



# **Model Curriculum**

### **Junior Hot Mix Plant Operator**

SECTOR: INFRASTRUCTURE EQUIPMENT SUB-SECTOR: EQUIPMENT OPERATIONS OCCUPATION: OPERATOR REF ID: IES/Q0115, V1.0 NSQF LEVEL: 3





Kell India After of the -year of the		Certificate	N-S-D-C National Skill Development Corporation Transforming the skill landscape		
c	CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS				
	is hereby issued by the				
	INFRASTRUCTURE EQUIPMENT SKILL COUNCIL				
for the					
	MODEL CURRICULUM				
Job Rol	Complying to National Occupational Standards of Job Role/ Qualification Pack: ' <u>Junior Hot Mix Plant Operator</u> ' QP No. ' <u>IES/ Q 0115 NSQF Level 3</u> '				
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Date of Issuance:	June 1 <sup>st</sup> , 2017				
Valid up to:	April 30 <sup>th</sup> , 2018	11~5	Authorized Signatory rastructure Equipment Skill Council)		
* Valid up to the next review date of the Qualification Pack					





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## Junior Hot Mix Plant Operator

**CURRICULUM / SYLLABUS** 

This program is aimed at training candidates for the job of a "<u>Junior Hot Mix Plant Operator</u>", in the "<u>Infrastructure Equipment</u>" Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Junior Hot Mix Plant	Operator	
Qualification Pack Name & Reference ID	IES/Q0115		
Version No. 1.0		Version Update Date	01 June 2017
Pre-requisites to Training	5	Standard n Hot Mix Plant Operation perience in assisting opera	•
Training Outcomes	<ul> <li>Assist in ca plant. General various compositions compositions systems, operation matchine and</li> <li>Assist in car materials and materials, mutical asphalt, shutt</li> <li>Assist in car a hot mix plat service scheral and documen</li> <li>Comply with safety and end</li> </ul>	rrying out pre-operation al introduction to hot mix ponents sections, engine, rational controls and inst related systems for operat rying out hot mix plant of aggregates, starting of ang down the plant; post-op rying out maintenance a ant. General maintenance dule; common faults and ts. worksite health and sa wironment policies; person quipment, basic first aid	a checks on a hot mix plants, basic working of hydraulic and electrical trument panel, preparing ions operations. Properties of hot mix plant, loading of mixing, discharging of perative checks and trouble shooting of procedures and periodic their diagnosis; reports afety guidelines. Health, hal protective equipment,





This course encompasses <u>4</u> out of <u>4</u> National Occupational Standards (NOS) of "<u>Junior Hot Mix Plant</u> <u>Operator</u>" Qualification Pack issued by "<u>Infrastructure Equipment Skill Council</u>".

Sr. No.	Module	Key Learning Outcomes	Equipment Required
No1	Assist in carrying out pre-operation checks on hot mix plant Theory Duration (hh:mm) 12:00 Practical Duration (hh:mm) 24:00 Corresponding NOS Code IES/N0143	<ul> <li>Organisational Context: Acquire a working knowledge of the following:</li> <li>Organisation structure, reporting and escalation line.</li> <li>Performance standards and procedures in the company.</li> <li>Work target and review mechanism with supervisor</li> <li>Location and process for storage and disposal of waste.</li> <li>Safety policy of the organisation and emergency procedures</li> </ul> Technical Knowledge: Understand the fundamentals of the following: <ul> <li>Different types of hot mix plants, features, performance and installation basics.</li> <li>Components and sections of hot mix plant and its functioning to include: <ul> <li>Cold bin feeder</li> <li>Auto weighing system</li> <li>Conveyor belts; all functions</li> <li>Mixing drums; screeners</li> <li>Bitumen unit</li> <li>Pollution control device</li> <li>Exhaust control systems</li> <li>Hot mix surge silo</li> <li>Filler systems</li> </ul> Basics of engine and its systems; procedure for filling and topping up of fuel, coolant, oils. Basics of electricals; types of motors used in hot mix plant for various ops and its functioning. Types of aggregates and its physical characteristics Method of greasing and lubrication different parts of the plant. Instrument panel/cabin controls and their operation Optimal working condition of components and monitoring systems Documents and log books to be maintained for recording activities. Procedures for reporting defects if beyond his scope. Skills - Core &amp; Professional. Acquire the ability to:</li></ul>	<ul> <li>Scaled Model of <u>Hot Mix Plant for</u> theory sessions</li> <li>Live Hot Mix Plant at nearby project site for practical sessions</li> <li>Class room with audio-video system</li> <li>Manufacturers O and M Manual &amp; Video</li> <li>Safety video</li> <li>PPE Items &amp; Safety Gear</li> </ul>







Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul> <li>instructions/guidelines related to equipment &amp; worksite ops.</li> <li>Write and record any incidents &amp; deviations on the prescribed formats.</li> <li>Orally communicate information &amp; instructions to co-workers in a clear and concise manner.</li> <li>Plan and organise work related tasks with all concerned in most efficient and cost effective way.</li> </ul>	
		<ul> <li>Performance Criteria: Execute the following tasks and procedures:</li> <li>HM Plant Checks; in coordination with operator <ul> <li>Assist in visual inspection of parts, components and sections of the plant for damage and leakages.</li> <li>Assist in checking electrical connections and systems including the motors.</li> <li>Check fuel and lubricant levels in the burners as per requirement.</li> <li>Check roller filters are free of impurities.</li> <li>Check bolts and valves are appropriately fixed.</li> <li>Check fuel in the power generator as per requirement</li> <li>Inspect all greasing points and ensure lubrication as applicable.</li> <li>Check cabin visually for obstructions. Check all monitoring and warning systems as per operational manual.</li> <li>Ensure safety equipment in place before</li> </ul> </li> </ul>	
		<ul> <li>operating the plant.</li> <li>Material Checks; in coordination with operator</li> <li>Check requisite amount of aggregates and gravel are present in the hoppers.</li> <li>Check quantity of bitumen in the plant is as per the mix design requirement</li> <li>Clean all the hoppers to make it clear and free of obstructions.</li> <li>Check water levels in the drum and pollution control bank as per instructions</li> <li>Reporting &amp; Documentation</li> <li>Assist in maintaining log book to record</li> </ul>	







Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul><li>all actions before starting operations.</li><li>Follow procedure for reporting defects to operator/ supervisor.</li></ul>	
2	Assist in carrying out hot mix plant operations. Theory Duration (hh:mm) 10:00 Practical Duration (hh:mm) 20:00 Corresponding NOS Code IES/N0144	<ul> <li>Organisational Context: Acquire working knowledge of the following:         <ul> <li>Procedures and guidelines related to breakdown &amp; maintenance services.</li> <li>Location of tools and equipment and procedure for issue and return.</li> <li>Safety policy of the organisation and emergency drills.</li> </ul> </li> <li>Technical Knowledge. Understand the fundamentals of the following:         <ul> <li>All the basics of plant operations as listed under pre-op checks. Besides,</li> <li>Starting procedure as per correct sequence and specs.</li> <li>Operating the various systems to ensure efficient production.</li> <li>Monitoring systems to ensure optimal output of plant.</li> <li>Stopping procedure including emergency stop button</li> <li>Various hand signals, safety &amp; emergency signs at project site.</li> <li>Documents and log books to be maintained for recording activities.</li> <li>Procedures for reporting defects if beyond his scope.</li> </ul> </li> <li>Skills - Core &amp; Professional. Acquire the ability to:         <ul> <li>In addition to core and generic skills listed above</li> <li>Interpret signage at project work site correctly.</li> <li>Use correct terminology while interacting with others at site</li> <li>Help plan work schedule in time bound and cost effective way.</li> <li>Help identify operational slow-downs and take timely remedial action.</li> </ul> </li> <li>Performance Criteria. Execute the following tasks and procedures:</li> </ul>	<ul> <li>Scaled Model of Hot Mix Plant for theory sessions</li> <li>Live Hot Mix Plant at nearby project site for practical sessions</li> <li>Adequate stocks of aggregates and consumables.</li> <li>Class room with audio-video system</li> <li>Manufacturers O and M Manual &amp; Video</li> <li>Safety video</li> <li>PPE Items &amp; Safety Gear</li> </ul>







Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul> <li>the correct order to include         <ul> <li>Heating the bitumen pipeline before ops to clear residues.</li> <li>Heating of bitumen 12 hours before mixing/ as per specs</li> <li>Turning on exhaust motors to clear dust from filler elevators</li> <li>Turning on power generator to supply power to hot mix plant</li> <li>Switching on the hot mix plant as per sequential procedure.</li> </ul> </li> <li>Assist in test running of hot mix plant for functional checks.</li> </ul>	
		<ul> <li>Assist in turning on the hot mix plant as per procedure and ensure proper flow of materials, through both visual means and control panel indicators.</li> <li>Assist in controlling the speed and flow of different materials into the drum as per the required output.</li> <li>Assist in monitor / observe gauges /indicators to ensure conformance to processing specs.</li> <li>Coordinate with co- workers to ensure regular flow of raw materials in the appropriate hoppers.</li> <li>Assist to check output is as per requirements and monitor weigh hopper for appropriate flow into surge silo.</li> <li>Coordinate with vehicle operators for collecting the output efficiently.</li> </ul> Safety during operations <ul> <li>Ensure PPE is worn especially dust mask when moving around the plant.</li> <li>Ensure proper communication through correct hand signals and eye contact</li> </ul> Reporting and Documentation <ul> <li>Assist in maintaining log book to record all activities (input and output flow) carried out</li> <li>Report any defects which are beyond his scope to the operator/supervisor</li> </ul>	
3	Assist in carrying out routine maintenance and trouble shooting of hot mix plant.	<ul> <li>Organisational Context: Acquire working knowledge of the following:</li> <li>Emergency organisation structure and maintenance policy.</li> </ul>	<ul> <li>Scaled Model of <u>Hot Mix Plant for</u> <u>theory sessions</u></li> <li>Live Hot Mix Plant</li> </ul>







No.Theory Duration (hh:mm) 12:00• Location of special tools and equipment/ accessories.Practical Duration (hh:mm) 26:00• Location of special tools and equipment/ accessories.Corresponding NOS Code IES/N0145• Corresponding NOS • Maintenance and service Schedule including related checklists• Documents and log books to be maintained for recording activities.•• Procedures for reporting defects if beyond his scope.•Skills - Core & Professional. Acquire the ability to:•• In addition to core and generic skills listed above;•• Plan maintenance & servicing keeping operational needs in mind.	Equipment Required
Performance Criteria. Execute the following tasks and procedures:         Routine Maintenance; in coordination with operator         • Assist in carrying out scheduled maintenance as per manufacturers specs         • Clean/change all filters and replace as necessary.         • Replenish lubricants and coolants as per manufacturers specs         • Lubricate/grease all the moving joints/ pivot pins and control levers         Basic Trouble Shooting; in coordination with operator         • Assist in identifying service needs and defects through visual inspection.         • Assist to arrange for repairs or replacement of defective components.         • Assist to arrange for repairs or replacement of defective in diagnosing the defect/ problem and rectify; if need be seek advice from operator/supervisor.         • Documentation & Reporting:         • Assist in maintaining all	<ul> <li>audio-video system</li> <li>Manufacturers O and M Manual &amp; Video</li> <li>Safety video</li> </ul>







Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul><li>records/documents.</li><li>Report defects and problems in time and escalate as necessary</li></ul>	
4	Comply with Worksite Health and Safety Guidelines Theory Duration (hh:mm) 06:00 Practical Duration (hh:mm) 10:00 Corresponding NOS Code IES/N7601	<ul> <li>Organisational Context. Acquire working knowledge of the following: <ul> <li>Health, safety, environmental (HSE) policies and guidelines of the company &amp; their importance</li> <li>Contact details of personnel responsible for HSE related matters &amp; in case of emergencies.</li> <li>Location of first aid room / station and assembly points.</li> <li>Reporting channel and documentation procedure for all HSE related matters.</li> </ul> </li> <li>Technical Knowledge. Understand the fundamentals of the following: <ul> <li>OEMs guidelines for health, safety and security requirements.</li> <li>Types, use and importance of Personal Protective Equipment (PPE)</li> <li>Types of common hazards and risks at worksite and preventive measures.</li> <li>In case of emergencies procedure to stop/ shut down machinery.</li> <li>Common injuries and appropriate basic first aid treatment.</li> <li>Firefighting equipment: Basic knowledge of handling and using them.</li> <li>Guidelines for transport, storage and disposal of hazardous materials and waste</li> <li>Safety signs/symbols and warnings used in worksites and their meaning</li> </ul> </li> <li>Skills - Core &amp; Professional. Acquire the ability to: <ul> <li>In addition to the core and generic skills listed above</li> <li>Use correct PPE and other safety gear while in the work site.</li> </ul> </li> <li>Performance Criteria. Execute the following tasks and performances: <ul> <li>Comply with safety, health, environment and security related regulations &amp; guidelines at work.</li> </ul> </li> </ul>	<ul> <li>Scaled Model of Hot Mix Plant for theory sessions</li> <li>Live Hot Mix Plant at nearby project site for practical sessions</li> <li>Class room with audio-video system</li> <li>Organisation's ESH / Safety video</li> <li>PPE Items &amp; Safety Gear</li> <li>Firefighting equipment &amp; Charts</li> <li>First Aid Kit and Charts</li> </ul>





Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul> <li>of self and others; general public not at risk.</li> <li>Operate fire extinguishers as applicable.</li> <li>Support in administering basic first aid for common injuries at work site.</li> <li>Record and report details as related to operations, incidents or accidents as applicable.</li> </ul>	
	Total Duration	Unique Equipment Required:	
	Theory Duration 40:00 Practical Duration 80:00	<ul> <li><u>Scaled Model of Hot Mix Plant for theory sessions</u></li> <li><u>Live Hot Mix Plant at nearby project site for practical</u></li> <li>Adequate stocks of aggregates and consumables.</li> <li>Class room with audio-video projection system</li> </ul>	

Grand Total Course Duration: 120 Hours, 0 Minutes

(This syllabus/ curriculum has been approved by Infrastructure Equipment Skill Council)





### Trainer Pre-requisites for Job role: "Junior Hot Mix Plant Operator" mapped to Qualification Pack: "IES/Q0115, v1.0"

Sr. No.	Area	Details	
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack "IES/Q 0115 Version 1.0".	
2	Personal Attributes	Aptitude for conducting training, with strong communication and interpersonal skills. Passion for training and developing others; well-organised; and a team player. Eager to learn and keep oneself updated with the latest in the mentioned field.	
3	Minimum Educational Qualifications	Class 8 <sup>th</sup> ; preferably 10th	
4a	Domain Certification	Certified for Job Role: "Junior Hot Mix Plant Operator" mapped to QP: <u>"IES/Q 0115 – Version 1.0"</u> . Minimum accepted score 70%. Desired: Certification Training in Hot Mix Plant Operations & Maintenance	
4b	Platform Certification	Certified for Job Role: " <u>Trainer</u> " mapped to Qualification Pack: SSC/1402. Minimum accepted score 70%.	
5	Experience	<ul> <li>Around 3 to 4 years' site experience in Hot Mix Plant Operations.</li> <li>At least 1 to 2 years' experience in conducting O and M training programs.</li> </ul>	





Assessment Criteria	
Job Role	Junior Hot Mix Plant Operator
Qualification Pack	IES/Q 0115 Version 1.0
Sector Skill Council	Infrastructure Equipment

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for Qualification Pack has been laid down based on the NOS's. Each Performance Criteria (PC) has been assigned marks proportional to its importance within NOS.SSC will also lay down proportion of marks for Theory and Skill 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 40% in each NOS and 50% aggregate
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.

			Marks Allocation		
Assessment Outcomes	Assessment Criteria for the outcome	Total Mark	Out Of	Theory	Skills Practical
<ol> <li>IES/N0143 Assist in carrying out pre-operation checks on hot mix plant</li> </ol>	PC1. Assist in conducting visual inspection around the hot mix plant with the senior operator for oil leaks in different parts of the plant		3	1	2
	PC2. Assist in checking electrical connection including the motors used in the plant		2	1	1
	PC3. Check if the roller filters are free of impurities	35	2	1	1
	PC4. Check whether the bolts and other valves are appropriately fixed		3	1	2
	PC5. Fill diesel in the power generator as per operator's / supervisor's instructions		3	1	2
	PC6. Check all incoming electrical connections and the motors in the plant		3	1	2







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	PC7. Check if the fuel and lubricant levels in the burners is as per the requirement		2	1	1
	PC8. Visually check the cabin for any obstructions		2	1	1
	PC9. Check the amount and size of course aggregate and gravels are present in the hoppers		1.5	0.5	1
	PC10. Check if the quantity of the bitumen in the plant is as per the requirement of the mix design/ instructions from the operator		3	1	2
	PC11. Clear all the hoppers are clear and free from the obstructions if any		2.5	0.5	2
	PC12. Check for water levels in the drum and the pollution control bank as per the operator's instructions		2.5	0.5	2
	PC13. Assist in maintaining a checking/maintenance logbook to record all activities performed before starting the operation		2.5	0.5	2
	PC.14 Report defects precisely to the operator/supervisor		3	1	2
		Total	35	12	23
<ol> <li>IES/N0144 Assist in carrying out hot mix plant operations</li> </ol>	PC1. Check if the pipeline of the bitumen is clear the residual from previous operations as per instructions of the operator/ supervisor		3	1	2
	PC2. Check the temperature of the bitumen and keep it ready 12 hours before mixing as per instructions from the operator/supervisor	30	3	1	2
	PC3. Turn on the exhaust motor to clear the dust from the filler elevators as per operator/ supervisor's instructions		1	0.5	0.5
	PC4. Assist in test run of the hot mix plant to check the normal functioning of the plant		1	0.5	0.5







		n.	
PC5. Assist in starting components in correct order manually or through computer controls	2.5	0.5	2
PC6. Assist in checking flow of materials into the mixing drum based on the instructions from the operator/ supervisor	3	1	2
PC7. Provide indications to the operator to control the speed and flow of different materials	3	1	2
PC8. Assist the operator in monitoring the temperature of the bitumen regularly	2	1	1
PC9. Coordinate with the co- workers to ensure regular supply of raw materials in the appropriate hoppers	1.5	1	0.5
PC10. Remove obstructions if any during the operations based on instructions from the operator/ supervisor	1.5	1	0.5
PC11. Check water supply in the mixing drum and pollution bank as per the instructions from the operator/ supervisor	1	0	1
 PC12. Check the output is as per the mix design/ customer requirements	1	0	1
PC13. Check the weigh hopper for appropriate flow of output	1	0	1
PC16. Check proper flow of hot mix in hot mix surge silo as per the requirement	1	0	1
PC 17. Wear dust masks when working around the plant	1.5	0.5	1
PC18. Make positive eye contact with other equipment operators at the site before crossing in front of or behind the equipment	1	0.5	0.5
PC19. Wear all PPE while sampling asphalt binder and for all operations	1.5	0.5	1







	PC20. Assist the operator in recording input and output flow as per the desired formats of the organization		0.5	0	0.5
		Total	30	10	20
3. IES/N0145 Assist in regular maintenance of hot mix plant	PC1. Assist in performing scheduled maintenance, such as replace worn parts such as belts, roller bearings, etc.		3	1	2
	PC2. Assist in basic maintenance, such as change spark plug, grease controls, cleaning of conveyor belts as per instructions from the operator/ supervisor		3	1	2
	PC3. Check bearings at the burner end of the slinger conveyor for excessive heating		1.5	0.5	1
	PC4. Replenish coolants, lubricants and fluids regularly as per the instructions from the operator/ supervisor		1.5	0.5	1
	PC5. Change filter, clean and change flame-eye regularly as per instructions from the operator/supervisor	20	1.5	0.5	1
	PC6. Inspect silos, fuel tanks for leaks or scattering of concrete or limestone regularly		1.5	0.5	1
	PC7. Lubricate all pins and pivot points regularly as per instructions from the operator/ supervisor		1.5	0.5	1
	PC8. Check battery levels and condition of the terminals and carry out minor adjustments if required		1.5	0.5	1
	PC 9. Assist in repair or replacement of defective components, such as motor, burner, temperature control		1	0	1
	PC10. Identify missing or defective components or controls as per the equipment drawings		1	0.5	0.5







	PC11. Comply with safety requirements, such as confined space, lock-out procedures		1	0.5	0.5
	PC12. Assist in maintaining records and documentation relating to service, such as log books, repair lists, etc.		1.5	1	0.5
	PC13. Follow reporting procedures as laid down by the employer		0.5	0	0.5
		Total	20	7	13
4. IES/N7601 Comply with worksite health and safety guidelines	PC1. Comply with safety, health, security and environment related regulations/ guidelines at the work site		1.5	0.5	1
	PC2. Use Personal Protective Equipment (PPE) and other safety gear as applicable to the equipment and the worksite		1.5	0.5	1
	PC3.Follow safety measures during operations to ensure that the health and safety of self or others (including members of the public) is not at risk		1.5	0.5	1
	PC4.Carry out operations as per the manufacturer's and worksite related health and safety guidelines	15	1.5	0.5	1
	PC5. Handle the transport, storage and disposal of hazardous materials and waste in compliance with worksite health, safety and environmental guidelines		2	1	1
	PC6. Operate various grades of fire extinguishers, as applicable		2.5	0.5	2
	PC7. Support in administering basic first aid and report to concerned team members, as required, in case of an accident		1.5	0.5	1







PC8. Respond promptly and appropriately to an accident/ incident or emergency situation, within limits of your role and responsibility		1.5	0.5	1
PC9. Record and report details related to operations, incidents or accidents, as applicable		1.5	0.5	1
	Total	15	5	10