QUALIFICATION FILE

NSDA Reference
To be added by NSDA

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
Prof. (Dr.) S. K Nayak, Director General, CIPET, CIPET Head office, Guindy, Chennai

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E-mail address:bdccipet@gmail.com, cipethq@vsnl.com, drsknayak@cipet.gov.in

List of documents submitted in support of the Qualifications File:

1. Qualification Document – Maintenance of Chemical Plant Assistant
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 RoleIdentification in Petrochemicals sector

QUALIFICATION FILE

SUMMARY

Qualification Title: Maintenance of Chemical Plant Assistant
Nature and Purpose of the qualification: A CIPET trade certificate for Maintenance of Chemical Plant Assistant will able to understand the compliance towards safety issues while handling chemicals/equipments, especially hazardous chemicals. The assistant has the working knowledge of chemical reactors, chemical transfer systems, instruments used in chemical processing along with knowledge of GMP, SOPs and computer simulation software.
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: Maintenance of Chemical Plant Assistant occupation in chemical manufacturing process
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 – Preferably ITI, Minimum age - 18 years completed.
Progression from the qualification: The Maintenance of Chemical Plant Assistant with experience becomes Maintenance of Chemical Plant Technician

QUALIFICATION FILE

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: 26.08.2019

Format Structure of the Qualification:

Title and Identification code of component	Mandatory/ Optional	Estimated Size (Notional Hours)	Level
CPC/N9101: Basic know how of safety concepts, communication skills, basic knowledge of computers	M	124	4
CPC/N9104: Familiarization with Measuring Equipment's, Hand Tools and Practice	M	56	4
CPC/N9105: Familiarization with pesticide chemicals, instruments i.e. Ball and hammer mills, Rotary vacuum filters, Basket Centrifuge. Operation of sieve analysis.	M	780	4
Total		**960**	

QUALIFICATION FILE

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

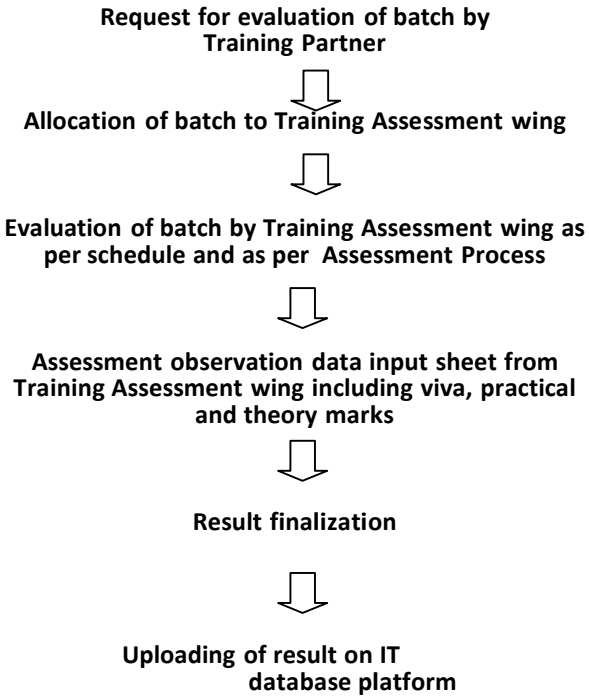
- **Theoretical test suite** – Will include multiple choice questions, audio-video question etc. which will test the trainee on his knowledge of the subject
- **Practical Knowledge suite** – Practical knowledge can be tested through Assessor driven evaluation/test, Situational Judgment Tests etc to test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

QUALIFICATION FILE

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.

QUALIFICATION FILE

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: Maintenance of Chemical Plant Assistant

Assessable outcome		**Assessment criteria for the outcome**		
LO	**Assessable outcome Description**	**Theory**	**Practical**	**Total**
1. CPC/N9104: Familiarization with basic concepts, different instruments used in chemical processing, job requirements & basic related process.	AO1. Discuss the work order (work output) required from the process and with the supervisor	1	6	7
	AO2. Refer all components/process related documents to understand dimensions and properties of the required work output	1	4	5
	AO3. Comprehend the process and chemical equipments required for the process	1	4	5
	AO4. Clearly understanding the does and don'ts of the manufacturing process as defined in SOPs/ Work Instructions or defined by supervisors	2	6	8
	AO5. 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	6	7
	AO6. Set the various parameters before starting the process as per the parameters are mentioned in the Work Instructions/ SOP manual	0.5	4	4.5
	AO7. Knowhow about the the raw material like pesticide granules, bonding additives etc. required for executing the activity	0.5	2	2.5
	AO8. Ensure that the required chemical equipments available before starting the process	1	2	3
	AO9. comprehend the type chemical method or techniques	1	4	5
	AO10. Ensure the availability of spare parts for continuous operation of machine	1	2	3
	AO11. Ensure that instruments machines parts & no foreign material is entrapped in parts of mould/die.	4	10	14

	AO12. Ensure cleaning of the other machine tools, auxiliaries (if any)	4	20	24
	AO13. Ensure cleaning of the area around the machine for any oil, grease, water etc	2	10	12
	AO14. Consult with superiors in case of any doubt/clarification	4	0	4
	AO15. Develop Self-confidence after resolving the queries to complete the task.	4	0	4
	AO16. Report completion of work to superiors	2 2	0	2
	AO17. Develop good interpersonal relations with superiors & fellow operators.	4	0	4
	AO18. Maintain disciplined behavior in work place	4	0	4
	AO19. Develop good coordination with other department person for getting their support for work.	2	0	2
	Sub total	**40**	**80**	**120**
2. CPC/N9105 : Understanding of instruments used in chemical processing & Operate various chemical equipments, such as Ball & Hammer Mill, Plate & Frame Filter Press, Rotary Vacuum Filter, Basket Centrifuge, Sieve Analysis etc.	AO1. Report the problems caused by machines to superior, when not resolved by operator.	10	60	70
	AO2. Report major processing defects beyond control of operator	10	40	50
	AO3. Keep records of machine log book, data sheet of machine parameter	10	60	70
	AO4. Maintain documents related to incoming & outgoing material.	10	40	50
	AO5. Meet targets & goals for production	4	4	8
	AO6. Minimize defects in final product	3	4	7
	AO7. Follow quality system to get better product	3	2	5
	AO8. Keep work area clean & systematic	3	5	8
	AO9. Comply to safety & health guidelines & rules	2	5	7
	Subtotal	**55**	**220**	**275**
3. CPC/N9101: 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/	2	4	6

machine during operations			
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.Plann 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.Checkthetemperature 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.Carryout 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
	Subtotal	**55**	**150**	**205**
	Total	**150**	**450**	**600**

Meansofassessment1:

The assessment comprise of-

- Theory Assessment
- Viva voice
- Practical assessment

Meansofassessment2:

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.

QUALIFICATION FILE

SECTION2

EVIDENCE OF LEVEL

Level of qualification: 4

Title /Name of Qualification/Component: Maintenance of Chemical Plant Assistant Level: 4			
NSQF Domain	**Outcomes of the Qualification/Component**	**How the job role relates to the NSQF Level descriptors**	**NSQF Level**
Process	The Maintenance of Chemical Plant Assistant is responsible for maintaining chemical equipments and machineries in a continuous process plant with their working knowledge. He/she has to: • 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 chemical equipments 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 chemical equipments & 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 chemical equipments is cleaned properly & no foreign material is entrapped in its parts • Consult with superiors in case of any doubt/clarification	He should know the instruments used in chemical processing & Operate various chemical equipments, such as Ball & Hammer Mill, Plate & Frame Filter Press, Rotary Vacuum Filter, Basket Centrifuge, Sieve Analysis etc. The Maintenance of Chemical Plant Assistant is involved in activities like, To perform in-process and final product QA tests of finished product as required, To perform routine calibrations of equipment and ability to monitor operators which justifies the pegging of Level 4.	**4**

	• Self-confidence after resolving the queries to complete the task • Report completion of work to superiors • Good interpersonal relations with superiors & fellow operators • Disciplined behavior in work place • Good coordination with other department person for getting their support for work • Discuss about the Plan: Qualitative or quantitative or both; what kind of information have; which technique is suitable etc • Sampling: Accuracy depends on proper sampling, characteristic of sample is very important, required good representative sample (from top, middle and bottom and mix up and take average sample) • Sample preparation: mixing of chemicals, melting , heating, Decantation etc. • Operation of Ball Mill, Hammer Mill, Plate & Frame Filter Press, Rotary Vacuum Filter, Basket Centrifuge, Mixing Equipment etc. • 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 • Identify activities which can cause potential injury through sharp objects, burns, fall, electricity, gas leakages, radiation, poisonous fumes, chemicals ,loud noise • Conduct regular checks with support of the maintenance team on machine health to identify potential hazards due to wear and tear of machine • Inform the concerned authorities about the potential risks identified in the processes, workplace area/ layout, materials used etc • Inform the concerned authorities about machine breakdowns, damages which		

	• Support the Safety team and the supervisor in creating the risk mitigation plan • Follow the instructions given on the equipment manual describing the operating process of the equipment • Follow the Safety, Health and Environment related practices developed by the organization • Ensure relevant safety board's/ signs are placed on the shop floor • Operate the machine using the recommended Personal Protective Equipment (PPE) and ensure team members also use the related PPEs at the workplace • Maintain a clean and safe working environment near the work place and ensure there is no spillage of chemicals, production waste, oil, solvents etc.		
Professional knowledge	The user/individual on the job needs to know and understand: • Properties of various active ingredients in pesticides • Mixing of chemicals, melting, heating, Decantation etc. • Understanding different chemical methods and instruments such as Ball Mill, Hammer Mill, Rotary vacuum filter, Basket Centrifuge, Plate & Frame Filter Press etc. • Processing behavior of various raw materials and safe storage of raw materials, Chemical equipments etc	Maintenance of Chemical Plant Assistant should understand and know factual knowledge about chemicals and chemical equipments used in chemical processing with Basic knowledge of instruments like Ball Mill, Hammer Mill, Rotary vacuum filter, Basket Centrifuge, Plate & Frame Filter Press etc which justifies the	4

Professional skill	The user/individual on the job needs to know and understand: • Understand the chemical processing methodology, working knowledge of chemical reactors • Operation of Different types of Chemical Equipments Working on Chemical Instruments such Ball Mill, Hammer Mill, Rotary vacuum filter, Basket Centrifuge, Plate & Frame Filter Press etc. Hazards and safety aspects involved in the use of chemicals and usage of relevant PPEs • Detect problems in day to day tasks: Support operator in using specific problem solving techniques and detailing out the problems • Discuss possible solution with the supervisor for problem solving. The user/individual on the job needs to know and understand how to: • Plan and organize the work order and jobs received from the internal customers/ operator. • Organize all process/ equipment manuals The user/individual on the job needs to know and understand how to: • Follow instructions and work on areas of improvement identified • Complete the assigned tasks with minimum supervision • Complete the job defined by the operator within the timelines and quality. The user/individual on the job needs to know and understand how to: • Use common sense and make judgments during day to day basis • Use basic reasoning skills to identify and resolve basic problems • Use intuition to detect any potential problems which could arise during operations.	Maintenance of Chemical Plant Assistant should recall general principles of chemical equipments used in chemical processing along with working knowledge of chemical reactors. Types of chemical pesticides. He should understand quality concepts and use in the area of work allotted which justifies the pegging of Level 4.	4

QUALIFICATION FILE

Core skill	The user/ individual on the job needs to know and understand how to: • How to be able to read warnings, instructions and other text material on product labels, components etc • Read instructions especially safety instructions especially symbols while using the equipment in the plant area logs. The user/individual on the job needs to know and understand how to: Discuss task lists, schedules, and work-loads with co- workers/assistants and supervisors Question internal customers/ Shop floor operator appropriately in order to understand the nature of the problem and make a diagnosis Avoid using jargon, slang or acronyms when communicating with a operator /fellow subordinates etc. Unless it is required.	Maintenance of Chemical Plant Assistant should 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 which justifies the pegging of Level 4.	4
Responsibility	Maintenance of Chemical Plant Assistant is responsible for maintaining chemical equipments and machineries in a continuous process plant with their working knowledge. Also, he is supposed to perform in-process and final product QA tests of finished product as required. Escalations of any queries regarding the job and interaction with other concern department and routine calibrations of equipments.	Maintenance of Chemical Plant Assistant is responsible for his own job in operating chemical reactors which justifies the pegging of Level 4.	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 Maintenance of Chemical Plant Assistant - 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

QUALIFICATION FILE

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?

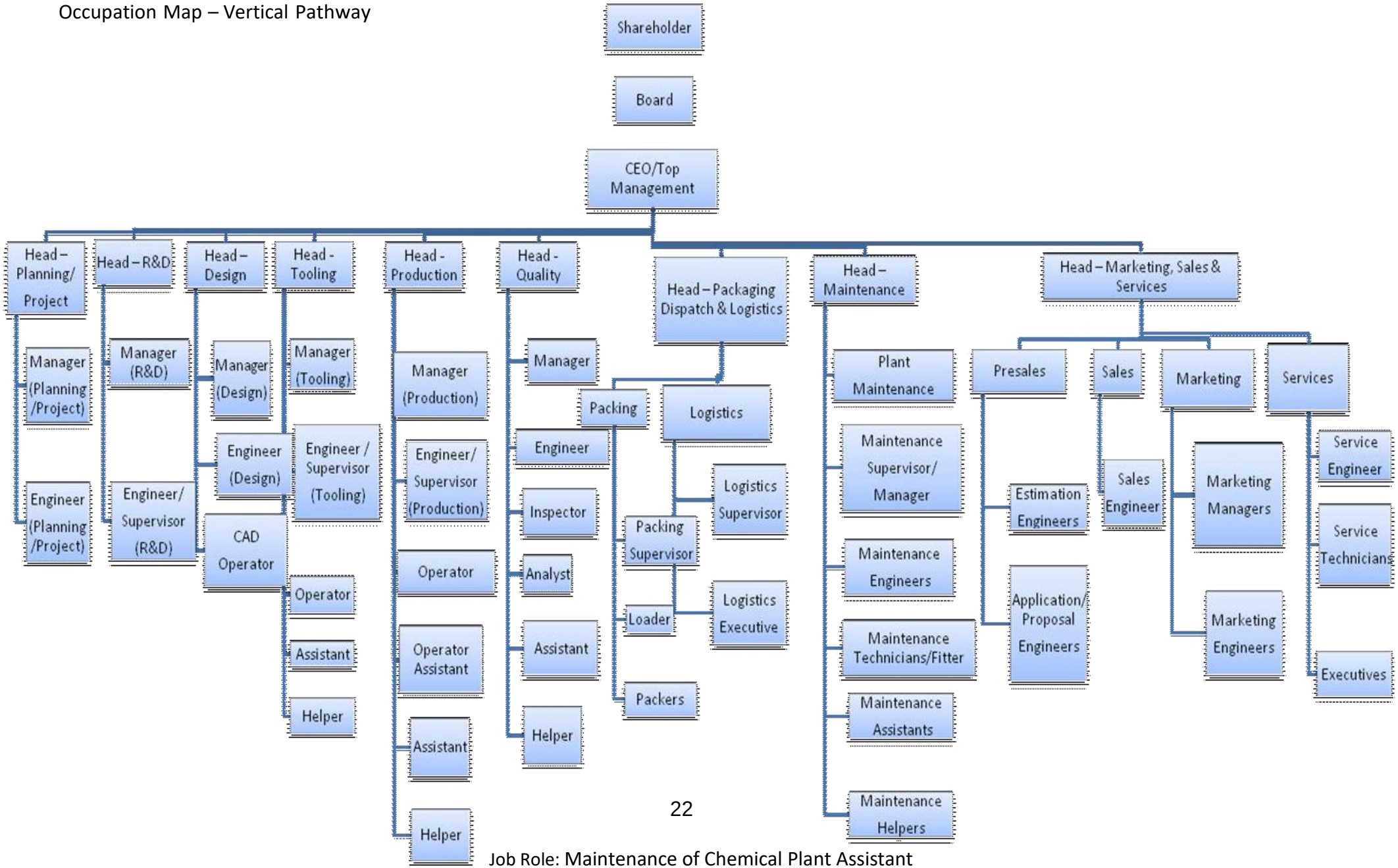
Relevant information was collected from Industries and allied sector working in this area. The Plastics industries are recruiting people based on the qualification acquired. Maximum of the industries accept this as qualification for selection/short listing of the individual **(Minutes of Meeting of Core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

Vertical Pathway:
The Occupational Map has been created & attached.

The Maintenance of Chemical Plant Assistant with experience becomes Maintenance of Chemical Plant Technician

Horizontal Pathway:

The individual can migrate within the chemical processing related industries

QUALIFICATION FILE

Occupation Map – Vertical Pathway