

EXECUTIVE SUMMARY

of

M/s. MADHUSHEEL RASAAYAN PVT. LTD.

Total Production: 4.15 TPD, Area: 1.42 hectares

Sy.No.17/A/2 & 17/E/2

Mirzapur village, Pudur mandal

Vikarabad district of Telangana state

For

CONDUCTING PUBLIC HEARING

Prepared by



M/s Pragathi Labs & Consultants Pvt. Ltd.

(Recognized by MINISTRY OF ENVIRONMENT & FORESTS, GOVT. OF INDIA)
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NABET Certificate No. NABET /EIA/1720/RA-0093

EXECUTIVE SUMMARY

M/s. Madhusheel Rasaayan Private Limited is proposing to establish a new plant for the manufacturing of specialty chemicals from bio-based raw materials. The project site is located at Sy.No.17/A/2 & 17/E/2, Mirzapur village, Pudur mandal, Vikarabad district of Telangana state.

Project Description

The proposed products will be manufactured from agro-based materials such as corn cobs. The produced products further utilized in the production of pharmaceutical Active Pharma Ingredients (APIs), agricultural products, cosmetics, textiles, animal health care products, personal health care products, food and beverages. The products along with the production capacities are given below

Production details

No.	Name of the Product	Production Capacity (TPD)
1	Furfuraldehyde	2.00
2	2-Methyl Tetra hydro furan	1.38
3	2-Tetrahydrofurfuryl alcohol	0.77
Total		4.15

With the increasing the growth of population there is a need for industrial growth to produce sufficient production. Of all development projects, industrial projects have a profound influence on society and environment, in both positive and negative directions. Industries mean more jobs, generation of goods, services and some observable rise in a standard of living as positive impacts.

Apart from positive impacts they also bring negative impacts on the environment such as environmental pollution, resources depletion, health effects, corrosion, loss of yield etc. The use of the right and advanced methods can minimize negative impacts and maximize positive impacts.

The proponent of the proposed industry want to understand the environmental implications if any, at the starting stage so that they can take necessary steps to control the same. Environmental Impact Assessment (EIA) procedure can help to anticipate such fallouts of the industries and thereby help to decide an alternative technology and resetting. Thus EIA studies are most efficient and effective aid for planning at the initial stage of industry. Hence, the M/s Madhusheel Rasaayan Pvt. Ltd. entrusted the job of preparing EIA studies to M/s Pragathi Labs & Consultants Pvt. Ltd., which recognized by MoEF & CC, Govt. of India and Quality Council of India.

In the view of this, a Draft Environment Impact Assessment study was carried out. The root cause of this study is not only to get permission from the Pollution Control Board, but also to ensure that the management is properly enriched with the effective pollution control measures. The salient features of the project are as follow

Salient features of the project

No.	Features	Description			
1	Capacity	4.15 TPD			
2	Area	1.42 hectares			
3	Cost of the project	Rs. 464 Lakhs			
4	Category	'B1'			
5	Water requirement	18 KLD			
6	Power requirement	160 KW			
7	Co-ordinates	No.	Corners	Latitude	Longitude
		1	A	17°18'52.10"N	78°0'10.81"E
		2	B	17°18'51.74"N	78°0'12.26"E
		3	C	17°18'53.68"N	78°0'12.65"E
		4	D	17°18'54.13"N	78°0'10.61"E
8	Altitude (MSL)	673 m			
9	Meteorological data (IMD, Pune -1981 to 2010)	Min. & Max. Temperature: 11.4 & 42.4 °C			
		Min. & Max. Relative humidity: 28 & 82 %			
		Annual Rainfall: 855 mm			
		Avg. Wind speed: 9.1 kmph			
		Predominant wind direction is from: Southeast followed by East			
10	Nearest Road	SH-20, 1.5 km towards South direction			
11	Nearest Village	Mirzapur, 1 km towards SW direction			
12	Nearest Reserved Forest	Damagundam RF at 7.5 km towards SW direction			
13	Nearest major habitation	Manneguda, 2.7 km towards SW direction			
14	National park/Wildlife sanctuaries/ Defense installation	None within the study area			
15	Nearest water body	Shivareddypet cheruvu, 6.3 km towards West direction			
16	Nearest Railway station	Vikarabad, 10.3 km towards West direction			

Process Description

Furfuraldehyde

Pulverized corn cobs are fed to digester along with sulfuric acid and water. After digestion the mixer will be filtered to separate the solution from corn cob waste. The filtrate will be neutralized by adding Caustic lye. Ether solvent will be added for the extraction of furfuraldehyde from aqueous solution. The mixture will be allowed to settle for the separation of aqueous and organic layers. Then aqueous solution will be separated and sent to MEE for

the separation of Sodium sulphate salt. The salt from MEE will be sold to secondary users like soap and detergent industries. Organic solution will be continuously distilled for the separation of furfuraldehyde from Ether. There will not be any emissions anticipated from the process. The corn cobs waste from the filter unit will be used as fuel in the boiler.

2-Methyl Tetrahydrofuran and 2-Tetrahydrofurfuryl alcohol

2-Methyl Tetrahydrofuran and 2-Tetrahydrofurfuryl alcohol are produced from hydrogenation of Furfuraldehyde in the presence of metal-catalyst. The resultant mixture will be continuously distilled for the separation of 2-Methyl Tetrahydrofuran and 2-Tetrahydrofuryl alcohol.

Description of the Environment

The baseline data has been generated during the period of summer season (March to May, 2018) for air, noise, water, soil, socio-economics and biological environment.

Air Environment

Critical parameters like PM₁₀, PM_{2.5}, SO₂, NO₂ & CO were monitored at 8 locations in the study area as per the MoEF& CC guidelines. From the AAQ results, it is observed that average concentration of PM₁₀ is varying from 31.5 to 42.9µg/m³, PM_{2.5} is varying from 16.4 to 22.2µg/m³, SO₂ is in between 7.2 and 10.4µg/m³, NO₂ is in between 7.8 and 14.7µg/m³ and CO is varying from 0.26 to 0.32 mg/m³. All the AAQ values are found well within the National Ambient Air Quality Standards (NAAQS).

Noise Environment

Noise levels are monitored at 7 locations. The day time L_{eq} noise levels are in between 40.5 and 54.3 dB (A) and night time levels are from 38.9 to 43.8 dB (A). The nearest habitation (Mirzapur) is located at a distance of 1.0 Km. Propagative noise levels at the nearest habitation is falling below the National Ambient Noise Quality Standards (NANQS).

Water Environment

Six sampling stations were selected for physico-chemical and biological analysis. Out of 6 samples, 5 locations are from ground water sources and one is from surface water source.

The results obtained for ground water and surface water samples are compared with IS: 10500 and IS: 2296 specification limits and all the results are below the specified limits.

Land Environment

As per the remote sensing data, the forest area is 55 %, fallow land and crop land constitutes 18 and 15 % respectively.

Soil samples were collected from 5 sampling stations to evaluate the quality of soil by using soil fertility and other physical parameters like texture, bulk density, infiltration rate etc.

The results indicate that all the soil samples are neutral in nature. Key nutrients such as N, P & K are better, low and medium levels respectively.

Socio-Economic Study

Based on the census data 2011, the details of socio-economic structure have been identified. That includes total households and population, occupational structure, literacy levels. Primary data also collected by consulting the local people within the study area.

The total population in the study area is 54,561. The schedule cast population constitutes 24% and the schedule tribe population constitutes 3%. The density of population is 174 per sq.km. The main occupation of the people in this area is cultivation and most of them are agricultural labourers. The literacy rate is 56 % of which, the male literacy rate is 59% and female literacy rate is 41%. The illiteracy rate is 44%. Work force distribution of main and non-workers is 47 and 47% respectively. The major problem encountered in the study area is unemployment.

Biological Environment

Project land is a fallow land. Therefore, there will not be any loss of forest or prime agricultural land. The size or magnitude of the industry is too small. Hence, there will not be any negative anticipated impacts on the flora and fauna of Dhamagundam reserved forest found at 7.5 km distance towards SW direction from the project site. No important species (endangered, endemic, threatened and rare) are identified that need immediate conservation.

Anticipated Environmental Impacts and Mitigation Measures

The prediction of impacts helps in minimizing the adverse impacts on environmental quality during pre and post project execution. Both positive and negative impacts are described and attempt to be made to minimize negative impacts and to maximize positive impacts by implementing appropriate mitigation measures.

No major impacts are anticipated on environment during construction phase. However, the impacts are transient in nature.

Summarized environmental impacts and its suggested mitigation measures during operation phase are given in the following Table.

Summary of Impacts and their Mitigations during Operation phase

During Operation				
{PRIVATE }Env. Attribute	Negative Impacts	Probable Source	Mitigation Measures	Remarks
Air	Emissions from point and fugitive source	1. Stack 2. Raw material storage 3. Production block	1. No emissions are anticipated from the manufacturing process. 2. Stack height 30 m above the ground level will be provided for boiler. Usage of corn cob agro waste as renewable energy source to reduce air emissions. 3. Stack of 1.6 m above the reference level will be installed to the D.G. set. 4. Proper raw materials storage will be carried out 5. Unnecessary idling of vehicles will be avoided. 6. Proposed green belt will be acts as a sink of air pollutants.	Air emissions from proposed activities of project are very less. However, AAQ values will confirm to the stipulated standards.
Noise	Increase in noise levels	Boiler, D.G. set Cooling tower, Transportation & plant machinery	1. Ear plugs & muffs will be provided to the employees at noise prone areas 2. Acoustic enclosure will be provided to the plant machinery 3. Regular maintenance of machinery and vehicles 4. Vehicles speed will be permitted to 25 kmph. 5. Provision of thick green belt.	With increase in green belt development. Proper equipment maintenance can minimize the source noise emanation.
Water	Water quantity and quality depletion	1. Water consumption for the plant (18 KLD) 2. Effluent generated from process and other units (7 KLD)	1. Water consumption will be minimized by recirculation and reuse methods. The treated water will be reused in the process. 2. ETP system provided with Screening, Neutralization, flocculation, aeration, settling and PSF. It is a Zero Liquid Discharge technology. 3. ETP treated water will be utilized for green belt development.	Water usage will be minimized by the selected methodology. It is a 'Zero' discharge method and no waste water will be sent to outside the plant premises.
Land/ Soil	Solid waste generation	1. Manufacturing unit, ETP 2. Canteen, greenbelt etc.	<u>Hazardous waste</u> ETP sludge of (4 kg/day) will be used as manure for proposed green belt development. Inorganic salts (348 kg/day) to secondary users. Used oil (0.5 L/day) will be sent to Authorised recyclers. Used containers (400 Nos./month) to Authorized recyclers Hazardous waste handled as per Hazardous and Other wastes (Management and Trans boundary Movement) Rules, 2016. <u>Municipal waste</u> Leaves, canteen food waste of 20 kg/day can be used as compost for green belt development.	No major negative impacts are anticipated as the solid waste generated from the plant will be managed properly.

During Operation				
{PRIVATE}Env. Attribute	Negative Impacts	Probable Source	Mitigation Measures	Remarks
Socio-economy	More pressure on resources like land, water and consumables	Water, Air, infrastructure and socio-economics	1. Creation of employment during construction phase 25 nos. and during operation phase 68 nos. may improve present socio-economic structure to the nearby residents for some extent. 2. 2% of the annual profit will be allocated for Corporate Social Responsibility (CSR) activities. 3. 2% of project capital cost will be allocated for Corporate Environment Responsibility (CER) activities. 4. The CSR and CER activities will improve existing infrastructure, water, toilets and other demands received during PH meetings which are appropriate	On the whole it will have more positive impacts to the residents living in the vicinity of the project area.
Eco-Biology	Ecosystem sustainability, loss of biomass and diversity	1. Deforestation 2. Biodiversity 3. Abiotic factors 4. Avifauna	1. Loss of biomass will be compensated by green belt development using native diversified plant species of 770 nos. under regular supervision and maintenance 2. Deforestation causes increase in temperature, which can be compensated by greenbelt. 3. No migration routes of birds are observed in the study area, bird nests recommended where ever possibility is there which will attract avi-fauna.	The proposed green belt will enrich soil organic matter which helps to sink of pollution, brings sustainable ecosystem.

Environmental Monitoring Program

The total capital and recurring cost for Environmental Pollution Control is Rs. 40 Lakhs and Rs.15.44 Lakhs/Annum respectively.

Hazard identification and Degree of Hazard Potential

The hazardous substances are identified based on their chemical characteristics like flammability, reactivity, explosive and toxicity. The most widely used reactive ranking hazard index is Dow chemical Company's Fire & Explosion Index (F & EI) has been calculated for the hazardous chemicals used in the proposed industry. Based upon the FEI values the degree of hazard identified as light category in view of the low volume of chemical storage. However appropriate safety measures will be taken by the management.

Environmental Management Plan

The Environmental Management Cell of the project shall be headed by the plant manager, and shall be assisted by adequate supporting staff. EMP will be made and followed by the industry to mitigate the impacts on the environment.

Project Benefits

- The proposed products will be manufactured from Corn cobs (agro-waste material). So there will be an increase in demand for the raw materials in the study area.
- No major waste will be generated, as the industry uses agro waste as fuel after processing.
- As it is synthetic organic chemical industry the demand of the proposed products in foreign market is also significant, which will boost the export potential of the company as well as country.
- Growth in industrial sector.
- Generation of employment opportunities during operation phase are of 68 Nos. and the preference will be given to the local people.
- The industry will contribute revenue to the Govt. in the form of taxes.
- 2 % of the annual profit will be allocated for CSR activities and 2 % of the capital investment will be allocated for CER activities.
- Proposed greenbelt is 34 % of the total plant area will not only acts as barrier for air and noise pollution but also improve the aesthetics of the area.

**NATIONAL AMBIENT AIR QUALITY STANDARDS
CENTRAL POLLUTION CONTROL BOARD
NOTIFICATION**

New Delhi, the 18th November, 2009

No.B-29016/20/90/PCI-L—In exercise of the powers conferred by Sub-section (2) (h) of section 16 of the Air (Prevention and Control of Pollution) Act, 1981 (Act No. 14 of 1981), and in super session of the Notification No(s). S.O. 384(E), dated 11th April, 1994 and S.O. 935(E), dated 14th October, 1998, the Central Pollution Control Board hereby notify the National Ambient Air Quality Standards with immediate effect, namely:-

NATIONAL AMBIENT AIR QUALITY STANDARDS

S. No.	Pollutant	Time Weighted average	Concentration in Ambient Air		Methods of Measurement
			Industrial, Residential, Rural and Other Area	Ecologically sensitive area (notified by Central Govt.)	
(1)	(2)	(3)	(4)	(5)	(6)
1	Sulphur Dioxide (SO ₂), µg/m ³	Annual*	50	20	<ul style="list-style-type: none"> • Improved West and Geake • Ultraviolet fluorescence
		24 hours**	80	80	
2	Nitrogen Dioxide (NO ₂), µg/m ³	Annual*	40	30	<ul style="list-style-type: none"> • Modified Jacob & Hochheiser (Na-Arsenite) • Chemiluminescence
		24 hours**	80	80	
3	Particulate Matter (size less than 10 µm) or PM ₁₀ µg/m ³	Annual*	60	60	<ul style="list-style-type: none"> • Gravimetric • TOEM • Beta attenuation
		24 hours**	100	100	
4	Particulate Matter (size less than 2.5 microns) or PM _{2.5} µg/m ³	Annual*	40	40	<ul style="list-style-type: none"> • Gravimetric • TOEM • Beta attenuation
		24 hours**	60	60	
5	Ozone (O ₃) µg/m ³	8 hours **	100	100	<ul style="list-style-type: none"> • UV photometric • Chemiluminescence • Chemical method
		1 hour **	180	180	
6	Lead (Pb) µg/m ³	Annual*	0.5	0.5	<ul style="list-style-type: none"> • ASS / ICP method after sampling on EPM 2000 or equivalent filter paper • ED – XRF using Teflon filter
		24 hours**	1.0	1.0	

(1)	(2)	(3)	(4)	(5)	(6)
7	Carbon Monoxide (CO) mg/m ³	8 hours**	2	2	Non Dispersive Infra RED (NDIR) Spectroscopy
		1 hour**	4	4	
8	Ammonia (NH ₃) μg/m ³	Annual*	100	100	<ul style="list-style-type: none"> • Chemiluminescence • Indophenol blue method
		24 hours**	400	400	
9	Benzene (C ₆ H ₆) μg/m ³	Annual*	5	5	<ul style="list-style-type: none"> • Gas chromatography based continuous analyser • Adsorption and desorption followed by GC analysis
10	Benzo (a) Pyrene (BaP) – particulate phase only ng/m ³	Annual*	1	1	Solvent extraction followed by HPLC / GC analysis
11	Arsenic (As) ng/m ³	Annual*	6	6	AAS / ICP method after sampling on EPM 2000 or equivalent filter paper
12	Nickel (Ni) ng/m ³	Annual*	20	20	AAS / ICP method after sampling on EPM 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Note: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

Ambient Noise Standards

SCHEDULE

(see rule 3(1) and 4(1))

Ambient Air Quality Standards in respect of Noise

Area code	Category of Area / Zone	Limits in dB(A) Leq*	
		Day Time	Night Time
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence Zone	50	40

Note:-

1. Day time shall mean from 6.00 a.m. to 10.00 p.m.
2. Night time shall mean from 10.00 p.m. to 6.00 a.m.
3. Silence zone is an area comprising not less than 100 metres around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority
4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

* **dB(A) Leq** denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

A "decibel" is a unit in which noise is measured.

"A", in **dB(A) Leq**, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq: It is an energy mean of the noise level over a specified period.

Note : The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended by the Noise Pollution (Regulation and Control) (Amendment) Rules, 2000 vide S.O. 1046(E), dated 22.11.2000 and by the Noise Pollution (Regulation and Control) (Amendment) Rules, 2002 vide S.O. 1088(E), dated 11.10.2002, under the Environment (Protection) Act, 1986.

Indian Standard

DRINKING WATER — SPECIFICATION

(Second Revision)

1 SCOPE

This standard prescribes the requirements and the methods of sampling and test for drinking water.

2 REFERENCES

The standards listed in Annex A contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

For the purpose of this standard the following definition shall apply.

3.1 Drinking Water — Drinking water is water intended for human consumption for drinking and cooking purposes from any source. It includes water (treated or untreated) supplied by any means for human consumption.

4 REQUIREMENTS

Drinking water shall comply with the requirements given in Tables 1 to 4. The analysis of pesticide residues given in Table 3 shall be conducted by a recognized laboratory using internationally established test method meeting the residue limits as given in Table 5.

Drinking water shall also comply with bacteriological requirements (*see 4.1*), virological requirements (*see 4.2*) and biological requirements (*see 4.3*).

4.1 Bacteriological Requirements**4.1.1 Water in Distribution System**

Ideally, all samples taken from the distribution system including consumers' premises, should be free from coliform organisms and the following bacteriological quality of drinking water collected in the distribution system, as given in Table 6 is, therefore specified when tested in accordance with IS 1622.

4.2 Virological Requirements

4.2.1 Ideally, all samples taken from the distribution

Table 1 Organoleptic and Physical Parameters
(Foreword and Clause 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to Part of IS 3025	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Colour, Hazen units, <i>Max</i>	5	15	Part 4	Extended to 15 only, if toxic substances are not suspected in absence of alternate sources
ii)	Odour	Agreeable	Agreeable	Part 5	a) Test cold and when heated b) Test at several dilutions
iii)	<i>pH</i> value	6.5-8.5	No relaxation	Part 11	—
iv)	Taste	Agreeable	Agreeable	Parts 7 and 8	Test to be conducted only after safety has been established
v)	Turbidity, NTU, <i>Max</i>	1	5	Part 10	—
vi)	Total dissolved solids, mg/l, <i>Max</i>	500	2 000	Part 16	—

NOTE — It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Table 2 General Parameters Concerning Substances Undesirable in Excessive Amounts
(Foreword and Clause 4)

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Aluminium (as Al), mg/l, <i>Max</i>	0.03	0.2	IS 3025 (Part 55)	—
ii)	Ammonia (as total ammonia-N), mg/l, <i>Max</i>	0.5	No relaxation	IS 3025 (Part 34)	—
iii)	Anionic detergents (as MBAS) mg/l, <i>Max</i>	0.2	1.0	Annex K of IS 13428	—
iv)	Barium (as Ba), mg/l, <i>Max</i>	0.7	No relaxation	Annex F of IS 13428* or IS 15302	—
v)	Boron (as B), mg/l, <i>Max</i>	0.5	1.0	IS 3025 (Part 57)	—
vi)	Calcium (as Ca), mg/l, <i>Max</i>	75	200	IS 3025 (Part 40)	—
vii)	Chloramines (as Cl ₂), mg/l, <i>Max</i>	4.0	No relaxation	IS 3025 (Part 26)* or APHA 4500-Cl G	—
viii)	Chloride (as Cl), mg/l, <i>Max</i>	250	1 000	IS 3025 (Part 32)	—
ix)	Copper (as Cu), mg/l, <i>Max</i>	0.05	1.5	IS 3025 (Part 42)	—
x)	Fluoride (as F) mg/l, <i>Max</i>	1.0	1.5	IS 3025 (Part 60)	—
xi)	Free residual chlorine, mg/l, <i>Min</i>	0.2	1	IS 3025 (Part 26)	To be applicable only when water is chlorinated. Tested at consumer end. When pro- tection against viral infec- tion is required, it should be minimum 0.5 mg/l
xii)	Iron (as Fe), mg/l, <i>Max</i>	0.3	No relaxation	IS 3025 (Part 53)	Total concentration of man- ganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xiii)	Magnesium (as Mg), mg/l, <i>Max</i>	30	100	IS 3025 (Part 46)	—
xiv)	Manganese (as Mn), mg/l, <i>Max</i>	0.1	0.3	IS 3025 (Part 59)	Total concentration of man- ganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xv)	Mineral oil, mg/l, <i>Max</i>	0.5	No relaxation	Clause 6 of IS 3025 (Part 39) Infrared partition method	—
xvi)	Nitrate (as NO ₃), mg/l, <i>Max</i>	45	No relaxation	IS 3025 (Part 34)	—
xvii)	Phenolic compounds (as C ₆ H ₅ OH), mg/l, <i>Max</i>	0.001	0.002	IS 3025 (Part 43)	—
xviii)	Selenium (as Se), mg/l, <i>Max</i>	0.01	No relaxation	IS 3025 (Part 56) or IS 15303*	—
xix)	Silver (as Ag), mg/l, <i>Max</i>	0.1	No relaxation	Annex J of IS 13428	—
xx)	Sulphate (as SO ₄) mg/l, <i>Max</i>	200	400	IS 3025 (Part 24)	May be extended to 400 pro- vided that Magnesium does not exceed 30
xxi)	Sulphide (as H ₂ S), mg/l, <i>Max</i>	0.05	No relaxation	IS 3025 (Part 29)	—
xxii)	Total alkalinity as calcium carbonate, mg/l, <i>Max</i>	200	600	IS 3025 (Part 23)	—
xxiii)	Total hardness (as CaCO ₃), mg/l, <i>Max</i>	200	600	IS 3025 (Part 21)	—
xxiv)	Zinc (as Zn), mg/l, <i>Max</i>	5	15	IS 3025 (Part 49)	—

NOTES

1 In case of dispute, the method indicated by '*' shall be the referee method.

2 It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Table 3 Parameters Concerning Toxic Substances
(Foreword and Clause 4)

SI No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Cadmium (as Cd), mg/l, <i>Max</i>	0.003	No relaxation	IS 3025 (Part 41)	—
ii)	Cyanide (as CN), mg/l, <i>Max</i>	0.05	No relaxation	IS 3025 (Part 27)	—
iii)	Lead (as Pb), mg/l, <i>Max</i>	0.01	No relaxation	IS 3025 (Part 47)	—
iv)	Mercury (as Hg), mg/l, <i>Max</i>	0.001	No relaxation	IS 3025 (Part 48)/ Mercury analyser	—
v)	Molybdenum (as Mo), mg/l, <i>Max</i>	0.07	No relaxation	IS 3025 (Part 2)	—
vi)	Nickel (as Ni), mg/l, <i>Max</i>	0.02	No relaxation	IS 3025 (Part 54)	—
vii)	Pesticides, µg/l, <i>Max</i>	See Table 5	No relaxation	See Table 5	—
viii)	Polychlorinated biphenyls, mg/l, <i>Max</i>	0.000 5	No relaxation	ASTM 5175*	— or APHA 6630
ix)	Polynuclear aromatic hydro- carbons (as PAH), mg/l, <i>Max</i>	0.000 1	No relaxation	APHA 6440	—
x)	Total arsenic (as As), mg/l, <i>Max</i>	0.01	0.05	IS 3025 (Part 37)	—
xi)	Total chromium (as Cr), mg/l, <i>Max</i>	0.05	No relaxation	IS 3025 (Part 52)	—
xii)	Trihalomethanes:				
a)	Bromoform, mg/l, <i>Max</i>	0.1	No relaxation	ASTM D 3973-85* or APHA 6232	—
b)	Dibromochloromethane, mg/l, <i>Max</i>	0.1	No relaxation	ASTM D 3973-85* or APHA 6232	—
c)	Bromodichloromethane, mg/l, <i>Max</i>	0.06	No relaxation	ASTM D 3973-85* or APHA 6232	—
d)	Chloroform, mg/l, <i>Max</i>	0.2	No relaxation	ASTM D 3973-85* or APHA 6232	—

NOTES

1 In case of dispute, the method indicated by '*' shall be the referee method.

2 It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Table 4 Parameters Concerning Radioactive Substances
(Foreword and Clause 4)

SI No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to Part of IS 14194	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Radioactive materials:				
a)	Alpha emitters Bq/l, <i>Max</i>	0.1	No relaxation	Part 2	—
b)	Beta emitters Bq/l, <i>Max</i>	1.0	No relaxation	Part 1	—

NOTE — It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Table 5 Pesticide Residues Limits and Test Method
(Foreword and Table 3)

SI No.	Pesticide	Limit µg/l	Method of Test, Ref to	
			USEPA (4)	AOAC/ ISO (5)
(1)	(2)	(3)		
i)	Alachlor	20	525.2, 507	—
ii)	Atrazine	2	525.2, 8141 A	—
iii)	Aldrin/ Dieldrin	0.03	508	—
iv)	Alpha HCH	0.01	508	—
v)	Beta HCH	0.04	508	—
vi)	Butachlor	125	525.2, 8141 A	—
vii)	Chlorpyrifos	30	525.2, 8141 A	—
viii)	Delta HCH	0.04	508	—
ix)	2,4- Dichlorophenoxyacetic acid	30	515.1	—
x)	DDT (<i>o, p</i> and <i>p, p</i> – Isomers of DDT, DDE and DDD)	1	508	AOAC 990.06
xi)	Endosulfan (alpha, beta, and sulphate)	0.4	508	AOAC 990.06
xii)	Ethion	3	1657 A	—
xiii)	Gamma — HCH (Lindane)	2	508	AOAC 990.06
xiv)	Isoproturon	9	532	—
xv)	Malathion	190	8141 A	—
xvi)	Methyl parathion	0.3	8141 A	ISO 10695
xvii)	Monocrotophos	1	8141 A	—
xviii)	Phorate	2	8141 A	—

NOTE — Test methods are for guidance and reference for testing laboratory. In case of two methods, USEPA method shall be the reference method.

Table 6 Bacteriological Quality of Drinking Water¹⁾
(Clause 4.1.1)

SI No.	Organisms	Requirements
(1)	(2)	(3)
i)	<i>All water intended for drinking:</i>	
	a) <i>E. coli</i> or thermotolerant coliform bacteria ^{2), 3)}	Shall not be detectable in any 100 ml sample
ii)	<i>Treated water entering the distribution system:</i>	
	a) <i>E. coli</i> or thermotolerant coliform bacteria ²⁾	Shall not be detectable in any 100 ml sample
	b) Total coliform bacteria	Shall not be detectable in any 100 ml sample
iii)	<i>Treated water in the distribution system:</i>	
	a) <i>E. coli</i> or thermotolerant coliform bacteria	Shall not be detectable in any 100 ml sample
	b) Total coliform bacteria	Shall not be detectable in any 100 ml sample

¹⁾Immediate investigative action shall be taken if either *E.coli* or total coliform bacteria are detected. The minimum action in the case of total coliform bacteria is repeat sampling; if these bacteria are detected in the repeat sample, the cause shall be determined by immediate further investigation.

²⁾Although, *E. coli* is the more precise indicator of faecal pollution, the count of thermotolerant coliform bacteria is an acceptable alternative. If necessary, proper confirmatory tests shall be carried out. Total coliform bacteria are not acceptable indicators of the sanitary quality of rural water supplies, particularly in tropical areas where many bacteria of no sanitary significance occur in almost all untreated supplies.

³⁾It is recognized that, in the great majority of rural water supplies in developing countries, faecal contamination is widespread. Under these conditions, the national surveillance agency should set medium-term targets for progressive improvement of water supplies.