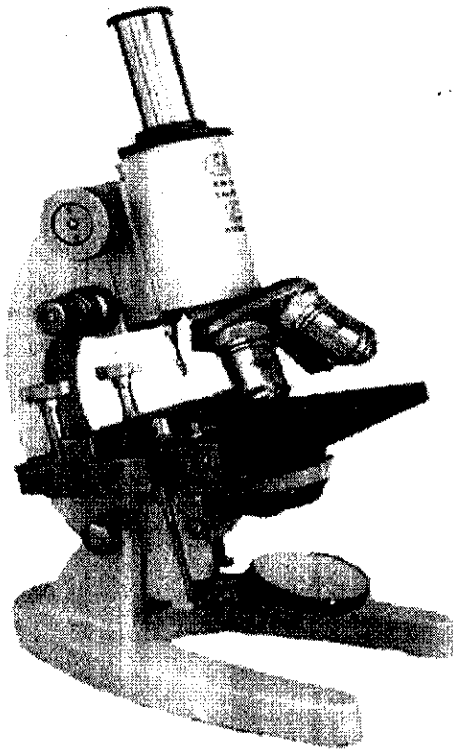


**POSSIBLE LINKAGE
BETWEEN
INSTITUTIONS & INDUSTRIES
TOWARDS
BUSINESS LED R & D
IN
GUJARAT**



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INTRODUCTION

It is a well accepted fact that lack of R&D environment affects not only its ability to develop newer technology, but also its capacity to make full use of whatever technology it imports or absorbs from outside. As per Department of Science and Technology, in value terms, only 25% of our exports are from technology intensive sectors while as much as 72% of our imports are due to import of technology intensive products and services. On the other side, even though there is good number of R&D laboratories there is a poor integration between our those R&D activities and the industrial requirement of the country. Most of the places, a scientist has better information on the technical side, but market or business prospects are of secondary importance to him. A businessman, on the other hand, would allocate and concentrate mainly on resource, time and energy based on their cost and market valuation. Value for a product or process used by him/her is totally behind to their technological or scientific beauty or ingenuity. This different standard and goal could be possibly bridged by a suitable restructuring process and communication.

An attempt has, therefore, been made to understand the available R&D infrastructure and their on-going need based activities in the process of industrial development in Gujarat.

BROAD CLASSIFICATION OF R&D ACTIVITIES

R&D activities may be broadly divided into three categories namely –

1. **Development of technologies, which are much cheaper to develop in the countries like ours.** This, in turn, can be purchased by large countries within the country or abroad and will be translated from laboratory scale research into commercial production in the market place. The development of new molecules by companies like Ranbaxy and Dr. Reddy's Laboratory and licensing the same to MNC abroad, developments at NCL, Pune and IICT, Hyderabad, development of computer software packages by some of the Indian companies etc. are examples of this category.
2. 2nd category R&D activities is at the **level of University** wherein, the results of R&D activities are mainly published in academic journal, and presented mainly at Conferences or Seminars. University also expects that the R&D results that have potential for commercialisation should be transferred to private sectors for further research in order to develop a larger scale production in a commercial way.
3. Another category of R&D business could be through **incremental developments or improvements in the existing products/ process**, reduction in costs, quality improvements, developments to suit local requirements etc. As for example, Technology Upgradation in various

sectors to compete internationally has been taken up as one of the main objectives under Cluster Development Programme of Govt. of Gujarat.

4. Such R&D business usually involves low value addition but of large in number, specially targeting small and medium sectors.

ONGOING NEED BASED R&D

Possibly, in case of 1st category of R&D, involving large financial returns in the form of know-how payment, royalty to the investors etc., development of activities in the State of Gujarat is not impressive. Since India signed the GATT Agreement in 1993, a large number of global firms, approximately 60 in number have set up R&D Centre in technology-intensive sectors for accessing local skilled manpower. A list of prominent Global R&D Firms entered the country in the recent past is shown in Table-1.

Table-1

R&D CENTRES STARTED BY GLOBAL FIRMS : 1997-1999

Sr.No.	Firm	Location	Focus of R&D
1	Microsoft	Hyderabad	Operating system for Internet browsing
2	Monsanto	Bangalore	Agricultural biotechnology
3	Adobe	New Delhi	Multimedia software products
4	Daimler Chrysler	Bangalore	Intelligent automobile guidance systems

5	Unilever	Bangalore	Beverages
6	Seagram	Pune	Alcohol from coarse grain
7	Motorola	Hyderabad	VLSI design centre
8	Mentor Graphics	Hyderabad	VLSI design centre
9	Pepsico	Bangalore	Fruit processing technology
10	Baan	Hyderabad	ERP application R&D
11	Oracle	Hyderabad	Software product development
12	Sun Microsystems	Kolkata	Electronic business products
13	GE	Bangalore	Medical equipment and software
14	LG Electronics	Bangalore	Designing embedded software
15	Gulf Oil	Bangalore	CNG technology products
16	Sanyo	Bangalore	Computer aided design
17	Daewoo Electronics	Delhi	Industrial design for new products
18	Ikos	Delhi	Design verification products
19	Glaxo	Mumbai	Drug development
20	Hoechst Roussel	Pune	Immunodiagnostics
21	Honda	Delhi	Design and development of two-wheelers
22	Philips	Bangalore	Manufacturing technology development
23	Informix	Mumbai	Database product development
24	Novell	Bangalore	Network products
25	Cadence Desgn	Delhi	Computer aided design product
26	Scala	Pune	ERP products
27	View Logic	Bangalore	Design automation tool development
28	Exxon	Bangalore	Additives and polymers

These developments have number of implications in our overall economy, namely --

- India's R&D capability has gone up.

- There will be an automatic upgrading of technology in certain areas; and
- The demand for skilled R&D personnel has increased.

Notable point is that most of those Global Firms have chosen their place of activities more prominently in Hyderabad and Bangalore, but not even at the industrially developed State like Maharashtra and Gujarat or at Tamil Nadu. **Possibly we may have to understand the reason behind it.**

In the 2nd category i.e. R&D at University level, we may need to understand the general behaviour of academicians and prime objective of on-going R&D activities on basic science, rather than applied research for obtaining just PhDs. Some of the important characterisation and behaviour in Universities towards R&D may be stated as under :

Academicians prefer to do consultancy job because the task of deliveries are in short term basis. They need to balance their major commitment that is teaching under-graduates, supervising post-graduates with the optional commitment that is getting involved in research to transfer technology to private sectors. Private sectors, on the other hand, are reluctant to invest money on R&D activities and prefer to import technology rather than modifying and developing the technology. They also face difficulties in getting R&D funding from the Government.

Finally, there exists a weak linkage between university and private sectors due to the differences in their role and responsibilities and also government programmes are not effective enough to commercialise R&D results.

However, Gujarat, in specific, Gujarat Agriculture University has done some notable work in recent past, like – (1) Development of Hybreed cotton (Shankar-4, Shankar-6 etc.) and (2) Development of Coloured cotton, Tissue culture and so on. This technology as developed, subsequently commercialised for cultivation successfully.

In the 3rd category of R&D activities i.e. usually involving low value addition, but in large number specifically targeting Small and Medium Sector Units showing an incremental development in the existing products/processes to achieve appropriate quality with minimum cost. Here, Gujarat has taken very prominent role towards Technology Upgradation in various industrial clusters in the State under Special Cluster Development Programme (Industrial Policy 2000-2005).

MAJOR INITIATIVE TAKEN BY GOVT. OF GUJARAT

Table-2 shows an on-going initiative taken by Industries Commissionerate for Technology Upgradation identifying 10 major sectors, with an active involvement of respective R&D Institute of the State. Similar way, another 5 areas have been already earmarked to take

necessary intervention on Technology Upgradation under Cluster Development Programme in the current financial year i.e. 2003-04.

Table-2

Cluster Development with a special focus on Technology Upgradation already undertaken

Sr. No.	Cluster	Location	Institution
1	Pharmaceutical	Ahmedabad/Vadodara	PERD & UNIDO
2	Ceramic Tiles Ceramic Sanitarywares Ceramic Pottery	Morvi/Wankaner Thangadh Ahmedabad/ Himatnagar	CGCRI
3	Powerlooms Industry	A'bad/Dholka/Surat	ATIRA
4	Power Driven Pumps	Ahmedabad/Mehsana	ERDA
5	Brass Parts Industry	Jamnagar	EDI
6	Jewellery	Ahmedabad	NIFT
7	Garment	Ahmedabad	NIFT
8	Salt	Little Rann of Kutch Region	CSMCRI & SEWA
9	Fish Processing	Veraval	CEPT & Veraval Inds. Asscn.
10	Re-rolling Mills Ind.	Bhavnagar/Sihor	GITCO&Re-rolling Mills Asscn.

***Proposed areas for Technology upgradation
during 2003-04.***

<i>Cluster</i>	<i>Location</i>	<i>Institution</i>
<i>Fabrication Industry</i>	<i>Mehsana, Ahmedabad, Vallabh Vidyanagar</i>	<i>NSIC</i>
<i>Dyes & Dye Intermediates</i>	<i>Vapi, Ankleshwar, Panoli</i>	<i>NPC</i>
<i>Oil Mills Industry</i>	<i>Dhoraji, Gondal and Rajkot</i>	<i>SISI</i>
<i>Spectacle Frames</i>	<i>Vadodara</i>	<i>SISI</i>
<i>Machine Tools</i>	<i>Rajkot</i>	<i>EDI</i>

As a major initiative taken by iNDEXTb, a **Directory of in-house R&D activities** has been prepared. Report has analysed and listed over 76 R&D/Testing Institutes, district-wise and sector-wise along with their field of specialisation. Report was widely circulated and well accepted by Industries, Industries Association, Institutions and Policy Makers. This has also enabled them to have linkages on various need-based service provided by those Institutions.

Based on the further need of the Industries, iNDEXTb, through Indian Bureau of Mines, has developed **three indigenous Process Technology in the fields of China Clay, Chalk and Silica Sand**, which are, in turn,

transferred to the potential investors in the State for their use and implementation. In an another step, iNDEXTb, through Central Glass and Ceramic Research Institute, Naroda has **developed technology on “Recycling and Re-use of Ceramic Waste,”** to reduce environmental problems and to create a new investment opportunity. Technology Transfer process is going on at Thangadh. In the recent past, ATIRA, under active support of Industries Commissionerate/iNDEXTb, has developed **LOW COST SHUTTLELESS LOOM** for the decentralised Powerloom Sector in Gujarat.

OBSERVATIONS AND CONCLUSION

Overall, iNDEXTb/**Industries Commissionerate** is playing an active and prominent role in developing and implementing need based R&D activities through an inter-linkage between Industries, Institutes and Universities of the State. However, a lot many is yet to be done.

R&D and Testing Laboratory and their activities in detail are given in the **R&D Directory** placed at **Annexure**. From the Directory prepared by iNDEXTb, it may be said that majority of industrial sectors and their requirement are covered through the existing Testing Centres/Institutions as described in Page 3. It is more prominent in case of **Chemical/Effluent Testing, Building Materials/Ceramic, Metals and Food Products**.

However, in case of Districtwise Classification (Page 6), Ahmedabad and Vadodara are found to be main centres for available R&D/Testing facilities in the State. Interestingly, industrially developed places like Surat does not possess sound platform for Testing/R&D activities sufficiently.

When more than 50 recognised Scientific & Industrial Research Organisation are existed in Gujarat, only a few is found to be active.

Based on all these observations and in order to create an active bridge between Institutions and Industries, following immediate measures may be thought –

- *Intervention needs to be made to understand the Technology need for each sector separately, in specific, for SMEs. Need based technology development work should be entrusted to the Universities/Institutions leading to post-graduation and PhD with financial support from the Industries Department and/or from the specific Industries Association. The whole project work needs to be monitored and guided by the Experts from Industries and Committee as decided by Government.*
- *Teachers in the existing Institution/Universities should be allowed to do consultancy for industries liberally. The Institute and the Teachers may share remuneration received out of this service equally. Promotion of teachers should be closely linked with the development work carried out*

by them for the Industries. Similarly, existing 26 Engineering Colleges of the State need to be strengthened and turned in that direction. This will, in turn, upgrade the quality of Teachers/Professors and the Institution as per the need of Industries. This will further narrow down the gap between R&D Institution/Universities and Industries and will enhance R&D led business in a faster pace.

- *Finally, In order to create a closer interaction between Institutions and Industries and to develop R&D led business in Gujarat, an Expert Committee may review and formulate the necessary policy and Action Plan in this direction. The Committee may consist of -*

<i>Principal Secretary</i>	<i>Chairman</i>
<i>Secretary, Science & Technology</i>	<i>Member</i>
<i>Industries Commissioner</i>	<i>Member</i>
<i>MD-iNDEXTb</i>	<i>Member</i>
<i>Officials from leading R&D Institutes/Universities</i>	<i>Member</i>
<i>Leading Industrialists/Industries Associations</i>	<i>Member</i>

Annexure

Industrial Material Testing

Institutes/Centres

and

In-House R&D Units

in

Gujarat

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SECTION - I

List of Institutes/Centres Providing Testing facilities

Industrial Development in a sector of industry and a specific region has definite bearing on technological development, quality control and standardization. Technological innovation and updating of Technology as a result of continuous efforts in research and development sustains the industrial development in all respect.

A progressive industrial undertaking is required to have in-house testing facilities as well as research facility to maintain quality and performance standards of the products manufactured. However more often than not most of the small and medium scale industrial units may not have Research and Development and Testing Facilities. These industrial units, therefore, are required to take assistance from National Institutions/Test Centres and professional testing laboratories in the vicinity of their works.

In order to locate the Centre/Institute engaged in testing services, a list is given in this section providing testing facilities in the State of Gujarat. The names of Institutes/Laboratories are given in the alphabetical manner with their location. Subsequently, in another section the list of Centres with complete address, items tested and line of activity is given in the same chronological order.

SECTION - I

List of Institutes/Centres Providing Testing Facilities

Sl.No.	Name & Address of the Institute/Centre	Station
1	Ahmedabad Engineering Research Institute	Ahmedabad
2	Ahmedabad Textile Industry's Research Association (ATIRA)	Ahmedabad
3	Altra Analytical Laboratories	Ahmedabad
4	Anandjiwala Technical Consultancy Services Pvt. Ltd.	Ahmedabad
5	B K Mody Government Pharmacy College	Rajkot
6	Biocare Diagnostics & Biomedical Research Centre	Ahmedabad
7	Birla Vishwakarma Mahavidyalaya	Vallabh Vidyanagar
8	Central Glass & Ceramic Research Institute	Ahmedabad
9	Central Institute of Plastic Engg. & Technology	Ahmedabad
10	Central Leather Research Institute	Ahmedabad
11	Central Salt & Marine Chemicals Research Institute	Bhavanagar
12	Chemdyes Corporation	Ahmedabad
13	Chemical Consultancy Services	Vadodara
14	Chromatography & Instruments Co.	Vadodara
15	Dharm Singh Desai Institute of Technology	Nadiad
16	Divine Laboratory Services	Ahmedabad
17	Electrical Research & Development Association	Vadodara
18	Electronic testing & Development Centre	Vadodara
19	Faculty of Technology & Engineering Dept. of Applied Mechanics	Vadodara
20	Field Testing Station - SISI	Ahmedabad
21	Finia Laboratory	Halol
22	Food & Drug Laboratory	Vadodara
23	Garg Lab. & Chemicals	Gandhidham
24	Gitar Laboratories	Ahmedabad
25	Government Polytechnic	Ahmedabad
26	Government Polytechnic	Dahod
27	Government Polytechnic	Porbandar
28	Government Polytechnic	Rajkot
29	Government Polytechnic	Valsad
30	Gujarat Industrial Research & Development Agency	Vadodara
31	Gujarat Laboratory	Ahmedabad
32	Inspectorate (India) Consulting Engg. (P) Ltd.	Gandhidham
33	Jagdish Laboratory	Ahmedabad
34	Jyoti Ltd	Vadodara

35	Khadi Gramodyog	Ahmedabad
36	Kilachand Devchand Polytechnic	Patan
37	Kobe Steels Pvt. Ltd.	Vadodara
38	L D College of Engineering	Ahmedabad
39	Lukhidharaji College of Engineering	Morvi
40	Man Made Textile Research Association	Surat
41	Maruti Engg. Co.	Vadodara
42	Mayur Industrial Testing & Analytical Laboratory	Mehsana
43	Met Chem Laboratories	Vadodara
44	Met Heat Engineers	Vadodara
45	National Environmental Engineering Research Institute	Ahmedabad
46	National Institute of Design	Ahmedabad
47	National Metallurgical Laboratory	Ahmedabad
48	Navakar Analytical Laboratory	Ahmedabad
49	Navyug Analytical Laboratory	Ahmedabad
50	NDT Services	Ahmedabad
51	National Dairy Development Board	Anand
52	Nehal Cable Industries	Nadiad
53	Patel Alloys Steel Ltd.	Ahmedabad
54	Physical Research Laboratory	Ahmedabad
55	Petrography & Mineral Chemistry Laboratory	Gandhinagar
56	Polytechnic - MS University	Vadodara
57	Prototype Development & Training Centre - NSIC	Rajkot
58	Rachana Laboratory	Vadodara
59	RADIO TECH	Ahmedabad
60	Rajkot Engineering College	Rajkot
61	Sarabhai Research Centre	Vadodara
62	Sardar Patel Renewable Energy Research Institute	Vallabh Vidynagar
63	Sardar Vallabhai Patel Institute of Technology	Valsad
64	Sardar Vallabhai Regional College of Engg. & Technology	Surat
65	SGS India Ltd.	Ahmedabad
66	Shri AV Parekh Technical Institute	Rajkot
67	Shri Dinesh Mills Ltd.	Vadodara
68	Shri KJ Polytechnic	Bharuch
69	Sir Bhavsinghji Polytechnic Institute	Bhavnagar
70	S.K. & S.K. Engineers	Bhavanagar
71	Dr. S & S S Gandhi College of Engg. and Technology	Surat
72	Space Application Centre (ISRO)	Ahmedabad
73	Sharon Engineering & Test House	Ahmedabad
74	Star Precision Electronics (India) Ltd.	Vadodara
75	Tolani Foundation	Adipur
76	Tradesco (India) Rubber Works	Ahmedabad
77	Veekay Vikram & Co.	Ahmedabad

SECTION - II

<p>DISTRICTWISE LIST OF INSTITUTES/CENTRES PROVIDING TESTING FACILITIES</p>
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In this section the Institutes/Centres providing testing facilities are given according to the location in the district. The Serial Number referred in this Section is same as the chronological number given in first Section. The districtwise list of Centres/Institutes is given hereunder.

SECTION - II

Districtwise Classification of Testing Centers/Institutes

Name of the District	Serial Number of Insitute/Centres
Ahmedabad	1, 2, 3, 4, 6, 8, 9, 10, 12, 16, 20, 24, 25, 31, 33, 35, 38, 45, 46, 47, 48, 49, 50, 53, 54, 59, 65, 72, 73, 76, 77
Anand	7, 51, 62
Bharuch	68
Bhavnagar	11, 69, 70
Dahod	26
Gandhinagar	55
Kheda	15, 52
Kutch	23, 32, 75
Mehsana	42
Panchmahals	21
Patan	36
Porbandar	27
Rajkot	5, 28, 39, 57, 60, 66
Surat	40, 64, 71
Vadodara	13, 14, 17, 18, 19, 22, 30, 34, 37, 41, 43, 44, 56, 58, 61, 67, 74
Valsad	29, 63

SECTION – III

<p>ACTIVITYWISE LIST OF INSTITUTIONS PROVIDING TESTING FACILITIES</p>
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In this section the classification is made according to the type of activity and area of operation of the Institutes/Centres engaged in providing testing facilities. The chronological number given is same as that in other sections.

SECTION - III

Activity-wise Classification of Testing Centres/Institutes

Activity	Serial Number of Testing Centres/Institutes
Building Materials	1, 4, 7, 19, 25, 26, 27, 28, 29, 36, 39, 56, 57, 60, 63, 68, 69, 71, 75
Ceramics	8, 17, 34, 43, 46, 55
Chemicals	3, 5, 8, 11, 12, 13, 14, 15, 20, 22, 23, 24, 30, 32, 40, 42, 49, 57, 58, 61, 65, 67
- Dyestuff	2, 33, 38
- Pharmaceuticals	3, 5, 22, 24, 61
Engineering	7, 32, 34, 38, 52, 62, 64, 65
- Automobiles	41
- Electrical M/cs	7, 18, 28, 32, 34, 38, 64
- Electronic Items	18, 66, 72
- Ferros/Non-Ferrous Metals	13, 14, 16, 19, 21, 29, 30, 37, 43, 44, 47, 50, 53, 54, 57, 59, 70, 73
Food Products	6, 22, 23, 24, 31, 42, 65
- Milk Products	22, 42, 51
- Oil	3, 14, 17, 48
- Spices	3, 31
- Special Oils	15
Leather	10
Minerals	17, 30, 43, 47, 55, 57
Plastics	9, 30
Rubber	17, 30, 76, 77
Soil Testing	1, 4, 23, 29
Water Testing/Effluent Testing	3, 6, 11, 12, 13, 15, 20, 30, 31, 40, 43, 45, 57, 58, 63, 64, 65, 70
Textiles	2, 33, 35, 40, 65, 67, 74

SECTION - IV

List of Institutes/Centres providing testing facilities with details of Groups of Items being tested and testing facilities available

Sl. No.	Name & Address of the Institute/Centre	Groups Items Tested	Testing Facilities Available
1	Ahmedabad Engineering Research Institute Raju Complex Basement Gurukul Memnagar Road Ahmedabad 380 052 Ph. 7456724, Fax: 7456724	Civil Engineering and Building Construction Items.	Testing services, technical services, non-destructive testing and soil investigation.
2	Ahmedabad Textile Industry's Research Association (ATIRA) PO Ambawadi Vistar Ahmedabad 380 015 Ph. 6304671-73, 6568995 Fax: 6302874	Textile Items: Yarns and fabrics	Physical testing of fibres, yarns and fabrics, Chemical testing on textile, dyes, chemical resins, Pilot mill service spinning/weaving testing.
3	Altra Analytical Laboratories Pankore Naka Biscuit Lane Ahmedabad 380 001 Ph. 5353638	Chemicals, Food, Spices, Oils, Water, Metals, Drugs, Chemicals	Chemical analysis of textile auxiliaries, Food spices, Oils, Oil Seeds, Cakes Water, Metals and Alloys, Drugs Testing, Fertilizers for Nitrogen, Phosphorus & Potassium content.
4	Anandjiwala Technical Consultancy Services Pvt. Ltd. Major CK Patel's Bunglow Ellisbridge Ahmedabad 380 006 Ph: 6567524	Building materials and Soil Testing	Impact test, transverse test, moisture content and all tests relating to building materials. Fineness, setting time, soundness, compression, strength, tensile strength of cement. Soil testing.

5	B K Mody Government Pharmacy College Polytechnic Campus Rajkot 360 003	Drugs and Pharmaceutical	Chemical and Physical testing of chemicals.
6	Biocare Diagnostics & Biomedical Research Centre 308, Sumeru Complex Paldi Char Rasta Ahmedabad 380 007 Ph. 6577901	Food & Drugs Industry	Biological testing, Waste water analysis.
7	Birla Vishwakarma Mahavidyalaya Vallabh Vidyanagar Dist. Anand	Mechanical Civil Electrical items.	Plating testing, Metal testing Bricks/wood/MSBars/Concrete/ Cement/Soil testing, Electric motor/transformer/switchgear testing.
8	Central Glass & Ceramic Research Institute 168/169 Naroda Industrial Estate Ahmedabad 382 330 Ph. 2823345 Fax: 2822052	Glass, Ceramic & allied raw materials and products.	Chemical analysis of Ceramic & Allied materials, Acid resistance test for chemical stoneware, Alkali resistance test, Toxicity test and determination of lead and calcium. Refractories and other allied materials.
9	Central Institute of Plastic Engg. & Technology Plot No. 630, Phase IV GIDC, Vatva Ahmedabad 382 445 Ph. 5830569/5835219 Fax: 5835236	Plastic raw materials and finished products.	Measurement of Mechanical, Electrical, Rheological, Thermal, Optical, Chemical and Physical properties as per ASTM, LS, DIN, BS & ISO specifications.
10	Central Leather Research Institute - Regional Centre for Extension and Development 50/3 GIDC Estate, Vatva Ahmedabad 382 445 Ph. 5830352 Fax 5835962	Leather and Tannery Items	Chemical Analysis of Chemicals, Leather Tanning Materials and Water.

11	Central Salt & Marine Chemicals Research Institute Gijubhai Batheka Marg Bhavanagar 364 002 Ph. 567760/568923 Fax: 566970	Salt and Marine Chemicals, Seaweeds and Inorganic Chemicals.	All related test for the Chemicals.
12	Chemdyes Corporation Bhulabhai Park Geeta Mandir Road Ahmedabad 380 022 Ph. 5396567	Chemicals Water .	Melting point & boiling range Water by Karl Fischer method UV Spectrometer General Analysis.
13	Chemical Consultancy Services 25/C Dahibanagar Society, Manjalpur Vadodara 390 010	Chemical/ Water/Metals	Testing of ground and effluent water, Inorganic salts and chemicals Soap & detergents, Ferrous and nonferrous metals.
14	Chromatography & Instruments Co. 122, GIDC Makarpura Vadodara 390 010 Ph. 642926	Chemicals /Gases/ Liquids and Oil testing	Testing of High molecular weight compounds and chemicals, gases and liquids, metals etc.
15	Dharm Sinh Desai Institute of Technology Post Box No. 35 College Road Nadiad 387 001 Ph. 60502 Fax: 60501	Inorganic chemical Special oils/ transformer oil and water	Environment Engineering Structural Analysis and Design Concrete testing Geotech Engineering testing Transport Engineering.
16	Divine Laboratory Services 211, Harshad Chambers Gopal Indl. Estate Opp. Vallabhnagar Odhav Ahmedabad 382 415 Ph. 2873928, Fax: 2892804	Metals and Alloys	Chemical analysis of pure copper, copper base alloys, white metals, nickel, zinc, ferro-alloys, electroplating and chemicals.
17	Electrical Research & Development Association Makarpura Indl. Estate Vadodara 390 010 Ph. 642964/557, Fax: 643182	Ceramics/ Glass/Minerals/ Rubber/Organic Oils/Lubricating oils, etc.	Certification and special testing for electrical materials, products and systems.

18	Electronic Testing & Development Centre Dept. of Electronics C1-641/648, GIDC Estate, Vadodara 390 010 Ph. 643121, Fax: 643279	Electrical and Electronics Materials	Calibration of Electrical/ Electronics Instruments, Testing of Domestic Appliances, Product test and quality advisory service.
19	Faculty of Technology & Engineering Dept. of Applied Mechanics MS University of Baroda Kalabhavan Vadodara 390 001 Ph. 553371	Cement/ Building materials	Testing of Steel, Cement, Timber, RCC beams and solid, Engines and Pumps, Metals
20	Field Testing Station Small Industries Service Instt. (Ministry of Industry Govt. of India) 130, GIDC Odhav Ahmedabad Ph. 2871007	Chemical/ Water	Chemical analysis of Dyes/Dye Intermediate. Inorganic Chemicals Water & effluent water Detergent and acid slurry Organic Chemicals
21	Finia Laboratory C-1, 181, GIDC Halol Dist. Panchmahals	Ferrous/non-ferrous alloys	Chemical analysis of ferrous and non-ferrous alloys.
22	Food & Drug Laboratory (Govt. of Gujarat) Nr. Polytechnic Vadodara 390 002	Food/ Chemicals/ Milk/Pharmaceuticals	Testing of food, milk and drugs, cosmetics and other chemicals.
23	Garg Lab. & Chemicals 122 B, Rly. Colony Gandhidham (Kutch) Pin 370 201	Food/ Chemicals/ Petrochemical/ Sand	Chemical analysis of chemicals, petrochemicals and sand Water hardness.
24	Gitar Laboratories 67/73 Embassy Market Nr. Dinesh Hall Ahmedabad 380 009 Ph. 6584721	Chemicals Pharmaceuticals Food items.	Drugs, pharmaceuticals soaps, minerals, oil seeds, oil, food, spices, pulps & paper, insecticides & pesticide, chemicals & solvents, water, fertilizers.

25	Government Polytechnic Ambawadi Vistar Ahmedabad 380 015	Building materials	Testing of cement, concrete, bricks, metal, soil, timber.
26	Government Polytechnic Polytechnic Campus PO Dahod Dist. Dahod	Cement testing, building bricks and tiles, metals.	Compression test, finenes, setting time, hardness, shear test of metals, sieve analysis, bulk density and elongation.
27	Government Polytechnic Polytechnic Campus Porbandar 360 577	Civil Eng. materials, water, timber.	Testing of timber, steel, cement and construction material.
28	Government Polytechnic Polytechnic Campus Rajkot	Building materials Pump/engine Electrical appliances	Testing of cement, sand, bricks, metals, tiles, etc. All related tests. Testing of performance of domestic appliances, choke coil, transformers, starters.
29	Government Polytechnic Polytechnic Campus Valsad	Construction materials, steel, metal, soil etc.	Physical properties of common Civil Engineering materials and for construction.
30	Gujarat Industrial Research & Development Agency Science College Compound Vadodara 390 002 Ph. 795548/791905	Chemicals/Ore s/Metal Water Plastic and Rubber.	Testing of Ores/Minerals/ Metals/ Chemicals/Soap/Detergents/ Fertilizers/Pesticides/Oils/Oil cakes/Mineral Oil/Inks/Paints/ Pigments/Water/Plastic/Rubber.
31	Gujarat Laboratory F-17, Madhavpura Market Shahibaug Ahmedabad 380 004 Ph. 5624821/5626040 Fax: 5625436	Agriculture produce, oil seeds, food products, water and soap analysis.	Testing of oil cakes, oil seeds, agriculture produces, vegetable oils, water, soap and detergents.
32	Inspectorate (India) Consulting Engg. (P) Ltd. Sundeep D-39, Shaktinagar Gandhidham 370 201	Chemicals/Met allurgy/ Electrical etc.	Chemical analysis of chemicals, electrical testing, metal testing.

33	Jagdish Laboratory C/3, Girdhar Chamber Dhalni Pole Astodia, Ahmedabad 380 001	Dyes, Dyed Yarns & Fabrics.	Chemical analysis of dyes, chemicals and intermediates, dyed yarns and fabrics.
34	Jyoti Ltd. Industrial Area PO Chemical Industries Vadodara 390 003 Ph. 321041	Mechanical Electricals Metallurgical Ceramics	Testing of Hydraulics Turbines Rotating Electrical machines, Circuit Breakers and Control Gear relays. Ferrous/non-Ferrous metals. Plastic and Ceramics materials testing.
35	Khadi Gramodyog Prayog Samiti Gandhi Ashram Ahmedabad 380 027 Ph. 7559382	Khadi Cloth, Cotton and Yarn.	Cotton and Cloth tests for Khadi.
36	Kilachand Devchand Polytechnic Station Road Patan 384 265	Cement Aggregates Bricks/Tiles Timber	Physical properties, setting time, soundness, compression, tensile. Fineness modules, Sp. gravity, Impact test, Absorption, Transverse Compression. Compressive strength.
37	Kobe Steels Pvt. Ltd. 30, Sarvodaya Society Chhani Road Vadodara 390 002	Steel Metals	Chemical analysis of Ferrous/Non- Ferrous Metals. Physical analysis of Metals.
38	L D College of Engineering Navrangpura Ahmedabad 380 015 Ph. 6441752	Civil Engineering Chemical Engineering Mechanical Engineering	Tests on road meatl and bitumen like abrasion, attrition, crushing strength, viscosity, penetration, flash fire point. Microscopic and Geochemical testing of rocks and minerals.
39	Lukhidharaji College of Engineering College Campus Morvi 368 641 Dist. Rajkot	Building material	Physical test of building materials i.e. tensile, compression, impact, hardness, water absorption etc.

40	Man Made Textile Research Association Nr. Market Telephone Exchange Ring Road Surat 395 002 Ph. 623211 Fax: 622500	Textile/ Chemical/ Water	Fibre-staple length, diameter, sp. gravity, crimp percentage of moisture etc. Yarn appearance, single thread strength test, tenacity, cotton denier, filament count, shrinkage etc. Fabrics, shrinkage, spray rating, strength, weave analysis, stiffness, weight/sq.mt. etc. Dyestuff testing, Water analysis, Organic and Inorganic Chemical analysis.
41	Maruti Engg. Co. Leela Sadan Nr. Kalika Mandir Opp. Lakadi Pool Dandia Bazar Vadodara 390 001	Automobile	Testing of fuel/oil, air filters.
42	Mayur Industrial Testing & Analytical Laboratory 36, Shankar Nagar Society Near Dudhasagar Dairy Mehsana 384 002 Ph. 55306	Chemical/Food Products/Milk Products	Chemical analysis and General testing of Oil seeds, Milk and Dairy Products, Food Products.
43	Met Chem Laboratories 10, Parushram Nagar Society Sayaji Gunj Vadodara 390 005 Ph. 361314/361319	Ferrous/Non-Ferrous Metals/Water/Refractories/Mineral	Chemical analysis and physical tests of chemicals, metals and minerals.
44	Met Heat Engineers 741/742 GIDC Makarpura Indl. Estate Vadodara - 390 010 Ph. 642374	Metal Testing	Physical Testing Tensile, Bend, Hardness, Compression test of metals and alloys.
45	National Environmental Engineering Research Institute Sewage Farm Road Ahmedabad 380 022 Ph.5320419	Water Effluent Testing.	Chemical and Bacteriological analysis of water. Characterisation of domestic and Industrial Waste Water. Biological examination of water and waste water. Biological examination of water and waste water.

46	National Institute of Design Paldi Ahmedabad 380 007	Ceramic	Firing of Ceramic Wares for Testing the glaze, body and colour, etc.
47	National Metallurgical Laboratory Industrial Estate Naroda Ahmedabad 382 330	Chemical analysis of Metals & Minerals.	Chemical analysis of Metals, Foundry Sands, Clay, Ores, Minerals etc. Physical test of Foundry Sands and Clyas. Benification of Ores and Minerals.
48	Navakar Analytical Laboratory 2794, Zaveriwad Opp. Laheria Pole Kalupur Relief Road Ahmedabad 380 001	Oil, Fats, Soap stock, Non Edible Oil.	Analysis of Fatty matter, Saponification value, Iodine value and other tests.
49	Navyug Analytical Laboratory 1575/1 Raipur Ahmedabad 380 001 Ph. 5359734	Dye Intermediates Fine Chemicals, etc.	Analysis of Dye Intermediate, Fine Chemicals.
50	NDT Services Motilal Estate Bhairavnath, Maninagar Ahmedabad 380 028 Ph. 5325845 Fax: 5325643	NDT Services	Industrial Radiography, Magnetic Particle Examination and Liquid Penetration Examination.
51	National Dairy Development Board Dairy Road Anand 388 001 Ph. 40148/40149 Fax: 40165/40156	Milk and Milk Products, Edible Oil & Seeds.	Analysis of Milk, Milk Products, Oil Seeds and Edible Oil.
52	Nehal Cable Industries C/3-9 GIDC Nadiad 387 001	Cables/Wires	Testing of Cables and Wires as per BIS Specifications.
53	Patel Alloys Steel Ltd. 297-300 Phase II GIDC Estate, Vatva Ahmedabad 382 445 Ph. 5830673/5835312 Fax:5833884/5835307	Metal Testing Mechanical Chemical NDT	Sand Testing, Chemical Analysis, Physical Testing like tensile strength, hardness, izodnotch test, impact test etc. Ultrasonic testing, dye-penetrant check, magnetic particle testing. Alloys test corrosion resistant, heat resistant, creep resistant.

54	Physical Research Laboratory Satellite Navrangpura Ahmedabad 380 009	Physical Tests	Cosmic Rays, X-ray, Radio Astronomy, Infra Red Detection.
55	Petrography & Mineral Chemistry Laboratory Commissionerate of Geology & Mining Block No. 15 Dr. Jivraj Mehta Bhavan Gandhinagar 382 010 Ph. 8505/8763	Industrial Minerals, Clays and Mineral Materials.	Physical and Chemical Analysis of Minerals and Clays for Mineral Constituents and Engineering Properties.
56	Polytechnic - MS University of Baroda University Campus Vadodara 390 005	Cement, Timber, Bricks.	Analysis of Material for Construction.
57	Prototype Development & Training Centre National Small Industries Corpn. Ltd. (Govt. of India Undertaking) Aji Industrial Estate Rajkot 360 003 Ph.387613/387885	Chemicals Mechanical Metal & Alloys Minerals Building Materials (Cement/ Timber/ Bricks/Tiles Ceramics Drinking Water Effluent Water Any Other Testing	Elemental Analysis Diesel Engine - as per IS Specifications Centrifugal Pumps Physical & Metallurgical Analysis Destructive & Non-Destructive testing. Calibration - Dial Gauge, Bore, Gauge, Thermocouple, Measuring -Dimension, Master Ring Gauge, Thread Gauge, Plug Gauge, Snap Gauge, Checking - Hardness, Surface finish, Elemental Analysis (Chemical, Physical) and Metallurgical Analysis. (Ferrous & Non-Ferrous), Elemental Analysis, Physical & Chemical Analysis of Materials. Physical & Chemical Analysis of Materials, Chemical Analysis (Elemental), Chemical Analysis (Elemental), Testing of Tin Containers as IS Specification. Non-pressure Stove (Wick Stove) PVC Conduits, PVC Pipes Elec- trical Insulators, Coating test of zinc, paint, chrome, nickel etc. Foun- dry raw material industrial oil.

58	Rachana Laboratory Environment Consultants & Engineers 43-C Taskhand Society Nr. Delux Bus Stop New Chhani Road Vadodara 390 002 Ph. 483551/483868 Fax: 483551	Environmental and Chemical.	Sewage Waste Effluent Water Air Testing Solid Waste Testing.
59	RADIO TECH Gujarat Hosiery Mills Compound Rakhial-Gomtipur Road Ahmedabad 380 021 Ph. 2160851 Fax: 2146187	NDT Services	Industrial Radiography X-ray Gamma ray Ultrasonic testing.
60	Rajkot Engineering College Rajkot Nagrik Sahakari Bank Prerit VVP Sanchalit Polytechnic Campus Rajkot 360 003 Ph. 387944	Building Materials	Testing of Building Materials and NDT for existing building elements.
61	Sarabhai Research Centre P B No. 3714 Wadi Wadi Vadodara 390 007 Ph. 382262 Fax: 381163	Drugs and Pharmaceutical s Testing	Preclinical, Toxicity, Safety Testing, Biological Tests.
62	Sardar Patel Renewable Energy Research Institute P B No. 2 Vallabh Vidynagar 388 120 Dist. Anand Ph. 31332/45011 Fax: 47982	Solar Thermal Devices Testing	Testing of Solar Flat Plate, Solar Cooker as per BIS Norms.
63	Sardar Vallabhai Patel Institute of Technology Valsad 388 306 Ph. 74246, Fax: 74119	Construction Materials and Water.	Brick, Sand, Cement, Steel, Tiles Testing and Water Testing.

64	Sardar Vallabhai Regional College of Engg. & Technology Majura Gate Post Box No. 36 Surat 395 007 Ph. 222371/74 Fax: 228394	Mechanical/ Electrical/Che mical	Pumps, engines, pressure gauges testing Switch testing, Motor testing, Starter testing Building material testing, Soil testing, Water & Waste Water Ores/Alloys/Deoiled, Cakes/Detergent Analysis.
65	SGS India Ltd. 410/411, Sampada Near Mithakali Six Roads, Navrangpura Ahmedabad 380 009 Ph. 6563825 Fax: 6560801	Agriculture Produce, Textile, Water and Industrial Products and Chemicals.	Chemicals, Food Products, Textiles, Metal and Alloys. Physical and Chemical Testing.
66	Shri AV Parekh Technical Institute Dr. Yagnik Road Rajkot 360 001 Ph. 446535/458683	Electrical Electronics Testing	Testing of Electrical & Electronics Items.
67	Shri Dinesh Mills Ltd. Padra Road PO Box No. 65 Vadodara 390 001	Textiles & Chemicals	Testing of Dyes and Chemicals. Fibre, Yarn, Fabric for Woollen Textile.
68	Shri KJ Polytechnic College Campus Bharuch 392 002 Ph. 46402	Building Materials	Building Materials, Cement, Steel, Timber testing.
69	Sir Bhavsinghji Polytechnic Institute Bhavnagar 364 002	Cement & Building Materials Bricks/Floorin g Tiles Soil Metal test	Fitness, Setting time, Soundness, Compression. Fineness Modules, Sp. Gravity, Bulk Density, Percentage Voids, Crushing Strength, Elongation Index. Absorption, Transverse Compression test. Sp. Gravity, Grain Size, Sieve Analysis. Tensile, Transverse, Cold Blend, Hardness Impact, Comprehensive Tests.

70	S.K. & S.K. Engineers Plot No. 605 Pattani Road Bhavanagar 364 001	Lime, Water, Cast Iron, Brass, Bronze	Chemical Analysis.
71	Dr. S & S S Gandhi College of Engg. and Technology Majura Gate Surat 395 001, Phone:. 640568	Civil Engg. Building Construction Materials	Cement/Lime, Concrete testing. Bricks/Tiles/Wood testing Metal testing.
72	Space Application Centre Jodhpur Tekra Ahmedabad 380 015	Television receivers, Video Equipments,	Testing of TV sets, Microwave Equipments, Video Equipments, Remote Sensing and Materorology.
73	Sharon Engineering & Test House, 9, Kanan Society Near Lalbhai Centre Maninagar (East) Ahmedabad 380 008	Metals and Metal Testing	Physical Properties ultimate Analysis for Metals.
74	Star Precision Electronics (India) Ltd. 21/4, GIDC Estate Vadodara 390 010 Ph./Fax: 444701	Textile Fibre & Yarn.	Yarn eveness analysis, yarn strength, count and twist testing.
75	Tolani Foundation Gandhidham Polytechnic Adipur 370 205	Building Materials	Soil Testing, Hardness Testing for Building Materials.
76	Tradesco (India) Rubber Works 170 Gujarat Vepari Mahamandal Audyogic Vasahat, Odhav Ahmedabad 382 410 Ph. 2870412/2870463	Rubber	Tensile, Adhesion, Humidity. Elongation Hysteria Water Absorption, Ageing.
77	Veekay Vikram & Co. P B No. 250-2, GIDC Odhav Ahmedabad 382 415 Ph. 2877305	Rubber Products/Comp ounds.	Tensile Stength, Elongation, Hardness, Compression set, Brittleness Temperature. Resistance to action of fluids, Resistance to flex cracking, Rebound Resilence, Abrasion Resistance, Adhesion Ageing.

SECTION - V

<p>LIST OF TESTING EQUIPMENT AND INSTRUMENTS AVAILABLE IN SOME TESTING CENTRES/LABORATORIES</p>
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In order to get a fair idea about the types of equipments available with the Institutes/Centers providing testing facilities, the list of equipments that some selected centers are having in their laboratories is given in this Section. The user industry can interact with the Institutes/Centers and based on the instruments available can exploit possibility of testing product so far not carried out ordinarily.

**B . K. MODY GOVERNMENT PHARMACY COLLEGE
POLYTECHNIC CAMPUS
BHAVNAGAR ROAD
RAJKOT 360 003**

<u>Sr. No.</u>	<u>Item</u>
1.	Fourier Transform Infra-Red Spectrophotometer (Japan)
2.	Double Beam U.V. Vis. Spectrophotometer (Japan)
3.	Flame Photometer
4.	Brook Field Viscometer USA
5.	Moisture Balance
6.	Karl Fisher Apparatus for Moisture Analyzer
7.	Ele. Single Pan Balance (Japan)
8.	U.V. Cabinet for Identification of Substance
9.	Research Kymographs - for evaluation of effect of drugs
10.	Colloid Mill
11.	Laminar Flow Bench - Air Station
12.	Rotatory Tablet Machine
13.	Dissolution Test Equipment
14.	Naphalometer
15.	Projector Head Trinocular Research Microscope
16.	Refractometer

BIOCARE DIAGNOSTICS & BIOMEDICAL RESEARCH CENTRE
308, SUMERU COMPLEX
OPP. SADHANA HIGH SCHOOL
PALDI CHAR RASTA
AHMEDABAD 380 007

<u>Sr.</u> <u>No.</u>	<u>Item</u>
1.	Centrifuges
2.	Microscopes Phase and other Research Microscope
3.	Computer
4.	Electronic Balance
5.	Colorimeter
6.	Vortex Mixture
7.	Heater
8.	Incubators
9.	Ovens
10.	Inoculation Chamber
11.	Laminar air flow
12.	Fully Automated Blood and Fluid Culture System
13.	MGIT System for Tuberculosis
14.	pH Meter with Electronic Display
15.	Electronic Colony Counter
16.	Other routine Instruments including Glass Ware, Automated Pippeting Devices

**CENTRAL INSTITUTE OF PLASTICS ENGINEERING &
TECHNOLOGY
PLOT NO. 630, PHASE IV
GIDC VATVA
AHMEDABAD 382 445**

**Sr.
No.**

Item

PHYSICAL PROPERTIES

1. Specific Gravity Test
2. Density Test
3. Dimension/Weight

THERMAL PROPERTIES

1. Melt Flow Index Test
2. Heat Deflection Test
3. Vicat Softening Point
4. Oxygen Index Test
5. Thermal Ageing Test
6. Reversion & Warpage Test
7. Carbon Black Content Test
8. Melting Point
9. Smoke Density
10. Rate of Burnin/U L Test
11. Identification of Plastics
12. Identification of Rubber

ELECTRICAL PROPERTIES

1. Volume & Surface Resistivity Test
2. Insulation Resistance Test
3. Arc Resistance Test
4. Comparative Tracking Resistance Test

MECHANICAL PROPERTIES

1. Tensile Strength Test
2. Flexural Strength Test
3. Compression Strength Test
4. Izod & Charpy Impact Test
5. Dart Impact Test for Films/Laminates
6. Tear Strength Test

7. Co-Efficient of Friction
8. Peel Strength Test
9. Seal Strength Test
10. Rockwell Hardness Test
11. Abrasion Resistance Test
12. Burst Strength Test for Films
13. Shore Hardness Test for Rubber/Plastics
14. Compression Set Test for Rubber & Foams

OPTICAL PROPERTIES

1. Haze Test
2. Clarity Test
3. Gloss Test
4. Refractive Index Test
5. Microscope
6. Light Booth for Colour Comparision Test
7. Opacity Test for PVC Pipes
8. Carbon Black/Colour Dispersion Test
9. Polar -0- Scope for Stress Studies
10. Spectrophotometer

PERMANENCE PROPERTIES

1. Gas Permeability Test for Films
2. Moisture Vapour Permeability Test for Films
3. Environmental Stress Cracking Resistance Test
4. Water Absorption
5. Resistance to Chemicals
6. Leaching/Migration Test
7. Accelerated Weathering (UV)
8. Natural Weathering Test

RHEOLOGICAL PROPERTIES

1. Capillary Viscosity, Mixing/Compounding & Blending of Polymers & Rubbers
2. Processing Trails on Single & Twin Screw Extruder also Reprocessing and Granulation Test can be done.

PRODUCTS LISTED CAN BE TESTED AS PER

1. Indian Standards
2. British Standards
3. International Standards
4. American Standards
5. Any Other Standards Test Method

**CENTRAL SALT & MARINE CHEMICALS RESEARCH INSTITUTE
GIJUBHAI BADHEDA MARG
BHAVNAGAR 364 002**

<u>Sr. No.</u>	<u>Item</u>
1.	Carlo - Erba SA. 1106 Elemental Analyser
2.	Carlzeiss Specerd M-80 - IR Spectrometer
3.	Biorad FTS - 40 FT - IR/FT-RAMAN
4.	Atago Polax - D Polarimeter
5.	Beckman DO - 7 Uv - Visible Spectrophotometer
6.	Faraday Balance
7.	JEOL FX - 100FT - NMR Spectrometer
8.	Bruker Esp - 300 ESR - Spectrometer
9.	Enraf Nonius CAD-4 - Single Crystal x-Ray Diffractometer
10.	Shimatzu Atomic Absorption - Frame Emission Spectro - Photometer A A-670
11.	Expandable Ion-Analyser IA-940 with printer
12.	Flame Photometer

**CHROMATOGRAPHY & INSTRUMENTS COMPANY
122, GIDC MAKARPURA INDUSTRIAL ESTATE
VADODARA 390 010**

<u>Sr. No.</u>	<u>Item</u>
1.	Gas Chromatograph
2.	TOC Analyser
3.	Dissolved Gas Analyser
4.	HPLC
5.	Bio Fermenter
6.	Data Processor

**DHARMSINH DESAI INSTITUTE OF TECHNOLOGY
POST BOX No. 35
COLLEGE ROAD
NADIAD 387 001**

**Sr.
No.**

Item

1. Computer Aided Structural Analysis & Design (Casad) Laboratory
2. Structural Engineering & Concrete Technology Laboratory
3. Geotech Engineering Laboratory
4. Transportation Engineering Laboratory
5. Environmental Engineering Laboratory

**ELECTRICAL RESEARCH & DEVELOPMENT ASSOCIATION
POST BOX No. 760
MAKARPURA ROAD
VADODARA 390 010**

TEST FACILITIES

ERDA has its test facilities for type, developmental, certification and special testing for Electrical Materials, products and systems as under:

INSULATION MATERIALS & SYSTEMS

Material identification and characterization, material compatibility, environmental effects, flammability, electrical strength, multistress endurance, electrical and partial discharge, thermal conductivity/class, arc resistance and tracking index, ageing, gassing characteristics of liquid dielectrics. PNA and dissolved gas analysis of transformer oil, condition monitoring and life assessment of transformer etc.

MATERIALS

Physical, chemical and mechanical properties, structural property of Electrical, magnetic and refractory materials, metallurgy, NDT including radiography, corrosion, stress & vibration analysis, shock testing electro-mechanical endurance, fatigue and fracture, surface treatment, heat transfer, composite materials etc.

ELECTRICAL PRODUCTS

Switchgear & Controlgear, HT/LT Cables, Domestic Electrical Appliances, lamps & luminaires, pumps and motors, transformers, reactors, energy meters etc.

SHORT CIRCUIT TESTS

L V Switchgear & Controlgear (upto 50 kA, 550V) and 11 kV Distribution Transformer (upto 630 KVA).

HIGH VOLTAGE TESTS

HV Impulses tests (1200 kV/60 kJ), partial discharge, capacitance and tan delta, measurements, corona measurement, temperature rise, pollution.

CALIBRATION

CT's, PT's, HV Source, Energy Meters, Thermal Instruments, Pressure Gauges etc.

**ELECTRONICS TESTING AND DEVELOPMENT CENTRE
STANDARDISATION TESTING & QUALITY CERTIFICATION
DIRECTORATE
DEPARTMENT OF ELECTRONICS (GOI)
C-1, 641/648 GIDC Makarpura
VADODARA 390 010**

1. Calibration of: Electronic Instruments
 Electrical Instruments
 High Voltage Test Sets
 Mechanical Measuring Instruments
2. Testing of: Domestic Appliances
 Electronic Equipments
 Electrical Equipments
 High Voltage Test Sets
3. Prioduct Test and Evaluation
4. Development Assistance
5. Quality Advisory Services
6. Technical Information Services
7. Training and Consultancy Services

CALIBRATION FACILITIES:

Electrical/Electronics Instruments:

1. Multimeter (Analog & Digital)
2. AC/DC Voltmeter
3. Ammeter
4. Frequency Meter
5. Ohm Meter
6. AC/DC Std. Voltage Source
7. AC/DC Std. Current Source
8. Million Megohm Meter, Meggers or Insulation Testers
9. Decade Resistors
10. Kelvin/Wheatstone Bridge
11. LCR Bridge
12. AC/DC HV Test Equipments
13. Oscilloscope
14. Loss Angle Meter

MECHANICAL MEASURING INSTRUMENTS:

Gauges:

1. Plain Plug/Ring
2. Thread Plug/Ring
3. Slip
4. Snap
5. Radius
6. Bore
7. Thickness
8. Dial/Plunger & Lever
9. Height

VERNIERS CALIPERS:

1. Simple
2. Digimatic
3. Pistol
4. Gear Tooth
5. Dial

MICROMETERS:

1. Inside
2. Outside
3. Pana
4. Depth

Granite Square
 Surface/Angle Plates
 Combination Set/Bevel Protractors
 Sine Bar/V Blocks
 Straight Edge
 Pressure Gauges
 Hardness Testers
 Steel Scales & Measuring Tapes
 Torque Wrenches & Torque Meters

TESTING AND EVALUATION FACILITIES;**Electrical/Electronics:**

Resistors
Capacitors
Inductors
Diodes
Transistors
Electrical Appliances
Connectors
Switches
Electronic Ballast

Environmental And Endurance Testing Facilities:

Dry Cold
Dry Heat
Damp Heat Steady State
Damp Heat Cyclic
Salt Mist
Drop, Topple & Fall
Aging
Impact
Bump
Vibration
Thermal Shock

**GOVERNMENT POLYTECHNIC
APPLIED MECHANICS DEPARTMENT
VALSAD**

<u>Sr. No.</u>	<u>Item</u>
1.	Universal Testing Machine of Capacity 40 tonnes
2.	Compression of Testing Machine of 200 tonnes Capacity
3.	Brineel Hardness Testing Machine
4.	Box Shear Apparatus
5.	Tile Testing Machine
6.	Loss Angles Equipment
7.	Equipment required for Cement Testing
8.	Electrical Oven

**GUJARAT LABORATORY
F-17 MADHAVPURA MARKET
SHAHIBAUG
AHMEDABAD 380 004**

<u>Sr. No.</u>	<u>Item</u>
1.	Spectrophotometer
2.	Single Pan Balance
3.	Refractometer
4.	Microscopes
5.	Ovens
6.	Furnace
7.	Waterbath
8.	U.V. Cabinet
9.	T.L.C., Centrifuge

**L D COLLEGE OF ENGINEERING
UNIVERSITY ROAD
NAVRANGPURA
AHMEDABAD 380 015**

**MECHANICAL ENGINEERING DEPARTMENT OFFERS EXCELLENT
CONSULTATION AND TESTING FACILITIES**

Highly qualified faculty in different areas of mechanical engineering
Well developed laboratories enriched with latest instruments
Modern workshop with CNC machines, EDM, CNC Lathe Trainer etc.
Well trained Supervisors/Mechanics
Computer Centre with latest Pentium Computers alongwith Software
like MASTERCAM, AUTOCAD Release 14 etc.

CONSULTATION IN SPECIALISED AREA:

Machine design, machine tool design, etc.
Fluid Power Engg., Hydraulics etc.
Production and Industrial Engg. etc.
Thermal Engg., Heat & Mass Transfer
Materials Handling Equipment
Ergonomic (Human factor consideration)
Control System Engineering
Metrology & Instrumentation
Material Science & Metallurgy
Product development
Computer Software Training

Also Training Programme for designers and other Engg. Personnels
(Managerial/ Supervisory level) can be arranged as per requirement.

ROUTINE, SPECIAL TESTING AS PER BIS, OTHER STANDARDS:

Calibration of various instruments like pressure gauge, Vacuum
gauge, thermometer, vernier calipers, flow meters, anemometers,
velometer, etc.
Design approvals of various items like Trailers, Heavy Loaders,
Mechanical Elements etc.
V-notch, Orifice Calibration, Ultrasonic flowmeter calibration etc.
All types of Pump testing
Hydraulic testing of Pipes, etc.

Material testing, Spring testing, etc.
 Failure Analysis
 Rickshaw Meter, PUC-Certificate, Scooter testing etc.
 Dynamic Balancing of Rotors
 Heat Exchanger Performance testing
 Engine Testing
 Energy Audit
 Calibration of all measuring Instruments
 Determination of Thermal Conductivity
 Non routine testing
 Alignment & performance test of Machine tools
 Testing of Sewing Machine as per BIS
 Pipe Thickness Measurement
 Surface Roughness Assessment
 ISO 9000 Counseling & Consultancy

ELECTRICAL ENGINEERING DEPARTMENT

Testing facilities available in various Sectors:

Electrical measurement: Calibration of Ammeter, Voltmeter, Wattmeters 1-ph, 3-ph, energy meters 1-ph & 3-ph.

Measurement of inductance, resistance of all variety falling in the range from milliohms to megaohms, Capacitance fans.

Electrical Machines: Performance of all a.c. d.c. machines

H.V. Engg.: Calibration of H.V. Voltmeter, Transformer oil testing, Inc. measurement, Dielectric strength measurement of film, sheet and other solids.

Switchgear: Testing of switches, MCB, MCCB, Thses, AirCBS, Isolators, Load Break Switches used in H.T. etc., AISOCTS, and Relays.

Miscellaneous tests like - Testing of Weighing M/Cs for Electrical Voltage Variations and Frequency Variation and various Switching conditions.

List of Major Lab Equipments:

Substandard Ammeters, Voltmeters and Wattmeters, Rotary substandard Energy Meter. H.V. test set 50 KV Spheregap H.V. test for 120 KV, 0-5 KV tester, 0-10 KV H.V. testing No. 2, shering bridge for non-destructive testing of dielectrics, K.D. Bridges, Mew metal C.t.s high current set No. 1, Range 0-5000 Amp, 0-100 Amp set No. 2, humidity chamber, standard electrode film testing, Dynamometer for 10 H.P. motor testing large of lamp loads, 7.5 KW Rehostatic load No. 2, Induction regulator 10 KVA No. 1, Substandard meters for voltage, current, power and energy measurement technometers, frequency meters.

CHEMICAL ENGINEERING DEPARTMENT

List of Laboratories at Chemical Engg. Dept.:

Heat Transfer
Mass Transfer
Fluid Flow Operation
Mechanical Operation
Chemical Process Industries
Chemical Reaction Engineering
Computer Programming
Fertilizer Technology
Petroleum Refining & Petrochemicals

List of Major Equipments available for testing:

Computerised Gas-Liquid Chromatography, Simulator
Distillation Column with and without reflux
Boiler
Electronic Weighing Balance
Constant Bath
Oven
Muffle Furnace
Heating Mantle
Flash-fire point apparatus
Pour point apparatus
Aniline Point apparatus
Spray Dryer/Rotary Dryer etc.

Various testing facilities available at Environmental Engineering Division are as follows:

Chemical and Bacteriological Analysis of Water
Physico-Chemical Analysis of Wastewater
Analysis of Sludge
Chemical Analysis of Cement
Chemical Analysis of Soil
Chemical Analysis of Bauxite
Chemical Analysis of Alum
Chemical Analysis of Cement Mortar & Concrete
Chemical Analysis of Aggregate
Analysis of Trace Organic
Ambient Air Quality Measurements
Measurement of Noise Levels
Analysis of Chemicals

The major Laboratory Equipments/Instruments at Environmental Engineering Division are as follows:

pH Meter
 Conductivity Bridge
 Spectrophotometer
 Hot Air Oven
 Soxhlet Extraction Apparatus
 BOD Incubator
 Monopan Balance
 Sample Preservator
 Sound Level Meter
 High Pressure Liquid Chromatograph
 Bacteriological Incubator
 Muffel Furnace
 High Volume Air Sampler
 Stack Monitoring Kit
 Dissolved Oxygen Meter
 Ion Selective Meter
 TDS Meter
 Nephelometer

**MAN MADE TEXTILE RESEARCH ASSOCIATION
 NEAR MARKET TELEPHONE EXCHANGE
 RING ROAD
 SURAT 395 002**

**List of various Equipments available in Different
 MANTRA Laboratories:**

POLYMER TESTING LABORATORY

High Pressure Liquid Chromatography
 Different Scanning Calorimetry
 Thermogravimetric Analyser

YARN MANUFACTURING & TESTING

Laboratory Spinning Machine
 Draw Texturising Machine
 Airjet Texturising Machine

Universal Tensile Strength Tester
 Electric Single Yarn Tensile Tester
 Digital Twist Tester
 Dynafil-M
 Polarising Microscope
 Dynamic Modulus Tester
 Dynamic Mechanical Analyser
 Density Gradient Column

FABRIC MANUFACTURING & RESTING LABORATORY

Computer Colour Matching Xenotest 150
 UV VIS Spectrophotometer
 I R Spectrophotometer
 Sublimation Fastness Tester
 H.T.H.P. Sample Dyeing Machine
 Pretema Multi-colour Dyeing Machine
 Lab Cont. Minipad Steam Ptg. Machine
 Fourier Transform Infrared Spectrometer
 Progloss 3 Angle Gloss Meter

COMPUTER AIDED TEXTILE DESIGNS (CAD)

Software-Dobby Jacquard Print
 Computers Peripherals
 Computer Colour Matching System

ECO-LABORATORY

GC/MS, FID, ECD, NPD, MS with EI+, CI+ and CI-Sources (Fisons, Italy)
 Atomic Absorption Spectrophotometer with flame, graphite furnace and mercury concentrator (GBC, Australia)
 UV/VIS Spectrophotometer (GBC, Australia)
 GC (Perkin Elmer)

CHEMICAL TESTING LABORATORY

BOD Incubator
 Perspirometer
 Crockmeter
 UV Cabinet
 M.P., B.P. Apparatus
 Infrared Oven
 Carlfisher Apparatus

pH Meter
Conductivity Meter
Centrifuge
Oven
Muffle Furnace
Bomb Calorimeter
Pourpoint Apparatus
Reverse Osmosis Plant
High Temperature High Pressure Dyeing Machine
Flash Point Apparatus
Waterstill
Redwood Viscometer
Brookfield Viscometer
Pretema Multicolor H.P.H.T. Dyeing Machine
Mangler Stirrer
Lab Stirrer
Ernst Benzag Testil Machine (Paddding, Drying, Curing and Loop
Steaming)
Constant Temperature Bath
Extractor
Warprill
Hydrostatic Dome & Head Tester

LIST OF LABORATORY EQUIPMENTS AVAILABLE FOR THE ANALYSIS OF ENVIRONMENT POLLUTING AGENTS

GC/NS, FID, ECD, NPD, MS with RI+, CI+ and CI- sources (Fisons, Italy) - For qualitative and quantitative analysis (at ppm and ppb levels) of the carcinogenic amines used in dyestuffs, pesticides and preservatives.

Atomic absorption Spectrophotometer (GBC, Australia) - For the analysis of traces of heavy metals.

UV-VIS Spectrophotometer (GBC, Australia) - For quantitative analysis of formaldehyde.

Gas Chromatograph (Parkin Elmer) - Detection and quantification of monomers and dimers in polymers.

High pressure liquid Chromatography - for the analysis of lower molecular weight hazardous components in polymers.

I.R. Spectrophotometer (Parkin Elmer) - To confirm the presence of hazardous organic chemicals.

Fourier Transform Infrared Spectrophotometer - Identification and confirmation of hazardous organic molecules.

Dissolved Oxygen Matter - for BOD determinations.

Equipments for the analysis of COD-Chemical Oxygen Demand.

BOD incubator for Biological Oxygen Demand.

Infrared Oven - for dyeing.

pH Meter - To measure pH of industrial effluents.

Conductivity Meter

Turbidity matter - for suspended matter.

Ovens and muffle furnace for moisture content and ash

Bomb Calorimeter for caloritic value of fuels.

Reverse Osmosis Plant for Desalination.

Red-wood Viscometer - for viscosity measurement.

Brookfield Viscometer

Thermogravimetric for polymer

Differential Scanning Calorimetry.

Soxhlet Extraction unit for oil content.

MAYUR INDUSTRIAL TESTING & ANALYTICAL LABORATORY
36, SHANKARNAGAR SOCIETY
OPP. DUDHSAGAR DAIRY
MEHSANA 384 002

Testing facilities available for the following sector in Laboratory:

Oilseeds & Oilcake, Milk & Dairy Products, Water Analysis, Effluent Water Analysis, Food & Food Products under P.F.A. Rules, Cattle Feed & Minerals testing, Chemical testing.

List of major Laboratory Equipments/Instruments:

PYE UV-Vis. Spectrophotometer, Colouri meter-Elico, pH Meter-Systronics, Conductivity Meter-Systronics, Refractometer, Balance - Elec. Muffle Furnace, Oven, Water still, Hot Plate, Water Bath, Heating Mantle, Kjeldahl-distillation unit, Soxhlet extraction, Lovibond coumparator etc.

MET-CHEM LABORATORIES
SAYAJIGUNJ
VADODARA 390 005

**Sr.
No.**

Item

- | | |
|----|------------------------------|
| 1. | Carbon and Sulphur Apparatus |
| 2. | Monopan Balance |
| 3. | Muffle Furnace |
| 4. | Hot Drying Oven |

5. Different types of Fabrication Glassware and Standard Glasswares pH Meter
6. Water Conductivity Measurement Apparatus
7. Karl Fisher Apparatus
8. Melting Point Apparatus
9. Kjeldahl Equipment for Nitrogen Determination
10. Redwood Viscosity No. 1 & No.2 Equipment
11. Flash & Fire Point COC Equipment
12. Iron and Copper Corrosion Test for Oil
13. Ash and Sulphonated Ash Determining Equipment
14. Refractive Index Determinators
15. Surface Tension Apparatus
16. Specific Gravity Measurement Apparatus
17. Dirt Count Measurement Apparatus
18. Inter Granular Corrosion Test Equipment
19. Rate of Corrosion Equipment
20. Stress Corrosion Measurement for Copper Base Alloy
21. Microscope for Microstructure
22. Rock well Hardness Tester
23. Ultimate Tensile Tester
24. Charpy V Notch Tester
25. NDT - Ultrasonic Flaw Detector with all Accessories
26. NDT Portable Magnetic Particle Testing Equipment with all Accessories
27. NDT-Ultrasonic Thickness Gauge
28. All types of Sieve with Mechanical Sieve Shaker
29. Vernier Calipers
30. Micrometer Screw
31. Ring and Ball Apparatus
32. Filler passing Equipment
33. Pliability Tester for Kraft & Outer Wrap
34. Moisture Absorption Tester
35. Relative Specific Gravity Measuring Apparatus
36. Shore Hardness Test as per ASTM 2240

MET-HEAT ENGINEERS PVT. LTD.
741-742 GIDC INDUSTRIAL ESTATE
MAKARPURA
VADODARA 390 010

Sr.	<u>Item</u>
1.	Vacuum Emission Spectrometer
2.	Carbon and Sulphur Photometer
3.	VIS Spectro Photo Meter
4.	Double Cell Photo Colory Meter
5.	Electrolytic Analyser
6.	Analytical single pan Micro Balance
7.	Muffle Furnace
8.	Water Distillation Plant
9.	Platinum Crucible
10.	Hardness tester. FIE make for HRA, HRR, HRC & BHN
11.	Single pan Electronics Balance

Physical Testing Laboratory:

Universal Tensile testing M/c. 40 tons capacity/FIE make. Calibrated under Lloyds Surveyor

Impact Testing M/c. (Charpy and Izod) IS/BS-FIE make

Calibrated under Lloyds Surveyor

Projection Digita, Temperature Indicator upto 200 C (Minus)

Projection Microscope

Dry Ice making unit

Notch Broaching Machine

Universal Tensile Testing M/c (Electronics) 60 tons capacity/FIE make. Calibration under Loyd's Surveyor

Metallography

Inverted stage type Metallurgical Microscope alongwith photographic attachment

Cutting M/scPolishing M/c Belt type

Electrolytic polishing and etching unit

NATIONAL DAIRY DEVELOPMENT BOARD
ANAND 388 001

- A gas-liquid Chromatography with a mass spectra to analyze the flavour compounds in foods.
- A gas liquid Chromatography for the estimation of fatty acid composition.
- An Electron Capture Gas Chromatography to determine the pesticide residues in milk and milk products.
- High Pressure Liquid Chromatography to estimate vitamins, aflatoxins and other organic compounds.
- Atomic absorption to determine heavy metals in milk and milk products and in foods.
- NMR to determine the oil content in edible oil seeds.
- Milkotester for the determination of fat content in milk and milk products.
- Refractometer to determine the refractive index of liquids and edible oils.
- Rancimat to determine the refractive index of liquids and edible oils.
- Camag Densitometer to scan the TLC plates for the estimation of aflatoxins.
- Microwave digestion and distillation unit for the estimation of protein content in milk and milk products.
- Beckman make U.V. -Visible range spectrophotometer to determine the purity of different organic compounds and chlorophyll.
- Facilities to carry out complete chemical and microbial analysis of milk and milk products and edible oils as per the BIS and International Standards.

PETROGRAPHY & MINERAL CHEMISTRY
COMMISSIONERATE OF GEOLOGY & MINING
BLOCK No. 15
DR. JIVRAJ MEHTA BHAVAN
GANDINAGAR 383 010

Testing facilities are available for analysis of Industrial Minerals which are being used by Chemical, Cement, Ceramic, Glass, Paper, Textile, Paints, Rubber industries. Minerals and clays are tested for chemical and physical characters. Rocks specimens are studied for its mineral constituents and engineering properties.

List of major Laboratory Instruments/Equipments:

<u>Sr.</u> <u>No.</u>	<u>Item</u>
1.	Viscometer
2.	X-ray Diffractometer
3.	Atomic Absorption Spectrophotometer
4.	Infrared Spectro-photometer
5.	Particle size analyser
6.	Differential Thermal Analyser (DTA-TGA)
7.	Sartorius Electronic Analytical Balances
8.	Flame Photometer
9.	Bomb Calorimeter
10.	Amplival Pol D Microscope
11.	Photo Micrographic attachment
12.	Cutting Polishing Unit

**PROTOTYPE DEVELOPMENT & TRAINING CENTRE
AJI INDUSTRIAL AREA
BHAVNAGAR ROAD
RAJKOT 360 003**

<u>Sr. No.</u>	<u>Item</u>
1.	Ultrasonic Crack Detector
2.	Metallurgical Microscope
3.	Bomb Calorimeter
4.	Viscometer
5.	Flash Point Tester
6.	Carbon Residue
7.	Polishing M/c
8.	Spectro Photometer
9.	Strohlein Apparatus
10.	Muffle Furnace
11.	Water Distillation Plant
12.	Single Pan Chemical Balance
13.	Physical Balance
14.	Vacuum Filtration Pump
15.	Electrochemical Analysis Apparatus
16.	Universal Testing Machine
17.	Hot Air Oven
18.	Double Pan Chemical Balance
19.	Hot Plate
20.	Seive Shaker
21.	Permeability Matter
22.	Moisture Tester
23.	Sand Muller
24.	Universal Testing M/c for Sand
25.	Clay Tester
26.	Core Hardness Tester
27.	Mould Hardness Tester
28.	Digital pH Meter
29.	Air cum Hydraulic Pressure Testing M/c
30.	Handle Pull Tester
31.	I.C.P. Spectrometer
32.	Automatic Carbon & Sulphur Apparatus
33.	Rockwell Hardness M/c

**RACHANA LABORATORY
43/C, TASHKAND SOCIETY
NEAR DELUXE BUS STOP
NEW CHHANI ROAD
VADODARA 390 002**

<u>Sr. No.</u>	<u>Item</u>
1.	Spectrophotometer
2.	Digital pH Meter
3.	Electronic Balance
4.	Digital Conductivity Matter
5.	Hot Oven (Temp. range 0-300 C)
6.	Hot Plate
7.	Distillation Assembly
8.	COD Analysis facility
9.	Hot Water Bath
10.	High Volume Sampler for Ambient Air Quality Measurement
11.	Online Stack Gas Monitoring facility
12.	Suspended Solids and total dissolved solids analysis facilities
13.	Oil and Greases Analysis
14.	BOD Incubator

ENGINEERING COLLEGE - RAJKOT
GOVT. POLYTECHNIC CAMPUS
BHAVNAGAR ROAD
RAJKOT 360 003

Sr. No.	<u>Item</u>
1.	Universal Testing Machine
2.	Torsion Testing Machine
3.	Compression Testing Machine
4.	Hardness Testing Machine
5.	Impact Testing Machine
6.	Set of Instruments for Cement Testing
7.	Set of Instruments for Aggrigate Testing
8.	Set of Instruments for Non-Destructive Tests.

SARABHAI RESEARCH CENTRE
POST BOX NO. 3714
WADI WADI
VADODARA 390 007

Analytical Laboratory:

Sr. No.	<u>Item</u>
1.	HPLC with UV-vis Detector - Chrompack
2.	HPLC with UV-vis, RI and Flurosence Detectors - Gilson
3.	HPLC (Binary Gradient) with UV-Viz and EC Detector - Shimadzu
4.	Gas Liquid Chromatograph with FID, ECD and FPD Detectors Verian 3700
5.	Integrator - Oracle 1
6.	Integrator - Oracle 3
7.	Integrator - Hewlett Packard 3390 A
8.	UV-vis Spectrophotometer with Recorder - Beckman 26
9.	IR Spectrophotometer - Beckmen 4240

10. Spectrophotofluorometer - Amino Bowman Ct.No.0523-62155
11. Digital Flamephotometer - Systronics 121
12. Oxygen Flask Ignitor - Thomas-OGG 11
13. Digital pH meter - Systronics Sr. No. 1869
14. pH meter - Systronics 322
15. Karl Fischer Titrator Model V/M-D - Veego
16. Meltin Point Apparatus - Thomas Hoover
17. Centrifuges: (i) Beckman TJ-6 with Refrigerat (ii)RemiT-8 (iii) Maharana
18. Ovens, Electric with Temperature Control - Cintex
19. Microgramatic Balance - Mettler
20. Single Pan Mico Balance - Mettler (i) Type H (ii) Type HS 1 AR
21. Ordinary Balance, Two Pan - Avery
22. Vortex Mixer - Remi
23. Mechanical Shaker - Ganson
24. UV Cabinet for TLC observation
25. TLC Apparatus
26. Constant Temperature Water Bath
27. Waring Blender
28. Constant Temperature Water Bath
29. Waring Blender
30. Dehumidifier
31. High Vaccum Pump - Jebivak
32. Voltage Stabilizer - Servo Controlled
33. Omni Power Servo Stabilizer
34. Refrigerator

Biological Testing Laboratory:

**Sr.
No.**

Item

1. Research Kymograph
2. Respirometer
3. Pyrogen Meter - Electrolab
4. Temperature Recording Probes - Electrolab
5. Double Pan Balance - Mattle flame
6. Single Pan Balance - Avery
7. Centrifuge - Remi
8. Binocular Research Microscopes
9. Tissue Processor - Astna
10. Rotary Microtome - AO Spencer
11. Microtome Knives - Erma, Janam
12. Mircrotome Knife Sharpner

13. Slide Cabinet
14. Ovens, Electric with Temperature Control
15. Incubators
16. Shaker
17. Tissue Flootation Bath
18. Heating Block, 37 C, Dry
19. Verber Mixer
20. Automactic Micropipette
21. Thermometers
22. pH Meter
23. Colony Counter
24. Steam Sterilizer
25. Refrigerators

SARDAR PATEL RENEWABLE ENERGY RESEARCH INSTITUTE
POST BOX NO. 2
VALLABH VIDYANAGAR 388 120

Tests Conducted:

(1) Solar Flat Plate Collector:

<u>Sr.</u>	<u>Item</u>
<u>No.</u>	
1.	Time Constant Test
2.	Thermal Efficiency Test
3.	Incident Angle Modifier Test
4.	Exposure Test
5.	Rain Penetration Test
6.	Static Pressure Test
7.	Endurance Test

Solar Cooker:

<u>Sr.</u>	<u>Item</u>
<u>No.</u>	
1.	Stagnation Temperature Test
2.	Water Heating Test

Services Offered:

<u>Sr. No.</u>	<u>Item</u>
1.	Testing of Solar Flat Plate Collectors and Solar Cookers as per BIS.
2.	Testing of Components of Solar Flat Plate Collectors and Solar Cookers.
3.	Consultancy on the design of Solar Thermal Devices.
4.	Consultancy on development of Test setups.
5.	Human Resource Development.

Major Equipment:

<u>Sr. No.</u>	<u>Item</u>
1.	Global Solar Radiation
2.	Diffuse Solar Radiation
3.	Direct Solar Radiation
4.	Pyranometer Calibration
5.	Emissivity
6.	Paint Testing
7.	Data Logger with 16 differential channels along with printer
8.	LI - COR 10 channel data logger

**DR. S & SS GHANDHY COLLEGE OF ENGG. & TECH.
MAJURA GATE
SURAT**

<u>Sr. No.</u>	<u>Item</u>
1.	Universal Testing Machine (capacity 20 tonnes, 20,000 kg)
2.	Avery No. 7111 self contained compression testing machine
3.	Wolpert Pendulum type impact testing machine

4. Aggregate Impact Value Apparatus
5. Compression testing machine capacity 200 tonnes
6. Vibrating Table
7. Tiles cutter with blade
8. Tiles flexure strength testing machine with 20 kg. lead
9. Rebound Hammer
10. Hot Air Oven
11. Universal Testing Machine 40 tonnes with microprocessor
12. Wather Bath
13. Electric Oven with Thermostate control
14. Aggregate Impact Tester
15. Compression Testing Machine Cap. 200 tonnes (electronic)
16. Devel Abrasion testing machine
17. Concrete Vibrator Needle type
18. Abrasion Testing Machine for Flooring Tiles
19. Brinall Hardness Testing Machine
20. Universal Testing Machine 400 KN with microprocessor (Electronic)

SHARON ENGINEERING & TEST HOUSE
9, KANAN CO-OP SOCIETY
NEAR LALBHAI CENTRE
MANINAGAR EAST
AHMEDABAD 380 008

List of Machinaries available:

<u>Sr.</u> <u>No.</u>	<u>Item</u>
1.	Universal tensile testing machine: FIE make 40 ton capacity with to transverse and bend test.
2.	Impact testing machine: Capacity 30 KG-M, F.I.F make testing upto minus 196c at sub zero tempt.
3.	Hardness tester with RB-RC scale and BHN with 187.5, 250 kgs and 3000 kgs load.
4.	Pressure gauge calibration range 0-600 kg/cm ² with Machine Sensitivity + 0.1% with Traciability Certificate.
5.	Microscope with magnification range 50 x to 1500 x.
6.	Inter granular corrosion test apparatus to test samples as per inter granular corrosion test practice ASTM A-262

7. Profile Projector with magnification 10X, 25X and 50X.
8. Macro Examining Microscope.
9. Ultrasonic Thickness Examination with D meter.

**SHRI A.V. PAREKH TECHNICAL INSTITUTE
DEPARTMENT OF TECHNICAL EDUCATION
DR. YAGNIK ROAD
RAJKOT 360 001**

Sr. No.	<u>Item</u>
1.	Digital Logic Trainer Kits
2.	Sound Level Meter
3.	Induction Furnace
4.	Distortion & Noise Meters
5.	Field Strength Meter
6.	Strain Gauge
7.	L.V.D.T.
8.	Digital Frequency Counter
9.	O/P Power Meter
10.	Oscilloscopes
11.	Regulated Power Supply
12.	A.F.O./B.F.O.
13.	High Voltage Tester
14.	Mega Ohm Meter
15.	Earth Tester
16.	Digital Oscilloscope with DMM.

**SHRI K J POLYTECHNIC
BHARUCH 392 002**

Testing Machines available:

Sr. No.	<u>Item</u>
1.	Universal Testing M/c 20T Capacity
2.	Compressing Testing M/c 200 T Capacity

3. Aggregate Abrasion Testing M/c
4. Aggregate Impact Testing M/c
5. Aggregate Crushing Value M/c
6. Flakyness & Elongation Test Apparatus
7. Density Measuring Cylinders
8. C.B.R. Test Apparatus
9. Direct Shear Box
10. Swelling Pressure Measuring Apparatus
11. Proctor Compaction Test Apparatus
12. Liquid, Plastic & Shrinkage Limit Apparatus
13. Transverse and Abrasion Testing of Tiles
14. Electric Oven
15. Electronic Balance

STAR PRECISION ELECTRONICS (INDIA) LIMITED
SERVICE DIVISION UNIT NO. 3
21/4, GIDC MAKARPURA
VADODARA 390 010

Computerised Yarn Lab Instruments:

Yarn Evenness Analyser

Lea Multi Tester

Twist Tester

Portable Moisture Measuring Instrument

Computerised Fibre Lab Instruments:

Fibre Scan

Fibre Fineness & Maturity Tester

Bundle Strength Tester

Colourimeter

SECTION - VI

<p align="center">LIST OF RECOGNISED IN-HOUSE RESEARCH AND DEVELOPMENT UNITS IN GUJARAT</p>
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- | | |
|--|---|
| 1. Alembic Chemical Works Co. Ltd.
Alembic Road
Vadodara 390 003 | 8. Anup Engineering Ltd.
Anil Starch's Premises
Anil Road
Ahmedabad 380 025 |
| 2. Alembic Glass Industries Ltd
Alembic Road
Vadodara 390 003 | 9. Apex Electricals Ltd.
Padya Road
Samiala 391 410
Vadodara |
| 3. Ambalal Sarabhai Enterprises Ltd.
Wadi Wadi
Vadodara 390 007 | 10. Asea Brown Boveri Ltd.
Maneja
Vadodara 390 013 |
| 4. Amtech Electronics Ltd.
E-6, GIDC Electronics Zone
Gandhinagar 382 022 | 11. Atlas Dye-Chem Industries
Near Grid Station
Industrial Area
Odhav
Ahmedabad 382 414 |
| 5. Anil Starch Products Ltd.
PB No. 10009
Anil Road
Ahmedabad 380 025 | 12. Atul Limited
The Ashoka Chambers
Rasala Marg
Mithakhali Cross Roads
Ellis Bridge
Ahmedabad 380 006 |
| 6. Anjalee Enterprises P Ltd.
101 BN Chambers
RC Dutt Road
Vadodara 390 005 | 13. Ban Labs Pvt. Ltd.
Dr. Vikram Sarabhai Nagar
Gondal Road (South)
Rajkot 360 094 |
| 7. Ankur Scientific Energy Technologies Pvt. Ltd.
Ankur
Near Old Sama Jakat Naka
Vadodara 390 008 | |

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| <p>14. Baroda Electric Meters Ltd.
Anand Sojitra Road
Vithal Udyognagar
Vallabh Vidyanagar
Dist. Kheda</p> <p>15. Bayer Diagnostics India Ltd.
589 Sayajipura
Ajwa Road
Vadodara 390 019</p> <p>16. Bhagwati Spherocast Ltd.
1, Krishna Society
Ellisbridge
Ahmedabad 380 006</p> <p>17. Cadilal Healthcare (P) Ltd.
201/2/3, Saffron
Ambawadi
Ahmedabad 380 006</p> <p>18. Cadila Pharmaceuticals Ltd.
244, Ghodasar
Maninagar
Ahmedabad 380 008</p> <p>19. Chromatography & Instruments Co.
122, GIDC Industrial Estate
Makarpura
Vadodara 390 010</p> <p>20. Cibatul Limited
PO Atul 396 020
Dist. Valsad</p> <p>21. Core Healthcare Ltd.
Core Towers
Off CG Road
Near Parimal Garden
Ellisbridge
Ahmedabad 380 006</p> | <p>22. Crown Television Ltd.
Plot No. A1 & A2
GIDC Electronics Estate
Sector 16
Gandhinagar 382 044</p> <p>23. Devrekha Engineers Pvt. Ltd.
57, Functional Estate
Road No. 6E
Udhna 394 210</p> <p>24. Diamines & Chemicals Ltd.
Plot No. 13
PO Petrofiles
Dist. Vadodara 391 347</p> <p>25. Dinesh Rubber Industries
Rustom Mill's Compound
Dhobighar
PO Box 288
Dudheshwar Road
Ahmedabad 380 004</p> <p>26. Dishman
Pharmaceuticals & Chemicals Ltd.
Bhadra Raj Chambers
Near Swastik Cross Road
Navrangpura
Ahmedabad 380 009</p> <p>27. Eimco Elecon (India) Ltd.
Anand Sojitra Road
Vallabh Vidyanagar</p> <p>28. Electrotherm (India) Ltd.
414/GIDC Phase II
Vatva
Ahmedabad 382 445</p> <p>29. Gujarat Alkalies & Chemicals Ltd.
Yashkamal
Sayajiganj, Baroda</p> |
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30. Gujarat Ambuja Cements Ltd.
PO Ambujanagar 362715
Ta. Kodinar
Dist. Amreli 363 715
31. Gujarat Communications & Electronics Ltd.
Anurag Commercial Centre
Race Course Road
Vadodara 390 005
32. Gujarat Heavy Chemicals Ltd.
R&D, B-309 7th Main
Peenya Industrial Estate II Stage
Bangalore 560 058
33. Gujarat Insecticides Ltd.
805/606 GIDC Estate
Ankleshwar 393 002
34. Gujarat Machinery Manufacturers' Ltd.
Post Box No. 1
Vithal Udyognagar
Karamsad 388 325
35. Gujarat Narmada Valley Fertilizers Co. Ltd.
PO Narmadanagar
Dist. Bharuch
36. Gujarat Petrosynthesis Ltd.
Opp. Dandia Bazar
Fire Brigade Station
Vadodara 390 001
37. Gujarat State Fertilizers Co. Ltd.
PO Narmadanagar
Dist. Bharuch
38. Gujarat State Fertilizers & Chemicals Ltd.
PO Petrofils 391 347
Dist. Vadodara
39. Himalaya Machinery Pvt. Ltd.
608, GIDC Makarpura
Industrial Area
Vadodara 390 010
40. Indian Petrochemicals Corporation Ltd.
PO Petrochemicals
Dist. Vadodara 391 346
41. Indo Colchem Limited
Plot No. 36, Phase II
GIDC Estate
Vatva
Ahmedabad 382 445
42. Intas Pharmaceuticals Ltd.
203, Chinubhai Centre
Off Nehru Bridge
Ashram Road
Ahmedabad 380 009
43. Jyoti Limited
PO Chemical Industries
Industrial Area
Vadodara 390 003
44. Lakhanpal National Ltd.
GIDC Industrial Estate
Makarpura
Post Box No. 719
Vadodara 390 010
45. Madhu Silica Pvt. Ltd.
40 GIDC Chitra
Bhavnagar 364 004

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|---|---|
| <p>46. Madhusudan Industries Ltd.
Rakhial Station
Ta. Dehgam
Ahmedabad 382 315</p> <p>47. Masibus Process Instruments Pvt. Ltd.
B/30 GIDC Electronics Zone
Sector 25
Gandhinagar 382 044</p> <p>48. Metrochem Industries Ltd.
508/509 Shilp
C G Road
Navrangpura
Ahmedabad 380 009</p> <p>49. Mitsu Industries Ltd.
Plot No. 304/2
II Phase, GIDC
Vapi 396 195</p> <p>50. Navbharat Seeds Pvt. Ltd.
Vasukaran
Near Lotus Flats
Opp. Gujarat Vidyapith
Ashram Road
Ahmedabad 380 014</p> <p>51. Paramount Pollution Control Ltd.
Paramount Complex
Gotri Road
Race Course
Vadodara 390 007</p> <p>52. Parshwanath Dychem Industries Pvt. Ltd.
A-25, Capital Commercial Centre
2nd Floor, Ellisbridge
Ashram Road
Ahmedabad 380 009</p> | <p>53. Patwa Kinariwala Electronics Ltd.
C-29/A, Sardar Industrial Estate
Ajwa Road
Vadodara 390 019</p> <p>54. Paushak Limited
Alembic Road
Vadodara 390 003</p> <p>55. Prototype Development & Training Centre
Aji Industrial Estate
Rajkot 360 003</p> <p>56. Rubamin Limited
2nd Floor, Synergy House
Subhanpura
Vadodara 390 007</p> <p>57. Shilchar Electronics Ltd.
Bil Road
Bil 391 410
Dist. Vadodara</p> <p>58. Shri Dinesh Mills Ltd.
Post Bag No. 2501
Padra Road
Vadodara 390 005</p> <p>59. Steelcast Limited
Ruvapari Road
Bhavnagar 364 005</p> <p>60. Stellar Chemical Laboratories Pvt. Ltd.
Kankar Na Muwada
Vill. Derol
Panchmahal 389 320</p> <p>61. Sun Pharmaceutical Industries Ltd.
Synergy House
Subhanpura Gorwa Road
Vadodara 390 007</p> |
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|---|---|
| 62. Suvik Electronics Pvt.
Ltd.
Nowroji Vakil Compound
Police Line
Shahibagh
Ahmedabad 380 004 | 66. Themis Chemicals Ltd.
Plot No. 69-A
GIDC Industrial Estate
Vapi
Dist. Valsad |
| 63. Synbiotics Limited
P B No. 129
Wadi Wadi
Vadodara 390 007 | 67. Torrent Pharmaceuticals
Ltd
Torrent House
Off Ashram Road
Ahmedabad 380 009 |
| 64. Synthetics & Polymer
Industries
77, GVMS Audyogic
Vasahat Ltd.
Odhav
Ahmedabad 382 415 | 68. Transpek Industry Ltd.
Kalali Road
Atladra
Vadodara 390 312 |
| 65. Tata Telecom Ltd.
E-1/1, GIDC Electronics
Estate
Gandhinagar 382 028 | 69. Vipor Chemicals Pvt. Ltd.
218, GIDC Industrial
Estate
Makarpura
Post Bag No. 717
Vadodara 390 01 |

SECTION - VII

**LIST OF RECOGNIZED SCIENTIFIC & INDUSTRIAL
RESEARCH ORGANIZATIONS IN GUJARAT**

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|---|---|
| <p>1. Amul Research and Development Association
Amul Dairy
Anand 388 001</p> | <p>7. Indian Heart Foundation and Research Institute
C/11 Silver Arc
Near Gujarat College Rly. Crossing
Ellisbridge
Ahmedabad 380 006</p> |
| <p>2. Blind Men's Association
Dr. Vikram Sarabhai Road
Vastrapur
Ahmedabad 380 015</p> | <p>8. Indian Medical Scientific Research Foundation
Ajay Mansion
Opp. SAU Cold Storage
Malviya Gondal Road
Rajkot 360 002</p> |
| <p>3. Charutar Arogya Mandal Medical Research Society
Vallabh Vidya Nagar
Dist. Kheda</p> | <p>9. Institute of Cardiology & Research Centre
Civil Hospital Campus
Ahmedabad 380 016</p> |
| <p>4. Divyajyot Ayurvedic Research Foundation
Shree Maa Anantanand Ashram
Divyadham
PO Vehlal
Ahmedabad 382 325</p> | <p>10. Institute of Kidney Diseases and Research Centre
Civil Hospital Campus
Ahmedabad 380 016</p> |
| <p>5. Dr. Jivraj Mehta Smarak Health Foundation
Arogyadham
Dr. Jivraj Mehta Marg
Ahmedabad 380 007</p> | <p>11. Lions Cancer Research Centre
Govt. Medical College Campus
Majura Gate
Surat 395 001</p> |
| <p>6. Harilal Jechand Doshi Medical Research Foundation
Malaviyanagar
Off Gondal Road
Rajkot 360 004</p> | <p>12. Muljibhai Patel Society for Research in Nephro-Urology
Nadiad 387 001</p> |

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| <p>13. Nagri Eye Research Foundation
C/o CH Nagri Minicipal Eye Hospital
Ellisbridge
Ahmedabad 380 006</p> | <p>19. Tuberculosis Research Centre
C/o Shri KJ Mehta TB Hospital
Amargadh 364 210
Dist. Bhavnagar</p> |
| <p>14. Rajkot Cancer Society Research Wing
Smt. Vasantben R Desai Cancer Research Centre
Raiya Road
Rajkot 360 001</p> | <p>20. Ahmedabad Textile Industry's Research Association
PO Ambawadi Vistar
Ahmedabad 380 015</p> |
| <p>15. Rotary Rural Eye Health and Research Centre
Rotary Eye Institute
Dudhia Talao
Opp. Fire Brigade
Navsari 396 445</p> | <p>21 B V Patel Pharmaceutical Educational and Research Development Centre
Thaltej Gandhinagar Highway
Ahmedabad 380 054</p> |
| <p>16. Sheth Vadilal Sarabhai Medical Research Foundation Trust
VS Hospital
Ellisbridge
Ahmedabad 380 006</p> | <p>22. Centre for Environmental Planning and Technology (CEPT)
Kasturbhai Lalbhai Campus
University Road
Navrangpura
Ahmedabad 380 009</p> |
| <p>17. Span Research Centre
174, New Industrial Estate
Road No. 6-G,
Udyognagar
Udhna 394 210
Surat</p> | <p>23. Chartuar Vidyamandal Anand
Vallabh Vidyanagar</p> |
| <p>18. The Gujarat Research and Medical Institute
Camp Road
Shahibaug
Ahmedabad 380 004</p> | <p>24. ENAR Foundation Research Centre
National Highway No. 8
Village Dharagire
PO Kabilpore
Navsari 396424</p> |
| | <p>25. GMDC Science and Research Centre
Dist. Banaskantha
Ambaji 385 110</p> |

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| <p>26. GSFC Science Foundation
Research Centre
PO Fertilizer Nagar
Vadodara 391 750</p> <p>27. Gujarat Ecological
Education and Research
Foundation
Indroda Nature Park
PO Sector 9
Gandhinagar 382 009</p> <p>28. Gujarat Energy
Development Agency
2nd Floor, Suraj Plaza-II
Sayaji Gunj
Vadodara 390 005</p> <p>29. Gujarat Industrial
Research &
Development Agency
Science College
Compound
Sayajiganj
Vadodara 390 002</p> <p>30. Man-Made Textile
Research Association
(MANTRA)
Near Market
Telephone Exchange
Ring Road
Surat 395 002</p> <p>31. National Institute of
Design
Paldi
Ahmedabad 380 007</p> <p>32. Physical Research
Laboratory
Navrangpura
Ahmedabad 380 009</p> | <p>33. Vastu Shilpa Foundation
for Studies &
Research in
Environmental Design
Sangeth-Thaltej Road
Ahmedabad 380 054</p> <p>34. Vedhshala (Astronomical
Observatory)
Naranpura Railway
Crossing
Ahmedabad 380 013</p> <p>35. Baroda Citizen Council
Above Health Museum
Sayaji Baug
Vadodara 390 018</p> <p>36. Centre for Social Studies
South Gujarat University
Campus
Udhna-Magdalla Road
Surat 395 007</p> <p>37. Consumer Education and
Research Centre
Suraksha Sankool
Ahmedabad-Gandhinagar
Highway, Thaltej
Ahmedabad 380 054</p> <p>38. Entrepreneurship
Development Insitute of
India
PO Bhat
Dist. Gandhinagar</p> <p>39. Foundation for Research
in Health Systems
6, Gurukrupa
183, Azad Society
Ahmedabad 380 015</p> |
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| <p>40. Gujarat Institute of
Developmental Research
Sarkhej-Gandhinagar
Highway
Gota 382 481
Dist. Ahmedabad</p> | <p>45. Mahatma Gandhi Labour
Institute
Drive-in Road
Memnagar
Ahmedabad 380 052</p> |
| <p>41. Gujarat Vishvakosh Trust
HL Commerce College
Hostel Compound
Navrangpura
Ahmedabad 380 009</p> | <p>46. Mudra Foundation for
Communications
Research and Education
Mudra House
Off Seth CG Road
Ellisbridge
Ahmedabad 380 006</p> |
| <p>42. Indian Institute of
Management
Vastrapur
Ahmedabad 380 015</p> | <p>47. Sardar Patel Insitute of
Economic and
Social Research, Thaltej
Ahmedabad 380 054</p> |
| <p>43. Institute of Rural
Management
Post Box No. 60
Anand 388 001</p> | <p>48. Gujarat Ayurved
University
PB No. 4
Jamnagar 361 008</p> |
| <p>44. Lalbhai Dalpatbhai
Bharatiya
Sanskriti Vidyamandir
Near Gujarat University
Ahmedabad 380 009</p> | <p>49. Maharaja Sayajirao
University
University of Baroda
Fategunj
Vadodara 390 002</p> |

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