

**C CONTACT DETAILS OF THE AWARDING BODY FOR THE QUALIFICATION**

**Name and address of awarding body:** Central Institute of Plastics Engineering and Technology (CIPET), Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals, Govt. of India, Head Office, Guindy, Chennai

**Name and contact details of individual dealing with the submission**

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**List of documents submitted in support of the Qualifications File:**

1. Qualification Document – Analytical Instrument Operator
2. Curriculum/ Syllabus
3. Criteria for Assessment of Trainees
5. Occupational Map
6. Documents supporting need of the Qualification:
  - a. Annual Report 2016-17
  - b. A Report on Human Resource and Skill requirement for the Chemicals and Pharmaceutical sector (2022) by NSDC.
  - c. Brief report of Chemicals and petrochemicals Industry in India, April 2015, Corporate Catalyst India Pvt Ltd, Page 4
  - d. Industry Engagement certificate in preparation of learning outcomes and Job Role Identification in Petrochemicals sector

## QUALIFICATIONFILE

### SUMMARY

<b>Qualification Title:</b> Analytical Instrument Operator
<b>Nature and Purpose of the qualification:</b>  A CIPET trade certificate for Analytical Instrument Operator knows the analytical methodology & handles various analytical instruments such as GC-MS, HPLC, LC-MS, ICP-OES, Karl-Fischer Auto titrator, Abel's Flashpoint Apparatus etc.
<b>Body/bodies which will award the qualification:</b>  The Academic Cell –HO, Central Institute of Plastics Engineering and Technology (CIPET), Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals, Govt. of India, Head Office, Guindy, Chennai.
<b>Body which will accredit providers to offer courses leading to the qualification:</b>  The Academic Cell –HO, Central Institute of Plastics Engineering and Technology (CIPET), Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals ,Govt. of India ,Head Office ,Guindy , Chennai.
<b>Body/bodies which will be responsible for assessment:</b>  The assessment is being carried out at individual Centre level. Training Assessment Wing, Head Office (HO) of Central Institute of Plastics Engineering and Technology (CIPET), Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals, Govt. of India, Guindy, Chennai is responsible for overall assessment.
<b>Occupation(s) to which the qualification gives access:</b>  Analytical Instrument Operator occupation in chemical manufacturing process
<b>Proposed level of the qualification in the NSQF:</b> Level 4
<b>Anticipated volume of training / learning required to complete the qualification:</b>  960 Notional hours.
<b>Entry requirements / recommendations:</b> Minimum qualification – Science Graduate & Minimum age - 21 years completed.
<b>Progression from the qualification:</b> Analytical Instrument Operator with experience will become the Analytical Instrument Engineer
<b>Planned arrangements for the Recognition of Prior learning (RPL):</b>  RPL arrangements are being developed and will be informed in due course of time.
<b>International comparability where known:</b> It will be carried out in next phase as comparability is being verified.
<b>Date of planned review of Qualification:</b> 30.04.2020

## QUALIFICATIONFILE

<b>Format Structure of the Qualification:</b>			
<b>Title and Identification code of component</b>	<b>Mandatory/Optional</b>	<b>Estimated Size (Notional Hours)</b>	<b>Level</b>
CPC/N9205: Familiarization with basic concepts, different analytical instruments, job requirements & basic related process.	M	92	4
CPC/N9206: Understanding of analytical methodology & Operate various analytical instruments such as GC-MS, HPLC, etc.	M	744	4
CPC/N9204: To practice & maintain safe and good work environment.	M	124	4
<b>Total</b>		<b>960</b>	

# QUALIFICATIONFILE

## SECTION1

### ASSESSMENT

#### SECTION 1

#### ASSESSMENT

##### **Body/Bodies which will carry out assessment:**

A Separate department/ body -Training Assessment Wing of Central Institute of Plastics Engineering and Technology (CIPET), Ministry of Chemicals and Fertilizers, Department of Chemicals and Petrochemicals, Govt. of India, Head Office, Guindy, Chennai.

##### **Will the assessment body be responsible for RPL assessment?**

RPL arrangements are being developed and will be informed in due course of time.

##### **Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, consistent and fair and show that these are in line with the requirements of the NSQF:**

With uniformity and setting of learning outcomes for different Jobs Roles the assessment of candidates will be at learning outcome level. Assessment criterion has been defined for each learning outcome and it includes both theoretical and practical skills on which the candidate will be assessed. The question suite which will be used to check the skills of the trainee would include

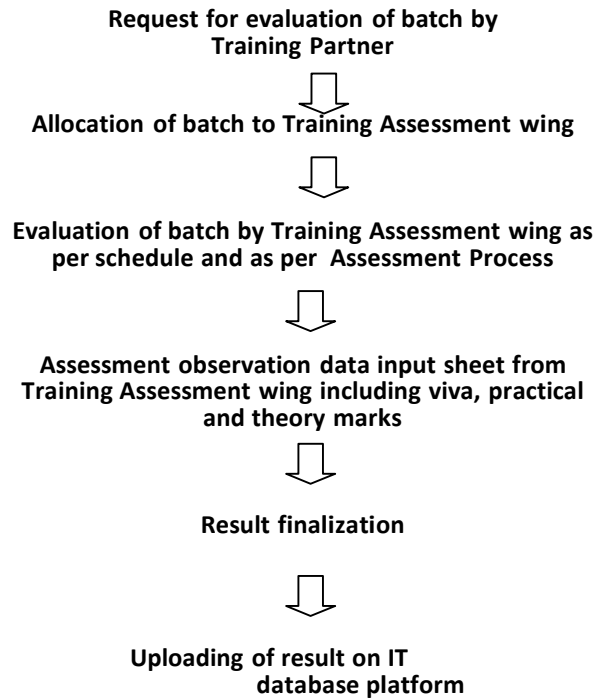
- **Theoretical test suite** – Will include multiple choice questions, audio-video question etc. which will test the trainee on his knowledge of the subject
- **Practical Knowledge suite** – Practical knowledge can be tested through Assessor driven evaluation/test, Situational Judgment Tests etc to test practical core competence. A mix of these would be able to evaluate the trainee on his practical knowledge of the Qualification Document.

##### **Assessment strategy:**

- Assessment criteria for Qualification Document have been developed. Each Learning Outcome have separate marks for Theory and Practical Skills.
- The Training Assessment Wing will have assessors who will not be associated with training activities and will be provided training on the said work. Thus it will ensure that the assessment carried out is fair and consistent.
- Set of question bank developed to assess the theoretical and practical knowledge. To ensure the quality, each trainees get the unique set of question
- Student has to score minimum marks separately for theoretical and practical skill and overall percentage should also be 50% for theory and 70% for practical.
- Empanelment of subject matter expert as assessor to assess trainee specifically on practical skills
- Assessments are preferably conducted by written examination papers in English/regional languages according to the requirement.
- It has been ensure that TP/trainer should not be present during assessment

# QUALIFICATIONFILE

## Assessment Process Flow:



## Summative Assessment:

Based on the Total Marks allotted for the specific subject, formal evaluation shall be conducted. Based on secured marks, candidates shall be declared pass or fail.

Steps undertaken for summative assessment:

1. Based on Completion of Batch, Evaluation Schedule shall be prepared
2. Identified Assessor is nominated for Evaluation
3. Setting up of separate Question Paper for Theory & Practical Examination
4. Conduct of examination as per the schedule
5. Evaluation & Certification

**Evidence Collected during Assessment:** Theoretical Answer Sheets, Practical Exam Sheets, Evaluation Sheets, Jobs produced during practical Exams.

## Protocol for Selection of Assessors:

The Assessors should have the minimum qualification: Degree in Science/Engineering.  
The Assessors should have minimum 5 years of Experience in the relevant field.

## QUALIFICATIONFILE

### ASSESSMENT EVIDENCE

1. Criteria for assessment for each Qualification Document will be created by CIPET.
2. Each Assessable outcome (AO) will be assigned marks proportional to its importance in Learning Outcome and few performance criteria may be allotted marks in combine.
3. Each Learning Outcome will be assessed both for theoretical knowledge and practical which is being proportionately demonstrated in the table below.
4. The assessment for the theory part will be based on knowledge bank of questions created by CIPET which will contain multiple choice theory questions and Practical question database with mark allotment criteria.
5. To pass the Qualification Document, every trainee should score a minimum of 50 % in Functional and all Generic Learning Outcome's.
6. In case of successfully passing only certain number of Learning Outcome's, the trainee is eligible to take Subsequent assessment on the balance Learning Outcome's to pass the Qualification Document.

**Title of the Component:** Analytical Instrument Operator

Assessable outcome		Assessment criteria for the outcome		
LO	Assessable outcome Description	Theory	Practical	Total
1.CPC/N9205: Familiarization with basic concepts, different analytical instruments, job requirements & basic related process.	AO1. Discuss the work order ( work output) required from the process and with the supervisor	1	5	6
	AO2. Refer all components/process related documents to understand dimensions and properties of the required work output	2	5	7
	AO3.comprehend the process and analytical instruments required for the process Clearly understanding the does and don'ts of the manufacturing process as defined in SOPs/ Work Instructions or defined by supervisors	2	10	12
	AO4. Knowhow about the conversion procedure and process to be adopted for completing the work order from the supervisor by referring the Work Instruction document/SOP manual	1	4	5
	AO5. Set the various parameters before starting the process as per the parameters are mentioned in the Work Instructions/ SOP manual by referring the Work Instruction document/SOP manual	0	5	5
	AO6. comprehend the raw material like plastics granules, bonding additives etc. required for executing the activity	1	4	5
	AO7. Ensure that the required analytical is available before starting the process	1	3	4
	AO8. Knowhow about the type of analytical instruments or techniques	1	2	3
	AO9. Ensure the availability of spare parts for continuous operation of machine	1	2	3
	AO10. Ensure that instruments machines parts & no foreign material is entrapped in parts of mould/die.	3	15	18

	AO11. Ensure cleaning of the other machine tools, auxiliaries(if any)	3	15	18
	AO12. Ensure cleaning of the area around the machine for any oil, grease, water etc.	4	10	14
	AO13. Consult with superiors in case of any doubt/clarification	3	0	3
	AO14. Develop self-confidence after resolving the queries to complete the task.	3	0	3
	AO15. Report completion of work to superiors	4	0	4
	PC16. Good interpersonal relations with superiors & fellow operators.	4	0	4
	AO17. Disciplined behavior in work place	3	0	3
	AO18. Good coordination with other department person for getting their support for work.	3	0	3
	<b>Subtotal</b>	<b>40</b>	<b>80</b>	<b>120</b>
2.CPC/N9206: Understanding of analytical methodology & Operate various analytical instruments such as GC-MS, HPLC, etc.	AO1. Report the problems caused by machines to superior, when not resolved by operator.	9	50	59
	AO2. Report major processing defects beyond control of operator	9	50	59
	AO3. Keeping records of machine log book, data sheet of machine parameter	9	50	59
	AO4. Maintain documents related to incoming & outgoing material	8	50	58
	AO5. Meet targets & goals for production	4	4	8
	AO6. Minimize defects in final product	4	4	8
	AO7. Follow quality system to get better product	4	4	8
	AO8. Keep work area clean & systematic	4	4	8
	AO9. Comply to safety & health guidelines & rules	4	4	8
		<b>Sub Total</b>	<b>55</b>	<b>220</b>
3.CPC/N9204: To practice & maintain safe and good work environment	AO1. Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise	1	4	5
	AO2. Identify areas in the plant which are potentially hazardous/unhygienic in nature	1	4	5
	AO3. Conduct regular checks with support of the maintenance team on machine health to identify potential hazards due to wear and tear of machine	2	4	6
	AO4. Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc.	2	4	6
	AO5. Inform the concerned authorities about machine breakdowns, damages which can potentially harm man/ machine during operations.	2	4	6
	AO6. Create awareness amongst other by sharing information on the identified risks.	2	4	6
	AO7. Support the Safety team and the supervisor in creating the risk mitigation plan	2	4	6
	AO8. Plan for Minimum wastage & its safe disposal	2	4	6
	AO9. Work in conformance to legal requirements, organizational policies and procedures	2	4	6
	AO10. Ensure that the mould is ready & having no problem in Dry run	2	4	6
	AO11. Check material is available for production. If required Arrange for pre drying	2	4	6
	AO12. Check the availability & readiness of ancillary Equipments	2	4	6

AO13. Load the material (if required) in the hopper	2	4	6
AO14. Set the parameters of the machine i.e temperature, pressure, speed etc	2	4	6
AO15. Check the temperature on the barrel with respect to Set temperature	2	4	6
AO16. Conduct trial run to get ample piece once machine is set	2	4	6
AO17. Adjust parameters unless getting final product	2	4	6
AO18. Visual check of final product	2	4	6
AO19. Define accepted products and defective products as per approved plan	2	4	6
AO20. Carry out post molding operation during the cycle time run such as. trimming, apply protective tapes, putting labels on each product for identification	1	4	5
AO21. Store the final product in specified area	1	4	5
AO22. Clean the machine & equipments at regular interval	1	4	5
AO23. Work in compliance with specified health and safety standards	1	4	5
AO24. Ensure preventive maintenance of machines & ancillary equipments	1	4	5
AO25. Develop coordination with maintenance department for resolving breakdown maintenance in minimum possible time.	1	4	5
AO26. Ensure Root cause analysis of moulding defects	1	4	5
AO27. Carry out Analysis of data sheets available in department	1	4	5
AO28. Take all corrective & preventive action	1	4	5
AO29. Report the problems caused by machines to Superior, when not resolved by operator.	1	4	5
AO30. Report defects in the moulds that one do not have the Authority to repair	1	4	5
AO31. Report major processing defects beyond control of operator	1	4	5
AO32. Keep records of machine log book, datasheet of Machine parameter	1	4	5
AO33. Maintain documents related to incoming & outgoing material	1	4	5
AO34. Meet targets & goals for production	1	4	5
AO35. Minimize defects in final product	1	4	5
AO36. Follow quality system to get better product	1	4	5
AO37. Keep work area clean & systematic	1	3	4
AO38. Comply to safety & health guidelines & rules	1	3	4
<b>Subtotal</b>	<b>55</b>	<b>150</b>	<b>205</b>
<b>Total</b>	<b>150</b>	<b>450</b>	<b>600</b>

**Means of assessment 1:**

The assessment comprise of -

- Theory Assessment
- Viva voce
- Practical assessment

**Means of assessment 2:**

**Pass/Fail-**

**The Pass mark of theory written assessment is 50% and for viva and practical assessment is 70%. The candidate has to pass separately in Theory and Practical.**



# QUALIFICATIONFILE

## SECTION2

### EVIDENCE OF LEVEL

Level of qualification: 4

Title/Name of Qualification/Component: Analytical Instrument Operator Level:4			
NSQF Domain	Outcomes of the Qualification/Component	How the job role Relates to the NSQF Level descriptors	NSQF Level
Process	<p>Analytical Instrument Operator: he/she has to- Understand the work order and the process requirements Discuss the work order ( work output) required from the process and with the supervisor. Refer all components/process related documents to understand dimensions and properties of the required work output Understand the process and analytical instruments required for the process Clearly understanding the does and don'ts of the manufacturing process as defined in SOPs/ Work Instructions or defined by supervisors Understand the conversion procedure and process to be adopted for completing the work order from the supervisor by referring the Work Instruction document/SOP manual Set the various parameters required for executing the activity Ensure that the required instrument available before starting the process Understand the type of analytical instruments &amp; methods required for executing the required conversion operation and ensure that the same is available for operations Ensure the availability of spare parts for continuous operation of machine Ensure that analytical instrument is cleaned properly &amp; no foreign material is entrapped in its parts.</p>	<p>Analytical Instrument Operator job requires limited range of activities which are familiar and predictable like availability of consumables, safety PPE, solvent used, basic machine parts and its functions etc. He should understand the solvent, injection syringe etc. required for executing the activity which justifies the pegging of Level 4.</p>	4

	<p>Consult with superiors in case of any doubt/clarification</p> <p>Report completion of work to superiors.</p>		
<b>Professional knowledge</b>	<p>The user/individual on the job needs to know and understand:</p> <p>General Principle of moulding procedure, process knowledge, Machine startup &amp; shutdown procedures, moulds loading and unloading procedure.</p> <p>Types of different thermoplastics materials, additives and grades for different plastics products.</p> <p>Identification &amp; Troubleshooting of various defects in products produced in the various plastics processing machineries like Injection, Extrusion and Blow.</p>	<p>Analytical instrument Operator should understand and know factual knowledge about process, principle of plastics Processing Technique like Injection and its operation, Quality and Inspection etc. which justifies the pegging of Level 4.</p>	
<b>Professional skill</b>	<p>The user/individual on the job needs to know and understand:</p> <p>How to make proper decisions pertaining to the work. Identification of problem.</p> <p>Finding the resource to resolve the problem.</p> <p>Consult superiors in case of any assistance.</p> <p>Understand the plan, fix up priorities for work operations as per job requirements.</p> <p>Organize and analyze information relevant to work .</p> <p>Understand the basic concepts of shop-floor work productivity including material management waste reduction etc.</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>undertake and express new ideas and initiatives to others . Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses.</p> <p>participate in improvement procedures including process, quality etc.</p>	<p>Analytical instrument Operator should recall general principles of procedure and process knowledge which may be repetitive type of work in the area allotted,</p> <p>Thus he should demonstrate practical skill, routine and repetitive in injection processing, he should also understand quality concepts and use in the area of work allotted which justifies the pegging of Level 4.</p>	4

## QUALIFICATIONFILE

<p><b>Core Skill</b></p>	<p>The user/individual on the job needs to know and understand how to:          Prepare document related to processing parameter, other technical records like machine log sheets, job card etc. prepare draft drawings for the final output product. Write information documents to internal departments/ internal teams.</p> <p>Read &amp; interpret machine parameters, engineering drawing and sketches.          Read equipment manuals and process documents.          Read instructions like safety instructions , symbols while using the equipment in the plant area          The user/individual on the job needs to know and understand how to:          Communicate orally any instructions related to work with superiors &amp; co workers with clarity and Listen actively.          Follow company protocol for communication</p>	<p>Analytical instrument Operator should be able to read /write warnings, instructions and other text material on product labels, components etc with minimum required clarity, should have skill of basic arithmetic ,like samle weights additions etc. which justifies the pegging of Level 4.</p>	<p>4</p>
<p><b>Responsibility</b></p>	<p>Machine Operator- Analytical instruments operator responsible for his own job and self-learning. He/she Set up basic as well as all critical machine controls and operate sample Injection and data interpretation, in order to produce good quality report as per approved specifications by supervis or, Identify and Troubleshoot the defects occur during sample processing. He may need to control/ check multiple machines at a time.</p>	<p>Analytical Instrument operator is responsible for his own job and learning sample Injection Process which justifies the pegging of the QP at Level 4.</p>	<p>4</p>

### **SECTION3**

#### **EVIDENCEOFNEED**

##### **What evidence is there that the qualification is needed?**

Qualification document has been developed by suggestion and approval of Chemicals and Petrochemicals Core committee constituted by Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilizers, Govt. Of India which consist of senior leaders and experts from Plastics and Allied Industry, Associations under which more than 1 Lakhs Industrial units and has been further substantiated by various study reports, Annual reports etc.

##### **What is the estimated uptake of this qualification and what is the basis of this estimate?**

The Skill gap report states that, incremental human resource requirement for the chemical sector is 1.95 lakhs by 2022. Refer: Name of the Report "Are port of C&PC on Framework for Skill Management in the chemical sector.

##### **What steps were taken to ensure that the qualification(s) does/do not duplicate already existing or planned qualifications in the NSQF?**

Mapping of Analytical Instrument Operator has been done with National Classification of Occupation 2015 to ensure the qualification does not duplicate, the qualification have being checked with qualification pack of other sectors like Rubber, Electronics etc and there is no duplicity observed in terms of contents, module/syllabus covered etc.

The NSDC list of approved and under developed Qualification Packs was checked prior to stating the work to ensure no duplicity.

##### **What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated?**

Qualification documents shall be revised once in a year and CIPET shall collect the feedback from Industries/ Associations and necessary revisions/updating in Qualification document will be carried out. Feedback mechanism has been created by CIPET. Based on the Industry feedback in term of employability, course coverage, placement factors etc will be checked and growth indicators will be identified and reviewed by CIPET.

##### **ANNEXURE:**

7. Presentation of 2nd core group committee meeting along with Minutes of meeting approved by members
- 9 (b). A Report on Human Resource and Skill requirement for the Chemicals and Pharmaceutical sector (2022) by NSDC.
- 9 (c). Brief report of Chemicals and petrochemicals Industry in India, April 2015, Corporate Catalyst India Pvt Ltd, Page 4

## QUALIFICATIONFILE

### **SECTION4**

#### **EVIDENCE OF RECOGNITION AND PROGRESSION**

**What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector?**

Relevant information was collected from Industries and allied sector working in this area. The Plastics industries are recruiting people based on the qualification acquired. Maximum of the industries accept this as qualification for selection/short listing of the individual **(Minutes of Meeting of Core committee is attached).**

The skills acquired at level 4 for a particular duration makes it easy for the Individual to progress to the next level.

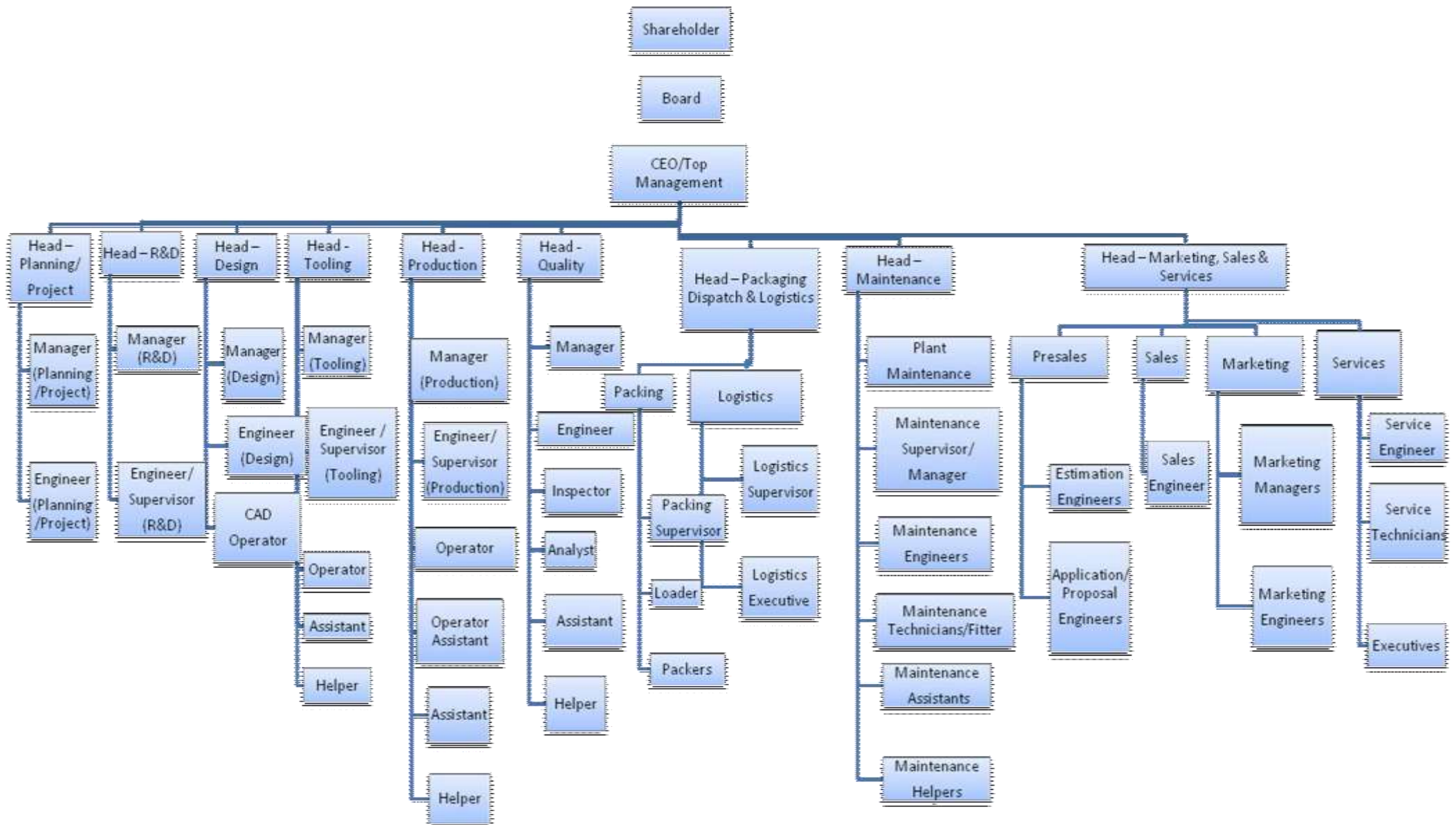
#### **Vertical Pathway:**

Analytical Instrument Operator with experience will become the Analytical Instrument Engineer

#### **Horizontal Pathway:**

The individual can migrate within the chemical processing related industries

Occupation Map–Vertical Pathway



Job Role: Analytical Instrument Operator