

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 Qualification File:

1. Qualification Document – Chemical Manufacturing Plant Maintenance Supervisor
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

QUALIFICATION FILE

SUMMARY

Qualification Title: Chemical Manufacturing Plant Maintenance Supervisor
Nature and Purpose of the qualification: A CIPET trade certificate for Chemical Manufacturing Plant Maintenance Supervisor and his Work involves the inspection and evaluation of maintenance and repair requirements and the coordination of maintenance activities necessary for the effective operation of specialized mechanical equipment and electrical/electronic instrumentation devices utilized in public utility water and wastewater facilities.
Body/bodies which will award the qualification: 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.
Body which will accredit providers to offer courses leading to the qualification: 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.
Body/bodies which will be responsible for assessment: The assessment is being carried out at individual Centre level. Training Assessment Wing in 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.
Occupation(s) to which the qualification gives access: Chemical Manufacturing Plant Maintenance Supervisor occupation in chemical
Proposed level of the qualification in the NSQF: Level 4
Anticipated volume of training/learning required to complete the qualification: 960 Notional hours.
Entry requirements / recommendations: Minimum qualification – ITI/ Diploma in Chemical/ Mechanical/Electrical engineering, Minimum age - 18 years completed.

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<p>Progression from the qualification:</p> <p>Chemical Manufacturing Plant Maintenance Supervisor with experience becomes the Maintenance Engineer in the Chemical Manufacturing Plant.</p>			
<p>Planned arrangements for the Recognition of Prior learning (RPL):</p> <p>RPL arrangements are being developed and will be informed in due course of time.</p>			
<p>International comparability where known: It will be carried out in next phase as comparability is being verified.</p> <p>Date of planned review of Qualification: 26.08.2019</p>			
<p>Format Structure of the Qualification:</p>			
Title and Identification code of component	Mandatory/ Optional	Estimated Size (Notional Hours)	Level
1. CPC/N9504: To practice & maintain safe and good work environment.	M	92	4
2. CPC/N9505: Familiarization with substances or products used in maintenance at a chemical plant	M	744	4
3. CPC/N9506: Analyzing plant maintenance needs and diagnosing equipment malfunctions	M	124	4
Total		960	

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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

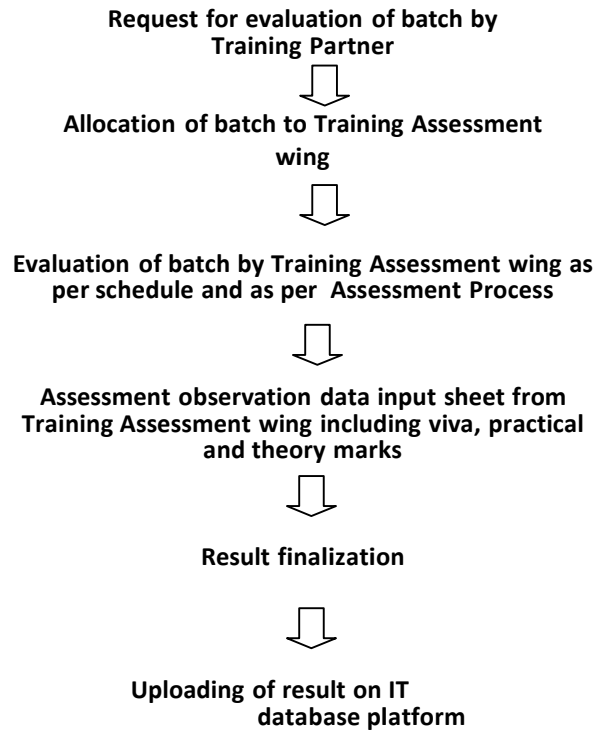
- **Theoretical test suite** – Will include multiple choice questions, audio-video question etc. which will test the trainee on his knowledge of the subject
- **Practical Knowledge suite** – Practical knowledge can be tested through Assessor driven evaluation/test, Situational Judgment Tests etc to test 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

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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.

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: Chemical Manufacturing Plant Maintenance Supervisor

Assessable outcome		Assessment criteria for the outcome		
LO	Assessable outcome Description	Viva	Practical	Total
1. CPC/N9505: Familiarization with substances or products used in maintenance at a chemical plant	AO1. Develop ability to ensure compliance to chemical regulatory requirements and guidelines	1	5	6
	AO2. Refer all components/process related documents to understand dimensions and properties of the required work output	2	5	7
	AO3. Develop ability to identify opportunities for process improvement and ensure the implementation of the same	1	5	6
	AO4. Clearly understanding of the does and don'ts of the manufacturing process as defined in SOPs/ Work Instructions or defined by supervisors	1	5	6
	AO5. Monitor equipment operation, evaluating and diagnosing equipment malfunctions	2	5	7
	AO6. Estimate labor and material costs	1	5	6
	AO7. Coordinate contractual maintenance services, scheduling equipment maintenance	1	5	6
	AO8. Evaluate plant maintenance and repair activities and reviewing completed work performed by maintenance contractors	1	5	6
	AO9. Ensure awareness of emerging areas such as water soluble fertilizers	5	20	25
	AO10. Ensure ability to aid the initial set-up and implementation of design mix for new products	5	20	25
	AO11. Consult with superiors in case of any doubt/clarification	3	0	3
	AO12. Develop self-confidence after resolving the queries to complete the task.	4	0	4
	AO13. Report completion of work to superiors	3	0	3
	AO14. Develop good interpersonal relations with superiors & fellow operators.	3	0	3

	AO15. Ensure disciplined behavior in work place	4	0	4
	AO16. Develop good coordination with other department person for getting their support for work.	3	0	3
	Sub total	40	80	120
2. CPC/N9506 : Analyzing plant maintenance needs and diagnosing equipment malfunctions	AO1. Report the problems caused by machines to superior, when not resolved by operator.	10	27	37
	AO2. Report major processing defects beyond control of operator	7	28	35
	AO3. Keep records of machine log book, data sheet of machine parameter	8	25	33
	AO4. Maintain documents related to incoming & outgoing material	10	30	40
	AO5. Meet targets & goals for production	5	30	35
	AO6. Minimize defects in final product	5	30	35
	AO7. Follow quality system to get better product	5	25	30
	AO8. Keep work area clean & systematic	5	25	30
	Subtotal	55	220	275
3. CPC/N9504: 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 like chiller, mould Temperature controller, hopper loader, Cooling towers etc	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 sample 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, data sheet 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
Sub total	55	150	205
Total	150	450	600

Means of assessment 1:

The assessment comprise of

- Theory Assessment
- Viva voice
- 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.

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SECTION2

EVIDENCE OF LEVEL

Level of qualification: 4

Title /Name of Qualification/Component: Chemical Manufacturing Plant Maintenance Supervisor			
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF Level descriptors	NSQF Level
Process	<p>Chemical Manufacturing Plant Maintenance Supervisor- he/she has to-</p> <ul style="list-style-type: none"> • Understanding the work order and the process requirement from the supervisor • Arranging the required raw material and Dies for the process • To interact with the supervisor in order to understand the maintenance and manufacturing schedule • To plan the day's production activities based on the supervisor's instructions • To collect chemical data sheet, machine instructions and work manuals • To ensure availability of consumables and chemicals for production in sufficient quantity as per production plan/supervisor instructions. • Clearly understanding the does and don'ts of the manufacturing and maintenance process as defined in SOPs/ Work Instructions or defined by supervisors. • Check availability of chemicals and personal protective equipment's (PPE) such as Gloves, Goggles etc. • Ensure that the required material 	<p>Chemical Manufacturing Plant Maintenance Supervisor - Chemical Processing job requires limited range of activities which are familiar and predictable like availability of consumables, raw material used, basic machine parts and its functions etc.</p> <p>He should understand the raw material like all the required chemicals for manufacturing and maintenance etc. which justifies the pegging of Level 4.</p>	4

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	<ul style="list-style-type: none">• Ensure cleaning of the area around the apparatus for any oil, grease, combustible substances etc. so as to prevent any accident• Ensure availability of the coolant and working of valves to circulate the coolant to cool and solidify plastic• Refer the queries to supervisor if they cannot be resolved by the operator• Confirm self - understanding to the supervisor once the query is resolved so that all doubts & queries can be resolved before the actual process execution• He is responsible for chemical manufacturing and maintenance of the equipment• Perform visual inspection of the output products• Achieve productivity, quality and safety standards as per company's norms• Report problems to supervisor• He will be responsible for Inspecting the finished components conducting minor repair/de-flashing if any on output parts which can be reworked.		
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	<ul style="list-style-type: none"> • The role holder will interact with maintenance team and material management team • The individual needs to ensure sorting, streamlining & organizing, storage and documentation, cleaning, standardization and sustenance across the plant and office premises of the organization • He needs to understand Market Information, Management and Client Relation Management • Marketing knowhow and strategy • He also needs to understand and practice Entering, update and maintain data in MS Office system/ Office open source system. 		
Professional knowledge	<p>The user/individual on the job needs to know and understand:</p> <p>All aspects of operations including raw material ordering, production scheduling etc.</p> <p>Maintenance and reliability goals and expectations.</p> <p>Data Analysis: Whether the data make sense or no type of material being used in the industry & for work order required for the process and with the supervisor</p>	Chemical Manufacturing Plant Maintenance Supervisor – Chemical Manufacturing and should understand and know factual knowledge about process, principle of chemical and machine processing Techniques like operation, trouble shooting, Quality and Inspection etc. which justifies the pegging of Level 4.	4
Professional skill	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> • Make proper decisions pertaining to the work • Identification of problem • Finding the resource to resolve the problem • Plan, fix up priorities for work operations as per job requirements 	Chemical Manufacturing Plant Maintenance Supervisor – Chemical Processing should recall general principles of chemical manufacturing	4

	<ul style="list-style-type: none"> • Organize and analyze information relevant to work • Basic concepts of shop-floor work productivity including material management waste reduction etc.consult superiors in case of any assistance • Undertake and express new ideas and initiatives to others • Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses. • Participate in improvement procedures including process, quality etc. • Apply, analyze, and evaluate the information gathered from observation, experience, reasoning, or communication, as a guide to thought and action. • exhibit good team work with all • Consult superiors or fellow workers in case of any assistance • Maintains good inter personal relations 	<p>and process knowledge which may be repetitive type of work in the area allotted,</p> <p>He should demonstrate practical skills in chemical manufacturing and plant maintenance which justifies the pegging of Level 4.</p>	
Core skill	<p>The user/ individual on the job needs to know and understand how to:</p> <p>How to be able to read warnings, instructions and other text material on product labels, components etc</p> <p>How to enter into the history card details of the fault identified in the plastic product manufactured read equipment manuals and process documents to understand the equipment and processes better.</p> <p>Read instructions especially safety instructions especially symbols while using the equipment in the plant area logs.</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>Discuss task lists, schedules, and work-loads with co-workers/assistants and supervisors</p> <p>Question internal customers/ Shop floor operator appropriately in order to understand the nature of the problem and make a diagnosis</p>	<p>Chemical Manufacturing Plant Maintenance Supervisor – Chemical manufacturing and plant maintenance processing 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 raw material weights additions</p>	4

	Avoid using jargon, slang or acronyms when communicating with a operator /fellow subordinates etc. Unless it is required.	etc. which justifies the pegging of Level 4.	
Responsibility	Chemical Manufacturing Plant Maintenance Supervisor – is responsible for work that involves the inspection and evaluation of maintenance and repair requirements and the coordination of maintenance activities necessary for the effective operation of specialized mechanical equipment and electrical/electronic instrumentation devices utilized in public utility water and wastewater facilities.	Chemical manufacturing and plant maintenance Supervisor is responsible for his own job of the right type of chemical production and proper maintenance of plant which justifies the pegging of Level 4.	4

SECTION3

EVIDENCE OF NEED

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 Chemical Manufacturing Plant Maintenance Supervisor 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

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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:

The Occupational Map has been created & attached.

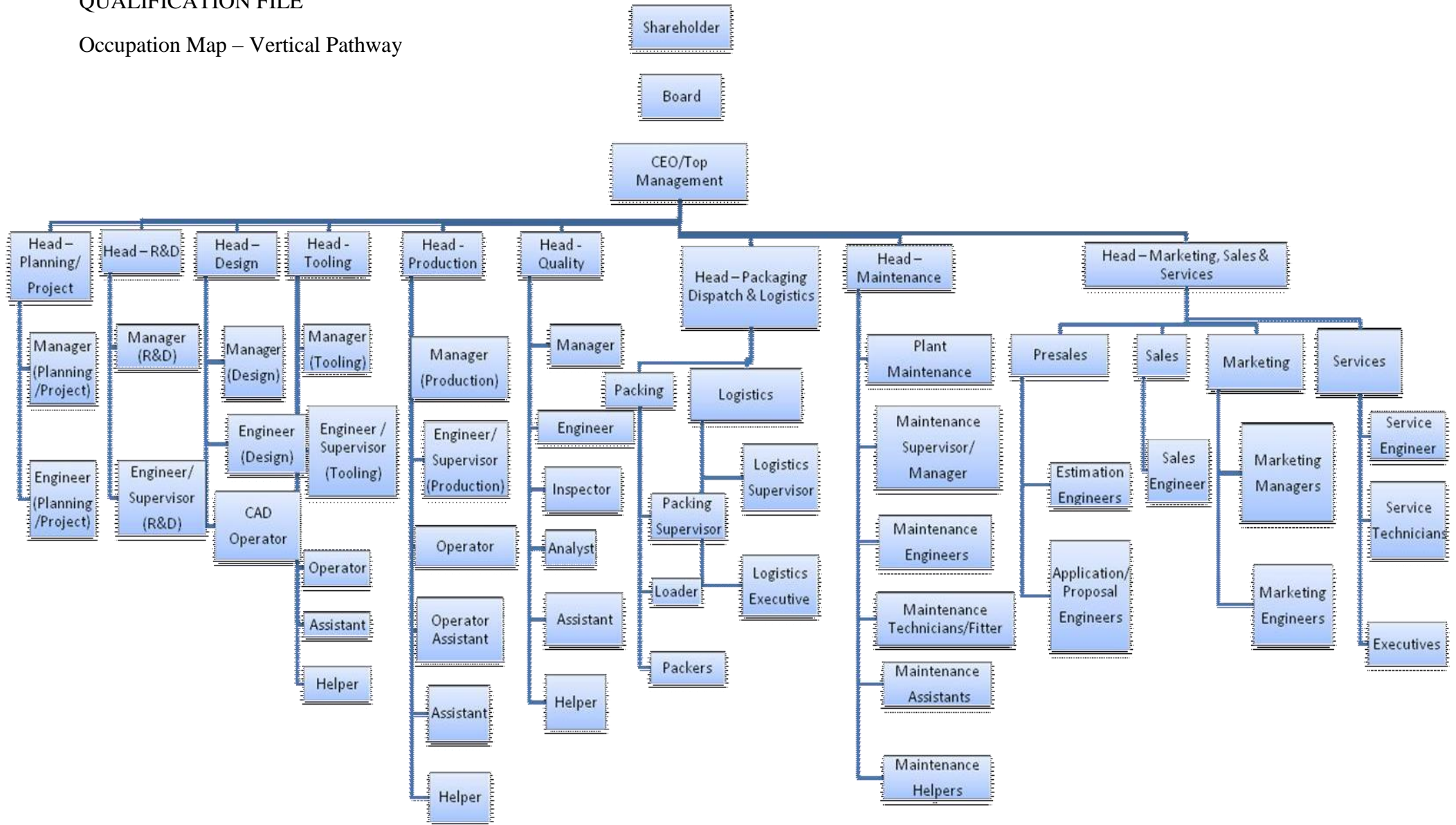
Chemical Manufacturing Plant Maintenance Supervisor with experience becomes the Maintenance Engineer in the Chemical Manufacturing Plant.

Horizontal Pathway:

The individual can migrate within the chemical processing related industries

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Occupation Map – Vertical Pathway



Job Role: Chemical Manufacturing Plant Maintenance Supervisor