

Revised Application Documentation: Revision made by NSDA\_25 May 2015

## **QUALIFICATION FILE – CONTACT DETAILS OF SUBMITTING BODY**

### **Name and address of submitting body:**

Infrastructure Equipment Sector Council

# 23-29, FF5, First Floor, "White House Building"

St. Marks Road, (Opp SBI)

Bengaluru - 560001

### **Name and contact details of individual dealing with the submission**

**Name:** Name: Col Krishna Vijay

**Position in the organisation:** Director NOS & Training

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## **List of documents submitted in support of the Qualifications File**

1. Annexure 1: Qualification Pack
2. Annexure 2: RFP for development of Occupational Standards
3. Annexure 3: Selection process of the Consultants to develop Occupational Standards
  - 3a. Minutes of the meeting of GC meetings
  - 3b. Composition of the Technical Committee
4. Annexure 4: Email approval of Occupational Standards by Technical Committee and Governing Council
5. Annexure 5: Occupational Analysis, List of companies and Industry associations participated in the development of these qualification packs (part of Occupational Analysis)
6. Annexure 6: List of QP/NOS validating companies
7. Annexure 7: NSDC QRC observation and feedback sheet
8. Annexure 8: Standard protocol for accreditation & assessments

## QUALIFICATION FILE SUMMARY

|  |   |  |              |
|--|---|--|--------------|
| <b>Qualification Title</b>   | Qualification Pack - IES/Q0107- Concrete Pump Operator  |  |              |
| <b>Body/bodies which will assess candidates</b>  | Infrastructure Equipment Sector Council   |  |              |
| <b>Body/bodies which will award the certificate for the qualification.</b>             | Infrastructure Equipment Sector Council   |  |              |
| <b>Body which will accredit providers to offer the qualification.</b>                  | Infrastructure Equipment Sector Council   |  |              |
| <b>Occupation(s) to which the qualification gives access</b>                           | Equipment operations  |  |              |
| <b>Proposed level of the qualification in the NSQF.</b>                                | 4   |  |              |
| <b>Anticipated volume of training/learning required to complete the qualification.</b> | 192 Hours   |  |              |
| <b>Entry requirements / recommendations.</b>   | Preferably Class VIII   |  |              |
| <b>Progression from the qualification.</b>   | Supervisor (Plant and Machinery)  |  |              |
| <b>Planned arrangements for RPL.</b>   | Under Development   |  |              |
| <b>International comparability where known.</b>  | <p><b>Australia:</b></p> <p>RIISS00018 Concrete Paving – Automated Paving Guidance System (APGS) Technician Skill Set</p> <p>RIISS00019 Concrete Paving – Finisher Skill Set</p> <p>RIISS00022 Concrete Paving - Joint Sealer Skill Set</p> <p>RIISS00023 Concrete Paving – Machine Operator Skill Set</p> <p>RIISS00026 Concrete Paving – Stringliner Skill Set</p> <p>.</p> |  |              |
| <b>Formal structure of the qualification</b>   |   |  |              |
| <b>Title of unit or other component</b><br>(include any identification code used)      | <b>Mandatory/Optional</b>   | <b>Estimated size (learning hours)</b> | <b>Level</b> |
| IES/N0119 Carry out pre-operations checks on a concrete pump                           | Mandatory   | 28                                     | 4            |
| IES/N0120 Operate Concrete Pump  | Mandatory   | 98                                     | 4            |
| IES/N0121 Perform routine maintenance and troubleshooting of a concrete pump           | Mandatory   | 38                                     | 4            |
| IES/N7601 Comply with worksite health and safety guidelines                            | Mandatory   | 28                                     | 3            |

Please attach any document giving further detail about the structure of the qualification – eg a Curriculum or Qualification Pack.

Give details of the document here: **Qualification Pack is attached as Annexure**

## **SECTION 1**

### **ASSESSMENT**

**Name of assessment body:**

If there will be more than one assessment body for this qualification, give details.

CII

**Will the assessment body be responsible for RPL assessment?**

Give details of how RPL assessment for the qualification will be carried out and quality assured.

RPL will be based on the same approved Qualification Pack and Assessment Criteria mentioned in the Qualification Pack.

**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:**

The emphasis is on 'learning-by-doing' and practical demonstration of skills and knowledge based on the performance criteria.

The assessment papers are developed by Subject Matter Experts (SME) available with the Assessment Agency as per the performance and assessment criteria mentioned in the Qualification Pack. The assessments papers are also checked for the various outcome based parameters such as quality, time taken, precision, tools & equipment requirement etc. The assessment sets are then reviewed by IESC official for consistency.

The assessments are designed so as to assess maximum parts during the practical hands on work. The technical limitations at the training centres are taken care in theory and viva. Criteria such as use of lift to pick heavy objects or selection of fire extinguisher during a fire are also assessed under theory/viva.

The assessment agencies are instructed to hire assessors with integrity, reliability and fairness. Each assessor shall sign a document with its assessment agency by which they commit themselves to comply with the rules of confidentiality and conflict of interest, independence from commercial and other interests that would compromise impartiality of the assessments. The assessment agencies are instructed to ideally have assessor with minimum 15 years industry experience as an ITI graduate / minimum 10 years' industry experience as diploma engineer and minimum 5 years' industry experience as graduate engineer.

The assessors selected by Assessment Agencies are scrutinized and made to undergo training and introduction to IESC Assessment Framework, competency based assessments, assessors guide etc.

The assessors are provided with assessors guide developed by the Subject Matter Expert of the assessment agency as per the assessment framework. The assessment guides are developed to ensure the maximum possible consistency in the assessment by different assessors and elaborate on the following

- Qualification Pack Structure
- Guidance for the assessor to conduct theory, practical and viva assessments
- Guidance for trainees to be given by assessor before the start of the assessments.
- Guidance on assessments process, practical brief with steps of operations practical observation checklist and mark sheet
- Viva guidance for uniformity and consistency across the batch.

The assessment by assessment agency will be completely based on the assessment criteria as mentioned in the Qualification Pack. Each NOS in the Qualification Pack (QP) will be assigned a relative weightage for assessment based on the criticality of the NOS. Therein each Performance Criteria in the NOS will be assigned marks for or practical based on relative importance, criticality of function and training infrastructure.

**The following tools are proposed to be used for final assessment:**

**Practical Assessment:** This will comprise of a test hands on job to be prepared as per figure/engineering drawing by following appropriate working steps, using necessary tools, equipment and instruments.

Candidate's aptitude, safety consciousness, quality consciousness etc. will be ascertained by observation and

will be marked in observation checklist.

**Viva/Structured Interview:** This tool will be used to assess the conceptual understanding and the behavioural aspects as regards the job role and the specific task at hand. It will also include questions on safety, quality, environment, tools and equipment's etc.

**Written Test:** Under this test few key items which cannot be assessed practically will be assessed. The written assessment will comprise of  
True / False Statements  
Multiple Choice Questions  
Matching Type Questions.

Optical Mark Recognition (OMR)/ Online System for this will be preferred.

Please attach any documents giving further information about assessment and/or RPL.  
Give details of the document(s) here: Annexure 8

## **ASSESSMENT EVIDENCE**

Complete the following grid for each grouping of NOS, assessment unit or other component as listed in the entry on the structure of the qualification on page 1.

### **CRITERIA FOR ASSESSMENT OF TRAINEES**

**Job Role** Concrete Pump Operator

**Qualification Pack** IES/Q0107

**Sector Skill Council** INFRASTRUCTURE EQUIPMENT

#### **Guidelines for Assessment**

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 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

| Assessable Outcomes   | Assessment criteria for the outcome   | Marks Allocation |        |        |                  |
|---|---|------------------|--------|--------|------------------|
|   |   | Total Mark       | Out Of | Theory | Skills Practical |
| 1. IES/N0119 Carry out pre-operations checks on a concrete pump | PC1. Adhere to time limits given by supervisor  | 45               | 2      | 0      | 2                |
|   | PC2. Visually inspect the body and components for cracks, leakages, and ensure all switches are in neutral.                   |                  | 2      | 0      | 2                |
|   | PC3. Check that oil levels of engine, transmission, radiant coolant and brake are as per manufacturer's indicators            |                  | 4      | 1      | 3                |
|   | PC4. Check differential and hydraulic oil levels  |                  | 3      | 0      | 3                |
|   | PC5. Check water level and contamination in the water tank  |                  | 4      | 1      | 3                |
|   | PC6. Conduct visual inspection to check the various controls, gauges, warning lamp, emergency button and other safety devices |                  | 4      | 1      | 3                |
|   | PC7. Check Transfer tube/Rock Valve/Gate Valve/S tube for wear and tear and adjust sealing gap if required                    |                  | 3      | 0      | 3                |

|  |  |  |   |   |   |
|--|--|--|---|---|---|
|  | PC8. Check delivery line for tensioners, reducers, bends, couplings, wedges/clips, leakages, and pipe support and wall thickness |  | 4 | 1 | 3 |
|  | PC9. Check and set out all necessary work signs as required  |  | 4 | 1 | 3 |
|  | PC10. Clean air filter dust bowls and check the gasket and inner filter  |  | 3 | 0 | 3 |
|  | PC11. Top up coolant and oil in engine, transmission, etc. if necessary as per manufacturer's indicators                         |  | 2 | 0 | 2 |
|  | PC12. Inspect all greasing points to ensure that all greasing pins and pivots points are well greased.                           |  | 3 | 1 | 2 |
|  | PC13. Examine the compressor unit (if available) and all fittings  |  | 2 | 0 | 2 |
|  | PC14. Walk completely around the concrete pump checking that no one is under or on the machine before operating                  |  | 3 | 1 | 2 |

|  |  |              |           |          |           |
|--|--|--------------|-----------|----------|-----------|
|  | PC15. Maintain a checking/maintenance logbook to record all activities performed before starting the concrete pump |              | 1         | 0        | 1         |
|  | PC16. Report defects precisely to the supervisor if beyond scope of his role                                       |              | 1         | 0        | 1         |
|  |  | <b>Total</b> | <b>45</b> | <b>7</b> | <b>38</b> |
| 2. IES/N0120<br>Operate a<br>Concrete Pump | PC1. Plan and organize the job according to given instructions   | <b>55</b>    | 3         | 0        | 3         |
|  | PC2. Carry out all pre-use and running checks  |              | 3         | 0        | 3         |
|  | PC3. Ensure the integrity of pipelines that are connected to pumps and truck mixers prior to concrete transfer     |              | 3         | 0        | 3         |
|  | PC4. Receive verbal orders or over radio to determine amount of concrete to be pumped.                             |              | 4         | 1        | 3         |
|  | PC5. Appropriately regulate the concrete flow to match the requirement of the project                              |              | 3         | 0        | 3         |
|  | PC6. Inspect the concrete mix to ensure that the concrete is pumpable  |              | 3         | 0        | 3         |

|  |   |  |   |   |   |
|--|---|--|---|---|---|
|  | PC7. Communicate with other workers and supervisors using signals, radios, or telephones, to start and stop flow of concrete.                   |  | 4 | 1 | 3 |
|  | PC8. Inspect equipment to ensure that tank levels, temperatures, chemical amounts, and pressures are at specified levels                        |  | 4 | 1 | 3 |
|  | PC9. Report any abnormalities if necessary.   |  | 3 | 0 | 3 |
|  | PC10. Record operating data such as products and quantities pumped, stocks used, gauging results, and operating times.                          |  | 4 | 1 | 3 |
|  | PC11. Clean, lubricate, and repair pumps and vessels, using hand tools and equipment as per industry standard                                   |  | 3 | 0 | 3 |
|  | PC12. Check pressure levels of concrete is as per requirement, by using calibrated pressure gauges or by reading mercury gauges and tank charts |  | 4 | 1 | 3 |
|  | PC13. Check levels of concrete is as per requirement, by using  |  | 4 | 1 | 3 |



|   |   |              |           |          |           |
|---|---|--------------|-----------|----------|-----------|
|   | calibrated rods or by reading mercury gauges and tank charts  |              |           |          |           |
|   | PC14. Check appropriate consistency of the concrete solution for smooth flow  |              | 3         | 0        | 3         |
|   | PC15. Check appropriate consistence of the concrete solution for smooth flow  |              | 1         | 0        | 1         |
|   | PC16. Carry out reverse flow incase required to clear the pump of concrete  |              | 3         | 0        | 3         |
|   | PC17. Use the emergency stop button to disable all power to the concrete pump in case of a crisis, as per operator manual |              | 3         | 0        | 3         |
|   |   | <b>Total</b> | <b>55</b> | <b>6</b> | <b>49</b> |
| 3. IES/N0121<br>Perform routine maintenance and troubleshooting for a concrete Pump | PC1. Assess the right service schedule by tracking machine operating hours  | <b>45</b>    | 4         | 1        | 3         |
|   | PC2. Clean air filter dust bowls at regular intervals   |              | 2         | 0        | 2         |
|   | PC3. Clean the pump and valves as per standard operating procedures   |              | 2         | 0        | 2         |

|  |  |  |   |   |   |
|--|--|--|---|---|---|
|  | PC4. Replenish coolants, lubricants and fluids everyday  |  | 3 | 1 | 2 |
|  | PC5. Grease all greasing pins and pivot points everyday  |  | 2 | 0 | 2 |
|  | PC6. Check battery levels and condition of the terminals and carry out minor adjustments if required   |  | 2 | 0 | 2 |
|  | PC7. Check and maintain the tyre rims, air pressure, wheel nuts and treads as per manufacturer's indications   |  | 3 | 0 | 3 |
|  | PC8. Ensure the machine is on firm and level ground before attempting to carry out any maintenance; track machine operating hours to assess the right service schedule |  | 3 | 0 | 3 |
|  | PC9. Complete timely and legibly daily/ weekly maintenance sheets as provided by the company   |  | 3 | 0 | 3 |
|  | PC10. Ensure that no maintenance task on any part of the equipment is performed when running or still hot  |  | 3 | 1 | 2 |

|  |   |              |           |          |           |
|--|---|--------------|-----------|----------|-----------|
|  | PC11. Assess when the problem is beyond his competence and report the problem to suitably qualified and competent personnel |              | 3         | 1        | 2         |
|  | PC12. Diagnose the problem  |              | 1         | 0        | 1         |
|  | PC13. Handle and dispose waste based on environmental guidelines at the work place  |              | 4         | 1        | 3         |
|  | PC14. Follow reporting procedures as laid down by the employer  |              | 3         | 1        | 2         |
|  | PC15. Complete all documentation in the prescribed standards in a timely manner   |              | 3         | 0        | 3         |
|  | PC16. Report and escalate problems/ incidents as required in a timely manner  |              | 2         | 0        | 2         |
|  | PC17. Report defects precisely to the supervisor if beyond scope of his role  |              | 2         | 0        | 2         |
|  |   | <b>Total</b> | <b>45</b> | <b>6</b> | <b>39</b> |
| 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                  | <b>35</b>    | 2         | 0        | 2         |
|  | PC2. Use Personal Protective Equipment  |              | 4         | 1        | 3         |

|  |  |  |   |   |   |
|--|--|--|---|---|---|
|  | (PPE) and other safety gear such as seat belt, body protection, respiratory protection, eye protection, ear protection and hand protection               |  |   |   |   |
|  | 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    |  | 3 | 0 | 3 |
|  | PC4. Carry out operations as per the manufacturer's and worksite related health and safety guidelines  |  | 4 | 1 | 3 |
|  | PC5. Handle the transport, storage and disposal of hazardous materials and waste in compliance with worksite health, safety and environmental guidelines |  | 4 | 1 | 3 |
|  | PC6. Follow safety regulations and procedures with regard to worksite hazards and risks  |  | 3 | 0 | 3 |
|  | PC7. Operate various grades of fire extinguishers, as applicable   |  | 3 | 0 | 3 |
|  | PC8. Support in administering basic first aid and report to  |  | 4 | 1 | 3 |

|  |  |              |           |          |           |
|--|--|--------------|-----------|----------|-----------|
|  | concerned team members, as required, in case of an accident  |              |           |          |           |
|  | PC9. Respond promptly and appropriately to an accident/ incident or emergency situation, within limits of your role and responsibility |              | 4         | 1        | 3         |
|  | PC10. Record and report details related to operations, incidents or accidents, as applicable   |              | 4         | 1        | 3         |
|  |  | <b>Total</b> | <b>35</b> | <b>6</b> | <b>29</b> |

## SECTION 2

### EVIDENCE OF NEED

#### What evidence is there that the qualification is needed? (annexure 4 &5)

- Based on industry feedback and extrapolating from the data received from various visits and questionnaires we have arrived at roles which comprise of approximately 80% of the workforce in the infrastructure equipment sector across the respective sub-sectors undertaken in this study.
- This have been prioritized keeping the following criteria in consideration:
  - High volumes of equipment sales
  - Inclusive of the critical roles captured in the feedback from the companies
  - Inclusive of the feedback received from the council members
- Governing council of IESC gave final approval and endorsement for the same.

#### What is the estimated uptake of this qualification and what is the basis of this estimate?

- Skills Gap analysis Reports for industry demand and secondary research data, though these do not lend to accurate demand projection.
- Feedback from industry for demand though sample size may not lend to accurate figures
- Training duration, and current and potential training capacity envisaged
- As per industry practice 2 operators are required per equipment

#### What steps were taken to ensure that the qualification(s) does/do not duplicate already existing or planned qualifications in the NSQF?

- NSDC list of Approved and Under-Development QPs was checked prior to commissioning the work
- Consultations with Construction Sector Skill Councils
- NSDC QRC team also confirmed the same

#### 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?

- Employer feedback will be sought post-placement
- A formal review is scheduled in two year time

|  |
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Please attach any documents giving further information about any of the topics above.

Give details of the document(s) here:

Annexure 4: Email approval of Occupational Standards by Technical Committee and Governing Council

Annexure 5: Section 3 and 4.1 of Occupational Analysis

Annexure 7: NSDC QRC observation and feedback sheet

## SECTION 3

### SUMMARY EVIDENCE OF LEVEL

Level of qualification:

Four

Summary of Direct Evidence (from learning outcomes):

Justify the NSQF level allocated to the QP by building upon the five descriptors of NSQF. Explain the reasons for allocating the level to the QP.

Generic NOS is/are linked to the overall authority attached to the job role

Summary of other evidence (if used):

| Concrete Pump Operator - IES/Q0107  |   |   |  |  |       |
|---|---|---|--|--|-------|
| Process Required  | Professional Knowledge  | Professional Skill  | Core Skill   | Responsibility   | Level |
| <p>Concrete Pump Operator is expected to conduct pre-operation checks on concrete pump, select the appropriate pressure and flow of concrete for different heights, operate the concrete pump as per the job and maintain the concrete pump.</p> <p>The activities identified are the <b>familiar and routine activities</b> for him as these</p> | <p>Operator is expected to have <b>knowledge of the functioning and operation</b> of concrete pump. <b>Feature/specifications</b> of the concrete pump, properties of concrete and <b>knowledge of concrete pump components, pre-operation checklist and routine maintenance</b></p> <p>Considering the in-depth <b>professional and factual knowledge</b>, which a concrete pump operator has for concrete pumping and maintenance this QP is pegged at Level 4.</p> | <p>Concrete pump Operator <b>identifies the appropriate pressure and flow of concrete</b> for various heights. He <b>checks the concrete pump for operation readiness</b> using pre-operation checklist and <b>conducts the routine maintenance</b> covering valves, cleaning pump and valves, lubrication, oil levels, coolant, air filters, battery, tyre, body structure and keep the records as per the operations manual &amp;</p> | <p>Operator is expected to be read and understand the various instrument panel, fluid levels and other indicators for pre-operation checks and routine maintenance. He has to select the appropriate pressure and flow of concrete based on the work site, concrete properties and job requirement. All of this requires <b>application of basic arithmetic principles</b>.</p> <p>Operator has to continuously give and receive instruction and guidance from co-</p> | <p>The jobholder is responsible to:</p> <ul style="list-style-type: none"> <li>Conduct pre-operation checks</li> <li>Operate Concrete pump</li> <li>Conduct routine maintenance</li> </ul> <p>For each work site there can be variations in pumping operation. So the jobholder based on his <b>own learning and experience</b>, identify appropriate pressure and flow of concrete to maximize the productivity efficiently. He is continuously</p> | 4     |

|   |         |   |   |  |  |
|---|---------|---|---|--|--|
| <p>activities are independent of job and worksite he is deployed on. Considering the outcomes the job roles is pegged at level 04</p> |         | <p>standard operating procedures.</p> <p>Thus he is <b>practically engaged</b> in the concrete pumping and maintenance.</p> | <p>workers on-site for moving the Concrete pump and pumping function hence they are expected to be good in <b>communication skills</b>.</p> <p>Jobholder is expected to conduct themselves in ways, which show a basic understanding of the <b>social and professional environment of working at construction, or other sites</b></p> | <p>engaged in the <b>self-learning process</b> and he has the <b>responsibility for own work</b>.</p> <p>Jobholder is majorly responsible for his own job and self-learning process which justifies the pegging of the QP at level 4 and not directly involved in some learning of others (which is a requirement for Level 5). In his routine activity he is free from supervision (which is a requirement of level 3).</p> |  |
| Level 4   | Level 4 | Level 4   | Level 4   | Level 4  |  |

## **SECTION 4**

### **EVIDENCE OF RECOGNITION OR 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?**

While designing the national occupational standards, occupational mapping was done on a large sample size and validated across the country. The career progression for roles in each occupation was also analysed and decided, based on industry validation across the country. The current challenges faced by the industry, at large, was also kept in mind.

Please attach any documents giving further information about any of the topics above.

Give details of the document(s) here:



- Annexure 5: Section 5 of Occupational Analysis
- List of companies and Industry associations participated in development of these qualifications (part of OA)