

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 IISSC

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. IISSC 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

## QUALIFICATION FILE SUMMARY

Qualification Title	Fitter: Hydraulic & Pneumatic System (ISC/Q0903)		
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.	4		
Anticipated volume of training/learning required to complete the qualification.	300 hours		
Entry requirements / recommendations.	ITI Pass and 18 years of age		
Progression from the qualification.	Technician – Hydraulic & Pneumatic System		
Planned arrangements for RPL.	RPL arrangements and policies are under development. The guidelines should be ready in 2-3 months.		
International Comparability	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. However Numeracy, literacy and basic science levels are lower in order to match with the existing Indian conditions.		
<b>Formal structure of the qualification</b>			
Title of unit or other component (include any identification code used)	Mandatory/ Optional	Estimated size (learning hours)	Level
ISC/N0918: Understand the assigned job of hydraulic and pneumatic equipments	Mandatory	300	4
ISC/N0919: Prepare for operation of hydraulic and pneumatic equipments	Mandatory		
ISC/N0920: Carry out the assigned operation of hydraulic and pneumatic equipments	Mandatory		
ISC/N0921: Activities specific to hydraulic & pneumatic fitter	Mandatory		

ISC/N0008: Use basic health and safety practices at the work place	Mandatory		
ISC/N0009: Works effectively with others	Mandatory		

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

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 IISSC 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 IISSC 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 IISSC. 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

Iron & Steel – Fitter: Hydraulic & Pneumatic system

ISC/Q0903

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	Assessable Criteria	Total Marks 1000	Out Of	Marks Allocated	
				Theory	Practical
ISC/N0918: Understand the assigned job of hydraulic and pneumatic equipments	PC1. Interpret the checklist and understand the job requirements	150	10	5	5
	PC2. Plan, as appropriate to carry out the job		10	5	5
	PC3. Understand the hydraulic and pneumatic circuit drawing		15	10	5
	PC4. Understand the type of movement (a) Linear motion (hydraulic and pneumatic cylinders) (b) Rotary motion (electric motor, engine, hydraulic motor, turbine etc.)		15	5	10
	PC5. Understand other specifications and identify the sequence of activities required to assemble and dismantle the hydraulic and pneumatic equipments		15	5	10

	PC6. Read and interpret circuit drawings to ensure proper system		15	5	10
	PC7: Able to decode component part no. to match the specification		15	5	10
	PC8. Identify any clarifications that he/she wants to seek with respect to the given circuit drawing for the system		10	5	5
	PC9. Recognize whom to contact for clarifications on the circuit design		5	0	5
	PC10. Escalate the concern to the supervisor or shift-in-charge, if needed		5	0	5
	PC11. Identify tools, tackles & equipment required to perform the hydraulic and pneumatic job		15	5	10
	PC12. Ask helper to carry tools and tackles required to the desired work site		5	0	5
	PC13. Report to stores / supervisor in case of non-availability of tools & tackles or stock-out		15	5	10
		Total	150	50	100
ISC/N0919: Prepare for operation of hydraulic and pneumatic equipments	PC1. Reach the site with desired tools, tackles for hydraulic and pneumatic equipment	100	5	0	5
	PC2. Identify the root cause of the problem for proper functioning of hydraulic and pneumatic equipment, if any		15	5	10
	PC3. Prepare the list of spares with part number/specification required for completion of job		15	5	10
	PC4. Ensure that tools match the desired specifications for working in hydraulic and pneumatic systems		25	5	20
	PC5. Ensure tools and equipment required for assembly are free from physical damage and ready for operation		25	5	20



	PC6. Report damaged / defective components with part number/specification of hydraulic and pneumatic equipment as per the escalation matrix		15	5	10
		Total	100	25	75
ISC/N0920: Carry out the assigned operation of hydraulic and pneumatic equipments	PC1. Dismantle the of hydraulic and pneumatic equipments, as needed	150	15	5	10
	PC2. Replace the defective parts		10	0	10
	PC3. Assemble the parts according to the circuit drawings, as required		15	5	10
	PC4. Fasten mechanical components/ subassemblies together using fasteners with specified torquing		10	0	10
	PC5. Set and adjust flow, pressure, speed, level of hydraulic medium / air		15	5	10
	PC6. Re assemble the parts post correcting the defect		10	0	10
	PC7. Ensure compliance to parameters in line with the hydraulic and pneumatic circuit drawings		15	5	10
	PC8. Check abnormalities to ensure they are within desired limits (temperature, leakage, pressure, level, vibration, sound and RPM)		15	5	10
	PC9. Test the machine to ensure it is fit to use before handover		15	5	10
	P10. Record the test results in the prescribed format of the organization		15	5	10
	PC11. Ensure all activities are complete according to checklist		5	0	5
	PC12. Communicate to supervisor on completion of given job in case of any deviations from checklist		10	0	10
		Total	150	35	115

ISC/N0921: Activities specific to hydraulic & pneumatic fitter	PC1. Understand the hydraulic system, flow, components of hydraulic and pneumatic power unit and their functions	350	15	5	10
	PC2. Identify whether the motion is linear or rotary		15	5	10
	PC3. Understand for linear motion and type of movement required for operation of hydraulic/ pneumatic cylinders/systems		10	0	10
	PC4. Understand for rotary motion the operation of hydraulic/ pneumatic motors, pumps/compressor and turbines		10	0	10
	PC5. Understand concept and factors affecting hydraulic oil contamination		15	5	10
	PC6. Understand effect of hydraulic oil temperature, pressure on hydraulic performance		15	5	10
	PC7. Understand Hydraulic /Pneumatic valves, seals etc.		15	5	10
	PC8. Understand and aware on prime movers vibration		15	5	10
	PC9. Understand Hazards of pressurised oil/air		15	5	10
	PC10. Understand functioning of Hydraulic /Pneumatic power pack units with accessories		15	5	10
	PC11. Understand pumping theory		5	0	5
	PC12. Understand Air compression system		15	5	10
	PC13. Understand Principle of fluid power technology		15	5	10
	PC14. Understand operations of different valves and pressure gauges		10	0	10
	PC15. Understand the positive isolation process of hydraulic system		15	5	10

	PC16. Understand trouble shooting techniques of hydraulic system		15	5	10
	PC17. Periodically clean the reservoir, suction strainer, return line filter, breather filter etc.		5	0	5
	PC18. Periodically cleaning the suction air filter of air compressor		5	0	5
	PC19. Clean suction/delivery valves of air compressor		5	0	5
	PC20. Change the hydraulic oil/compressor lube oil		5	0	5
	PC21. Identify the tools, tackles & spares with part no. required for the operation		15	5	10
	PC22. Check the availability of the spares as required		15	5	10
	PC23. Identify the lubricants and hydraulic oils that will be required for the operation		15	5	10
	PC24. Report to supervisor / stores in case material is not available or not appropriate		10	0	10
	PC25. Identify specific accessories with part no. for hydraulic power pack		15	5	10
	PC26. Identify specific spares for compressor with part no.		15	5	10
	PC27. Identify specification of hydraulic oil and lubricants		15	5	10
	PC28. Identify proper hydraulic fluid with characteristic depending on the area of application		15	5	10
		Total	350	95	255
ISC/N0008: Use basic health and safety practices at	PC1. Use protective clothing/equipment for specific tasks and work conditions	150	10	5	5
	PC2. State the name and location of people responsible for health and safety		5	0	5

the workplace	in the workplace			
	PC3. State the names and location of documents that refer to health and safety in the workplace	1	0	1
	PC4. Identify job-site hazardous work and state possible causes of risk or accident in the workplace	9	5	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	10	5	5
	PC6. State location of general health and safety equipment in the workplace	5	0	5
	PC7. Inspect for faults, set up and safely use steps and ladders in general use	5	0	5
	PC8. Work safely in and around trenches, elevated places and confined areas	5	0	5
	PC9. Lift heavy objects safely using correct procedures	5	0	5
	PC10. Apply good housekeeping practices at all times	1	0	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	4	0	4
	PC13. Use the various appropriate fire extinguishers on different types of fires correctly	9	5	4
	PC14. Demonstrate rescue techniques applied during fire hazard	10	5	5
	PC15. Demonstrate good housekeeping in order to prevent fire hazards	1	0	1

PC16. Demonstrate the correct use of a fire extinguisher	4	0	4	
PC17. Demonstrate how to free a person from electrocution	5	0	5	
PC18. Administer appropriate first aid to victims as required e.g. in case of bleeding, burns, choking, electric shock, poisoning etc.	10	5	5	
PC19. Demonstrate basic techniques of bandaging	5	0	5	
PC20. Respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments	10	5	5	
PC21. Perform and organize loss minimization or rescue activity during an accident in real or simulated environments	5	0	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	5	0	5	
PC23. Demonstrate the artificial respiration and the CPR Process	5	0	5	
PC24. Participate in emergency procedures	5	0	5	
PC25. Complete a written accident/incident report or dictate a report to another person, and send report to person responsible	9	5	4	
PC26. Demonstrate correct method to move injured people and others during an emergency	1	0	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		10	5	5
	PC3. Provide information to others clearly, at a pace and in a manner that helps them to understand		10	0	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		10	0	10
	PC7. Display active listening skills while interacting with others at work		10	0	10
	PC8. Use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism		10	5	5
	PC9. Demonstrate responsible and disciplined behaviours at the workplace		15	5	10
	PC10. Escalate grievances and problems to supervisor		5	0	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 hydraulic and pneumatic job in accordance with the instructions / checklist, understand the hydraulic and pneumatic circuit drawings, Identify the tools and tackles that are required to carry out hydraulic and pneumatic circuit job

- Inspect the hydraulic and pneumatic equipment for scheduled maintenance or defects and identify cause of problem
- Prepare spares, material with part number/specification required for hydraulic and pneumatic operation
- Conduct routine maintenance with parameters or rectify the problem, as appropriate
- Conduct tests to ensure fitness
- Communicate to supervisor about completion of work
- Understand hydraulic and pneumatic circuit and identify motion specifications
- Understand component specific working principles of hydraulic and pneumatic equipments
- Understand auxiliary process like cleaning, de-humidification
- Assembling knowledge of hydraulic and pneumatic circuit and pipelines with accessories
- Ensure the availability of specific spares with part no., compressor/hydraulic system, hydraulic oils and lubricants
- Understand hydraulic fluid and characteristics
- 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.



Fitter: Hydraulic & Pneumatic system (ISC/Q0903)

Process required	Professional Knowledge	Professional Skills	Core Skills	Responsibility	Level
<p>The job holder is expected to deal with regular upkeep of hydraulic/ pneumatic equipment/ system, checking of hydraulic medium (hydraulic mineral oil), air under pressure and rectifying breakdowns including; identifying problems, dismantling equipment, cleaning parts, rectifying root causes, reassembling equipment, checking alignment, vibration, etc. to ensure fitness of equipment prior to handover and informing supervisor, operations, stores etc. as appropriate in a hydraulic and pneumatic system. The job holder is expected to work in familiar predictable, routine situation of clear choice</p>	<p>The job holder is expected to understand the basic details, process and principles of hydraulic/ pneumatic equipment/ system, He should also have an understanding of assembling techniques such as aligning, bending, fixing of hydraulic and pneumatic component. The job holder is expected to have factual knowledge of the hydraulic &amp; pneumatic operation</p>	<p>The job holder is expected to be able to handle different machines and tools wearing protective accessories. He should be able to position mechanical components in machines according to design requirements. He should be able to diagnose common problems in the tools based on visual inspection, sound, Temperature etc. The job holder is expected to recall &amp; demonstrate practical skills which are routine &amp; repetitive and involves narrow range of application using</p>	<p>The job holder is expected to express ideas with clarity. He should be able to understand the job requirements, construct simple sentences and express ideas clearly through written communication, fill up appropriate technical forms, process charts, and activity logs in required format of the company. He should be able to understand health and safety instructions, memos, reports, job cards, etc. and should be able to communicate with team members &amp; supervisor. The job requires the</p>	<p>The job holder is responsible for completing assigned tasks like regular upkeep of hydraulic/ pneumatic equipment/ system, checking of hydraulic medium (hydraulic mineral oil), air under pressure and rectifying breakdowns etc. He is responsible for identifying and troubleshooting problems of usual nature. He is expected to report defects precisely to the supervisor if it is beyond the scope of his role. The job holder is responsible for his own work &amp; learning.</p>	4

		appropriate rule & tool.	job holder to communicate with clarity & basic arithmetic skill & understanding of working environment		
Level 4	Level 4	Level 4	Level 4	Level 4	

**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: