ARAI / LABORATORY OPERATIONAL MANUAL

Version No.43 **Date: March 7, 2025**

This manual contains requirements for the competence, impartiality and consistent operation of ARAI laboratories to enable them to demonstrate that they operate competently and are able to generate valid results. The objective is to build confidence in the operation of laboratories.

This Manual is applicable for the following Laboratories:

Name of Laboratory	Testing or Calibration
1) Emission Certification Laboratory (ECL)	Testing
2) Vehicle Evaluation Laboratory (VEL)	Testing
3) Safety and Homologation Laboratory (SHL)	Testing
4) Automotive Electronics Laboratory (AED-Kothrud & HTC-AED)	Testing
5) Structural Dynamic Laboratory (SDL)	Testing
6) Engine Development Laboratory (EDL)	Testing & Calibration
7) Passive Safety Laboratory (PSL-Kothrud, Pune)	Testing
8) Noise, Vibration & Harshness Laboratory (NVH)	Testing
9) Homologation & Technology Centre- Passive Safety Laboratory (HTC-PSL, Chakan, Pune)	Testing
10) Homologation & Technology Centre- Emission Certification Laboratory (HTC-ECL, Chakan, Pune)	Testing
11) Homologation & Technology Centre- Fatigue And Material Centre of Excellence (HTC-FMCE, Chakan, Pune)	Testing
12) Environment Research Laboratory (ERL)	Testing
13) Engineering Design and Simulation (EDS)	Testing
14) Homologation & Technology Centre- Drivetrain Development Centre (HTC-DDC, Chakan, Pune)	Testing
15) Homologation & Technology Centre-Advanced Photometry and Optics Laboratory (HTC-Photometry, Chakan)	Testing
16) Forging Industry Division-Advanced NVH Development Centre (ARAI FID-ANDC)	Testing
17) Forging Industry Division-Passive Safety Laboratory (FID-PSL)	Testing
18) Calibration Laboratory (CAL-Kothrud, HTC & FID)	Calibration

Prepared by	Quality Manager	Approved by	DIRECTOR

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0.0 Organization profile

0.1 The Automotive Research Association of India (ARAI) is incorporated in the year 1966 at Pune with the following main objectives:

a) Research in Automotive engineering.
b) Design, development, evaluation and testing of vehicles, engines, automotive equipment, ancillary items and automotive materials.
c) Standardization
d) Technical Information Service and Calibration of equipment service

0.2 ARAI Vision and Mission Statements are defined as below:

0.2.1 **Vision:**

ARAI has a strong base of state-of-the-art technology equipment, laboratory facilities and highly qualified and experienced personnel. With these assets, ARAI has goals, strategies and action plans to achieve fullest customer satisfaction. These are: -

(a) to compete in service with excellence
(b) to obtain recognition and accreditation
(c) to cover global market
(d) to build commitment of all personnel
(e) to develop team spirit and sense of belonging amongst all.

0.2.2 **Mission:**

a. ARAI has been providing various services to the Indian Automotive Industry in the areas of design & development and know-how for manufacture & testing of components/ system to national/ international standards. ARAI shall strive to achieve international recognition in these areas.

b. ARAI shall seek the valuable guidance and support from Association members, from time to time to achieve growth and stability.
c. With the globalization of economy and business, ARAI shall enlarge its scope of services to meet the requirements of automotive industries anywhere in the world.

ARAI strongly believes that satisfaction of the customer needs on continuing basis, is of prime importance to earn the loyalty of the customers.

Therefore, emphasis shall be on meeting and exceeding the customer needs through continuing quality improvement with active participation of employees and also the customer.

0.3 **Core and Business Values**: While carrying out our activities and dealing with the customers, ARAI has adopted following set of values:

a) We keep our commitments.
b) We operate safely.
c) We are environmentally responsible.
d) We value diversity and respect the dignity of each person.
e) We recognize the contributions of every individual.
f) We act with speed and decisiveness.
g) We share ideas and nurture innovations.
h) We set clear goals, measure results, and seek to improve.
i) We are equal opportunity employer.
j) We are transparent in all our operations.

0.4 **Laboratory Quality policy:** For Laboratory function, following Laboratory Quality Policy is applicable in addition to Operation Policies (Quality Policy, Environment and Occupational Health & Safety Policy, Energy Conservation policy and Information security policy) which are applicable for all the departments in ARAI. All these Policies are issued under authority of Director. These are available on ARAI website and also displayed at various locations in ARAI.

In our pursuit towards advancement of testing and calibration capabilities and providing impartial, competent and consistent test/calibration service to our customers, we are committed to

- **provide Testing, Certification and Calibration services to the industry for developing safe, reliable and eco-friendly & user-friendly vehicles / components / products.**
- **carry out test and calibration in accordance with stated methods and customers' requirements.**
- **familiarize ourselves with the quality documentation and implement the policies and procedures in our work.**
- **comply with ISO/IEC17025 requirements and strive for customer satisfaction through continual improvement in our processes.**

DIRECTOR –ARAI

0.5 **Corporate Objectives:** Corporate objective depicted below are formulated by top management and deployed further at department and individual level. Please refer system procedure "ARAI/Objectives & Target" for details.

1. Maintain average annual growth rate of ≥10%.
2. Strive for customer satisfaction through continual improvement of our processes.
3. Enhance technical capabilities to address demanding requirements and harmonization of standards for the global customers.
4. Continuously improve our processes to reduce operational losses and enhance efficiency.
5. Safeguard the Confidentiality, Integrity and Availability of information and intellectual property.
6. Establish Safe, Energy Efficient and Green Building compliant new facilities at Chakan, Takwe and Kothrud.
7. Provide eco-friendly, safe working environment.
8. Drive for energy conservation initiatives and reduce carbon foot print.
9. Develop sustainable green coverage across all ARAI sites.

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1.0 Scope

The Laboratory Operations Management System (LOMS) is established to demonstrate our ability to meet the requirements of ISO/IEC17025:2017. Testing and Calibration activities are performed at various sites of ARAI, details of the same are mentioned in the table below:

Name of Testing Laboratory	Locations
1) Emission Certification Laboratory (ECL)	Site-1 ARAI, Survey No. 102, Vetal Hill, Off Paud Road, Kothrud, Pune-411038. P.B. No. 832, Pune - 411 004
2) Environment Research Laboratory (ERL)	
3) Vehicle Evaluation Laboratory (VEL)	
4) Safety and Homologation Laboratory (SHL)	
5) Automotive Electronics Laboratory (AED)	
6) Structural Dynamic Laboratory (SDL)	
7) Engine Development Laboratory (EDL)	
8) Passive Safety Laboratory (PSL)	
9) Noise, Vibration & Harshness (NVH)	
10) Engineering Design & Simulation (EDS)	
11) Homologation & Technology Centre- Passive Safety Laboratory (HTC-PSL, Chakan)	Site-2 ARAI-HTC, Plot No. E-1/1, MIDC Chakan Industrial Area, Phase-III, Taluka Khed, Dist – Pune
12) Homologation & Technology Centre- Emission Certification Laboratory (HTC-ECL, Chakan)	
13) Homologation & Technology Centre- Fatigue And Material Centre of Excellence (HTC-FMCE, Chakan)	
14) Homologation & Technology Centre- Automotive Electronics Laboratory (HTC-AED,Chakan)	
15) Homologation & Technology Centre- Drivetrain Development Centre (HTC-DDC, Chakan, Pune)	
16) Homologation & Technology Centre-Advanced Photometry and Optics Laboratory (HTC-Photometry, Chakan)	
17) Forging Industry Division -Advanced NVH Development Centre (FID-ANDC)	Site-3 ARAI-FID, B16/1, Mahalunge, MIDC, Chakan, Tal- Khed, Dist – Pune.
18) Forging Industry Division-Passive Safety Laboratory (FID-PSL)	

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Name of Calibration Laboratory	Locations
1) Calibration Laboratory (CAL)	Site-1 ARAI, Survey No. 102, Vetal Hill, Off Paud Road, Kothrud, Pune-411038. P.B. No. 832, Pune - 411 004
2) Homologation & Technology Centre (ARAI-HTC)	Site-2 ARAI-HTC, Plot No. E-1/1, MIDC Chakan Industrial Area, Phase-III, Taluka Khed, Dist – Pune
3) Forging Industry Division (ARAI-FID)	Site-3 ARAI-FID, B16/1, Mahalunge, MIDC, Chakan, Tal- Khed, Dist – Pune.

The above referred laboratories comply with ISO/IEC 17025:2017 and applicable guidelines by Accreditation bodies for identified testing and calibration services.

1.1 The Laboratory Operations Management System (LOMS)-ARAI covers requirements for competency to carry out testing and calibration including sampling as applicable. It covers testing and calibration using standard methods, non-standard methods and laboratory developed methods. For Calibration Laboratory, On-site calibration is also covered (Refer CP: 044: CAL /On Site Calibration Procedure).

1.2 ARAI/Laboratory Operation Manual is established to enable us to carry out testing and calibration activities with quality built into. This manual complements to ARAI/Process Model, the Apex level document of Operations Management System (OMS) defined to meet the requirements of ISO9001:2015, ISO14001:2015 and ISO45001:2018 and ARAI/Information Security Policy Manual to meet the requirements of ISO 27001:2013.

1.3 ARAI customers, regulatory authorities and accreditation bodies can use these management systems to confirm or recognize the competence of ARAI.

2.0 Normative reference

a) ISO/IEC 17025:2017
b) ARAI Operations Management System (OMS) -Table of Contents (Operations Manuals, System Procedures) Refer Annexure "C".
c) Accreditation bodies specific document are downloaded from their official website.

3.0 Terms and Definitions

Terms and definitions used in this manual are from ISO/IEC 17025:2017. Additional terms and definitions used are given below;

Sr.No.	Terms and Definitions
1.	ARAI – The Automotive Research Association of India, Pune
2.	LOMS – Laboratory Operations Management System
3.	ISO – International Organisation for Standardisation
4.	IEC – International Electro technical Commission
5.	HoDs – Head of Departments
6.	TPs – Test Procedures
7.	SPs – System Procedures
8.	DPs – Department Procedures
9.	CPs – Calibration Procedures
10.	LOM –Laboratory Operations Manual
11.	NC – Non-conformity
12.	QM / MR – Quality Manager / Management Representative
13.	TM – Technical Manager

4.0 General requirements

4.1 Impartiality:

4.1.1 ARAI activities are undertaken impartially and it works as autonomous body who acts independently as a third-party testing and calibration service provider. The organization structure is referred in clause 5.5a, Organization Chart of ARAI, which details the service portfolio of ARAI.

4.1.2 ARAI management is committed to impartiality which reflects in "laboratory quality policy" referred above and its approach and methodology adopted in implementation of ARAI/ Code of Business Conduct and Ethics (CBCE).

4.1.3 ARAI is committed for the impartiality of its activities and shall not allow commercial, financial or other pressures to compromise impartiality. To ensure impartiality, roles and responsibilities of the testing personnel, R&D personnel and Financial/Admin personnel are clearly identified.

4.1.4 Risks associated with Impartiality are identified on an ongoing basis, including those arising from ARAI activities or relationships of its personnel, customer and external service providers. Refer system procedure "ARAI/Risk Management "for further details.

4.1.5 ARAI initiate measures to eliminate or minimize risks associated with impartiality. ARAI has formulated ARAI/vigil mechanism and whistle blower policy which is an extension of the CBCE adopted by the ARAI to provide a secure and confidential channel of communication for its employees, supervisors, managers, senior management, suppliers or customers to disclose any improper practices that are taking place anywhere in ARAI enabling corrective action.

4.2 Confidentiality:

4.2.1 ARAI has signed "Non-Disclosure Agreement "based on respective customer requirement. Management of ARAI ensures that the personnel engaged in testing or calibration operations maintain the confidentiality and integrity of all information obtained or created during the test/calibration performance. Refer confidentiality Clause 8.1 of system procedure "ARAI /Code of Business Conduct and Ethics". Individuals are given freedom to report violation of this procedure by anyone (including the customer) to the Vigilance Officer for suitable prompt action.

If the ARAI intends to place customer information on public domain, then same is informed to the customer during contract review process. Unless agreed between ARAI and the

customer or the customer makes the information publicly available, all other information is regarded proprietary and confidential.

4.2.2 ARAI notifies customers (unless the notification is prohibited by law), whenever ARAI releases the information on public domain by requirement of law or authorized by contractual arrangements to release confidential information. ARAI put the disclaimer in Test Report's/Calibration Certificates.

4.2.3 Information about the customer obtained from other sources (for e.g. complainant, legal/government authorities, accreditation body etc.), is regarded as confidential. The source is kept confidential to the customer unless otherwise agreed to by the source.
ARAI being certified to ISO 27001 i.e. Information Security management System; confidentiality of information is ensured throughout the process.

4.2.4 The management or technical staff of ARAI (who also act as any committee member, as technical assessor or consultant on behalf of ARAI) gives an undertaking as a part of appointment letter, at the time of appointment that confidentiality and security of information shall be maintained at all times.
Non-disclosure agreement (NDA) is signed with the contractors who works as outside consultant/expert with ARAI.

5.0 Structural Requirements

5.1 ARAI is an association of Automotive Industries. It is a legally constituted association registered under Societies Registration Act 1860 (Reg. No. BOM133/66/GBBSD dt.10th December 1966). ARAI is also registered under The Bombay Public Trusts Act, 1950 (vide Reg. No. F-48091/Pune). ARAI is affiliated to the Ministry of Heavy Industries and Public Enterprises and is recognized by the Department of Scientific and Industrial Research.

As a legal obligation, ARAI comply with "Consent to operate" condition of "Maharashtra Pollution Control Board" and maintains Factory License issued by factory inspector as per Factories Act 1948.

ARAI is also registered under GST regime having GST number: 27AAATT1989P1ZL.

5.2 The Director is the executive head of ARAI and has overall responsibility. Director assisted by all HoDs form top management of ARAI.

5.3 ARAI has defined and documented the range of ARAI activities consisting of Testing and Calibration, for which it claims conformity with ISO/IEC17025: 2017. (Refer ARAI/Range of Activities for Testing and Calibration)
ARAI doesn't seek externally provided laboratory activities on an ongoing basis.

5.4 i) while performing Testing and Calibration activities, ARAI ensures that the following requirements are met, as applicable:

a. ISO/IEC17025:2017 requirements
b. Customers' requirements
c. Regulatory requirements
d. Accreditation Bodies specific requirements
e. BIS (Bureau of Indian Standards) Specific requirements
f. Any other accreditation/recognition agency Specific requirements

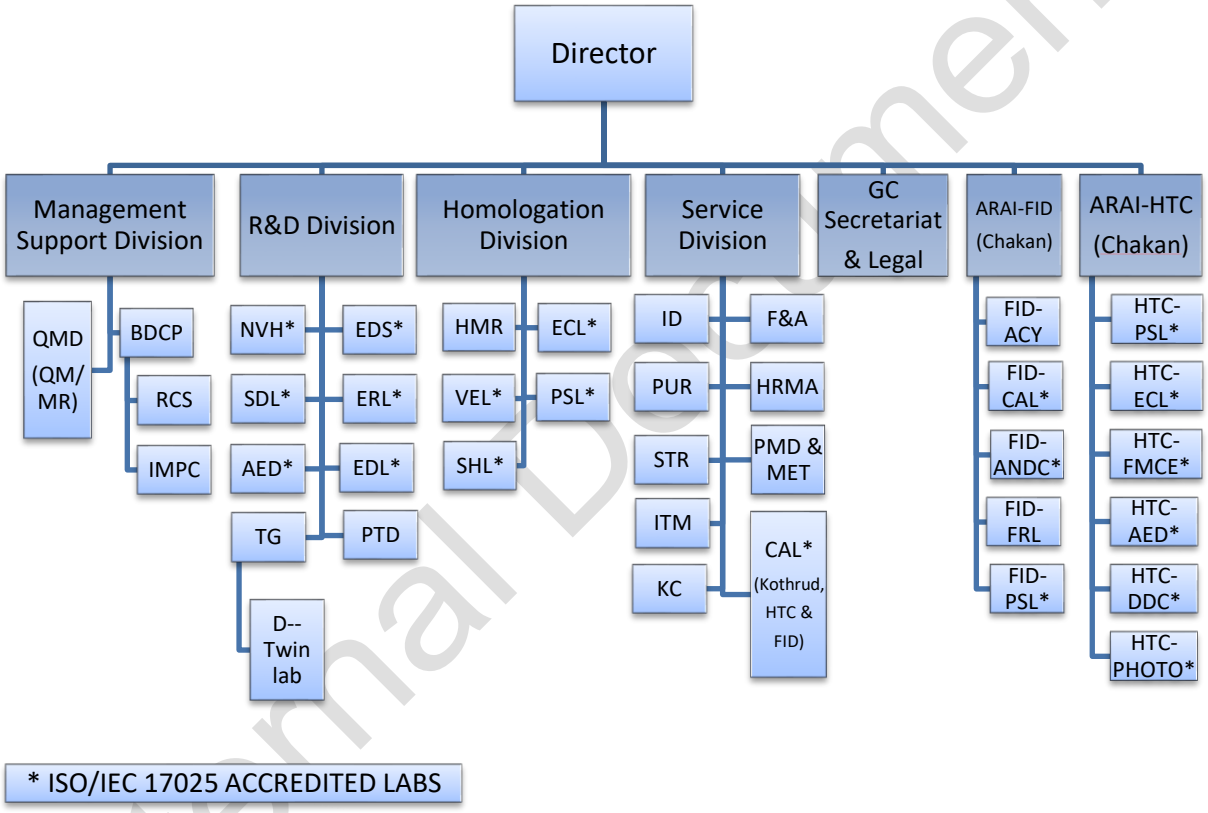
ii) LOMS covers the processes carried out at ARAI's permanent facilities and/or at sites away from our permanent facilities. The following laboratories are governed by ISO/IEC 17025:2017 and the Accreditation Bodies specific document for identified testing and calibration activities

TESTING ACTIVITIES			
Name of Department	**Testing**	**Permanent Facility**	**At site**
Emission Certification Laboratory (ECL)	Chemical Testing	Yes	No
Homologation & Technology Centre-Emission Certification Laboratory (HTC-ECL, Chakan)	Chemical Testing	Yes	No
Environment Research Laboratory (ERL)	Chemical Testing	Yes	No
Engine Development Laboratory (EDL)	Mechanical & Chemical Testing	Yes	No
Vehicle Evaluation Laboratory (VEL)	Mechanical Testing	Yes	No
Safety and Homologation Laboratory (SHL)	Mechanical, Electrical Testing	Yes	No
Structural Dynamic Laboratory (SDL)	Mechanical Testing	Yes	No
Homologation & Technology Centre- Fatigue And Material Centre of Excellence (HTC-FMCE, Chakan)	Mechanical Testing	Yes	No
Passive Safety Laboratory (PSL)	Mechanical Testing	Yes	No
Homologation & Technology Centre-Passive Safety Laboratory (HTC-PSL, Chakan)	Mechanical Testing	Yes	No
Noise, Vibration & Harshness (NVH)	Mechanical Testing	Yes	No
Engineering Design and Simulation (EDS)	Mechanical Testing	Yes	No
Automotive Electronics Laboratory (AED)	Electronics Testing and Mechanical Testing	Yes	No
Homologation & Technology Centre- Automotive Electronics Laboratory (HTC-AED)	Electronics Testing and Electrical Testing	Yes	No
Homologation & Technology Centre-Drivetrain Development Centre (DDC)	Mechanical Testing	Yes	No
Homologation & Technology Centre-Advanced Photometry and Optics Laboratory (HTC-Photometry, Chakan)	Photometry Testing	Yes	No
Forging Industry Division -Advanced NVH Development Centre (FID-ANDC)	Mechanical Testing	Yes	No
Forging Industry Division-Passive Safety Laboratory (FID-PSL)	Mechanical Testing	Yes	No
CALIBRATION ACTIVITIES			
Name of Department	**Calibration**	**Permanent Facility**	**At site**
Calibration Laboratory (CAL)	Mechanical, Electro-Technical, Thermal	Yes	Yes
Engine Development Laboratory (EDL)	Fluid flow Calibration	Yes	No
Homologation & Technology Centre(ARAI-HTC)	Mechanical Calibration	Yes	No

Forging Industry Division (ARAI-FID)	Mechanical Calibration	Yes	No

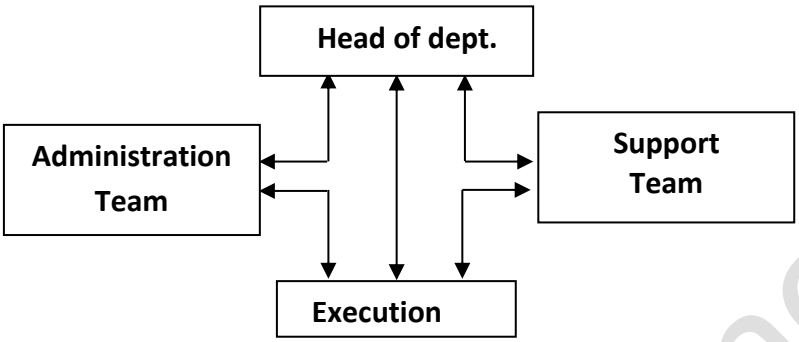
ARAI is responsible for Testing or Calibration carried out at permanent facilities, at sites away from its permanent facilities (On-site).

5.5a) The organization and management structure of ARAI which includes management support division, technical operations (consisting of R&D division and Homologation division) and support services, is implemented.



The departmental organization chart defines the relationship between technical, support and administration activities.

Organisation Chart of Test and Calibration Departments



Refer Annexure-A: "ARAI/List of Departments and their abbreviations"

5.5b) Apart from testing and calibration, ARAI is involved in other activities like research and development. The responsibility, authority and interrelationships of all personnel who manage, perform and verify work-affecting quality or influence on the test/calibration activities are defined to avoid the conflict of interest. Refer Annexure B below.

5.5c) ARAI has documented its procedures at organization and department level to ensure the consistent application of its laboratory activities and the validity of results. For ARAI documentation structure refer clause 8.2 below.

5.6 Director has appointed the Quality Manager (QM) for Calibration and testing activities, with the Responsibility and authority mentioned in Annexure B below.

It is ensured that QM has successfully undergone 4 days training on ISO/IEC17025. As HoD-QMD, QM is having direct access to Director-ARAI.

Head of Departments (HoDs) who are nominated as Technical Managers are overall responsible for the technical operation of their laboratories. They have the authority and resources needed to carry out their duties, including the implementation, maintenance and improvement of LOMS. Their responsibilities and authorities are mentioned in Annexure B below.

5.7 ARAI ensures that:

a) The communication regarding effectiveness of the Operations Management System and importance of meeting customers' and other requirements takes place. The appropriate communication processes are established. Refer system procedure ARAI/Communication, Participation and Consultation.

b) ARAI maintains integrity of management system when changes to the management system are planned and implemented. Please refer ARAI/Change management procedure for the details.

6.0 Resource Requirements:

6.1 General:

ARAI has a strong base of state-of-the-art technology equipment, laboratory facilities and highly qualified and experienced personnel. It has implemented integrated management system consisting of ISO9001, ISO14001, ISO27001 and ISO45001 to meet the requirements of interested parties and to achieve enhanced business performance. Its support services viz. infrastructure, Purchase, HR, Calibration and stores ensure the provision of resources needed for required quality of testing and calibration processes of various laboratories of ARAI. (Refer Departmental Facility Layout, List of Equipment, and List of Personnel in the department.)

6.2 Personnel:

6.2.1 Arrangements are made to ensure that departmental management and personnel are free from any undue internal or external commercial, financial and other pressures and influences that may adversely affect the quality of their performance.
While assigning tasks for a service, HoD ensures that involvement of personnel related to service delivery processes shall not diminish confidence in competence, impartiality and integrity of personnel performing the actual service delivery. The integrity of personnel is also assessed during the annual appraisal.

HOD (Technical Managers) ensures that the tests / calibrations are conducted strictly in accordance with the Operations Plans and Test /Calibration Procedures (TPs/CPs). Strict supervision is maintained through reviews/checks at various stages. In case, testing / calibration is performed for internal customers to ensure impartiality in the results, testing / calibration is performed and reviewed by the person who is not directly involved in design, manufacture or sale of the item under test / calibration. In case the integrity of any of the staff is in question, necessary corrective action is implemented by management as per clause 12 of **"ARAI/Code of business conduct and ethics"** system procedure.

6.2.2 The competence requirements for each function influencing the results of laboratory activities are documented with HR department. This includes education, qualification, technical knowledge, skill and experience as applicable.

6.2.3 HoD ensures personnel competency to execute the test or calibration activity based on ability to operate specific equipment, process of performing test or calibration, ability to evaluate and sign test or calibration certificate. HoD ensures appropriate supervision for the person

who is undergoing training. Personnel performing specific tasks are qualified on the basis of appropriate education, training, experience and / or demonstrated skills, as required. Please refer system procedure **"ARAI/Personnel Competency in the department"** for details.

6.2.4 Roles, responsibilities, authorities and accountabilities of all laboratory personnel are communicated to all concerned and are also available in their respective department folder readily available on LAN network.

6.2.5 HoD and designated person ensure the supervision of testing and calibration personnel including trainees identified in competency matrix (refer dept. /competency matrix). It is ensured that the nominated person for supervision is competent with procedures, purpose of test / calibration and with the assessment of the test / calibration results.

HRMA department maintains records of a) to c) of following points and concerned HoD maintain records of d) to f) of following points

a) determination of competence requirements
b) selection of personnel
c) training of personnel
d) supervision of personnel
e) authorization of personnel
f) monitoring of competence.

Supervision of Laboratory and Contractual Personnel:

HoD maintains the department-level details of each personnel employed by, or under contract. Where contractual and additional technical and key support personnel are used, ARAI ensure that such personnel are supervised and competent and that they work in accordance with LOMS.

Authorisation of personnel:

HoD authorizes specific personnel to perform particular types of sampling, test / calibration, to issue test / calibration certificate, to give opinions and interpretations and to operate particular types of equipment. HoD maintains the records of relevant authorization, competence, educational and professional qualification, training, skills and experience of all technical personnel. This information is available and periodically updated in Competency matrix.

6.2.6 HoD of the laboratory assigns specific authorizations to personnel for:
a) Development, modification, verification and validation of Test or Calibration method.

b) Analysis of Test & Calibration results, including statements of conformity and opinions / interpretations
c) Report, review and authorize results

6.3 Facilities and Environmental conditions:

6.3.1 The Calibration laboratory maintains environmental conditions as per Accreditation Bodies specific criteria for calibration laboratories in Mechanical, Fluid Flow, Radiological, Electro-Technical & Thermal Calibration.

For Testing laboratories Environmental conditions are maintained as per relevant National or International standard.

6.3.2 Testing and calibration laboratories ensure fulfillment of requirements in terms of location of the laboratory, building facilities, construction-features, environmental specifications and conditions (dust, illumination, temperature, humidity, electrical power, sound and vibration), conditioned air, exhaust air through chimney as per pollution norms, earth pits, UPS, first aid box, firefighting points, personal protective equipment for safety etc., to facilitate correct performance of the test / calibration.

Details of laboratory environment conditions are available in department documents folders (Viz- TPs/CPs, Equipment manual).

6.3.3 Each laboratory monitors, control and record Environmental conditions as required by relevant National or International standard or Accreditation Bodies specific requirements, specification, procedure, as per information from the calibration providers or where they influence the quality of results. Each laboratory ensures that Test / Calibration activities are carried out under controlled environmental conditions only.

6.3.4 Testing and Calibration laboratories ensure effective separation between areas performing incompatible activities, which may adversely affect each other. Measures are taken to avoid cross contamination, wherever applicable.

All laboratories have restricted entrance. All other individuals (including visitors) are escorted by HoD or the person nominated by HoD. Record of visitors is maintained by the Security Officer.

HoD ensures good housekeeping in the departments by demonstrating to the requirements of “ARAI/ Five-S Procedure”.

6.3.5 The requirements related to facilities and environmental conditions also apply to activities performed at facilities outside the ARAI’s permanent control. Such situation is applicable for

Calibration being done at site for which separate procedure is made Refer CP: 044: CAL /On Site Calibration Procedure which includes requirements for environment conditions.
For testing on test track which is done outside ARAI, it is ensured that the facilities and environment conditions are as per standard requirements.

6.4 Equipment:

6.4.1 Policy of ARAI is to equip the laboratories with equipment (with relevant software installed) and reference material that provide accuracy and precision in testing and calibration, laid down in National and International specifications and update the same in anticipation of changes needed by customers or / and by state of art technology changes. The list of major equipment in calibration / testing laboratories is maintained by concerned Laboratory.

6.4.2 ARAI uses equipment which are in its permanent control. However, in unforeseen circumstances ARAI may share the resources i.e. Man and equipment resources.

6.4.3 Upkeep of equipment: HoD/ designated person ensures the safe handling, transport, storage and maintenance of equipment to ensure proper functioning and in order to prevent deterioration and contamination wherever applicable. The manufacturer's manual is made available to the concerned for its compliance. Labs are maintaining separate Procedure for the above in their respective Department Document folder. E.g. CAL / Handling, Transportation, Storage of Reference Instruments and Customer supplier product (CSP)

6.4.4 The owner of the equipment verify that the new equipment is as per technical specification during GRR (Goods Receipt Report)/MIGO (Movement In Goods Out) clearance, before being placed in the service. Labs are maintaining separate Procedures for Verification of equipment after calibration and returned into lab after site visit (E.g. On-site Calibration Procedure)

6.4.5 While preparing Technical specifications of the equipment, it is ensured that the equipment is capable of achieving the measurement accuracy and/or measurement uncertainty required to provide a valid result.

6.4.6 All equipment used for test / calibration, including equipment for subsidiary measurements (e.g. for environmental conditions) having a significant effect on the accuracy, Measurement Uncertainty or validity of the result of the test / calibration / sampling, are calibrated before being put into service to determine its accuracy and provide measurement traceability.

6.4.7 Calibration planners are established for list of equipment of each laboratory. Before being placed into service, new equipment is calibrated to establish that it meets our specification requirement and then it becomes part of calibration planner for routine calibration as per stated calibration frequency.

6.4.8 Every equipment has its own identity number and inspection, measuring and testing equipment carry labels containing following information:

a) Name and code of equipment
b) Calibration certificate Number
c) Next due date of calibration

The detailed procedure of labeling is explained in "ARAI/Control of Monitoring and Measuring resources (Test & Measurement Equipment)" system procedure.

All reference standards are labeled with validity dates and due dates of calibration and a detailed record including actual usage of the same are maintained.

6.4.9 Equipment that has been subjected to overloading or mishandling, gives suspect results, or has been shown to be defective or outside specified limits, is segregated and identified suitably to preclude use. Results of all tests or calibrations carried out using such equipment are reviewed to decide action for clearing the operations. (Refer ARAI/Control of Non-Conforming Service and Service Delivery Procedure). HoD or designated person takes appropriate action as per ARAI/Incidents, Non - Conformances and Corrective and Preventive Action.

6.4.10 The designated person carries out necessary intermediate checks according to defined procedure where required. Checks needed to maintain confidence in the calibration status of reference standard and reference materials are carried out as per system procedure "ARAI/Control of Monitoring and Measuring resources (Test & Measurement Equipment)".

6.4.11 If calibration certificate or reference material data includes reference values or correction factors (deviation more than Accuracy); the designated person ensures correct implementation of correction factor arising out of Equipment calibration.

6.4.12 Each laboratory ensures that all test and calibration equipment are safeguarded (through control access) from unintended adjustments which invalidate the tests or calibration results. Such instructions are displayed where required and personnel are made aware of this.

6.4.13 The equipment (including reference material) record include the following as defined in the department procedures and ARAI/Control of Inspection, Measuring and Test Equipment procedure.

a) Identification number including software & firmware version. Of equipment, manufacturers name, type number, Sr. number (wherever relevant).

b) Manufacturer's name, type identification and serial number or other unique identification
c) Evidence of verification that equipment conforms with specified requirements
d) The current location where appropriate
e) Calibration dates, results of calibrations, adjustments, acceptance criteria, and the due date of the next calibration or the calibration interval.
f) Documentation of reference materials, results, acceptance criteria, relevant dates and the period of validity.
g) Maintenance plan and maintenance carried out data, where relevant to the performance of the equipment.
h) Details of damage, malfunction, modification to, repair of, the equipment.

6.5 Metrological traceability:

6.5.1 ARAI establishes traceability of its own measurement standards and measuring instruments to the SI by means of an unbroken chain of calibrations, each contributing to the measurement uncertainty, linking them to relevant primary standards of the SI units of measurement. ARAI comply with requirements of Accreditation Bodies for traceability of measurement results.

6.5.2 In case the calibration is carried out by external calibration agencies, the traceability to national or international standard is ensured by the use of calibration services from laboratories who are accredited as per ISO/IEC 17025 for the concerned calibration scope. The calibration certificate issued by these laboratories contain measurement results and measurement uncertainty with an identified metrological traceability.

ARAI laboratories have a programme and procedure for the calibration of reference standards and they are calibrated by a body which are capable of providing traceability to SI unit. Reference standards of measurement held by the Calibration Laboratory are used for Calibration only and for no other purpose.

Reference materials such as gases, chemicals, which are used for calibration, have traceability to national / international standard reference materials.

6.5.3 When metrological traceability to SI units is not technically possible, ARAI demonstrate traceability to an appropriate reference for e.g.

a) certified value of certified reference materials provided by a competent manufacturer.
b) results of reference measurement procedures, specified methods or consensus standards that are clearly described and accepted as providing measurement results fit for their intended use and ensured by suitable comparison.

6.6 Externally provided products and services:

6.6.1 ARAI ensures that only suitable externally provided products and services that affect laboratory activities are used, when such products and services:

a) are intended for incorporation into the laboratory's own activities, such as measurement standards and equipment, auxiliary equipment, consumable materials and reference materials;
b) are provided, in part or in full, directly to the customer by the laboratory, as received from the sub-contractor such as Test report or calibration certificate. As a policy, ARAI does not sub-contract any calibration or Testing activity, However, in unforeseen circumstances ARAI may subcontract Calibration and Testing activity.

c) are used to support the operation of the laboratory, such as facility and equipment maintenance services, proficiency testing services and assessment and auditing services taken from external provider etc.

6.6.2 ARAI has implemented "ARAI/Purchase Procedure" system procedure for control on externally provided products and services and retain records for:

a) defining, reviewing and approving the requirements for externally provided products and services;
b) defining the criteria for evaluation, selection, monitoring of performance and re–evaluation of the external providers;
c) ensuring that externally provided products and services confirm to ARAI requirements before they are used or for testing services, conform to the relevant requirements of ISO/IEC17025 before they are directly provided to the customer;
d) taking any actions arising from evaluations, monitoring of performance and re-evaluations of the external providers.

6.6.3 ARAI communicates its requirements to external providers, for:

a) the products and services to be provided;
b) the acceptance criteria;
c) competence, including any required qualification of personnel providing assessment and auditing Service;
d) activities that the laboratory, or its customer, intends to perform at the external Provider's premises.

7.0 Process requirements

7.1 Review of requests, tenders and contracts:

7.1.1 ARAI review the internal/external customer requests, tenders and contracts as below:
For Internal customers- Laboratory capabilities are known through scope of accreditation.

For external customers – Laboratory Personnel reviews the following:

a) Test or calibration requirements are defined completely and adequately by customer, documented & understood properly.
b) ARAI has the capability to meet the requirements like test or calibration methods to be used and relevant resources required.
c) Where external providers are used, ARAI comply with clause 6.6 requirements mentioned above and inform the customer about such arrangement and take customer's approval.

d) The appropriate method meeting the customer's requirement is selected.

Based on above review, the Laboratory Personnel communicates to the customer ARAI quotation/proposal or regret letter.

During contract review laboratory shall make it clear to the customer that, Products tested or equipment calibrated under Accredited Scope in no way imply that the same is approved by Accreditation Body.

7.1.2 Selection of testing or calibration method meeting the needs of the customer and which is appropriate for test / calibration is undertaken. Each laboratory properly operate standard method before introducing test / calibration. If the standard method changes, the confirmation is repeated. The particular TP or CP is selected based on testing or calibration requirement.

The Laboratory inform the customer, when the method proposed by the customer is considered to be inappropriate or out dated.

7.1.3 When the customer requests a statement of conformity to a specification or standard for the test (e.g. pass / fail, complies / does not complies, in tolerance / out of tolerance) the specification or standard and the decision rule is clearly defined in the Contract Review form. Unless inherent in the requested specification or standard, the decision rule selected is communicated to, and agreed with, the customer.

7.1.4 After receipt of requests, tenders and contracts from customers; review is done by respective laboratory. Any deviation observed during the review is resolved in consultation, communication with customer before work commences. ARAI ensures that deviations requested by customer does not impact on integrity or validity of results.

7.1.5 Any deviation or incomplete requests, tenders and contracts requirements are communicated to the customer and record is maintained.

7.1.6 In case of any amendment in the contract after the work is commenced, the contract review is repeated and amendment details are communicated to all affected personnel.

7.1.7 ARAI ensures confidentiality of information of other customers by providing restricted access to customers or their representatives; in case the request is received from customer regarding discussion and/or witness the test and or calibration activity at laboratory.
As applicable, Laboratories supports customer or their representative for preparation, packaging and dispatch of Customer Supplied Products needed for their verification.

7.1.8 Records of reviews, including any significant changes are maintained by concerned laboratory in the form of register /folder / Operation plans / Quality plans etc.

7.2 Selection, verification and validation of methods:

7.2.1 **Selection and verification of methods:**

7.2.1.1 It is the policy of ARAI to provide detailed instructions to the operator in the form of Test Procedures (TPs) and Calibration Procedures (CPs) to carry out testing and calibration. For evaluation of measurement uncertainty procedure is formulated, refer: "**ARAI/Procedure for Calculating Measurement Uncertainty"**.

7.2.1.2 A relevant standard specification on which the procedure is based is referred in TP or CP. Availability of current or pertinent standards are ensured by the KC by keeping in touch with the issuing authority.

7.2.1.3 Latest version of standards are used; however older versions of the standard may be referred wherever required by National/international Standards or as specified by the Customer.

7.2.1.4 Appropriate method is selected when the customer does not specify the method to be used. However, it is ensured that the customer has the same requirement of the updated standard. Method to be used for Testing or Calibration is mutually agreed between the Lab and customer at the time of review of requests, tenders and contracts.

7.2.1.5 Laboratories at ARAI verifies that method verification is done before performing Test or calibration activities to achieve the required performance. Method verification records are available with the laboratory. If method is revised by the issuing body, verification is repeated to the extent necessary.

7.2.1.6 When method development is required, it is a planned activity and is assigned to competent personnel equipped with adequate resources. Periodic reviews are carried out to ensure that the needs of the customers are fulfilled. Any modification to the development plan is approved by ARAI management.

7.2.1.7 Deviations from method for ARAI activities (if any) will be documented, technically justified, authorized and accepted by the customer.

7.2.2 **Validation of methods:**

7.2.2.1 ARAI validates nonstandard methods, laboratory developed methods or standard methods used outside their intended scope, amplification and modifications of standard methods. Validation confirms that the methods are fit for the intended use. The validation is as

extensive as is necessary to meet the needs of the given application. ARAI uses following techniques, as applicable for method validation
a) calibration or evaluation of bias and precision using reference material
b) systematic assessment of factors influencing the results
c) interlaboratory comparison
d) comparison of results achieved with other validated method

7.2.2.2 Whenever there are changes made to validated methods, the influence of such changes are determined and re validation is performed.

7.2.2.3 ARAI ensures that performance characteristics like measurement range, accuracy, measurement uncertainty, limit of detection, selectivity of the method, repeatability or reproducibility, robustness against external influences and bias of validated methods as assessed for the intended use are relevant to the customers' needs and consistent with specified requirements.

7.2.2.4 ARAI maintain records of method Validation which includes the following details:
a) the validation procedure used;
b) specification of the requirements;
c) performance characteristics of the method;
d) results obtained;
e) a statement on the validity of the method for its intended use.

7.3 Sampling (Applicable only for testing laboratories):

7.3.1 The sampling is carried out by the concerned laboratory wherever applicable. The Department Procedure (DP) defines the formats as per the reference of applicable relevant standard. Selection of sample (component/vehicle), its withdrawal and preparation of sample is carried out as per sampling procedure. Sampling method mention the factors to be controlled to ensure validity of subsequent testing. The sampling plan and method is made available at the site where sampling is undertaken. Sampling plan is based on appropriate statistical methods.

7.3.2 The sampling method include:
a) the selection of samples or sites;
b) sampling plan;
c) preparation and treatment of a sample(s) from a substance, material or product.
After receipt of sample in ARAI, further handling is done as per clause 7.4 stated below.

7.3.3 Record of sampling is maintained in the department indicating the following as appropriate:
a) reference to the sampling method;

b) date and time of sampling;
c) data to identify and describe the sample;
d) identification of the personnel performing sampling;
e) identification of the equipment used;
f) environmental or transport conditions;
g) diagrams or other means to identify the sampling location when appropriate;
h) deviations, additions or exclusions from the method and sampling plan.

7.4 Handling of test or calibration items:

7.4.1 ARAI has procedure (Refer ARAI/Handling, Storage, Packaging, Preservation & Delivery) for the transportation, receipt, handling, protection, storage, retention and disposal or return of test or calibration items including all provisions necessary to protect the integrity of test or calibration item and to protect the interest of ARAI and the customer. This procedure includes provisions to protect the item to avoid deterioration, contamination, loss or damage to the item during handling, transportation, storing/waiting and preparation for testing or calibration. Handling instructions if provided by the customer is followed by ARAI.

7.4.2 Sample or calibration items received in labs are clearly identified by SO no., and the same number (it accommodates number of items and its location) is used throughout the whole testing / calibration, quality control and reporting process. It is ensured that the items are not confused physically or when referred to in records or reports. Records are kept for easy traceability (Refer Department Procedures).

7.4.3 Samples are usually delivered to ARAI, collected from ARAI by customers through their representative or courier service. Other method such as road or rail transport, if specified, in the contract is adopted as per the customer requirement.

After receipt in ARAI, test or calibration items are checked for deviations from specified conditions and records maintained. When there is doubt about the suitability of an item for test or calibration, or when an item does not conform to the description provided, the customer is consulted for further instructions before proceeding and the results of this consultation are recorded. When the customer requires the item to be tested or calibrated acknowledging a deviation from specified conditions, the disclaimer is included in the report indicating which results may be affected by the deviation.

7.4.4 In case the test or calibration item needs to be stored or conditioned under specified environmental conditions, these conditions are maintained, monitored and recorded.

7.5 Technical records:

7.5.1 Departmental procedure defines the manner to retain original observations, (to extent required and practicable), derived data and related information to establish an audit trail, calibration records, staff records and a copy of each test report or calibration certificate issued for a defined period. The technical record includes the date and the identity of personnel responsible for each activity and for checking test/calibration results.

The Operations Process Chart of the department defines the method for recording the results of tests/ calibration. This addresses the factors that may affect the uncertainty wherever applicable and enable test or calibration to be repeated under conditions close to original one.

Observations, data and calculations are recorded at the time of performance of test/calibration and are identifiable with specific test or calibration activity.

7.5.2 When a mistake occurs in hand written record, it is scored out, re-written by the person designated and correct value endorsed alongside. Such endorsements are signed by the person designated. Correction fluid is not used to erase the record and overwriting is not permitted. The data entries on e-media are permitted to authorized or designated persons, thus, changes in original data are avoided.

In case technical record need to be amended due to customer demand, non-conforming work or complaint, Original and amended data and files are kept, including date of alteration, an indication of the altered aspects and the identity of the personnel responsible.

7.6 Evaluation of measurement uncertainty:

7.6.1 ARAI identify (based on SWIPE factors i.e. Standard, Work piece, Instrument, Procedure and Environment) all contributions that are of significance, including those arising from sampling and are considered using statistical methods of analysis. The procedure for calculating measurement uncertainty is given in system procedure “ARAI/Procedure for Calculating Measurement Uncertainty”. The records of measurement uncertainty are retained.

7.6.2 ARAI performing calibrations including our own equipment evaluate the measurement uncertainty for all calibrations.

7.6.3 a) ARAI performing testing evaluate the measurement uncertainty where quantifiable test results are being reported. For a particular testing where ARAI has evaluated measurement uncertainty, there is no need to evaluate measurement uncertainty for each result where the identified significant factors are under control.

b) In those cases where a well-recognized test method specifies limits to the values of the major sources of measurement uncertainty and specifies the form of presentation of the calculated results, ARAI is considered to have satisfied clause 7.6.3 a) requirements by following the test method and reporting instructions.

7.7 Ensuring the validity of results:

7.7.1 ARAI has system procedure "ARAI / Laboratory Quality Control Procedure" for monitoring the validity of tests and calibrations undertaken. The resulting data are recorded in such a way that trends are detectable and where practicable, statistical techniques are applied to review the results. Various checks are planned and executed to ensure the quality of results of testing / calibration which include one or any combination of the following

a) use of reference materials or quality control materials;
b) use of alternative calibrated instrumentation providing traceable results;
c) functional checks of measuring and testing equipment;
d) use of check or working standards with control charts;
e) intermediate checks on measuring equipment;
f) replicate tests or calibrations;
g) retesting or recalibration of retained items;
h) correlation of results for different characteristics of an item;
i) review of reported results;
j) intra laboratory comparisons;
k) testing of blind sample(s)- Not applicable for Testing or Calibration.

7.7.2 ARAI monitor its performance by comparison with results of other laboratories, where possible and appropriate. This monitoring is planned and reviewed and include the following:
a) participation in proficiency testing;
b) participation in inter laboratory comparisons;
c) co relation of results with other test laboratories

7.7.3 Quality data collected in above exercises is analyzed, used to control and improve as applicable the laboratory performance. Where quality data is found to be outside acceptance criteria as mentioned below, appropriate actions are taken to prevent incorrect results from being reported.

Acceptance criteria is defined as follows: -

Parameter	Acceptance criteria
Calibration parameter	En number ≤1
Testing parameter	• En number ≤1 • Z score≤2 • Acceptance criteria defined by the Test laboratories, where En and or Z score calculations are not possible
Replicate calibration/testing parameter	Deviation less than the uncertainty of measurement.
Calibration/verification of reference standard	The drift observed as a function of time from trend analysis within the specified limits as given by the manufacturer
Selecting external calibration agency	TUR (Test Uncertainty Ratio) equal to or better than 3:1, wherever possible

Reference: "ARAI / Laboratory Quality Control Procedure"

7.8 Reporting of results:

7.8.1 **General:** ARAI has system procedure "ARAI/Procedure for Reporting of Results" which details the ARAI procedure to address 7.8 clause of ISO/IEC17025 and additional requirements of accreditation/recognition bodies.

7.8.1.1 Before release of Report, result is reviewed by the designated personnel and authorized by the approved authorized signatories of respective laboratory.

7.8.1.2 ARAI policy is to provide reports of testing or calibration, which are accurate, clear, unambiguous, objective and devoid of errors. ARAI report includes all the information agreed with the customer, required by the method used and necessary for the interpretation of results.

ARAI issues report as hard Copies or in electronic form as per customer requirements by meeting ISO/IEC17025 requirements. Copies of all issued reports are retained as technical records.

7.8.1.3 When agreed with the customer, results are reported in simplified way for e. g. the calibration certificates issued to internal customers are reported in simplified way.

7.8.2 **Common requirements for reports (test, calibration or sampling):**

7.8.2.1 ARAI report includes at least the following information to minimize any possibility of misunderstanding or misuse.

a. A title "Test Report" and "Calibration Certificate" and "Sampling Report"
b. Name and address of ARAI on letter head
c. Location of performance of testing/calibration/sampling including when performed at a customer facility or at sites away from the ARAI's permanent facilities like on test track facility.
d. Unique identification of the certificate or report serial number on each page and the total number of pages and clear identification of the end.
e. the name and contact information (e.g. address) of the customer.
f. identification of the calibration procedure or test method or sampling method used.
g. Description, unambiguous identification and condition of the item calibrated or tested or sampled.
h. date of receipt of calibration or test item and the date of sampling where this is critical to the validity and application of the results.
i. date(s) of performance of calibration or test.
j. the date of issue of the report
k. reference to the sampling plan and sampling procedure used by ARAI or other bodies where these are relevant to the validity or application of the results.
l. a statement to the effect that the results relate only to the items tested or calibrated or sampled.
m. the test/calibration results with the units of measurement, wherever appropriate.
n. additions to, deviations, or exclusions from the test / calibration /sampling method.
o. identification of the authorized signatories for the report

p. clear identification when results are from external providers.

q. A statement "the report shall not be reproduced except in full without approval of ARAI "to assure that parts of a report are not taken out of context.

7.8.2.2 ARAI is responsible for all the information provided in the report, except when information is provided by the customer. Data provided by the customer is clearly identified. Additionally, a disclaimer is put on the report when the information is supplied by the customer and affect the validity of result.

Where ARAI is not responsible for sampling activity, it states in the report that results apply to the sample as received.

7.8.3 **Specific requirements for test reports:**

7.8.3.1 In addition to 7.8.2 requirements, ARAI test report includes the following information necessary for the for the interpretation of test results

a) information on specific test condition such as environment conditions.

b) where relevant (refer 7.8.6 below), statement of conformity with requirements or specifications.

c) where applicable, the measurement uncertainty reported in the same unit or in percentage to the measurand when

i) it is relevant to the validity or application of test results;

ii) a customer requirement; or

iii) the measurement uncertainty affects conformity to the specification.

d) Where appropriate, opinions and interpretations (refer 7.8.7 below)

e) additional information that may be required by specific method, accreditation/recognition authorities, customers as applicable.

7.8.3.2 Where ARAI is responsible for sampling activity, the test report also meet the requirements mentioned in 7.8.5 below, where necessary for the interpretation of test results.

7.8.4 **Specific requirements for calibration certificates:**

7.8.4.1 In addition to 7.8.2 requirements, ARAI calibration certificates includes the following information necessary for the for the interpretation of calibration certificates

a) the measurement uncertainty reported in the same unit or in percentage to the measurand

b) information on specific test condition such as environment conditions

c) a metrological traceability statements

d) the results before and after adjustment or repair, if asked by the customer

e) where relevant (refer 7.8.6 below), statement of conformity with requirements or specifications

f) where appropriate, opinions and interpretations (refer 7.8.7 below)

7.8.4.2 Where ARAI is responsible for sampling activity, the calibration certificate also meet the requirements mentioned in 7.8.5 below, where necessary for the interpretation of calibration results.

7.8.4.3 A calibration certificate or calibration label does not contain recommendation on "due date of calibration" except when it is agreed with the customer.

7.8.5 **Specific requirements for reporting sampling:** Where ARAI is responsible for sampling activity, in addition to 7.8.2 requirements, ARAI report includes the following information necessary for the interpretation of results;

a. The date of sampling
b. Unambiguous and unique identification of the substance, material or product sampled (including the name of the manufacturer, the model or type of designation and serial numbers as appropriate)
c. The location of sampling, including any diagrams, sketches or photographs
d. A reference to the sampling plan and procedures used;
e. Details of any environmental conditions during sampling that may affect the interpretation of the test results;
f. Information required to evaluate measurement uncertainty for subsequent testing or calibration.

7.8.6 **Reporting statement of conformity**: Refer system procedure "ARAI/Procedure for Reporting of Results" for details.

7.8.6.1 When a statement of conformity to a specification or standard is reported, ARAI document the decision rule applied considering level of risk associated apply the decision rule. Level of risk is not considered when the decision rule is prescribed by the customer or regulation.

7.8.6.2 Statement of conformity reported by ARAI clearly identifies the following

a) to which results the statement of conformity applies;

b) which specification or standard is met or not met;

c) the decision rule applied unless it is inherent in the requested specification or standard.

7.8.7 **Reporting opinions and interpretations**:

7.8.7.1 When opinions and interpretations are reported, ARAI ensures that only personnel authorized for the expression of opinions and interpretations release the respective statement. ARAI document the basis on which they have been made. Opinions and interpretations are clearly marked in the test report.

7.8.7.2 The opinions and interpretations expressed in reports are based on the results obtained from the tested or calibrated item and clearly identified.

7.8.7.3 When opinions and interpretations are directly communicated by dialogue with the customer, a record of the dialogue is retained.

7.8.8 **Amendments to reports**:

7.8.8.1 When an issued report needs to be changed, amended or re-issued, any change of information is clearly identified and, where appropriate, the reason for the change is included in the report.

7.8.8.2 Amendment to a report after issue is made only in the form of further document which includes the statement “amendment to report or supplementary/corrigendum to report. Such amendment meets all applicable requirements of ISO/IEC17025.

7.8.8.3 When it is necessary to issue completely new test report or calibration certificate, it is uniquely identified and contain a reference to the original that it replaces.

Reference: ARAI/Procedure for Reporting of Results

7.9 Complaints:

For details refer "ARAI/Complaints Redressal" system procedure

7.9.1 ARAI has system procedure "ARAI/Complaints Redressal" to receive, evaluate and make decisions on complaints.

7.9.2 Above system procedure is available to any interested party on request. Upon receipt of a complaint, ARAI confirm whether the complaint is related to ARAI activities and, if so, deal with it. ARAI is responsible for all decisions at all levels of the handling process for complaints.

7.9.3 Process of handling complaint at ARAI include the following steps

a) process for receiving, validating, investigating the complaint and deciding what actions are to be taken in response to it.

b) tracking and recording the complaints, including actions undertaken to resolve them.

c) ensuring that any appropriate action is taken.

7.9.4 ARAI is responsible for gathering and verifying all necessary information to validate the complaint.

7.9.5 Wherever possible, ARAI acknowledges receipt of the complaint and provide the complainant with the outcome.

7.9.6 The outcome to be communicated to the complainant is reviewed and approved by concerned HoD/QMD who are not involved in the original laboratory activities in question.

7.9.7 Whenever possible, ARAI gives formal reply of the end of the complaint handling to the complainant.

Refer "ARAI/ Complaints Redressal" system procedure.

7.10 Nonconforming work:

ARAI believes in conducting all laboratory activities 'right first time' using system approach to management.

Provision of following procedure is made to address any nonconformity

7.10.1 ARAI has system procedure "ARAI/Control of Non-Conforming Service and Service delivery "which is implemented when any aspect of ARAI activities or results of its work do not conform to ARAI procedures or the agreed requirements of the customers. The procedure addresses the following;

i) The responsibilities and authorities for the management of no conforming work are defined;

j) Actions including halting or repeating of work and withholding of reports, as necessary are based upon the risk involved;
k) An evaluation is made of the significance of the nonconforming work and its impact on previous results;
l) A decision is taken on the acceptability of the non-conforming work;
m) Where necessary, the customer is notified and work is recalled;
n) The responsibility for authorizing the resumption of work is defined.

7.10.2 ARAI retain records of nonconforming work and actions as specified in 7.10.1 bullets b) to f). Non-conforming work is reported using format ARAI/Non-Conformity report.

7.10.3 When evaluation of non-conforming testing / calibration work indicates recurrence of nonconforming work or any doubt about the operations with our procedures, the corrective action is initiated as per "ARAI/Control of Non-Conforming Service and Service delivery" procedure.

7.11 Control of data and information management:

7.11.1 ARAI laboratory personnel are having access to the data and information needed to perform their activities.

7.11.2 The acquisition, processing, recording, reporting, storage and retrieval of data defined in relevant department procedures when computers and automation devices are used. Computer software developed by the department is adequately documented and suitably validated for adequacy. HoD assisted by IT Champion ensures the proper functioning of computers and related equipment to maintain the integrity and confidentiality of test and calibration data as detailed below.

Whenever there are changes, including modifications to commercial off-the shelf software or laboratory software configuration, they are authorized, documented and validated before implementation.

7.11.3 ARAI has implemented ISO27001:2013 i.e. Information security management system wherein it has implemented controls to ensure confidentiality, integrity and availability of information.

All files registers, records, including Electronic media are legible, readily retrievable are stored in almirahs / racks and protected from damage and deterioration due to heat, moisture, light insects, etc.

Information Security Management System (ISMS) policies and procedures of ARAI addresses the following:

a) Control of data and information on paper and electronic media.
b) Storage, protection, retention and retrieval of data and information.
c) Confidentiality of data and information.
d) Procedures as part of work environment define the manner of maintaining computers and related equipment.
e) Computer databases are protected from un-authorized access by use of passwords. Data back-up is kept and protection from virus is ensured.
f) Recording of information management system failures and the correction and corrective action as appropriate

7.11.4 When ARAI information management system is managed and maintained through external provider, ARAI ensures that external provider complies with applicable requirements of ISO/IEC17025.

7.11.5 Instructions, manuals and reference data relevant to the LIMS are readily available to test / calibration personnel.

7.11.6 Calculations and data transfers are checked before reporting to the customer.

8.0 Management System requirements

8.1 Options:

ARAI has established, implemented and maintained various management systems to fulfill interested parties' requirements viz. ISO9001, ISO14001, ISO/IEC27001 and ISO45001. In view of this ARAI opts for option B.

Clause 8.2 to 8.9:

This manual state the management system of ARAI related to **clause 8.2 to 8.9** of ISO/IEC17025:2017 as detailed below.

Clause No.	Management System Requirement	ARAI Document Reference Number
8.2	Management system documentation (Option A)	Annexure 'C': ARAI Operations Management System (OMS) Table of Contents
8.3	Control of management system documents (Option A)	ARAI/Control of Documents
8.4	Control of records (Option A)	ARAI/Control of Operations Records Procedure
8.5	Actions to address risks and opportunities (Option A)	ARAI/Risk management
8.6	Improvement (Option A)	Summary Available with Individual labs.
8.7	Corrective actions (Option A)	ARAI/Incidents, Non - Conformances and Corrective Action
8.8	Internal audits (Option A)	ARAI/Internal Audit
8.9	Management reviews (Option A)	ARAI/Management Review Meeting

Concluding Remark:

We at ARAI; operate impartially, competently, consistently and generate valid test/calibration results.

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Annexure 'A' : ARAI/List of Departments and their Abbreviation

Department	Abbreviation
Director's Office	DIR
Noise, Vibration, Harshness Laboratory	NVH
Engineering Design And Simulation	EDS
Structural Dynamics Laboratory	SDL
Safety & Homologation Laboratory	SHL
Engine Development Laboratory	EDL
Passive Safety Laboratory	PSL
Emission Certification Laboratory	ECL
Vehicle Evaluation Laboratory	VEL
Infrastructure Development	ID
Prototype Manufacturing Department	PMD
Automotive Electronics Department	AED
Knowledge Centre	KC
Academy	ACY
Training Centre	TC
Learning Centre	LC
Finance & Accounts	F&A
Human Resource Management & Administration	HRMA
Quality Management Department	QMD
Calibration Laboratory	CAL

Metrology Laboratory	MET
Stores Section	STR
Purchase Section	PUR
Information Technology Management	ITM
Regional Centre South	RCS
Homologation Management & Regulations	HMR
Business Development & Corporate Planning	BDCP
Governing Council Secretriat & Legal	GCSL
ARAI-Forging Industry Division	FID
Environment Research Laboratory	ERL
Inspection & Maintenance Project Cell	IMPC
Homologation & Technology Centre	HTC
Homologation & Technology Centre - Passive Safety Laboratory	HTC-PSL
Homologation & Technology Centre- Emission Certification Laboratory	HTC-ECL
Homologation & Technology Centre- Fatigue And Material Centre of Excellence	HTC-FMCE
Technology Group	TG
Powertrain Design	PTD
Homologation & Technology Centre - Automotive Electronics Department	HTC-AED
Homologation & Technology Centre - Drivetrain Development Centre	HTC-DDC
Forging Industry Division -Advanced NVH Development Centre (FID-ANDC,Chakan)	FID-ANDC

ARAI / LABORATORY OPERATIONAL MANUAL

Version No.43 **Date: March 7, 2025**

Homologation & Technology Centre-Advanced Photometry and Optics Laboratory (HTC-Photometry, Chakan)	HTC-Photo
Forging Industry Division-Passive Safety Laboratory (FID-PSL)	FID-PSL

Prepared by	Quality Manager	**Approved by**	DIRECTOR

Annexure 'B':

Names, Responsibilities & Authorities of HoDs of Departments.

Role	Responsibilities & Authorities
Director	➢ Director is responsible for and authorised to take Policy decisions at the Institutional level in relation to industry, government, legislative agencies and other bodies appropriately from time to time. ➢ He is responsible for implementation of decisions taken by Governing Council, Advisory Panel and other recommendatory/ mandatory bodies governing the functioning of ARAI. ➢ He is responsible for guiding the day-to-day executive operations, advisory functions through HODs. Director is authorised to allocate manpower and the other resources required for smooth functioning of the Institute. ➢ Director is responsible to define organizational objectives and monitor activities in the Institute keeping in view the interest of Automotive Industry and nation at large and those of departmental personnel are described in the Departmental Procedures.
QM / MR	➢ Ensuring that the processes needed for LOMS are established implemented and maintained. ➢ Identification of deviations from the LOMS or procedures for performing ARAI activities. ➢ Actions to prevent or minimize deviations ➢ Reporting to top management on the performance of LOMS and need for improvement. ➢ Ensuring the effectiveness of ARAI activities through promotion of awareness of customer requirements throughout the organization. ➢ Liaison with external parties on matters relating to the LOMS.

HoD / TMAssisted by Management Team (Management Team typically include sub-ordinates like General Managers, Deputy General Managers, Managers, Deputy Managers, Engineers)	➢ HoDs are responsible for assisting the Director in the execution of policy decisions taken by various committees of Advisory / recommendatory / mandatory nature and Implementing such decisions in their own departments effectively, incorporating the features as called for by the Director. ➢ HoDs are authorised to delegate responsibilities to the staff of the department for discharging the duties appropriately and to have a control on the implementation of the plan in the department. ➢ The HoD is responsible to implement and maintain OMS and departmental procedures. The specific responsibilities and authorities of the HoD related to the Departmental Processes ➢ Overall planning, monitoring of departmental activities including maintaining documents, work schedule, liaising with customers as well as interaction with regulatory authorities. ➢ Reducing non-conformities at highest priorities at all levels. ➢ Setting Departmental objectives & improving service delivery, identification of appropriate resources. ➢ Ensuring involvement of personnel related to processes shall not diminish confidence. ➢ Interpretation of results and release of reports. ➢ Approval of DPs, TPs, Work Instructions. ➢ Approval of quality plans, formulation of teams. ➢ Approval of completeness of service, test report & Bill. ➢ Approval of actions on non-conformities ➢ Evaluate significance of deviations with respect to activities performed by competent person for which they are responsible.
Execution Team (Management Team typically include sub-ordinates General Managers, Deputy General Managers, Managers, Deputy Managers, Engineers), REs, , TAs, Mechanics)	**As designated by management team to carry out: -** Execution of planned activities for service. Day-to-day co-ordination for engine & vehicle emission test and general supervision of all activities. * Services / tests assigned by HoD * Calibration of the emission test equipment. * Preventive & breakdown maintenance of test equipment. • Preparation & checking of reports. • Reporting & discussing non-conformities with management. • Assistance in monitoring objectives set for improvement.
Supporting Team (Typically Mechanics, Test Drivers, Workshop Attendants	**Responsible to support such as:** To drive vehicle on the chassis dynamometer as per the driving cycle or on road as per manufacturer's request. * To assist execution team for carrying out tests and maintenance of equipment's.

Prepared by	Quality Manager	**Approved by**	DIRECTOR

	* To provide technical and workshop support to department. * To carry out fabrication and engine set up in test cells.
Administration Team (Typically Office Assistants, PAs, Asst. WP	* To assist HoD for routine work in the department. * To assist management & execution team for departmental services. * To assist in preparation of test reports as well as maintenance of test records.

Annexure 'C':

ARAI OPERATIONS MANAGEMENT SYSTEM (OMS)

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15.	Measurement Uncertainty
16.	Management Review Meeting
17.	Objectives and targets procedure.
18.	Performance Evaluation procedure.
19.	Personnel competency in the Department.
20.	Purchase Procedure.
21.	Quality Control Procedure
22.	Reporting of Results
23.	Risk Management Procedure