

Revision made by NSDA_25 May, 2015

QUALIFICATION FILE – CONTACT DETAILS OF SUBMITTING BODY

Name and address of submitting body:

Indian Iron and Steel Sector Skill Council

Address:- Royal Exchange, 6 N.S. Road, Kolkata- 700 001

Tel: 09831052652

Name and contact details of individual dealing with the submission

Name: Parimal Biswas

Position in the organisation: Chairman of NOS Committee & Director IISSSC

Address if different from above

Same as above

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List of documents submitted in support of the Qualifications File

1. Qualification Pack
2. RFP for development of Occupational Standards
3. IISSSC Protocol for Accreditation of Assessment Agencies and Assessment Framework.
4. Sample of assessors guide
5. Occupational Map & Progression matrix
6. List of companies and Industry associations participated in the development of this qualification.
7. List of QP/NOS validating companies.

8. QUALIFICATION FILE SUMMARY

Qualification Title	Bearing Maintenance (ISC/Q0906)		
Body/bodies which will assess candidates	Affiliated Assessment Agencies		
Body/bodies which will award the certificate for the qualification.	Indian Iron & Steel Sector Skill Council		
Body which will accredit providers to offer the qualification.	Indian Iron & Steel Sector Skill Council		
Occupation(s) to which the qualification gives access	Jobs related to preparation, supply, collection, evaluation and operation of all fluids connected with rolling operations in steel plant.		
Proposed level of the qualification in the NSQF.	3		
Anticipated volume of training/learning required to complete the qualification.	190 hours		
Entry requirements / recommendations.	Class – 10th Pass and 18 years of age		
Progression from the qualification.	Technician – Mechanical Maintenance		
Planned arrangements for RPL.	RPL arrangements and policies are under development. The guidelines should be ready in 2-3 months.		
International Comparability	<p>While writing the NOSs the European, Australian and Canadian NOSs were also referred to and an effort was taken to maintain comparability in the technical part of the NOSs.</p> <p>However Numeracy, literacy and basic science levels are lower in order to match with the existing Indian conditions.</p>		
Formal structure of the qualification			
Title of unit or other component (include any identification code used)	Mandatory/ Optional	Estimated size (learning hours)	Level
ISC/N0929: Understand the assigned job of bearing maintenance	Mandatory	190	3
ISC/N0930: Prepare for bearing maintenance operation	Mandatory		
ISC/N0931: Carry out the assigned bearing maintenance operation	Mandatory		
ISC/N0008: Use basic health and safety practices at the work place	Mandatory		

ISC/N0009: Works effectively with others	Mandatory		
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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 sent with the Qualification file

SECTION 1

ASSESSMENT

Name of assessment body:

Prima Competencies Pvt. Ltd.

Will the assessment body be responsible for RPL assessment? YES

Selection and due diligence of applicants are done as per IISSSC Protocol for Assessment Bodies and Assessment Framework.

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 IISSSC official for consistency. The assessments are designed so as to assess maximum parts during the practical hands on work. Duties and responsibility of a welder are also assessed. 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, first aid are also assessed under theory/viva.

Different NDT as well as Destructive Testing carried out on the job as per welding standard.

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 / Master Degree holder.

The assessors selected by Assessment Agencies are scrutinized and made to undergo training and introduction to IISSSC 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 / transparency in the assessment by different assessors and elaborate on the following

- 1 Qualification Pack Structure
- 2 Guidance for the assessor to conduct theory, practical and viva assessments
- 3 Guidance for trainees to be given by assessor before the start of the assessments.
- 4 Guidance on assessments process, practical brief with steps of operations practical observation checklist Attendance Sheet and mark sheet
- 5 Viva guidance for uniformity and consistency across the batch
- 6 Guidance on assessment evidence collection

A sample format of Assessment Guide for Fitter-Fabrication is attached. Similar Assessor Guides are developed and shared with the assessors before the start of the assessments as standard practices for all assessments by IISSSC. The Sample of Assessor Guide is attached as Annexure.

The assessment results are backed by evidences collected by assessors.

- 1 The assessor needs to collect a copy of the attendance for the training done under the scheme.

The attendance sheets are signed and stamped by the In charge /Head of the Training Centre.

2 The assessor needs to verify the authenticity of the candidate by checking the photo ID card issued by the institute as well as any one Photo ID card issued by the Central/Government. The same needs to be mentioned in the attendance sheet. In case of suspicion, the assessor should authenticate and cross verify trainee's credentials in the enrolment form.

3 The assessor needs to punch the trainee's roll number on all the test pieces. Different sections can have alpha numbering. For example a student roll number is ABC then the three pieces can be numbered and punched as ABC1, ABC2 and ABC3.

4 The assessor needs to take a photograph of all the students along with the centre name/banner at the back as evidence.

5 The assessor needs to carry a camera to click photograph of the trainees working on the job and giving theory exam as evidence.

6 The assessor also needs to carry a photo ID card.

7 The assessor also needs to take the photographs as evidence from appropriate angles/sides of the final work piece/job submitted by the trainee.

8 The assessor needs to indicate the parts for different Destructive testing as per standards mentioned in the assessment guide.

The details on assessment framework are elaborated in IISSSC Protocol for Accreditation of Assessment Agencies and Assessment Framework.

All IISSSC accredited Assessment Agency follow the "IISSSC Protocol for Accreditation of Assessment Agencies and Assessment Framework". 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:

1 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.

The end product will be measured against the specified dimensions and standards (like tolerance, finish, accuracy, time etc.) to gauge the level of his skill achievements

2 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.

3 Written Test: Under this test few key items which cannot be assessed practically will be assessed. The written assessment will comprise of

- i. True / False Statements
- ii Multiple Choice Questions
- iii Matching Type Questions.

Optical Mark Recognition (OMR)/ Online System for this will be preferred on place of written test subject to available required infrastructure.

Please attach any documents giving further information about assessment and/or RPL.

Give details of the document(s) here:

ASSESSMENT EVIDENCE

Complete the following grid for each grouping of NOS, assessment unit or other component as per the assessment criteria. Insert the required number of rows.

CRITERIA FOR ASSESSMENT OF TRAINEES

Bearing Maintenance

ISC/Q0906

Indian Iron & Steel Sector Council

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 70% in every NOS further each trainee must also score a minimum of 40% in each element assessed within 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

Assessable Outcome	Assessment criteria	Total Marks 1000	Out Of	Marks Allocated	
				Theory	Skills Practical
ISC/N0929: Understand the assigned job of bearing maintenance	PC1. Interpret the checklist and understand the bearing maintenance job requirements	250	15	5	10
	PC2. Identify classifications of bearings e.g. single row radial ball bearing, roller bearing, angular contact ball bearing, self-aligning bearing, special bearing races, cylindrical roller bearing, single/double row tapered roller bearing, thrust bearing etc.		20	5	15
	PC3. Understand the cleaning procedure of bearing and related parts		14	4	10
	PC4. Understand the dimensions and related parts of bearing		11	1	10
	PC5. Plan, as appropriate to carry out the bearing maintenance job		15	5	10
	PC6. Understand sections, views, scale of measurement used in the engineering drawing of the equipment		14	4	10
	PC7. Understand the symbols used in the engineering drawings		16	1	15

	PC8. Understand other specifications and identify the sequence of activities required for bearing maintenance/changing		13	3	10
	PC9. Read and interpret engineering drawings to ensure correct limits, tolerance and fits of bearings		16	1	15
	PC10. Identify any clarifications that he wants to seek with respect to the given equipment drawing		16	1	15
	PC11. Identify and seek clarifications with respect to bearings with all related parts		14	4	10
	PC12. Recognize whom to contact for clarifications on the engineering design		11	1	10
	PC13. Escalate the concern to the supervisor or shift-in-charge, if needed		15	5	10
	PC14. Identify tools, tackles & equipment (lifting equipment, various sizes of spanner, dial gauge, Vernier calliper, filler gauge, torque range, bearing heating furnace etc.) required to perform the bearing maintenance operation		15	5	10
	PC15. Identifying the different types of bearings for maintenance and changing		15	5	10
	PC16. Ask helper to carry tools required to the desired work site		15	5	10
	PC17. Report to stores / supervisor in case of non-availability of tools & tackles or stock-out of spares		15	5	10
		Total	250	60	190
ISC/N0930: Prepare for bearing maintenance operation	PC1. Reach the site with desired tools, tackles and equipment	200	15	5	10
	PC2. Plan for job duration and understand the process as per SOP		15	5	10
	PC3. Arrange necessary instruments to carry out maintenance (dial gauge, spirit level, vibration measuring instrument and tools for dismantling and assembling e.g. spanners, torque wrench, power tools etc.)		15	5	10

	PC4. Identify the root cause of the problem, if any (radial run out of assemble bearing, face run out with race way, face run out with bore, race way parallel with face, outside face inclination and thickness variance)		15	5	10
	PC5. Identify and collect bearings as per drawing		15	5	10
	PC6. Plan for storage of new bearing and old bearing at job site		15	5	10
	PC7. Ensure not to store multiple bearings on top of each other		15	5	10
	PC8. Ensure not to store large bearings in the upright position		15	5	10
	PC9. Understand the hazardous area of work and necessary precautions to be taken to execute the job as well as safe handling of equipments		15	5	10
	PC10. Prepare tools, tackles, the list of spares (lifting equipment, various sizes of spanner, dial gauge, Vernier calliper, filler gauge, torque range, bearing heating furnace etc.) required for completion of bearing maintenance/change job and ensure availability at work site		20	5	15
	PC11. Ensure that tools and tackles match the standard specifications		15	5	10
	PC12. Ensure tools, tackles and equipment required for assembly are free from physical damage and ready for bearing maintenance/changing operation		15	5	10
	PC13. Report damaged / defective components of equipment and bearings as per the escalation matrix		15	5	10
		Total	200	65	135
ISC/N0931: Carry out the assigned bearing maintenance operation	PC1. Interpret the SOP and plan for handling the parent equipment, dismantling, assembling of bearing	300	15	5	10
	PC2. Understand the checklist and ensure all assembly check points are measured and correctly recorded		14	4	10
	PC3. Dismantle the equipment, as needed for bearing maintenance and changing activities		11	1	10

PC4. Correct the defects in the bearing or replace the defective bearing	14	4	10
PC5. Assemble the bearing related parts according to the drawings	11	1	10
PC6. Fasten mechanical components/ subassemblies together using screws, bolts, and collars using hand/ power tools for bearing replacement	11	1	10
PC7. Set and adjust linkages, tensions and clearances of assembled components to specifications using fixed gauges and hand tools	11	1	10
PC8. Re assemble the bearing related parts post correcting the defect	13	3	10
PC9. Understand and ensure all necessary steps are completed before start-up of the machine	11	1	10
PC10. Identify and use appropriate vibration and temperature measuring instruments	14	4	10
PC11. Understand different types of bearings (anti friction, frictional bearing and their classification) the procedure of lubrication	15	5	10
PC12. Assemble, dismantle and measure gaps of different anti friction bearings e.g. ball bearing, roller bearing, taper roller bearing etc.	15	5	10
PC13. Assemble, dismantle and measure gaps of Babbitt bearing	15	5	10
PC14. Understand and conduct hand scraping of Babbitt bearing	11	1	10
PC15. Ensure lubrication of bearings prior to starting use of equipment	14	4	10
PC16. Record and monitor that temperature and vibration are at desirable levels	15	5	10
PC17. Identify any deviations from desirable levels and take necessary actions to correct them	15	5	10
PC18. Ensure alignment of bearing related parts and with the engineering drawings	14	4	10
PC19. Check bearing vibrations to ensure they are within desired limits	11	1	10

	PC20. Test the machine to ensure it is fit to use before handover		11	1	10
	PC21. Record the test results in the prescribed format of the organization		15	5	10
	PC22. Ensure all activities are complete according to checklist		13	3	10
	PC23. Communicate to supervisor on completion of given job and/or in case of any deviations from checklist		11	1	10
		Total	300	70	230
ISC/N0008: Use basic health and safety practices at the workplace	PC1. Use protective clothing/equipment for specific tasks and work conditions	150	9	4	5
	PC2. State the name and location of people responsible for health and safety in the workplace		6	1	5
	PC3. State the names and location of documents that refer to health and safety in the workplace		2	1	1
	PC4. Identify job-site hazardous work and state possible causes of risk or accident in the workplace		8	4	4
	PC5. Carry out safe working practices while dealing with hazards to ensure the safety of self and others state methods of accident prevention in the work environment of the job role		6	1	5
	PC6. State location of general health and safety equipment in the workplace		6	1	5
	PC7. Inspect for faults, set up and safely use steps and ladders in general use		6	1	5
	PC8. Work safely in and around trenches, elevated places and confined areas		6	1	5
	PC9. Lift heavy objects safely using correct procedures		6	1	5
	PC10. Apply good housekeeping practices at all times		2	1	1
	PC11. Identify common hazard signs displayed in various areas		6	5	1
	PC12. Retrieve and/or point out documents that refer to health and safety in the workplace		5	1	4
	PC13. Use the various appropriate fire extinguishers on different types of fires correctly		9	4	5
	PC14. Demonstrate rescue techniques applied during fire hazard		8	4	4

	PC15. Demonstrate good housekeeping in order to prevent fire hazards		2	1	1
	PC16. Demonstrate the correct use of a fire extinguisher		6	1	5
	PC17. Demonstrate how to free a person from electrocution		6	1	5
	PC18. Administer appropriate first aid to victims as required e.g. in case of bleeding, burns, choking, electric shock, poisoning etc.		8	3	5
	PC19. Demonstrate basic techniques of bandaging		6	1	5
	PC20. Respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		7	2	5
	PC21. Perform and organize loss minimization or rescue activity during an accident in real or simulated environments		6	1	5
	PC22. Administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock, before the arrival of emergency services in real or simulated cases		6	1	5
	PC23. Demonstrate the artificial respiration and the CPR Process		6	1	5
	PC24. Participate in emergency procedures		6	1	5
	PC25. Complete a written accident/incident report or dictate a report to another person, and send report to person responsible		4	1	3
	PC26. Demonstrate correct method to move injured people and others during an emergency		2	1	1
		Total	150	45	105
ISC/N0009: Work effectively with others	PC1. Accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	100	10	5	5
	PC2. Accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt		9	4	5

PC3. Provide information to others clearly, at a pace and in a manner that helps them to understand	11	1	10
PC4. Display helpful behaviour by assisting others in performing tasks in a positive manner, where required and possible	10	5	5
PC5. Consult with and assist others to maximize effectiveness and efficiency in carrying out tasks	10	5	5
PC6. Display appropriate communication etiquette while working	11	1	10
PC7. Display active listening skills while interacting with others at work	11	1	10
PC8. Use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism	8	3	5
PC9. Demonstrate responsible and disciplined behaviours at the workplace	14	4	10
PC10. Escalate grievances and problems to supervisor	6	1	5
Total	100	30	70

SECTION 2

EVIDENCE OF NEED

What evidence is there that the qualification is needed?

While collecting data from the companies for the occupational map, we also took feedback from industry, which was collected with respect to roles for which qualification packs development, was to be prioritized. This was largely based on volume of people required, quantitative and qualitative shortfall which the Industry feels they face. Governing council of IISSSC 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. The link to NSDC Human Resource & Skills Requirement in IISSSC

- Feedback from industry for demand though again sample size may not lend to accurate figures
- Training duration, and current and potential training capacity envisaged
- An LMIS development initiative is being put in place to be more precise regarding the demand and supply

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

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?

Agencies have been appointed by the SSC to interact with training providers to gather feedback in implementation.

Employer feedback will be sought post- placement.

A formal review is scheduled after two year time.

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

Give details of the document(s) here:

SECTION 3

SUMMARY EVIDENCE OF LEVEL

Summary of Direct Evidence:

- Understand the assigned job of bearing maintenance in accordance with the instructions / checklist
- Understand the engineering drawings of the equipment for bearing maintenance
- Seek clarifications with respect to the equipment, drawings, if any
- Identify the tools, tackles and bearing that are required to carry out the assigned job of bearing maintenance
- Reach the site and inspect the equipment for scheduled bearing maintenance and/or defects and identify cause of problem
- Prepare tools, tackles, spares, material required for bearing operation
- Conduct routine maintenance or rectify the problem, as appropriate
- Ensure lubrication of bearings and monitor vibration, temperature using appropriate equipment
- Conduct tests to ensure fitness
- Communicate to supervisor about completion of work
- Use Health and safety procedures, Fire safety procedures & Emergencies, rescue and first-aid procedures at workplace
- Ensure appropriate communication with superiors, peers and others as applicable at work place
- Demonstrate appropriate behaviour and etiquette at work place

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.

Bearing Maintenance (ISC/Q0906)					
Process required	Professional Knowledge	Professional Skills	Core Skills	Responsibility	Level
<p>The job holder is expected to inspect the equipment, identify the problems in the equipment and resolve the same by ensuring rectification of root causes e.g. leakages replacement of bearings, lubrication of bearings, ensuring fitness of all types of bearings in the plant. He is also expected to perform maintenance of all types of bearings in the plant. The nature of job is routine and predictable and involves limited range of activities. The job also involves identifying and troubleshooting of the problems and report to any qualified personnel if he is unable to solve the same problem</p>	<p>The job holder is expected to understand the basic details, process and principles for the job of Bearing Maintenance, Identify classifications, cleaning procedure, dimensions and related parts of bearing of bearings, He should know different types of parameters as per the checklist for maintenance to perform the job effectively</p>	<p>The job holder is expected to be able to diagnose common problems in the bearing functioning based on visual inspection, sound, temperature etc. He should be able to Suggest improvements (if any) in maintenance processes based on experience. He should perform troubleshooting of problems related to narrow range of application</p>	<p>The job holder is expected to express ideas with clarity. He should be able to interpret the checklists and understand the job requirements. He should be able to understand health and safety instructions, memos, reports, job cards, etc. and should be able to communicate with team members & supervisor</p>	<p>The job holder is responsible for completing tasks assigned by the supervisor like inspecting and rectifying issues related to leakages, replacement, lubrication etc. of bearings, maintaining all types of bearings in the plant under close supervision. He should be able to identify and troubleshoot problems of usual nature. and report defects precisely to the supervisor if it is beyond the scope of his role. He is expected to</p>	<p>3</p>

				work under close supervision & be responsible for his own work & learning.	
Level 3	Level 3	Level 3	Level 3	Level 3	

OTHER EVIDENCE OF LEVEL [This need only be filled in where evidence other than primary outcomes was used to allocate a level] (Optional)

Summary of other evidence (if used):

Accepted by QRC and validated by industry

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?

Horizontal and vertical mobility options have been articulated

Please attach any documents giving further information about any of the topics above.
Give details of the document(s) here: