



Model Curriculum

1. Liquid Paint Processing Operator

SECTOR: PAINTS AND COATINGS SUB-SECTOR: MANUFACTURING OCCUPATION: LIQUID PAINT PRODUCTION REF ID: PCS/Q0510, V1.0 NSQF LEVEL: 4











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Liquid Paint Processing Operator

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a <u>"Liquid Paint Processing Operator</u>", in the "<u>Paints</u> <u>and Coatings</u>" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Liquid Paint Processing Operator		
Qualification Pack Name & Reference ID. ID	PCS/Q0510, V1.0		
Version No.	1.0 Version Update Date		
Pre-requisites to Training	10 th Standard		
Training Outcomes	 10th Standard After completing this programme, participants will be able to: Know about the sector: Discuss the Paints and Coatings sector in India and its sub-sectors Know about different types of liquid paints and its uses with advantages and disadvantages Know about the major ingredients of liquid paint Know about paint manufacturing in general and the process flow. Understand the parameters for premixing Understand the working of the dispersion machine, learn its calibration and operation and cleaning procedure after completion of the job. Understand the sequence of addition of the ingredients during mixing stage and the mixing speed for each paint type Demonstrate various skills: Performance of behavioural, professional, technical and communication skills Understand safety: Work in a safe manner without endangering your health and that of your colleagues 		





This course encompasses 7 out of 7 National Occupational Standards (NOS) of "Liquid Paint Processing Operator" Qualification Pack issued by "<u>Paints and Coatings Skill Council</u>".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	Introduction Theory Duration (hh:mm) 6:00 Practical Duration (hh:mm) 00:00 Corresponding NOS Code Bridge Module	 Understand General Discipline in the class room (Do's & Don'ts) Understand the scope of the Paints and Coatings sector in India with its sub sectors Understand the liquid paint segment Advantages and benefits and features of various liquid paints as well as its uses and shortcomings Learn and Practice Basic skills of communication 	Laptop, white board, marker, projector
2	Charge the materials into dispersion machine Theory Duration (hh:mm) 34:00 Practical Duration (hh:mm) 75:00 Corresponding NOS Code PCS/No502	 Understand what are different types of liquid paints, their characteristics and where they are used Compare and explain differences between water based and solvent based paints Compare, understand and explain the differences between the various resin systems used Understand the components of liquid paints and paint chemistry Learn basics of liquid paint manufacture Learn to study and understand formulation of liquid paint and the process sheet Understand the different dispersion machines and its characteristics Mix the paint ingredients as per the job sheet and SOP Do a quality assurance check before submitting to Quality department for approval and transfer to dispersion machine Add the ingredients and premix as recommended in the formulation. Premix at the recommended speed and time period before charging into the dispersion machine Learn and understand the working and function of each equipment of liquid paint manufacture. Follow instructions of the process sheet and SOP to get a consistent quality for each batch Clean the machine as per the SOP after completing the batch Communicate with colleagues/supervisor regarding the operation at each stage 	Laptop, white board, marker, projector, first aid kit. Lab model paint processing set up.





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Sr. No.	Module	Key Learning Outcomes	Equipment Required
3	Grind/ Disperse the materials in dispersion unit Theory Duration	 Understand the working of different dispersion units used for liquid paints manufacture Learn and understand the procedure for setting up the dispersion machine 	Laptop, white board, marker, projector, first aid kit.
	(hh:mm) 47:00 Practical Duration (hh:mm) 75:00 Corresponding NOS Code PCS/No5o3	 Understand the grinding/ dispersion process, the process control parameters to be maintained Learn and understand the general and preventive maintenance of the dispersion unit and prepare a maintenance schedule Do a quality assurance check before submitting to Quality department for approval and transfer to mixing machine Transfer the dispersed paint from the dispersion machine after checking the fineness into the mixing machine. Measure the quantity transferred to calculate the yield Follow instructions of the process sheet and SOP to get a consistent quality for each batch Clean the machine as per the SOP after completing the batch Communicate with colleagues/supervisor regarding the operation at each stage 	Lab model paint processing set up.
4	Mix the paint raw materials Theory Duration (hh:mm) 45:00 Practical Duration (hh:mm) 70:00 Corresponding NOS Code PCS/No504	 Mix the paint ingredients as per the job sheet and SOP Do a quality assurance check before submitting to Quality department for approval. Add the ingredients and mix as recommended in the formulation. Mix for the recommended time period Learn and understand the working and function of each equipment of liquid paint manufacture. Learn and understand the working of the mixing machine Identify the mixing machine controls to calibrate the mill as per the process requirement. Collect the dispersed paint from the dispersion stage, check the fineness, measure the quantity before mixing the other ingredients Follow instructions of the process sheet and SOP to get a consistent quality for each batch Clean the machine as per the SOP after completing the batch 	Laptop, white board, marker, projector, first aid kit. Lab model paint processing set up.

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Sr. No.	Module	Key Learning Outcomes	Equipment Required
		• Communicate with colleagues/supervisor regarding the operation at each stage	
5	Co-ordinate with colleagues and/or customers Theory Duration (hh:mm) 08:00 Practical Duration (hh:mm) 04:00	 Understand customer requirements and specifications Learn about various performance indicators, meaning of targets ad timelines and how to communicate about these with your colleagues and customers Learn appropriate behavioural skills whilst dealing with colleagues/co-workers Learn how you can contribute to improving customer satisfaction 	Laptop, white board, marker, projector
	Corresponding NOS Code PCS/N9901		
6	Maintain standards of product / service quality Theory Duration (hh:mm) 12:00 Practical Duration (hh:mm) 10:00 Corresponding NOS	 Learn about quality requirements for manufacturing process Understand how quality is defined, various tests and their acceptance criteria, and how standards can be achieved Learn about various equipment used for quality tests and how to use them Learn to meet and exceed quality requirements of a customer 	Laptop, white board, marker, projector
	Code PCS/N9902		
7	Maintain OH&S standards and follow environmental standards Theory Duration (hh:mm) 6:00 Practical Duration (hh:mm) 16:00 Corresponding NOS Code PCS/N9903	 Learn about health hazards of chemicals/ ingredients used in paint manufacturing Learn the use and importance of personal protective equipment Learn to handle chemical, powder materials, tools and equipment in a safe manner Minimising risks of inhalation injury Become aware of hazards in liquid paint manufacturing process and how to prevent/eliminate them Understand methods and precautions to be taken for safe disposal of waste generated in the process Learn about safety signs in a plant environment and how to interpret and adhere to them 	Laptop, white board, marker, projector





Sr. No.	Module	Key Learning Outcomes	Equipment Required
8	Maintain IPR of organisation and customers Theory Duration (hh:mm) 04:00 Practical Duration (hh:mm) 04:00 Corresponding NOS Code PCS/N9904	 Learn to explain the meaning of IPR and the various confidential information and trade secrets in an organisation Understand why protection of IPR and trade secrets are critical for a business Learn about your responsibilities in maintaining IPR and trade secrets of your organisation and customers 	Laptop, white board, marker, projector
	Total Duration Theory Duration 162:00 Practical Duration 254:00	Unique Equipment Required: First aid kit	

Grand Total Course Duration: 416Hours, o Minutes

(This syllabus/ curriculum has been approved by **Paints and Coatings Skill Council**)





Trainer Prerequisites for Job role: "Paint Processing Operator" mapped to Qualification Pack: "PCS/Q0510, v1.0"

Sr. No.	Area	Details
1	Description	A Paint Processing Operator is an individual who charges the recommended bags of extender and pigment in the premix unit, carries out the dispersion or grinding, operates the ball mills, bead mills and sand mills to grind the pre-mix before sending to the mixer. Add the balance raw materials, to adjust the required properties, in the mixer.
2	Personal Attributes	A Paint Processing Operator should have an ability to work in shifts, attention to details, good eyesight, and ability to stand for long durations.
3	Minimum Educational Qualifications	B. Sc. (Chemistry)/ (Paint Technology)
4a	Domain Certification	Certified for Job Role: "Paint Processing <u>Operator</u> " mapped to QP: <u>"PCS/Qo510,</u> <u>v1.o"</u> . Minimum accepted score is 80%
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: "Trainer", mapped to the Qualification Pack: "SSC/Q1402". Minimum accepted % as per respective SSC guidelines is 70%.
5	Experience	• 5-year experience in laboratory or manufacturing and relevant training or teaching experience.





Annexure: Assessment Criteria

Assessment Criteria	
Job Role	Liquid Paint Processing Operator
Qualification Pack	PCS/Q0510, v1.0
Sector Skill Council	Paints and Coatings

- 1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
- 2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
- 3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
- 4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
- 5. To pass the Qualification Pack, every trainee should score a minimum of 60% in every NOS
- 6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

		Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical	
	PC1. understand the right raw materials to be used PC2. obtain the formulations prepared for the particular batch	2.5	1	1.5			
		2.5	1	1.5			
		PC3. understand the job sheet for target and requirement		3	1	2	
		PC4. pump the solvents and resins from internal storage vessels		3	1	2	
		PC5. ensure to receive the right raw materials such as powder, additives, etc.		3	1	2	
	the alssolvent and additives in case of solvent base paint manufacture based on the formulationsinto ionPC8. ensure to add the correct materials	water base paint manufacture	_	3	1	2	
PCS/N0502 Charge		arge the aterials into	solvent and additives in case of solvent base	- 50 -	3	1	2
dispersion			PC8. ensure to add the correct materials	50	3	1	2
machine		-		3	1	2	
		appropriate time frame		3	1	2	
			3	1	2		
		PC12. load powder to water and additives in case of water base paint manufacture		3	1	2	
		PC13. add the premixed raw materials to the disperser in case of solvent base paint					
		manufacture PC14. ensure not to dump the materials		3	1	2	
				3	1	2	

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Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical
PC15. add zirconium beads to the sand mill to obtain light color		3	1	2
PC16. add steel balls to ball mill to obtain dark colors		3	1	2
PC17. check the loaded materials before grinding		3	1	2
POINTS		50	17	33
TOTAL POINTS		50		

	Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical
	PC1. adjust the speed in the machine as per the disperser type used and the amount of mixture		2.5	1	1.5
	PC2. set the grind time at the disperser based on the requirement and quantity of mixture to be fed		2.5	1	1.5
	PC3. turn on the machine for grinding to begin		2.5	1	1.5
	PC4. operate the machine on confirming the safety features to function the machine are in place		2.5	1	1.5
	PC5. use the specified machine for grinding such as sand mill, bead mill, ball mill, high speed dispersion machine, twin- shaft dispersion machine, etc.		2.5	1	1.5
PCS/N0503 Grind/ disperse the materials in	PC6. process the materials in high speed disperser subjecting to high speed agitation or on other machines based on requirement and specified formulations	50	2.5	1	1.5
dispersion unit	PC7. use special additives where necessary, to enhance dispersion stability		2.5	1	1.5
	PC8. operate the machine for the required amount of time for grinding		2.5	1	1.5
	PC9. ensure to be aware of the potential dangers involved with the disperserPC10. ensure to blend the pigment into		3	1	2
	solvents PC11. ensure its reached the desired	-	3	1	2
	grinding level PC12. ensure general maintenance and		3	1	2
	upkeep of the dispersion machine PC13. ensure no shut down of machines		3	1	2
	due to improper maintenance PC14. perform regular cleaning process as prescribed by manufacturer		3	1	2







	Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical
	PC15. ensure the manufactured paint provides a high viscosity and high solids mixture		3	1	2
	PC16. ensure to meet 100%, the established colour standards and quality		3	1	2
	PC17. ensure compliance to meet specified laboratory procedures for quality check		3	1	2
	PC18. ensure to complete the grinding in target time		3	1	2
	POINTS		50	18	32
	TOTAL POINTS		50		

	Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical
	PC1. receive work instruction and				
	formulation details from the supervisor		2.5	1	1.5
	PC2. understand the job sheet for the				
	requirement and target for batch				
	completion		2.5	1	1.5
	PC3. confirm the inline quality check				
	result from QC after dispersion process		2.5	1	1.5
	PC4. transfer the paint to mixer after				
	dispersion or monitor its transfer to				
	dispersion in an automated plant		2.5	1	1.5
	PC5. measure the amount of paint in the mixer		3	1	2
	PC6. mix with recommended amount of		5	L	2
	binder or thinner to derive the desired paint				
PCS/N0504	type, e.g., solvent base or water based		3	1	2
Mix the paint	PC7. send sample for inline quality	50	5	1	2
raw materials	clearence	50	3	1	2
	PC8. after QC clearance, add emulsion,			-	2
	additives, binder, thinner, etc., to the paint				
	as per the recommended formulation		3	1	2
	PC9. maintain schedule of		_		
	recommended time, weight, frequency of				
	addition		3	1	2
	PC10. filter and remove the sand particles				
	as recommended		3	1	2
	PC11. send for quality check, especially,	-			
	viscosity of the paint after thinning		2.5	1	1.5
	PC12. ensure the consistent batch quality				
	of paint		2.5	1	1.5
	PC13. read the safety manuals as				
	prescribed by the company		2.5	1	1.5







	Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical
	PC14. ensure to wear appropriate protective gears such as gloves and masks while using the materials for thinning		3	1	2
	PC15. ensure to comply to the safety procedures of the company		3	1	2
	PC16. ensure to achieve the specified consistency per batch		2.5	1	1.5
	PC17. ensure the viscosity, colour, and chemical properties of the paint are as per requirement		3	1	2
	PC18. achieve the targets specified as per job sheet requirement		3	1	2
	POINTS		50	18	32
	TOTAL POINTS			50	

	Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical
	PC1. receive job order and instructions from reporting superior		0.5	0.0	0.5
	PC2. understand the work output requirements, targets, performance indicators and incentives		2.0	0.5	1.5
	PC3. deliver quality work on time and report any anticipated reasons for delays		2.0	0.5	1.5
	PC4. escalate unresolved problems or complaints to the relevant senior		2.0	0.5	1.5
	PC5. communicate maintenance and repair schedule proactively to the superior	50	2.0	0.5	1.5
	PC6. receive feedback on work standards		1.0	0.0	1.0
PCS/N9901 Coordinate with	PC7. document the completed work schedule and handover to the superior		2.0	0.5	1.5
colleagues and/or customers	PC8. exhibit trust, support and respect to all the colleagues in the workplace		1.0	0.25	0.75
customers	PC9. aim to achieve smooth workflow		2.0	0.5	1.5
	PC10. help and assist colleagues with information and knowledge		1.0	0.0	1.0
	PC11. seek assistance from the colleagues when required		1.0	0.25	0.75
	PC12. identify the potential and existing conflicts with the colleagues and resolve		1.0	0.25	0.75
	PC13. pass on essential information to other colleagues on timely basis		1.0	0.0	1.0
	PC14. maintain the etiquette, use polite language, demonstrate responsible and disciplined behaviors to the colleagues		2.0	0.5	1.5







Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical
PC15. interact with colleagues from different functions clearly and effectively on all aspects to carry out the work among the team and understand the nature of their work		1.0	0.25	0.75
PC16. put team over individual goals and multi task or share work where necessary supporting the colleagues		2.0	0.0	2.0
PC17. highlight any errors of colleagues, help to rectify and ensure quality output		1.0	0.25	0.75
PC18. work with cooperation, coordination, communication and collaboration, with shared goals and supporting each other's performance		1.0	0.0	1.0
PC19. ask more questions to the customers and identify their needs		1.0	0.25	0.75
PC20. possess strong knowledge on the product, services and market		2.0	0.5	1.5
PC21. brief the customers clearly on potential costs and hazards		1.0	0.25	0.75
PC22. communicate with the customers in a polite, professional and friendly manner		1.0	0.25	0.75
PC23. build effective but impersonal relationship with the customers		0.5	0.25	0.25
PC24. ensure the appropriate language and tone are used with customers		1.0	0.25	0.75
PC25. listen actively and have a two way communication		1.0	0.25	0.75
PC26. be sensitive to the gender, cultural and social differences such as modes of greeting, formality, etc.		1.0	0.25	0.75
PC27. understand the customer expectations correctly and provide the appropriate products and services		2.0	0.5	1.5
PC28. understand the customer dissatisfaction and address or escalate their complaints effectively		2.0	0.5	1.5
PC29. maintain a positive, sensible and cooperative manner all time		1.0	0.25	0.75
PC30. ensure to maintain a proper body language, dress code, gestures and etiquettes towards the customers		1.0	0.25	0.75
PC31. avoid interrupting the customers while they talk		1.0	0.0	1.0
PC32. ensure to avoid negative questions and statements to the customers		1.0	0.0	1.0
PC33.inform the customers on any issues or problems before hand and also on the developments involving them		2.0	0.5	1.5





	Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical
	PC34. ensure to respond back to the customer immediately for their voice messages, e-mails, apps, etc.		1.0	0.0	1.0
	PC35. develop good rapport with the customers and promote other products and services		2.0	0.5	1.5
	PC36. seek feedback from the customers on their understanding to what was discussed		1.0	0.0	1.0
	PC37. explain the terms and conditions clearly		2.0	0.5	1.5
	POINTS		50	10	40
	TOTAL POINTS			50	

	Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical
	PC1. keep in mind the profiles of expected customers		2.0	0.5	1.5
	PC2. understand the target customers and their product/ service quality requirements as defined by the company		3.0	0.5	2.5
	PC3. receive superior's/ customer feedback regularly		2.0	0.0	2.0
	PC4. aim to build a good connect with the customers through quality product/ service		2.0	0.5	1.5
	PC5.keep tab on frequent discussions with regular customers on general likes and dislikes in the market, latest trends, customer expectations, etc.		2.0	0.5	1.5
PCS/N9902 Maintain standards of	PC6. receive updates on regular feedbacks from the clients on current service, complaints, and improvements to be made, etc.	50	2.0	0.5	1.5
product/ service quality	PC7. if necessary, compulsively seek customer rating of product/ service in order to help develop a set of regularly improved procedures		2.0	0.5	1.5
	PC8. demonstrate quality orientation at all level		4.0	1.5	2.5
	PC9. aim to gain their long lasting loyalty through satisfaction		3.0	1.0	2.0
	PC10. ensure 100% customer satisfaction via product/ service quality		3.0	0.5	2.5
	PC11.treat the customers fairly and with due respect		3.0	0.5	2.5
	PC12. focus on executing company's marketing strategies and product development needs		3.0	1.0	2.0







1.0 0.5 13	2.0 1.5 37
1.0	2.0
0.5	1.5
0.5	1.5
1.0	2.0
0.5	1.5
0.5	1.5
1.0	2.0
	0.5

	Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical
	PC1. assess the various health, safety and environmental hazards in the work areas		1.5	0.4	1.1
	PC2. take necessary steps to eliminate or minimize the hazards		1.0	0.4	0.6
	PC3. analyze the causes of accidents at the workplace		1.5	0.4	1.1
	PC4. suggest measures to prevent such accidents from taking place	50	1.5	0.4	1.1
PCS/N9903 Maintain O&HS	PC5. take preventive measures to avoid risk of burns and other injury due to contact with hot surfaces, gas, fire, hot fluids/ liquids, etc.		1.5	0.4	1.1
standards and follow environmental	PC6. suggest methods to improve the existing safety procedures at the workplace		1.5	0.4	1.1
norms	PC7. dispose waste in the designated areas safely as per company's policies and rules		1.5	0.4	1.1
	PC8. maintain appropriate ventilation in the rooms while there is more exposure to paint vapours		1.0	0.4	0.6
	PC9. avoid dumping unused cans to safeguard the environment		1.0	0.0	1.0
	PC10. be aware of the locations of fire extinguishers, emergency exits, etc.		1.0	0.4	0.6
	PC11. practice correct emergency procedures		1.5	0.4	1.1









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TOTAL POINTS				50
POINTS		50	14	36
PC40. take necessary environmental hazards c	action and correct any aused	1.0	0.4	0.6
PC39. adhere to safet no material damage	y standards and ensure	1.0	0.4	0.6
· · · · ·	ident at workplace	1.0	0.4	0.6
PC37. report to th problems and hazards ide of environmental proced		1.0	0.4	0.6
PC36. document al hazards caused and the n comply with the establis of the workplace		1.0	0.0	1.0
PC35. document all the inspections, etc., conduct safety measures undertained and the safety measures	-	1.0	0.4	0.6
PC34. ensure availabilit safety equipment such as aid equipment, safety safety installations such fans, etc.	fire extinguishers, first equipment, clothing,	1.5	0.4	1.1
	•	1.5	0.4	1.1
PC32. ensure to displa where necessary for peo	y safety signs at places ole to be cautious	1.5	0.4	1.1

	Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical
	PC1. prevent leak of new plans and designs to competitors by reporting on time		7.0	0.0	7.0
	PC2. be aware of any of company's product or design patents	50	8.0	1.0	7.0
	PC3. report IPR violations observed in the market, to supervisor or company head		8.0	2.0	6.0
PCS/N9904 Maintain IPR of organisation	PC4. read copyright clause of the material published on the internet and any other printed material		8.0	0.5	7.5
and customer	PC5. protect infringement upon customer's business or design plans		8.0	2.0	6.0
	PC6. consult supervisor or senior management when in doubt about using information available from customer		6.0	0.0	6.0
	PC7. report any infringement observed by anyone in the company		5.0	0.0	5.0
	POINTS		50	5.5	44.5
	TOTAL POINTS				50





Performance Criteria	Total Marks (350)	Out of	Theory	Skills Practical
GRAND TOTAL	350			