Standard Potassium • Permanganate Solution (Potassium permanganate, sodium oxalate)

			ii) IS 3025 (Part 2) Inductively Coupled Plasma Atomic Emission Spectroscopy (a e s) **Detection limit 0.1 mg/l**	• ICP AES (315.887 nm) including – • computer controlled a e s with background correction • radio frequency generator • argon gas supply (welding grade or better) • Sample bottles • Glassware (beakers, filter funnels, volumetric flasks, pipettes) • acid dispensers • Membrane filtration equipment • Filter of pore size 0.45 microns	• Nitric Acid • Hydrogen Peroxide • Sulphuric Acid • Hydrochloric Acid • Ammonium Sulphate • Distilled Water • Calcium Stock solution (10 mg/l)
16	**Magnesium**	5.3, Sl No. xvi) of Table 2	i) IS 3025 (Part 46) a)Gravimetric Method **Detection limit more than 1 mg/l**	• Vacuum Pump • Filter Flasks • Filter Crucibles (medium porosity, 30 ml) • Muffle Furnace • Hot plate • Volumetric Flasks • Glasswares	• Methyl Red Indicator • Hydrochloric Acid • Ammonium Oxalate • Ammonium Hydroxide • Nitric Acid, Conc • Diammonium Hydrogen Phosphate • Urea
			b) Volumetric Method (EDTA)	• Hot plate • Volumetric Flasks • Glasswares	• Indicator Solutions i)Patton and Reeder Reagent, Sodium Chloride/Potassium Chloride ii) Murexide (Ammonium Purpurate), Absolute Ethylene Glycol, Sodium Chloride iii) Eriochrome Black T Indicator (EBT Indicator), Hydroxylamine, Hydrochloride, Ethanol/Methanol • Standard Zinc Solution – 0.01M (Pure Zinc Dust/Granules – 99.9% Pure; Hydrochloric Acid)

					• Buffer Solution (Ammonium Chloride, Ammonia, Sodium Hydroxide-1N) • Standard Ethylene Diamine Tetra Acetic Acid (EDTA) Solution – 0.001M (Disodium Ethylene Diamine Tetra Acetate Dihydrate, Standard Zinc Solution) • Triethanolamine Solution – 10% Potassium Cyanide • Hydroxlamine Hydrochloride
			c) Atomic Absorption Method **Detection limit max 5 mg/l**	• Atomic Absorption Spectrophotometer (285.2 nm) with Air-Acetylene Flame or Nitrous Oxide-Acetylene Flame and Hollow Cathode Lamp (Magnesium) • Polyethylene Bottles	• Hydrochloric Acid – 1N and 0.1N • Lanthanum Chloride (Lathanum Oxide, Hydrochloric Acid, Conc) • Cesium Chloride • Standard Magnesium Solution (1000mg/l) (Magnesium Oxide, Hydrochloric Acid)
			ii) IS 3025(Part 2) Inductively Coupled Plasma Atomic Emission Spectroscopy **Detection limit 0.03 mg/l**	ICP AES (279.079nm) including - computer controlled aes with background correction radio frequency generator argon gas supply (welding grade or better) • Sample bottles • Glassware (beakers, filter funnels, • volumetric flasks, pipettes) acid dispensers • Membrane filtration equipment	• Nitric Acid • Hydrogen Peroxide • Sulphuric Acid • Hydrochloric Acid • Ammonium Sulphate • Distilled Water • Magnesium Stock solution (10 mg/l)
17	**Sodium**	5.3, Sl No. xvii) of Table 2	i) IS 3025 (Part 45) a)Flame Emission Photometric Method anyone of the following applicable detection range:(0 to 1)mg/lit(1 to 10)mg/lit (0 to 100)mg/lit	• Flame Photometer (Direct Reading OR Internal Standard Type) **OR** Atomic Absorption Spectrophotometer (In Flame Emission Mode)	• Deionized Distilled Water • Stock Sodium Solution – 1mg/ml (Sodium Chloride) • Standard Lithium Solution – 1mg/ml

			b)Atomic Absorption Spectrometry Method **Detection range 0.20 to 4.0mg/l**	• Atomic Absorption Spectrophotometer with Air-Acetylene Flame and Hollow Cathode Lamp (Sodium) • Glassware • Beakers (20ml, Borosilicate)	• Sodium Chloride • Potassium Chloride • Stock Sodium Solution – 1mg/ml • Stock Potassium Solution – 1mg/ml
			c)Gravimetric Method	• Fritted Glass Crucible or Porous Porcelain Crucibles • Vacuum Pump or Aspirator • Filter paper • Pyrex bottle • Stirring rod	• Zinc Uranyl Acetate Reagent (Glacial Conc. Acetic Acid, Uranyl Acetate Dihydrate, Zinc Acetate Dihydrate, Sodium Chloride) • Ethyl Alcohol Wash Solution (Ethyl Alcohol, Pure Sodium Zinc Uranyl Acetate, Sodium Chloride, Acetic Acid, Diethyl Ether)
			ii) IS 3025(Part 2)	• Oven • Membrane filtration equipment and filters(0.45µm) • Inductively coupled plasma atomic emission spectrometer; Computer controlled AAS with background correction, Radiofrequency Generator, Argon Gas supply(welding grade or better) • pH meter • PTFE container • PTFE sample bottles(250 ml or 500ml) • Acid dispensers, Variables	• Nitric acid • Hydrogen peroxide • Sulphuric acid • Ammonium sulphate • Sodium Stock solution
18	**Residual Free Chlorine**	5.3, Sl No. xviii) of Table 2	IS 3025 (Part 26) Stabilized Neutral Ortho-Toluidine Method **Detection range 0.005 to 0.01mg/l**	• Spectrophotometer (with light path of 1cm cell or longer for ≤ 1 mg/ l) • Magnetic Stirrer Assembly • Refrigerator (Recommended) • pH meter	• Distilled Water – Chlorine Demand Free (Distilled Water, Chlorine) • Neutral Ortho-Toluidine Reagent • (Hydrochloric Acid – Conc, Mercuric Chloride, Disodium Salt of EDTA – • Dehydrated, Ortho-Toluidine Dihydrochloride Buffer Stabilizer Reagent (Dipotassium Hydrogen

			This requirement is not applicable for PNMW	• Brown Glass Stoppered Bottles	Phosphate, Potassium Dihydrogen Phosphate, Di (2-Ethyl Hexyl) Sulphosuccinate, • Diethylene Glycol Monobutyl ether Potassium Iodide Solution (Potassium Iodide Sulphuric Acid Conc. Sodium Carbonate Sodium Arsenite Standard Chlorine Solution (Chlorine Gas & Distilled Water OR Hypochlorite Distilled Water OR Hypochlorite Solution) Sodium Thiosulphate Solution – 0.025N)
19	**Mineral Oil**	5.3, Sl No. xx) of Table 2	**Clause 6 of IS 3025 (Part 39)** Partition Infra-Red Method **Detection limit 0.5 to 100 mg/l**	• Separating Funnel (1lit) with Teflon or Equivalent Stopcock • Infra-Red Spectrophotometer – Double Beam, Recording type • Cells – Infra-Red, Silica • Filter Paper – Whatman No.40 or Equivalent, 11cm Diameter • Analytical Balance	• Hydrochloric Acid • Hexane • Sodium Sulphate, Anhydrous • Reference Oil (Iso-Octane, Hexadecane, Benzene) • Trichlorotrifluoroethane
20	**Anionic Surface Active Agents (as MBAS)**	5.3, Sl No. xxi) of Table 2	Annex L of IS 13428 **Detection limit about 0.05 mg/l**	• pH Meter • Spectrophotometer (650 nm) 10mm & 50mm cells • Gas Stripping Apparatus (1 lit Capacity) • Nitrogen Air (20 ltr/hr to 50 ltr/hr) • Reflux Condenser • Fuming hood • Water bath	• Sodium Chloride • Ethyl Acetate • Al_2O_3 • Chloroform • Ethanol • Methanol • Sulphuric Acid • Ethanolic Sodium Hydroxide-0.1 mol/lit (Sodium Hydroxide, Ethanol) • Methylene Blue, Neutral Solution • Methylene Blue, Acidic Solution • Buffer Solution, pH 10 (Sodium Hydrogen Carbonate, Anhydrous Sodium Carbonate)

					• Phenolphthalein Indicator, Ethanol Dodecyl Benzene Sulphonic Acid Methyl Ester (Tetrapropylene Type), Stock Standard Solution
21	**Sulphide**	5.3, Sl. No. xxii) of Table 2	IS 3025 (Part 29) i) Iodometric Method **Detection limit above 1 mg/l**	• Glass Fibre Filter Paper. • Reaction Flask (1 lit capacity with 2 hole stopper fitted with gas-diffusion tube. • Absorption flasks (250ml Capacity) (2 No's) • Nitrogen/Carbon dioxide gas cylinder Or Carbon dioxide gas generator	• Zinc acetate solution – 2N • Sulphuric Acid, Conc. • Standard Iodine solution – 0.025 N • (Potassium Iodide, Iodine) Hydrochloric Acid, Conc. Standard Thiosulphate Solution - 0.025 N (Sodium thiosulphate, Sodium Hydroxide/Chloroform) • Starch indicator solution (Starch, salicylic acid, toluene) • Aluminium Chloride solution – 6N • Sodium hydroxide – 6N
			ii) Methylene blue Method D**etection limit upto 20 mg/l**	• Spectrophotometer (664 nm) or filterphotometer (600 nm). • Matched test tubes • Droppers • Dark glass bottle.	• N, N-dimethyl-p-Phenylene Diamine oxalate • Sulphuric Acid, Conc. & 1:1 solution • Ferric Chloride • Diammonium Hydrogen Phosphate • Methylene Blue • Standard Sulphide Solution • Zinc acetate
22	**Antimony**	5.3 Sl. No. xxiii) of Table 2	i) Annex H of IS 13428 Spectrophoto-metric Method	• Spectrophotometer (565 nm) • Erlenmeyer Flask (125ml) • Separating Funnels (125 ml) with Teflon • Stopcocks • Refrigerator • Ice Bath • Test Tubes • Pipettes	• Hydrochloric Acid – 6 N • Phosphoric Acid – 3N • Rhodamine B • Antimony Standard • Solution (100 µg/ml and 1 ug/ml (pure antimony, sulphuric acid) • Benzene • Sulphuric Acid • Perchloric Acid
			ii) IS 15303	• Atomic Absorption Spectrometer with • Hollow Cathode Lamp **OR**	• Metal free Water • Hydrochloric Acid, Conc. • Nitric Acid, Conc.

			Electrothermal Atomic Absorption Spectrometric Method	• Electrodeless discharge lamp (EDL). • Graphic Furnace • Readout Mechanism • Microlitre Pipettes-5 to 100 µl. **OR** • Automatic sampling device designed for the specific instrument. • Vent for Fumes • Cooling Device • Membrance Filter Apparatus (0.45µm) or smaller pore diameter membrane filters.	• Matrix Modifier Stock Solutions (Magnesium Nitrate, Nickel Nitrate, Phosophoric Acid, Palladium Nitrate, Citric Acid) • Stock Metal Solution • Antimony Solutions (100 µg/m Sb) • Iron-100µg Fe • Selenam-1.00 mg Sb • Chelating Resin • Sodium hydroxide -10 N
23	**Borates**	5.3, Sl. No. xxiv) of Table 2	Annex J of IS 13428	• Spectrometer (410 – 420nm) • Lab Apparatus made of Polypropylene/Polyethylene/Polytetra fluoro Ethylene • Refrigerator	• Azomethine – H, Sodium Salt • L - Ascorbic Acid • Buffer Solution (pH 5.9) [Ammonium Acetate, Sulphuric Acid, Phosphoric Acid, Citric Acid, Disodium Ethylene diamine – Tetraacetic Acid Dihydrate] • Borate Stock Solution - (1mg/ml) (Boric Acid) • Boron Standard Solution - 10µg/ml • Calcium Hydroxide
24	Bromate	5.3, Sl. No. xxv) of Table 2	IS 3025 (Part 67)	• Ion chromatographic system • Cartridges • Concentrator Column • Separator Column	• Sodium hydrogen carbonate, $NaHCO_3$. • Sodium carbonate,Na_2CO_3 • Disodium tetraborate decahydrate, • Boric acid • Potassium bromate • Nitric acid, • Sulfuric acid • Ethylenediamine, • Eluents • Bromate stock solution • Bromate standard solution

C- REQUIREMENTS FOR TOXIC SUBSTANCES

SI. No.	Tests	Clause Ref. of IS 14543	Referred Method of Tests & Limit of Detection	Test /Equipment /Apparatus	Chemical/Regents
(1)	(2)	(3)	(4)	(5)	(6)
1	**MERCURY**	5.3, Sl. No. i) of Table 3	IS 3025 (Part 48) i) Cold Vapour Atomic Absorption Spectrophotometry **Detection limit 0.0002 mg/l, Min**	• Atomic Absorption Spectrometer and Associated Equipment (Cold Vapour Technique) • Mercury Vapour Generation Assembly • Mercury Hollow Cathode Lamp • Recorder/Printer/Display Meter • BOD bottle, 300 ml • Water bath • Equipment assembly as per Fig 1	• Sulphuric acid, conc. • Nitric acid, Conc. • Stannous chloride • Hydrochloric acid, Conc. • Sodium chloride • Hydroxylamine sulphate • Potassium permanganate • Potassium persulphate • Mercuric chloride • Mercury free distilled water
			ii) Colorimetric Dithizone Method **Detection limit 0.002 mg/l, Min**	• Spectrophotometer • Separating Funnels (250 and 1000ml with PTFE stopcocks) • Glass wares • Whatman Filter No. 42	• Redistilled or Deionised Distilled Water (Mercury free) • Mercuric chloride • Nitric acid, Conc. • Potassium permanganate • Potassium persulphate • Hydroxylamine hydrochloride • Dithiozone solution, 6 µg/ml • Sulphuric acid – 0.25 N • Potassium bromide • Chloroform • Disodium hydrogen phosphate • Anhydrous potassium carbonate

					• Sodium sulphate, Anhydrous • Hydrochloric acid(1:1) • Ammonium hydroxide
2	**CADMIUM**	5.3, Sl. No. ii) of Table 3	IS 3025 (Part 41) i) Atomic Absorption Method (Direct) **Detection range 0.05 to 2mg/l**	• Atomic Absorption spectrophotometer with Air-Acetylene Flame • Cadmium Hollow Cathode Lamp or Multi Element Hollow Cathode Lamp for Use at 228.8 nm	• Hydrochloric acid, Conc. • Nitric acid, Conc. • Nitric acid, dilute – 1:499 • Pure Cadmium Metal
			ii) Atomic Absorption Method (Chelation and Extraction) **Detection range 0.005 to 0.2mg/l**	• Atomic Absorption spectrophotometer with Air-Acetylene Flame • Cadmium Hollow Cathode Lamp or • Multi Element Hollow Cathode Lamp for use at 228.8 nm • Separating funnel • pH meter • pH paper	• Hydrochloric acid, Conc. • Hydrochloric acid – 1:49 • Nitric acid, Conc. • Nitric acid, dilute – 1:499 • Pure Cadmium Metal • Sodium hydroxide • Methyl Isobutyl Ketone (MIBK) • Bromophenol Blue • Ethanol or Isopropanol • Pyrrolidine dithiocarbamic acid • Carbon Disulphide
			iii) Differential Pulse Anodic Stripping Voltametry **Detection range 0.0001 to 0.1mg/l**	• Polarograph – Capable of Differential Pulse Work • Hanging Mercury Drop Electrode • Platinum Counter Electrode • Saturated calomel Reference Electrode • Magnetic Stirrer Control Unit with Stirring Bar • Nitrogen Gas (Cylinder) • Scrubber assembly for nitrogen purification • Voltametric Cell assembly	• Hydrochloric Acid, Conc., spectrograde • Nitric Acid, Conc., spectrograde • Nitric Acid, dil – 1:1 • Hydroxylamine Hydrochloride • L-Ascorbic Acid • Pure Cadmium Metal • Granular Zinc • Mercury • Ammonium Meta Vanadate

3	**ARSENIC**	5.3, Sl. No. iii) of Table 3	IS 3025(Part 37) i) Atomic absorption method **Detection limit 0.001 mg/l**	• Atomic absorption spectrometer equipped with gas flow meter for Argon or Nitrogen and Hydrogen and with arsenic electrodeless discharge lamp • Atomizer • Reaction cell for producing arsenic hydride • Eye dropper or syringe • Refrigerator	• Argon or Nitrogen and Hydrogen • Sodium borohydride • Sodium hydroxide • Sodium Iodide • Sulphuric acid-18N & 2.5 N • Potassium persulphate • Nitric acid, conc • Perchloric acid, conc • Hydrochloric acid, conc • Arsenic trioxide • Arsenic pentaoxide • Dimethyl arsenic acid/cacodylic acid • Calcium chloride
			ii) Silver diethyl dithiocarbamate method **(Referee method)** **Detection limit 0.001 mg/l**	Arsine generator & absorption assembly (Fig. 2 of IS 3025 Pt 37) Spectrophotometer, 535 nm with 1 cm cells	• Hydrochoric acid , Conc • Potassium Iodide • Stannous chloride, arsenic free • Lead acetate • Ephedrine • Pyridine • Chloroform • Silver diethyl dithiocarbamate • Zinc – 20 to 30 mesh, arsenic free • Arsenic trioxide • Sodium hydroxide
			iii) Mercuric bromide stain method	Arsine generator glass assembly (Fig 3 of IS 3025 Pt 37)	• Sulphuric acid (1:1) • Nitric acid, conc • Roll cotton

					• Lead acetate • Arsenic papers • Mercuric bromide • Ethyl alcohol/isopropanol • Potassium iodide • Arsenic free stannous chloride • Zinc-20 to 30 Mesh, arsenic free • Arsenic trioxide • Sodium hydroxide
4	**CYANIDE**	5.3, Sl. No. iv) of Table 3	IS 3025(Part.27) i) Total cyanide after distillation method **Detection limit minimum 0.02 mg/l**	• Distillation apparatus consisting of boiling flask, 1l, thistle tube, Allihn water cooled condenser, gas dispersion tube, needle valve, suction flask and suction pump (Fig 1 of IS 3025 Pt 27) • Heating mantle • Gas absorber • Ground glass ST joints • Spectrophotometer for use at 62 nm with 1-cm cell • pH paper • Thermometer – 0°C – 110°C, l.c. 1°C	• Sodium hydroxide • Lead carbonate-powdered • Sulphamic acid • Magnesium chloride • Sulphuric acid, conc • Acetic acid, glacial • Potassium cyanide • Silver nitrate • Chloramine – T • Pyridine • Pyrazolone • BIS – pyrazolone
			ii) Selective electrode method **Detection range 0.05 to 10 mg/l**	• Expanded – scale pH meter or specific Ion meter • Cyanide Ion selective electrode • Reference electrode, double junction	• Potassium cyanide • Silver nitrate • Sodium hydroxide • Potassium nitrate • Potassium hydroxide

				• Magnetic mixer with TFE coated stirring Bar	
5	**LEAD**	5.3, Sl. No. v) of Table 3	IS 3025(Part 47) i) Atomic absorption method (direct) **Detection range 1.0 to 10.0mg/l**	• Atomic absorption spectrophotometer with air acetylene flame • Hollow cathode lamp OR Electrodeless Discharge lamp for use at 283.3 nm	• Hydrochloric acid, conc • Nitric acid, conc. • (Lead nitrate • Nitric acid, dil (1:499)
			ii) Atomic absorption method (chelation – extraction)	• Atomic absorption spectrophotometer with air acetylene flame • Hollow cathode lamp OR Electrode less Discharge lamp for use at 283.3 nm • Separatory funnel • 0.45µm membrane filter • Acid washed filter paper. • pH meter	• Hydrochloric acid, conc • Hydrochloric acid, dil (1:2) • Hydrochloric acid, dil (1:49) • Nitric acid, conc. • Pyrrolidine • Chloroform • Carbon disulphide • Sodium hydroxide • Bromophenol blue • Lead nitrate
			iii) Differential pulse anodic stripping voltametry (DPASV) **Detection range 0.001 to 0.1mg/l**	Polarograph capable of performing differential pulse work • Hanging mercury drop electrode • Platinum counter electrode • Saturated calomel reference electrode • Magnetic stirrer control unit with stirring bar • Scrubber assembly for nitrogen purification • Nitrogen gas (cylinder) • 0.45µm membrane filter	• Lead nitrate • Hydrochloric acid, conc. • Nitric acid, conc. • Nitric acid, dil (1:1) • Granular zinc • Mercury • Ammonium metavanadate
			iv) Dithizone method **Detection limit 0.1 mg/l**	• Spectrophotometer for use at 510 nm with 1-cm cell • pH meter • TEF beakers, 100 ml • Separating funnels, 250 ml, 500 ml	• Lead free distilled water • Lead nitrate • Nitric acid, 95% (w/w) • Nitric acid, dil 20% (w/w) • Nitric acid, dil (1:1) • Ammonium hydroxide Conc. (14 N)

					• Ammonium hydroxide, dil. 10% (v/v) • Ammonium hydroxide, dil. 1% v/v) • Anhydrous Ammonium Citrate • Anhydrous Sodium Sulphite • Hydroxylamine hydrochloride • Potassium cyanide • Dithizone • Chloroform • Hydrochloric acid (1:1)
6	**CHROMIUM**	5.3, Sl. No. vi) of Table 3	Annex K of IS 13428	• Atomic absorption spectrophotometer with reducing Air – acetylene flame • 0.45µm membrane filter • pH meter • Centrifuge	• Deionised distilled water, Ammonia free • Nitric acid, redistilled – 1:1 (v/v) • Hydrochloric acid, redistilled – 1:1 (v/v) • Chromium oxide • Lanthanum chloride • Lanthanum oxide , 99.9%, w/w • Ammonium pyrrolidine dithiocarbamate
7	**NICKEL**	5.3, Sl. No. vii) of Table 3	Annex M of IS 13428	• Atomic absorption spectrophotometer with nebulizer – burner having air-acetylene flame • Centrifuge • Nickel hollow cathode lamp/electrode less discharge lamp • Separating funnel, 250-ml with PTFE taps • pH meter	• Nitric acid, conc. – 1.4 g/ml • Pure nickel metal • Sodium hydroxide • Hydrochloric acid, conc. – 1.19 g/ml • Methyl isobutyleketone (MIBK) • Ammonium 1 – pyrrolidino carbodithioate • Bromophenol blue • Ethanol

8	**POLY CHLORINATED BIPHENYLE (PCB)**	5.3, Sl. No. viii) of Table 3	Annex N of IS 13428	• Gas chromatograph with EC detector & coupled with printer-plotter-cum-integrator • Glass chromatographic column, 300 mm long, 8 mm ID with ground glass socket at the upper end and a stop cock at low end. • Kuderna-Danish type, evaporator • Snyder columns • Syringe (5 µl) • Heating oven • Desiccator	• Silica gel, 60 – 100 mesh • N-hexane-redistilled • Potassium hydroxide pellets • Sodium hydroxide solution – 5N • Diethyl ether, chromatography grade • Cotton wool, extracted with hexane and diethyl ether • Acetic acid, glacial, redistilled • Chromium trioxide, re-crystallized • Apiezon L grease • Epikote Resin 1001 – 0.15 % • Chromosorb G (acid washed) DMCS treated, 60 – 80 mesh • Silicone gum GE-S-SI – 1.3 %
9	**POLYNUCLEAR AROMATIC HYDROCARBON**	5.3, Sl. No. ix) of Table 3 APHA 6440	i) High Performance Liquid Chromatography (HPLC) Method ii) Gas chromatographic (GC) Method	• High Performance Liquid Chromatograph (HPLC) complete with gradient pumping system, reverse phase column and detectors (UV and fluorescence) • Gas Chromatograph (GC) complete with column and flame ionization detector. • Separating funnel (2 l) • Evaporative flask • Three Ball Synder column • Kuderna- Danish Apparatus • Water bath (60-65˚C)	• Reagent Water • Sodium thiosulphate, granular • Cyclohexane • Methanol • Acetone, • Methylene chloride • Pentane – Pesticide quality or equivalent • Acetonitrile – HPLC quality • Sodium sulphate, granular, anhydrous • Silica Gel – 100/200 mesh • Stock standard solution • Std. PAHs Solutions – a)100 µg/ml of naphthalene, acenaphthylene, fluorine, phneanthrene and anthracene. b)5µg/ml Benzo (k) fluoranthene

*Note: Besides listed Equipments/Apparatus/Chemicals, following accessories are essential part of a chemical lab:

i) General glass wares like Pipettes Burette, Conical flasks, Beakers, Measuring cylinders, Volumetric flasks, (of different volumes)

ii) Provision for distilled/double distilled water
iii) Fuming Hood and sink with tap in the lab

The list does not cover the requirements of Pesticide Residues and Radio Active Residues as these requirements are to be got tested from outside approved lab.

D - MICROBIOLOGICAL REQUIREMENTS

General microbiological lab equipments **

- Hot air oven (capable of 160 to 180 ºC).
- Autoclave (capable of 15 psi/ 121 ºC) of suitable size as per need.
- Weighing Balance with least count 0.01 g (least count 0.001 g, if Tergitol-7 agar medium or Crystal violet neutral red bile lactose (VRBL) agar is being prepared in house).
- *p*H meter with least count 0.1 *p*H unit.
- Laminar air flow chamber OR Class II Biosafety Cabinets shall be used for product testing and reference culture in microbiology laboratories.
- Hot plate for media preparation.
- Membrane filtration assembly (including sterilized membrane filters of 47 mm to 50 mm diameter with 0.45 µm pore size, vacuum pump (for applying vacuum of about 70 kPa) and forceps with rounded tips).
- Inoculation loop/needle.
- Bunsen burner with LPG cylinder.
- Thermostatically controlled water bath.
- Air conditioner (recommended)
- Refrigerator
- Colony counting equipment (recommended)
- General glass wares including, petri dishes (made of glass or plastic), volumetric pipettes (of capacity 1 ml and 10 ml), flasks, test tubes, culture bottles, funnels, glass rod, measuring cylinders.
- Thermometer with least count, at least four times smaller than the range of required maximum permissible tolerance shall be used)
- Filter paper
- Cotton

SI. No.	Parameter	Clause Ref.	Referred Method of Test	Test Equipment/Apparatus **	Chemicals/Media/Reagents **
(1)	(2)	(3)	(4)	(5)	(6)
1	*Escherichiacoli* (or thermo tolerant bacteria)	5.2.1 of IS 14543	IS 15185 /ISO 9308-1	• General microbiological lab equipments (as listed above) • Incubator capable of maintaining $(36\pm2)^0$C • Equipment, for membrane filtration • Membrane filters • Disinfected forceps, for handling of membrane filters. • @Incubator capable of maintaining 44°C • Microscope and Glass slides (*for Gramstaining*)	• Distilled water • **Chromogenic Coliform Agar** (Enzymatic digest of casein 1.0g, Yeast Extract 2.0g, Sodium chloride 5.0g, • Sodium dihydrogen phosphate x 2H2O 2.2g, • Disodium Hydrogen Phosphate 2.7g, • Sodium pyruvate 1.0g, • Sorbitol 1.0g, • Tryptophane 1.0g, Tergitol – 7 0.15g, 6-chloro 3 indoxyl Beta D Galactopyranoside 0.2g, 5-Bromo 4-Chloro 3Indoxyl Beta D Glucuronic Acid 0.1g, • Iso propyl Beta D thiogalactopyranoside (IPTG) 0.1g, • Bacteriological Agar 9-18g • Water 1000ml • pH 6.8±0.2 at 25°C. • Oxidase reagent:

					• N,N,N',N'- Tetramethyl p phenylenediamine dihydrochloride 0.1g, • Water 10ml • Tryptone Soya Agar: • Tryptone 15.0g, • Soya Peptone 5.0g, • Sodium Chloride 5.0g, • Agar 15-25g, • Water 1000ml • pH 7.2±0.2 at 25°C • @Medium for indole production • @Kovac's reagent (*for indole test*) • Gram stain – (Methyl violet or Crystal violet, Iodine, Potassium iodide; Neutral red, Acetic acid, Ethanol)
2	Coliform Bacteria	5.2.2 of IS 14543	i) **Reference method** IS 5401 (Pt. 1) /ISO 4832	• General microbiological lab equipments (as listed above) • Incubator capable of operating at 37 ºC ± 1 ºC • Petri dishes, made of glass or plastic, of diameter 90 mm to 100 mm • Total-delivery pipettes, having nominal capacities of 1ml • Water bath, or similar apparatus, capable of operating at 44 to 47°C • Colony-counting equipment, consisting of an illuminated base and a mechanical or electronic digital counter.	• Distilled water • Crystal violet neutral red bile lactose (VRBL) agar – • (Enzymatic digest of animal tissues, Yeast extract, Lactose, Sodium chloride, Bile salts, Neutral red, Crystal violet, Agar)

				• Test tubes of dimensions approximately 16 mm x 160 mm • Durham tubes of dimensions appropriate for use with the test tubes • Bottles or flasks, for boiling and storage of culture media	• @ Brilliant green lactose bile broth – (Enzymatic digest of casein, Lactose, Dehydrated ox bile, Brilliant green)
			ii) IS 15185 /ISO 9308-1	• General microbiological lab equipments (as listed above) • Sample quantity : 50 ml • Incubator, thermostatically controlled at (36 ± 2) °C. • Equipment, for membrane filtration • Membrane filters • Disinfected forceps, for handling of membrane filters. • @Incubator capable of maintaining 44°C • Microscope and Glass slides (*for Gramstaining*)	• Distilled water • **Chromogenic Coliform Agar** (Enzymatic digest of casein 1.0g, Yeast Extract 2.0g, Sodium chloride 5.0g, • Sodium dihydrogen phosphate x 2H2O 2.2g, • Disodium Hydrogen Phosphate 2.7g, • Sodium pyruvate 1.0g, • Sorbitol 1.0g, • Tryptophane 1.0g, Tergitol – 7 0.15g, 6-chloro 3 indoxyl Beta D Galactopyranoside 0.2g, 5-Bromo 4-Chloro 3Indoxyl Beta D Glucuronic Acid 0.1g, • Iso propyl Beta D thiogalactopyranoside (IPTG) 0.1g, • Bacteriological Agar 9-18g • Water 1000ml • pH 6.8±0.2 at 25°C. • Oxidase reagent:

					• N,N,N',N'- Tetramethyl p phenylenediamine dihydrochloride 0.1g, • Water 10ml • Tryptone Soya Agar: • Tryptone 15.0g, • Soya Peptone 5.0g, • Sodium Chloride 5.0g, • Agar 15-25g, • Water 1000ml • pH 7.2±0.2 at 25°C • @Medium for indole production • @Kovac's reagent (*for indole test*) • Gram stain – (Methyl violet or Crystal violet, Iodine, Potassium iodide; Neutral red, Acetic acid, Ethanol)
3	Sulphitereducinganaerobes	5.2.4 of IS 14543	Annex C of IS 13428	• General microbiological lab equipments (as listed above) • Sample quantity : 50 ml • Screw cap bottles or vials and stoppers of boron silicate glass of capacities 100 ml • Water bath capable at 75 ± 5 °C. • Iron wire • Incubator (37 ºC ± 1 ºC) • Appropriate method to hermetically seal the vial or anaerobic systems • Anaerobic jar assembly (recommended)	• Distilled water • Differential reinforced clostridial medium (DRCM) – Double strength and Single Strength (if necessary) (Peptone tryptic digest of meat , Meat extract, Yeast extract, Starch, Hydrated sodium acetate, Glucose, L- cysteine-hydrochloride, Sodium hydroxide) • Sodium sulphite • Iron (III) citrate

4	*Pseudomonas aeruginosa*	5.2.5 of IS 14543	Annex D of IS 13428	• General microbiological lab equipments (as listed above) • Screw capped bottles • Incubator (37 ± 1° C) • @Incubator, capable of being maintained at 42 ± 0.5° C • @Incubator 4° C • UV cabinet fitted with UV lamp emitting light of wavelength 360 ± 20 nm • Cellulose acetate or nitrate membrane of pore size 0.22 µm (for alternate sterilization of ethanol) • @ Incubator, capable of being maintained at 42 ± 0.5° C	• Distilled water • Medium for determination of presumed ***Pseudomonas aeruginosa*** – (DL asparagine, L proline, Anhydrous dipotassium hydrogen phosphate, Magnesium sulphate heptahydrate, Anhydrous potassium sulphate, Ethanol) • @ Confirmatory medium (Milk agar medium) – [Skim milk powder, Bacteriological yeast extract, Peptone, Sodium chloride, Agar hexadecyltrimethyl ammonium bromide (centrimide)] • @ Clause D-10 (NOTE) of IS 13428 : 2005 specifies confirmation of non-pigmented strains as a further step, if required. Annex 2D of IS 13428 : 2005 specifies biochemical characteristics to be tested for this purpose. • No specific apparatus, media and reagents have been specified for the same. It is specified that commercially available identification kits may be used for this. For example Gram Staining Kit, Spore Staining Kit, Reagent for Oxidase test, Hydrogen Peroxide for Catalase Test,

					Hugh and Leifson Medium, Media for Nitrate Reductase Test, for Acetamide Deaminase activity, for Gelatin Liquification and for Starch Hydrolysis.
5	Aerobic Microbial Count	**5.2.6** of IS14543	IS 5402	• General microbiological lab equipments (as listed above) • Incubators 21 ºC ± 1 ºC and 37 ºC$\pm 1^0$C • Colony counting equipment	• Distilled water • Plate count agar (PCA) – (Enzymatic digestion of casein, Yeast extract, Glucose anhydrous, Agar) • Overlay medium (if necessary) – Agar
6	Yeast and Mould	**5.2.7** of IS 14543	IS 5403	• General microbiological lab equipments (as listed above) • Incubator (25 ± 1 ºC)	• Distilled water • Yeast extract-dextrose-chloramphenicol-agar medium – (Yeast extract, Dextrose, Chloramphenicol or Oxytetracycline hydrochloride, Agar)

** **NOTES**

Note 1 – The list does not cover the following requirements, as these parameters are to be tested from outside approved lab:

i) *Faecal streptococci* and *Staphylococcus aureus*.

ii) *Salmonella* and *Shigella*.

iii) *Vibrio cholera* and *V. parahaemolyticus*.

Note 2 – General Microbiological Lab Equipments as listed are common for various microbiological tests. Other additional equipments required for specific test methods are indicated against each parameter.

Note 3 – For preparation of culture media and reagents ingredients of uniform quality and chemicals of analytical reagent grade should be used. Alternatively, commercially available media and reagents may be used provided their composition comply with those given in Indian Standards.

Note 4 – Disposable glassware may be accepted as an alternative to re-usable glassware.

Note 5 – All efforts have been made to compile the list as per the respective standards exhaustively covering all the required test equipments, apparatus and chemicals. However, in case any omission or incorrectness is noticed while referring, the same may be conveyed to CMD immediately for suitable actions.

The marked equipments/ chemicals and media are required for confirmatory tests of respective microorganisms. The confirmatory test may be dispensed with/omitted, provided the licensee undertakes to start corrective actions based on presumptive presence of microorganisms.

E - REQUIREMENTS FOR BOTTLES/CONTAINERS FOR PACKAGED WATER

SI. No.	Clause No. of IS 15410:2003	Specified Requirement	Test Facility Requirement	Range and Accuracy/ Least Count (If and as Applicable)	Method of Test/ Remarks (If any)
1	4.1	Material	---	----	Raw Material conformity to ISs is indicated
2	4.2 4.2.1	Design, Shape and Dimensions	Visual	-----	
3	4.3 4.3.1 4.3.2	Manufacture, Workmanship, Finish and Appearance	Visual	------- ---------	To adhere GMP --
4	4.4	Capacity	Weighing Balance	Suitable range with , LC 0.1 g for Balanceor1 ml for Cylinder	Cl 5 of IS 2798
5	4.5	Wall Thickness	Micrometer	Suitable Range with LC 0.02 mm	Cl 4.5 of IS 2798
6	4.6.2	Transparency	Transparency/ Haze Meter	Range upto 100 %,LC 1%	Annex A of IS 15410
7	4.6.3	Leakage Test	Vibration Leakage Tester as per Cl. 6.2.1 of IS 2798 Reservoir Air Pressure Leakage Tester	-	Cl 6 of IS 2798
8	4.6.4	Drop Test	Drop Tester with height of 0.5 m		Cl 8 of IS 2798
9	4.6.5	Migration Test	Oven/Water Bath Hot Plate Analytical Balance SS Evaporating Dish	Capable ofmaintaining40$\pm$2° C	IS 9845

			Desiccator Glass Beaker, pyrex, 1000 ml Pouch Sealing Machine		
10	4.6.6	Water Potability test	Conditioning Chamber	Capable of maintaining 38±2° C	Annex B of IS 15410

F- REQUIREMENTS FOR POLYETHYLENE FLEXIBLE POUCHES FOR PACKAGED WATER

SI. No.	**Clause No. of IS 15410:2003**	**Specified Requirement**	**Test Facility Requirement**	**Range and Accuracy/ Least Count (If and as Applicable)**	**Method of Test/ Remarks (If any)**
Clause 6.1 Requirements for Films					
1	6.1.1	Description	Visual	----------	
2	6.1.2	Film Form	Visual	----------	
3	6.1.3	Winding of Film	Visual	----------	
4	6.1.4	Odour	Olfactory	----------	
5	6.1.5	Thickness (65± 5µ/ 75± 5µ)	Dead Weight Dial Micrometer	Suitable Range with LC 1 µ	A-2 of IS 2508
6	6.1.6	Width (in mm)	Scale	Suitable Range, LC 1 mm	
7	6.1.7	Overall Migration	Oven/Water Bath Hot Plate Analytical Balance SS Evaporating Dish Dessicator Glass Beaker, pyrex, 1000 ml Pouch Sealing Machine	Capable of maintaining 40±2° C	IS 9845

8	6.1.8	Tensile Strength	Tensile Testing Machine of suitable range	LC 0.01 kN	A-4 of IS 9845
9	6.1.9	Elongation at break	Tensile Testing Machine of suitable range	LC 0.01 kN	A-4 of IS 9845
10	6.1.10	Dart Impact Resistance	Dart Impact Tester with Drop Height of 66 cm	Set of weights(Min. Impact failure load : 2.20 N)	A-6 of IS 9845
Clause 7 Requirements for Pouches					
11	7.1	Vibration Leakage Test	Vibration Table Temp. - Ambient or27 ± 2^0 C incase of dispute	Table conforming to IS 7028 (Pt 2)Frequency of vibration 2 Hz	Annex D of IS 15609
12	7.2	Water Potability Test	Oven/Heating Arrangement Pouch Sealing Machine	Capable of maintaining 38 ± 2^o C	Annex E of IS 15609
13	7.3	Stack Load Test	Flat Wooden Plank Temp. - Ambient or 27 ± 2^0 C incase of dispute	Set of weights for20 N to 200 N	Annex F of IS 15609
14	7.4	Drop Test	Arrangement for flat drop from 1.2 m height	----------	Annex G of IS 15609
15	7.5	Ink Adhesion Test for Printed Pouch	Pressure Sensitive Tapes or Cello-Tape	25 mm wide tape Arrangement for pulling tape at 10mm/s at about 90^o	Annex H of IS 15609
16	7.6	Product Resistance Test for Printed Pouch	Paper Tissue	----------	Annex J of IS 15609
Clause 8 Construction					
17	8	Construction	Visual	----------	

ANNEXURE F

**SCHEME OF INSPECTION AND TESTING
FOR CERTIFICATION OF PACKAGED DRINKING WATER (OTHER THAN PACKAGED NATURAL MINERAL WATER) ACCORDING TO IS 14543: 2016**

1.0 LABORATORY -A laboratory shall be maintained which shall be suitably equipped and staffed with competent testing person(s) to carry out the different tests in accordance with the methods given in the Indian standards.

Testing person(s) shall be science/engineering graduate from disciplines such as chemistry/chemical engineering/ microbiology/ biotechnology/ biochemistry/ food technology/ botany and other biological/ life sciences. Engineering graduates from disciplines such as chemical engineering may also be engaged as testing persons.

2.0 TEST RECORDS - All records of analysis and tests shall be kept in suitable forms approved by the Bureau of Indian Standards (BIS) for a minimum period of 3 years.

Copies of any records that may be required by BIS shall be made available at any time on request.

3.0 LABELLING AND MARKING - The Standard Mark, as given in the Schedule of the Licence shall be clearly marked legibly and indelibly on the label of the bottle/container or on the pouch as the case may be, provided always that the material on which this Mark is applied conforms to every requirement of the specification. The dimension of standard mark shall be in accordance with specified design.

3.1 PACKING – The Packaged Drinking Water shall be packed as per clause 3.2, clause 5.1, clause 6 and Annex B of IS 14543:2016. The pouches and bottles/containers shall be supplied in secondary packaging as agreed to between the purchaser and the supplier.

3.2 MARKING – In addition to the Standard Mark as per clause 7. 3 of IS 14543:2016 the following information shall be given legibly & indelibly on each bottle/container or its label or directly printed on the pouch/bottle/container.

i. Name of the product (i.e. PACKAGED DRINKING WATER)
ii. Name and full address of the processor (i.e. manufacturer);
iii. Brand Name, if any;
iv. Batch or Code Number/Control Unit No.;
v. Date of processing/packing;
vi. Treatment of disinfection, if any;
vii. BEST BEFORE…… (DATE/MONTH/YEAR IN CAPITAL LETTERS); OR BEST BEFORE ……DAYS OR MONTHS FROM PACKAGING/MANUFACTURE;
viii. Net quantity;
ix. Direction for storage;
x. Keep the container away from direct sunlight; and
xi. Any other information required under the Legal Metrology (Packaged Commodity) Rules, 2011 and the Food Safety and Standards (Packaging and Labeling) Regulations 2011.
xii. Recycling symbol as per IS14535,
xiii. BIS website details: www.bis.gov.in

3.2.1 Minimum height of the BIS Standard Mark on different pack sizes of Packaged Drinking Water shall be asunder:

S. No.	Size of Container	Min height of BIS Standard Mark*
1	Pouch/Cups/bottle (250 ml capacity & below)	5mm

2	Bottles upto500ml capacity & below (but greater than 250 ml capacity)	7.5mm
3	Bottles more than 500ml capacity	10mm
4	All re-useable Jars	15mm
(* other dimensions of the BIS Standard Mark shall be in appropriate proportions as per BIS guidelines).		

3.3 Each secondary packing of pouches/bottles/containers shall be marked with the following, except where such secondary packing is transparent and the markings on the pouches/bottles/containers are legible through the secondary packing:

i. Indication of the source of manufacture i.e. manufacturer's name and address;
ii. Number of pouches/bottles/containers
iii. Brand name, if any
iv. Nominal capacity;
v. Batch No. or Code No.

3.4 LABELLING PROHIBITIONS -The label on the bottles/containers/pouches and/or the secondary packaging shall not contain claims which are prohibited as per clause 7.2 of IS14543:2016.

3.5 Shelf life: Declared shelf life for Packaged Drinking Water in all type of packing materials shall not be less than 30 days. (also see Table 1 and Note 8 under Table 1)

3.6 Brand names: The labels conforming to the marking details as mentioned in clause 7 of IS 14543 along with the brand names are to be submitted to by licensees to BIS for information only, which will only be noted by BIS for records. The compliance of such labels to the requirement of clause 7 shall be ensured by licensees. However, in case non-compliance to Clause 7 is observed by BIS and communicated in writing to licensee, licensee shall make necessary rectification and resubmit the label for confirmation to concerned BIS Branch Office within 15 days. Decision of BIS regarding whether labeling is complying or not with clause 7 of IS 14543 shall be final.

4.0 LEVELS OF CONTROL -The tests as indicated in Table 1 and at the levels of control specified therein, shall be carried out on the whole production of the factory covered by this Scheme and appropriate records maintained in accordance with clause 2 of this Scheme. Entire production which conforms to the Indian Standard and covered by the licence shall be marked with Certification Mark of the Bureau.

5.0 CONTROL UNIT - For the purpose of this Scheme, the quantity of packaged drinking water treated/processed from each processing line and filled/packed in one day shall constitute a Control Unit.

5.1 On the basis of tests and analysis results, the decision regarding conformity or otherwise of a Control Unit to the given requirements shall be made.

5.2 In respect of all other clauses of the Standard (other than those mentioned under Levels of Control– Table 1 of this Scheme) the factory shall maintain appropriate controls and checks to ensure that their product conforms to the requirements of the standard.

5.3 Records of the batch wise consumption of the added minerals, if applicable, are to be maintained along with the invoices and test certificates for the same.

6.0 Microbiological Requirements - If any failure is noticed in any of the microbiological requirements, control units available in the stock shall be rechecked and released into the market only after conformity is ensured.

6.1 The licensee shall take immediate corrective actions, which would involve complete investigation of the reasons for contamination and non-conformity. The manufacturer should re-start marking and dispatch only after the completion of satisfactory corrective actions and availability of satisfactory results of all microbiological tests as applicable for each control unit, for next 2 consecutive control units. The

manufacturer shall keep complete records of such instances for review by BIS for minimum period of 5 years.

7.0 SOURCE WATER - The source water used in production of Packaged Drinking Water shall be initially tested for Organoleptic and physical parameters (Table 1), Chemical requirements (Table 2), and all microbiological requirements possible to be tested in house. Subsequently, its quality may be regularly assessed at least once in three months through in-house testing for Colour, Odour, Taste, Turbidity, pH, Total Dissolved Solids and Microbiological requirements. In addition, any other requirements as considered necessary for process control, are to be tested where the incidence of their presence in higher levels has been detected during the previous tests.

7.1 Whenever, the quality of processed water is found to be not meeting the requirements of IS 14543 for the tested parameters, the source water shall be checked again for such parameters in which failure is observed for deciding upon the necessary controls to be exercised for conformance of quality of processed water to IS 14543.

7.2 In case non-conformity is observed for radioactive residues, the source of raw water shall be abandoned and water shall be recalled immediately.

7.3 As and when there is change in source water or addition of new source of raw water, it shall be intimated to BIS. The raw water collected from the new source shall be tested in accordance with Clause 7 as above and the processed water produced from such source water shall be tested for conformity to IS 14543 from BIS recognized outside lab. The reports of source water and the product water produced from the new source shall be submitted to BIS for approval before commissioning for regular production and marking.

7.4 The source water shall be treated as per clause 5.1 of IS 14543:2016. In case the licensee carries out remineralization as part of its treatment process, the ingredients used shall conform to food grade/pharma grade quality. The test certificate of these ingredients shall be submitted to BIS.

7.5 The means adopted for disinfection of the product water shall be declared and shall be done in accordance with clause 5.1.1 of IS 14543:2016.

8.0 Plastic Jars/Bottles/Containers - The plastic containers used for packing the material shall conform to IS 15410:2003. The conformity assessment shall be carried in accordance with the levels of controls as given under Table 2.

8.1 In addition, the top lid for glasses/cups shall be of suitable peelable structure in accordance with Clause 4.2.1 of IS 15410:2003.

8.2 Pouches–The polyethylene film and pouches shall conform to IS 15609. The conformity assessment shall be carried in accordance with the levels of controls as given under Table3.

9.0 REUSED CONTAINERS – Licensee shall ensure use of only such jars for packing the product water whose transparency continues to meet the requirements as per IS 15410 even after its repeated use. Jars which get soiled, de-shaped and/or mutilated during the course of use and refilling shall not be used.

9.1 Water to be used for the purpose of cleaning etc. IS 4251:1967 may be followed as Good Manufacturing practices.

10.0 HYGIENIC CONDITION - The source water shall be collected, processed, handled, stored, packed and marketed in accordance with the hygienic practices given under Annex B of IS 14543:2016. Other clauses shall also be complied in day to day production and quality control activities. Schedule for each activity for this purpose shall be displayed prominently in the factory premises and records of compliance shall be maintained for scrutiny by the Bureau. The hygienic conditions shall also be maintained at the site of water source. A check list for good hygienic practices and food safety system for packaged drinking water processing units is given in Annex C of IS 14543:2016.

11.0 REJECTION - Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016. A separate record providing the detailed information regarding the rejected control units and mode of their disposal shall be maintained. Such material shall in no case be stored together with that conforming to the specification.

IS 14543:2016 PACKAGED DRINKING WATER
(OTHER THAN PACKAGED NATURAL MINERAL WATER)
TABLE 1 LEVELS OF CONTROL
(Para 4 of the Scheme of Inspection and Testing)

TEST DETAILS				**Test equipment requirement** R: required (or)S: Sub-contracting permitted	LEVELS OF CONTROL		REMARKS
Clause	Requirement	Test Method			No. of Sample	Frequency	
		Clause	Reference				
5.2	Microbiological Requirement						
5.2.1	Escherichia coli	--	IS 15185	R	One	Each control unit	
5.2.2	Coliform Bacteria	--	IS 5401 (Part-1)* or IS 15185	R	One	Each control unit	
5.2.3	Faecal Streptococci and Staphylococcus aureus	--	IS 5887 (Part-2)* or IS 15186	S	One	Once in month	
5.2.4	Sulphite Reducing Anaerobes	--	Annex C of IS 13428	R	One	Each control unit	
5.2.5	Pseudomonas aeruginosa	--	Annex D of IS 13428	R	One	Each control unit	
5.2.6	Aerobic Microbial Count	--	IS 5402	R	One	Each control unit	
5.2.7	Yeast &Mould	--	IS 5403	R	One	Each control unit	
5.2.8	Salmonella and Shigella	--	IS 15187 & IS 5887 (Part-7), respectively	S	One	Once in month	
5.2.9	Vibrio cholera and V. parahaemolyticus	--	IS 5887 (Part-5)	S	One	Once in month	

TABLE 1 (continued)

TEST DETAILS					**Test equipment requirement** R: required (or)S: Sub-contracting permitted	LEVELS OF CONTROL		REMARKS
Clause	Requirement		Test Method			No. of Sample	Frequency	
			Clause	Reference				
5.3	Description		5.3	IS 14543	R	One	Each Control Unit	-
5.3 and Table 1	i)	Colour	-	IS 3025 (Part 4)	R	One	Each Control Unit	See Note 2
-do-	ii)	Odour	-	IS 3025 (Part 5)	R	One	Each Control Unit	-do-
-do-	iii)	Taste	-	IS 3025 (Part 8)	R	One	Each Control Unit	-do-
-do-	iv)	Turbidity	-	IS 3025 (Part 10)	R	One	Each Control Unit	-do-
-do-	v)	Total Dissolved Solids	-	IS 3025 (Part 16)	R	One	Each Control Unit	See Note 3
-do-	vi)	pH	-	IS 3025 (Part 11)	R	One	Every four hours	See Note 2
5.3 and Table 2	i)	Barium (as Ba)	-	Annex F of IS 13428 or IS 15302 or IS 3025 (Part 2)	S	One	Once in a month	See Note 4
-do-	ii)	Copper (as Cu)	-	IS 3025 (Part 42)* or IS 3025 (Part 2)	S	One	Once in a month	-do-
-do-	iii)	Iron (as Fe)	-	IS 3025(Part 53)*or IS 15303 or IS 3025 (Part 2)	S	One	Once in a month	-do-
-do-	iv)	Manganese (as Mn)	-	IS 3025 (Part 59)* or IS 3025 (Part 2)	S	One	Once in a month	-do-
-do-	v)	Nitrate (as NO3)	-	IS 3025 (Part 34)	R	One	Once in a week	-do-
-do-	vi)	Nitrite (as NO2)	-	IS 3025 (Part 34)	R	One	Once in a week	-do-
-do-	vii)	Fluoride (as F)	-	IS 3025 (Part 60)	S	One	Once in six months	See Note 6
-do-	viii)	Zinc (as Zn)	-	IS 3025 (Part 49)* or IS 3025 (Part 2)	S	One	Once in a month	See Note 5
-do-	ix)	Silver (as Ag)	-	Annex J of IS 13428	S	One	-Once in six months -See Note 6 also	-Once in a month for licensees using silver in any form. -See Note 5 also
-do-	x)	Aluminium (as Al)	-	IS 3025 (Part 55) or IS 15302	R	One	Once in a week	See Note 4
-do-	xi)	Chloride (as Cl)	-	IS 3025 (Part 32)	R	One	Each control unit	See Note 2
-do-	xii)	Selenium (as Se)	-	IS 3025 (Part 56)	S	One	Once in six months	See Note 6

-do-	xiii) Sulphate (as SO4)	-	IS 3025 (Part 24)	R	One	Each control unit	See Note 2
-do-	xiv) Alkalinity (as HCO3)	-	IS 3025 (Part 23)	R	One	Each control unit	See Note 2
5.3 and Table 2	xv) Calcium (as Ca)	-	IS 3025 (Part 40)* or IS 3025 (Part 2)	R	One	Once in a week	See Note 4
-do-	xvi) Magnesium (as Mg)	-	IS 3025 (Part 46)* or IS 3025 (Part2)	R	One	Once in a week	See Note 4
-do-	xvii) Sodium (as Na)	-	IS 3025 (Part 45)* or IS 3025(Part 2)	S	One	Once in six months	See Note 6
-do-	xviii) Residual Free Chlorine	-	IS 3025 (Part 26)	R	One	Each control unit	See Note 2
-do-	xix) Phenolic compounds (asC6H5OH)	6	IS 3025 (Part 43)	S	One	Once in a month	See Note 5
-do-	xx) Mineral Oil	6	IS 3025 (Part 39)	S	One	Once in a month	See Note 5
-do-	xxi) Anionic surface-active agents (as MBAS)	-	Annex K of IS 13428	S	One	Once in a month	See Note 5
-do-	xxii) Sulphide (as H2S)	-	IS 3025 (Part 29)	R	One	Once in a week	See Note 4
-do-	xxiii) Antimony (as Sb)	-	Annex G of IS 13428* or IS 15303	S	One	Once in a month	See Note 5
-do-	xxiv) Borates (as B)	-	Annex H of IS 13428* or IS 3025 (Part 2)	S	One	Once in a month	See Note 5
-do-	xxv) Bromates (as BrO3)	-	ISO 15061	S	One	Once in six months	See Note 6
5.3 & Table 3	i) Mercury (as Hg)	-	IS 3025 (Part 48)	S	one	Once in six months	See Note 6
-do-	ii) Cadmium (as Cd)	-	IS 3025 (Part 41)	S	one	-do-	-do-
-do-	iii) Arsenic (as As)	-	IS 3025 (Part 37)	S	one	-do-	-do-
-do-	iv) Cyanide (as CN)	2	IS 3025 (Part 27)	S	one	-do-	-do-
-do-	v) Lead (as Pb)	-	IS 3025 (Part 47)	S	one	-do-	-do-
-do-	vi) Chromium (as Cr)	-	Annex J IS 13428* or IS 3025 (Part 2)	S	one	-do-	-do-
-do-	vii) Nickel (as Ni)	-	Annex L IS 13428	S	one	-do-	-do-
-do-	viii) Polychlorinated biphenyl (PCB)	-	Annex M of IS 13428	S	one	-do-	-do-
-do-	ix) Polynuclear aromatic hydrocarbons	-	APHA 6440	S	one	-do-	-do-

TEST DETAILS				**Test equipment requirement** R: required (or)S: Sub-contracting permitted	LEVELS OF CONTROL		REMARKS
Clause	Requirement	Test Method			No. of Sample	Frequency	
		Clause	Reference				
5.3 & Table 4	i) Alpha emitters	-	IS 14194 (Part 2)	S	one	Once in five years	
-do-	ii) Beta emitters	-	IS 14194 (Part 1)	S	one	-do-	
5.4	Pesticide Residues	5.4	Annex D of IS 14543				See Note 1 below
i)	Pesticide residues considered individually	5.4.1	IS 14543**	S	One	Once in 6 months in 1st operative period	See Note 1 below
ii)	Total pesticide residue	-do-	-do-		-do-	-do-	-do-
-	Shelf Life Assessment	B 8.9	Annex B of IS 14543	R	Once in six months each type of container shall be tested for shelf life assessment		See Note 8 below

In case of dispute, methods given at column 4 and wherever indicated by "*" shall be the referee method.
**Shall be got tested from BIS recognized laboratory using internationally established test method as specified in Annex D of IS 14543 : 2016

Note 1: For tests with frequency of once in 6 months, in case no failure is observed during the first operative period (sample tested every 6 months) the frequency of such test may be reduced to one year. In case any failure is observed, after taking corrective action, the frequency shall be increased to once in three months. The original frequency of once in 6 months may be restored only if two consecutive samples pass.

Note 2: In case of failure in any requirement with frequency of each control unit like colour, odour, taste, turbidity, Chloride, Sulphate, Alkalinity, Residual free chlorine, after taking corrective action the frequency to be increased from each control unit to every four hours for one month. Thereafter frequency of each control unit may be restored if all the samples during the month are found passing. For pH, in case of failure, after taking corrective action, the frequency to be increased from every four hours to every hour for a week. Thereafter frequency of every 4 hours may be restored if all the samples during the week are found passing.

Note 3: In case of failure in total dissolved solid, after taking corrective action, the frequency to be increased from each control unit to every four hours for one month. Thereafter frequency of each control unit may be restored if all the samples during the month are found passing.

Note 4: In case of failure in any requirement like Barium, Copper, Iron, Manganese with frequency of once a month, after taking corrective actions, samples from 2 consecutive control units shall be tested in house or in BIS recognized third party lab. Thereafter frequency of once in a month may be restored if the samples from both control units are found passing. For Nitrate, Nitrite, Aluminium, Calcium, Magnesium, and Sulphide in case of failure, after taking corrective action, the frequency to be increased from once in a week to each control unit for one month. Thereafter frequency of once in a week may be restored if all the samples during the month are found passing

Note 5: In case of failure in any requirement like Zinc, Phenolic Compounds, Mineral Oil, Anionic surface active agents, Antimony, Borate, Silver (For licensee using silver in any form) with frequency of once a month, after taking corrective actions, samples from 2 consecutive control units shall be tested in house or in BIS recognized third party lab. Thereafter frequency of once in a month may be restored if the samples from both control units are found passing.

Note 6: In case of failure in any requirement like Fluoride, Silver, Selenium, Bromate, Sodium, Mercury, Cadmium, Arsenic, Cyanide, Lead, Chromium, Nickel, PCB, PAH, with frequency of once in six months, the frequency to be increased from once in 6 months to once in 3 months for 6 months. Thereafter frequency of once in 6 months may be restored only if both the samples tested at each quarter are found passing.

Note 7: Approved international standard test methods from organizations like ISO/ APHA/ ASTM/ AOAC/EPA/EN may also be permitted for performing tests given in Table 2 & 3. In case of dispute, methods given at column 4 and wherever indicated by "*" shall be the referee method.

Note 8: Shelf Life testing shall be done in house for all possible tests for description, organoleptic, physico-chemical, chemical, and microbiological parameters which are possible to be tested in house as per test methods prescribed in IS 14543. Records of shelf life studies to be maintained. In case of failure, the manufacturer shall review the shelf life declaration and re-declare the suitable revised shelf life.

Note-9: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-10: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

Note -11: Whenever, due to failure, the test frequency is increased, the compliance for such frequency levels may be ensured either from in-house or OSL testing of samples.

FORM 1
REPORT FOR FOUR HOURLY PH TESTING

Date of Production	Batch Number/ control unit number	pH	Remarks
1	2	3	4

FORM 2
REPORT FOR DAILY/ EACH CONTROL UNIT TESTING

Date of Production	Batch Number/ control unit number	Description	Colour	Odour	Taste	Turbidity	TDS	Chloride	Sulphate	Alkalinity	Residual Free chlorine	E.coli	Coliform Bacteria	Sulphite reducing anaerobes	Pseudomonas aeruginosa	Aerobic microbial count		Yeast & Mould	Remark
																20-220C	370C		
1	2	3					4	5	6	7	8	9	10	11	12	13	14	15	16

FORM 3
REPORT FOR WEEKLY & MONTHLY TESTING

Date	Batch/ control unit no.	Barium	Copper	Iron	Manganese	Nitrate	Nitrite	Aluminium	Calcium	Sulphide	Magnesium	Antimony	Borate	Phenolic Compounds	Mineral Oil	Zinc	Anionic Surface Active Agents	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

FORM 4

FORMAT FOR TESTING FROM BIS RECOGNIZED OUTSIDE LABORATORY

Month & Year	Batch No./DOM	Type of packing	Dates on which sample sent	Lab to which sample sent	Test report number & date	Results	Remarks

1. REPORT FOR MONTHLYTEST

i. Faecal streptococci and S. aureus, Salmonella and Shigella, V. cholera and V. parahaemolyticus

ii. Mineral Oil, Zinc, Anionic Surface-Active Agents, Phenolic Compounds, Antimony, Borates,

iii. Barium, Copper, Iron, Manganese (If done from BIS recognized outside laboratory)

2. REPORT FOR SIX MONTHLYTEST

i. Mercury, Cadmium, Arsenic, Cyanide, Lead, Chromium, Nickel, Fluoride, Selenium, Sodium, PCB, PAH, Bromates

ii. Silver (as applicable)

iii. Pesticide Residues

3. REPORT FOR FIVE YEARLY TEST

I. Radio Active Residues (Alpha and Beta Emitters)

FORM 5

SOURCE WATER TESTING (3 MONTHLY TESTS)

Month & Year	Source of water	In-house testing	Outside testing (if done)			Record of in-house testing/outside TR	Results	Remarks
			Name of lab	sample sent on	TR No. & Date			

FORM 6

RECORD FOR PLASTIC CONTAINERS USED FOR PACKING WATER

Date of receipt	Type of packing material	Name of supplier	Quantity received	Whether ISI marked	Details of outside testing		Results			Remarks
					Name of lab	Date of sending samples	Overall migration	Colour migration	Remaining parameters as per IS 15410	

FORM 7

RECORDS FOR SHELF LIFE ASSESSMENT (SEPARATE FOR EACH TYPE OF CONTAINER BEING USED)

Date on which sample kept	Batch No./DOM	Type of packing whose sample kept	Declared shelf life	Periodicity of testing	Date of Testing	Requirements Tested	Results	Remarks

FORM 8

FORMAT FOR PEFILM

Date of Receipt of Rolls	Name of Supplier	Quantity Received (No. of Rolls)	Details of Test report from O S Lab. With date	Description	Film Form	Winding of Film	Odour	Thickness	Width	Overall Migration	Tensile Strength	Elongation at Break	Dart Impact Resistance	Results	Remark
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)

FORM 9

FORMAT FOR POUCHTESTING

Date of Pouch Production	Time of production	Total quantity produced	Drop Test					Stack Load Test	Ink Adhesion of Printed Pouches	Product Resistance of Printed Pouches	Water Potability Test	Results	Remarks
			Machine No.										
			1	2	3	4	Etc.						
(1)	(2)	(3)	(4)					(5)	(6)	(7)	(8)	(9)	(10)

TABLE 2
GUIDELINES ON ENSURING CONFORMITY OF CONTAINERS USED FOR PACKAGED DRINKING WATER

Type of container	Parameters	Options for mode of conformity	Frequency to be followed by licensee
a) Plastic Jars	i) Overall migration and colour migration as per Clause 6 of IS 14543 & ii) Conformity to IS15410	i) 'ISI' marked, OR ii) In-house Test Reports of licensee, if facilities exist; OR iii) BIS recognized outside laboratory Test Report of the samples (not older than 6months from the date of purchase); OR iv) Combination of the above.	Once in six months, sample from one consignment of plastic jars of each size/material procured from a single source (i.e. supplier) shall be tested as per the modes of conformity given in column 3 (Not required if material is ISI marked)
b) Plastic Bottles, Glass/ cups	i) Overall migration and colour migration as per Clause 6 of IS 14543& ii) Conformity to IS15410	i) 'ISI' marked OR ii) In-house Test Reports of licensee, if facilities exist OR iii) BIS recognized outside laboratory Test Report of the samples (not older than 6months from the date of purchase)	Once in six months, sample from one consignment of plastic bottles/glasses/cups of each type/shape/capacity/material procured from a single source (i.e. supplier) shall be tested as per the modes of conformity given in column 3 (Not required if material is ISI marked)
c) Plastic cap (closures) of containers	Overall migration and colour migration as per Clause 6 of IS 14543	i) Declaration/ certificate w.r.t. foodgrade quality, as permitted under IS 14543, AND ii) In house test report of licensee, if facilities exist OR iii) BIS recognized outside laboratory test report of samples (not older than 6months from the date of purchase)	Once in six months, sample from one consignment of plastic caps/closures of each size/material procured from a single source (i.e. supplier) shall be tested as per the modes of conformity given in column 3 (Not required if material is ISI marked)
d) Foil (for sealing of	Overall migration and colour	i) Declaration/ certificate w.r.t. food	Once in six months, sample from one consignment

plastic cups/ glasses)	migration as per Clause 6 of IS 14543:2016&	grade quality of the material used for the plastic film, AND ii) In house test report of licensee, if facilities exist OR iii) BIS recognized Outside test report of samples (not older than 6months from the date of purchase)	of one consignment of foils procured from a single source (i.e. supplier) shall be tested as per the modes of conformity given in column 3 (Not required if material is ISI marked)

Note : Licensee to keep records of receipt for all types of containers and closures received, along with the corresponding test certificate in case of ISI marked consignment or test reports of samples tested in-house or got tested as per the specified frequency at BIS recognized laboratory, to be verified by BIS during periodic inspections for adequacy of the system being followed by licensee to control quality of packaging material received, accepted, rejected and method of disposal.

TABLE 3

Levels of control for Polyethylene Flexible Pouches for the packing of Packaged Drinking Water as per IS 15609

TEST DETAILS				**Test equipment requirement** R: required (or)S: Sub-contracting permitted	LEVELS OF CONTROL		
Clause	Requirement	Test Method			No. of Samples	Lot size	Remarks (Modes of Conformity etc.)
		Clause	Reference				
5	Material	5	IS 15609	S	One	Each consignment of Polyethylene film	i) ISI Marked, OR ii) BIS recognized outside laboratory Test Report of the samples, OR iii) Test certificate issued by PE resin supplier.
6.1		Requirement for Polyethylene Film					
6.1.1	Description	6.1.1	IS 15609	R	One	Each roll of polyethylene film	All rolls to be checked before using the same for making pouches. All such rolls which do not conform to the requirement shall be rejected
6.1.2	Film Form	6.1.2	-do-	R	-do-	-do-	-do-
6.1.3	Winding of film	6.1.3	-do-	R	-do-	-do-	-do-
6.1.4	Odour	6.1.4	-do-	R	-do-	-do-	-do-
6.1.5	Thickness	6.1.5	-do-	R	-do-	-do-	-do-
6.1.6	Width	6.1.6	-do-	R	-do-	-do-	-do-
6.1.7	Overall Migration	6.1.7	-do-	S	-do-	One consignment from each source (i.e. supplier) initially and subsequently once every six months for each source (i.e. supplier)	i) ISI Marked, OR ii) In house test report, if facility exist with the licensee OR iii) Outside approved laboratory test report of the sample If the sample does not conform to the requirement, the consignment shall be rejected.

Table 3 contd…

TEST DETAILS				**Test equipment requirement** R: required (or)S: Sub-contracting permitted	LEVELS OF CONTROL		
Clause	Requirement	Test Method			No. of Samples	Lot size	Remarks
		Clause	Reference				
6.1.8	Tensile strength	6.1.8	-do-	S	-do-	-do-	-do-
6.1.9	Elongation of break	6.1.9	-do-	S	-do-	-do-	-do-
6.1.10	Dart impact resistance	6.1.10	-do-	S	-do-	-do-	-do-
	7 Requirement for Flexible Pouches						
7.2	Water Potability Test	Annex E	-do-	S	-do-	Once in two months	Sample of each size shall be tested by rotation so that all the sizes shall be tested in one operative period.
7.3	Stack load Test	Annex F	-do-	R	-do-	One day production	If the sample does not conform to the requirement the same day production shall be rejected.
7.4	Drop test	Annex G	-do-	R	-do-	Every hour for each machine	If the sample does not conform to the requirement, the licensee shall follow the criteria for acceptance and retesting as per clause G-3 of IS 15609:2005. If it still does not conform then the same day production shall be rejected.
7.5	Ink Adhesion of Printed Pouches	Annex H	IS 15609	R	-do-	One day production	If the sample does not conform to the requirement the same day production shall be rejected. All rolls to be checked before using the same for making pouches. All such rolls which do not conform to the requirement shall be rejected.
7.6	Product resistance of printed Pouches	Annex J	-do-	R	One	-do-	-do-

Note-11: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-12: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

Annex G

Guidelines for Special Situations

G-1 Change of source of raw water or change in process

As and when there is change in source water or addition of new source of raw water, it shall be intimated to BIS. The raw water collected from the new source shall be tested in accordance with Clause 7 of SIT and the processed water produced from such source water shall be tested for conformity to IS 14543 from BIS recognized outside lab. The reports of source water and the product water produced from the new source shall be submitted to BIS for approval before commissioning for regular production and marking.

In case the manufacturer conducts remineralization as part of treatment process, any change in the ingredients shall be declared by the manufacturer. Further, the ingredients shall be of food/pharma grade quality. The test certificate indicating the individual ingredients and the respective compositions of each mineral/ingredient in the product shall be obtained from the manufacturer

G-2 Concurrent use of raw water from two different sources

In case of concurrent use of raw water of two different types of sources (for example water being extracted through own bore-well and also obtained from municipal source), the production from each source shall be assigned a different batch number and separately tested as per SIT for conformity of the product water, provided production lines are separate. Accordingly, records of production and testing of packaged drinking water produced using both the sources shall be kept by the licensee. However, when there is more than one source of raw water but processing plant is one, the raw water collected from the new source shall be tested in accordance with Clause 7 of SIT and the processed water produced from such source water shall be tested for conformity to IS 14543 from BIS recognized outside lab. The reports of source water and the product water produced from the new source shall be submitted to BIS for approval before commissioning for regular production and marking.

G-3 Modification in the process

G-3.1 In case of any addition, alteration and/or change in the production process without any change in raw water source, the processed water produced from such changed process shall be tested for conformity to IS 14543 from BIS recognized outside lab. The reports of the product water produced from the changed process shall be submitted to BIS for approval before commissioning for regular production and marking.

G-3.2 Testing of product water so produced by using different processes shall be carried out as per SIT and records be kept separately by the licensee.

Note 1: Testing for parameters concerning radio-active residues need not be doneunder above circumstances provided the source of raw water remains the same.

Note 2: Any change in process may require change of label. Therefore licensee may be advised to prepare fresh label incorporating all marking details.

G-4 Shelf-life

G-4.1 **Declared shelf life for Packaged Drinking Water in all type of packing materials shall not be less than 30 days**. If the manufacturer intends to declare a longer shelf-life than minimum 30 days, study shall be conducted on each type of packing whenever there is a change in the source of raw water/manufacturing/packing process, whichever is earlier. The shelf-life shall be declared on the labels as per 7.1 (g) of IS 14543. It shall be based on in-house shelf life study for which proper records be maintained conforming to declared shelf life.

G-4.2 Subsequently, for any change in the shelf life declared on the labels, the manufacturer shall inform BIS in advance along with shelf- life study reports and submit fresh label for approval. Tests to be carried out for shelf life studies are requirements given in Table 1 of IS 14543 along with routine microbiological tests as per IS 14543.

G-5 Label/marking approvals

G-5.1There is a practice that applicants/licensees submit labels to BIS for approval. Wherever any applicant/licensee submits labels to BIS for approval, it shall be informed to them that the labels conforming to the marking details as mentioned in clause 7 of IS 14543 along with the brand names are to be submitted to by licensees to BIS for information only, which will only be noted by BIS for records.

G-5.2 The compliance of such labels to the requirement of clause 7 shall be ensured by licensees. However, in case non-compliance to Clause 7 is observed by BIS and communicated in writing (provided brand name/trademark is not registered) to licensee, licensee shall make necessary rectification and resubmit the label for confirmation to concerned BIS Branch Office within 15 days. Decision of BIS regarding whether labeling is complying or not with clause 7 of IS 14543 shall be final.

G-5.3 However, in case the brand name/trademark submitted by the firm is a registered brand name/trademark, no objection to its use shall be raised even if the brand name/trademark is found to be in non-compliance to Clause 7. However, in such a case, the Head BO concerned shall communicate the details of such cases to CMD-2 for taking up with the concerned authorities.