

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 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

QUALIFICATION FILE

SUMMARY

Qualification Title: Chemical Manufacturing Plant Operator

Nature and Purpose of the qualification:

A CIPET trade certificate for Chemical Manufacturing Plant Operator is work with and maintains plant equipment and hazardous chemicals while maintaining safety protocols. Chemical plant operator control machinery that makes chemical products, including paints, cleaning fluids and cosmetics. Chemical plant operators primarily monitor the equipment under their charge. They both control instruments and make sure they're working properly, and they might schedule and coordinate maintenance efforts if necessary. They're also in charge of shutting down or otherwise handling equipment during an emergency. Plant operators perform other administrative tasks as well. For instance, they record test results and other data germane to a plant's operation. They also keep an eye on test results over time and suggest adjustments to the manufacturing process as necessary. They then relay those findings to supervisors and other managerial personnel.

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, 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 Operator and maintain plant equipments

Proposed level of the qualification in the NSQF: Level 4

Anticipated volume of training/learning required to complete the qualification:

960 National hours.

Entry requirements / recommendations:

Minimum qualification – Diploma in Chemical engineering/ B.Tech in Chemical Technology/ Science Graduate (Any Branch of Chemistry), Minimum age - 18 years completed.

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Progression from the qualification:			
Chemical Manufacturing Plant Operator will become the Supervisor in the Chemical Manufacturing Plant.			
Planned arrangements for the Recognition of Prior learning (RPL):			
RPL arrangements are being developed and will be informed in due course of time.			
International comparability where known: It will be carried out in next phase as comparability is being verified.			
Date of planned review of Qualification: 27.08.2019			
Format Structure of the Qualification:			
Title and Identification code of component	Mandatory/ Optional	Estimated Size (Notional Hours)	Level
CPC/N9304: Basic know how of safety concepts, communication skills, basic knowledge of computers	M	92	4
CPC/N9305: Ability to oversee all aspects of operations including ensuring raw material ordering, production scheduling, catalyst replacements etc.	M	250	4
CPC/N9306: Understanding of instruments used in chemical processing and working knowledge of chemical reactors and other equipment's along with their maintenance for production run.	M	618	4
Total		960	

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SECTION1

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

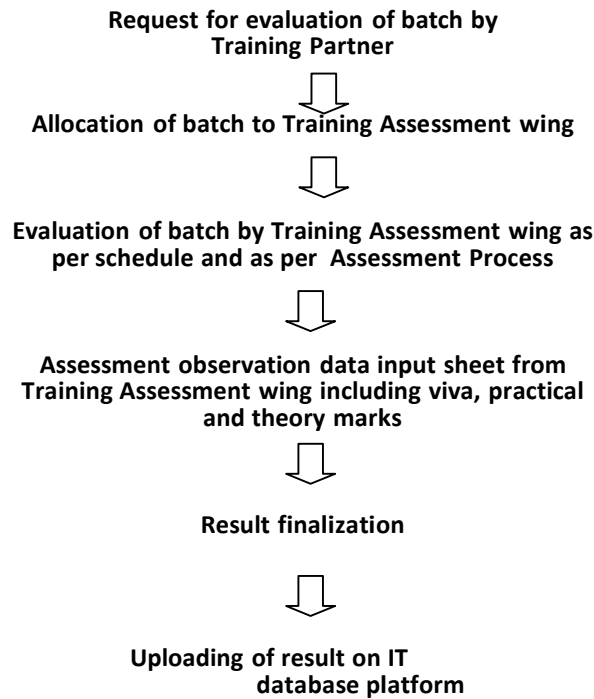
- **Theoretical test suite** – Will include multiple choice questions, audio-video question etc. which will test the trainee on his knowledge of the subject
- **Practical Knowledge suite** – Practical knowledge can be tested through Assessor driven evaluation/test, Situational Judgment Tests etc. to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

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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 Operator

Assessable outcome		Assessment criteria for the outcome		
LO	Assessable outcome Description	Theory	Practical	Total
1. CPC/N9305: Ability to oversee all aspects of operations including ensuring raw material ordering, production scheduling, catalyst replacements etc.	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	1	5	6
	AO3. Comprehend the process and chemical equipments required for the process	2	5	7
	AO4. Clearly understanding the does and don'ts of the manufacturing process as defined in SOPs/ Work Instructions or defined by supervisors	1	5	6
	AO5. Operate and adjust equipment controls document	1	8	9
	AO6. Set the various parameters before starting the process as per the parameters are mentioned in the Work Instructions/ SOP manual	2	8	10
	AO7.knowhow about the raw material like pesticide granules, bonding additives etc. required for executing the	2	4	6
	AO8. Ensure that the required chemical equipment is available before starting the process	2	10	12
	AO9. Knowhow about the type chemical method or techniques	2	10	12
	AO10. Ensure the availability of spare parts for continuous operation of machine	3	10	13
	AO11. Ensure that instruments machines parts & no foreign material is entrapped in parts of mould/die.	1	8	9
	AO12. Ensure cleaning of the other machine tools, auxiliaries(if any)requirements	2	8	10

	AO13. Ensure cleaning of the area around the machine for any oil, grease, water etc.	2	4	6
	AO14. Consult with superiors in case of any doubt/clarification.	2	10	12
	AO15. Develop self-confidence after resolving the queries to complete the task.	2	10	12
	AO16. Report completion of work to superiors	3	10	13
	AO17. Develop good interpersonal relations with superiors & fellow	4	0	4
	AO18. Maintain disciplined behavior in work place	3	0	3
	AO19. Develop good coordination with other department person for	3	0	3
	Sub total	40	80	120
2. CPC/N9306 : Understanding of instruments used in chemical processing and working knowledge of chemical reactors and other equipment's along with their maintenance for production run.	AO1. Ensure Mechanical maintenance of machinery for production process	10	30	40
	AO2. Ensure Mechanical maintenance of machinery & Operate various chemical equipments	5	30	35
	AO3. Ensure maintenance Chemical equipments, such as Distillation etc.	5	30	35
	AO4. Ensure maintenance Chemical equipments, such as Filtration units, etc.	5	30	35
	AO5. Ensure maintenance other chemical equipment viz. Boiler, Cooling tower, chilling/brine plant	5	30	35
	AO6. Ensure Maintenance of Other chemical equipment brine plant	5	30	35
	AO7. Reporting the problems caused by machines to superior, when not resolved by operator.	3	5	8
	AO8. Report major processing defects beyond control of operator	2	5	7
	AO9. Keep records of machine log book, data sheet of machine parameter	3	5	8
	AO10. Maintain documents related to incoming & outgoing material	2	5	7
	AO11. Meet targets & goals for production	2	4	6
	AO12. Minimize defects in final product	2	4	6
	AO13. Follow quality system to get better product	2	4	6
	AO14. Keep work area clean & systematic	2	4	6
	AO15. Comply to safety & health guidelines & rules	2	4	6
	Sub total	55	220	275
3. CPC/N9304: To practice & maintain safe and good work	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

environment	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. Planning 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. Ensure 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	1	4	5
	AO28. Taking 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	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 Effluent Treatment Plant Operator Level: 4			
NSQF Domain	Outcomes of the Qualification/Component	How the job role relates to the NSQF Level descriptors	NSQF Level
Process	<p>Chemical Manufacturing Plant Operator - he/she has to-</p> <ul style="list-style-type: none"> • The chemical manufacturing plant operator will able to understand the setting up of machinery for production, maintenance along with working knowledge of chemical reactors, instruments used in chemical processing. • The plant operator has the working knowledge of machinery including tasks like operation of distillation/filtration units, mixing and loading raw materials into machines, product sampling, data analysis, packing and loading finished items for shipment, closing down and cleaning the plant machinery. • To practice & maintain safe and good work environment. • Ability to oversee all aspects of operations including ensuring raw material ordering, production scheduling, catalyst replacements etc. 	<p>Chemical Manufacturing Plant Operator-</p> <p>Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge</p> <p>That an individual needs in order to perform to the required standard which justifies the pegging of Level 4.</p>	4

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	<ul style="list-style-type: none">• Understanding of instruments used in chemical processing and working knowledge of chemical reactors and other equipments along with their maintenance for production run.• Add the raw material in the machine using material loader or by manual feeding.• Ensure dies are clean if not clean with soft cotton cloth.• 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• Understand the raw material like plastics granules, fillers, bonding additives etc. required for executing the activity• 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 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"> • He is responsible for the output of products, Achieve productivity, quality and safety standards • Perform visual inspection • 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, 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> <ul style="list-style-type: none"> • properties of various active ingredients in pesticides • Measuring, weighing, mixing and loading raw materials into the machines • Operation of distillation & Filtration units, boilers, cooling tower, chilling/brine plant, checking meter and instrument readings • Data Analysis: Whether the data make sense or no type of raw material being used in the industry & for work Order required for the process and with the supervisor 	<p>Chemical Manufacturing Plant Operator – basic knowledge of Safety procedures(firefighting, first aid) within the organization basic knowledge of risks/hazards associated with each occupation in the organization knowledge of personal hygiene and how an individual an contribute towards creating a highly safe and clean working environment shooting, Quality and Inspection etc. which justifies the pegging of Level 4.</p>	4

Professional skill	<ul style="list-style-type: none"> • make proper decisions pertaining to the work <ul style="list-style-type: none"> • Identification of problem • Finding the resource to resolve the problem • consult superiors in case of any assistance • plan, fix up priorities for work operations as per job requirements • organize and analyze information relevant to work • basic concepts of shop-floor work productivity including material management waste reduction etc. 	Chemical Manufacturing Plant Operator – Chemical manufacturing plant operator should recall general principles of chemical manufacturing procedure and process knowledge which may be repetitive type of work in the area	4
	<ul style="list-style-type: none"> • 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 • The user/individual on the job needs to know and understand how to: • 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 		

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Core skill	<p>The user/ individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> • Prepare document related to processing parameter, other technical records like machine log sheets, job card, recording the test data for quality purposes etc. • prepare draft drawings for the final output product • write information documents to internal departments/ internal teams • read & interpret machine parameters • read and interpret engineering drawing and sketches • read equipment manuals and process documents • read instructions like safety instructions , symbols while using the equipment in the plant area • Communicate orally any instructions related to work with superiors & co workers with clarity • Listen actively • Follow company protocol for communication 	<p>Chemical Manufacturing Plant Operator –</p> <p>Plastic 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 etc. which justifies the pegging of Level 4.</p>	4
Responsibility	<p>Chemical Manufacturing Plant Operator</p> <ul style="list-style-type: none"> • Ability to oversee all aspects of operations including ensuring raw material ordering, production scheduling, catalyst replacements etc. • Ability to lead multidisciplinary teams. • Escalations of any queries regarding the job • INTERACTION with other concern department 	<p>Chemical Manufacturing Plant Operator - is responsible for his own job and which justifies the manufacturing of plant at Level 4.</p>	4

QUALIFICATION FILE

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 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

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SECTION4

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.

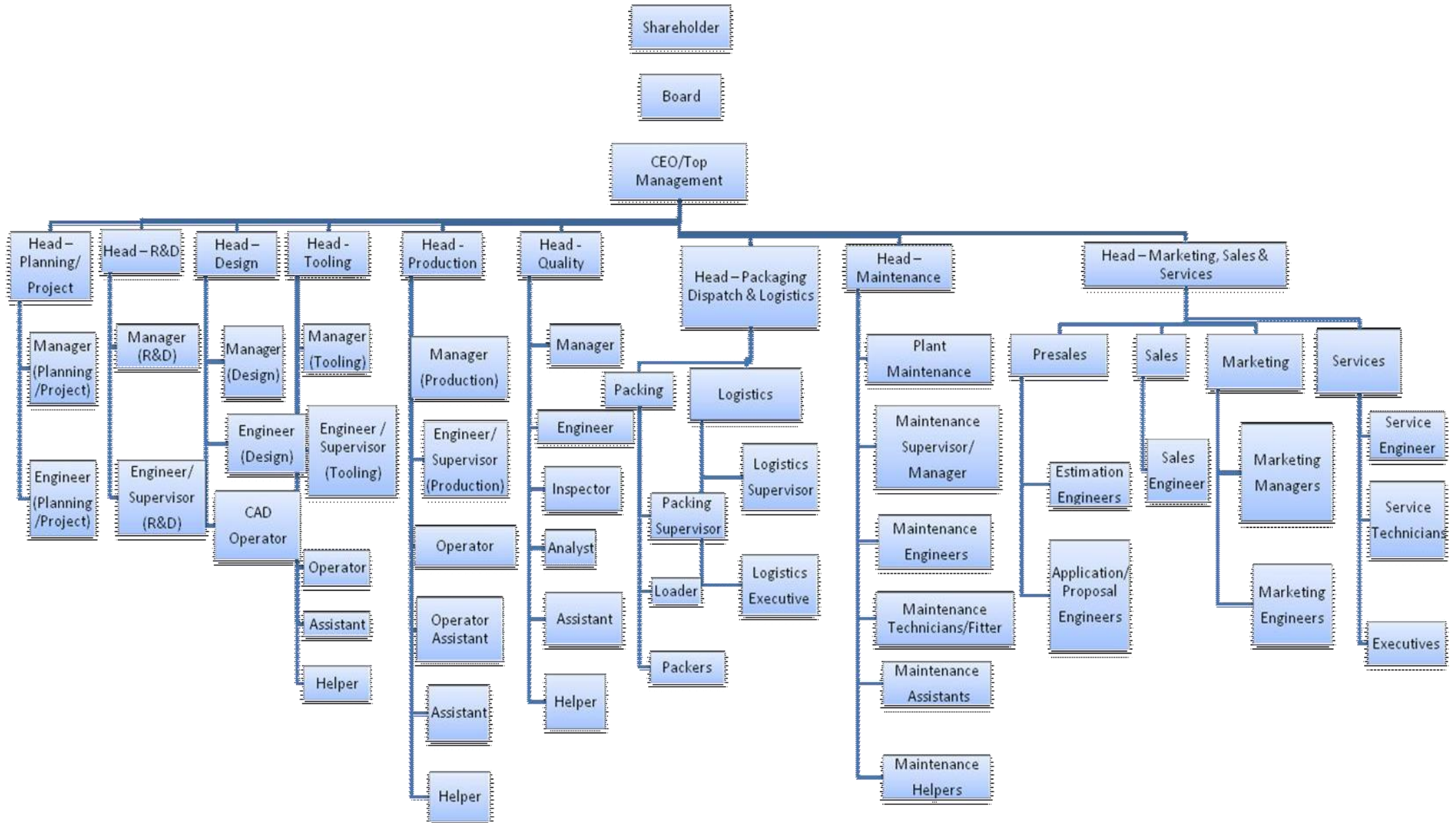
The Chemical Manufacturing Plant Operator has a clear pathway to Supervisor in the Chemical Manufacturing Plant..

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 Operator