CERTIFICATE COURSE IN FITTER & RIGGER (CCFR)

QUALIFICATION FILE

Ministry of Micro, Small and Medium Enterprises, New Delhi
(MSME-Technology Centre)

NSQF QUALIFICATION FILE

Version 6: Draft of 08 March 2016

NSDA Reference

CONTACT DETAILS OF THE AWARDING BODY FOR THE QUALIFICATION

Name and Address of Awarding Body:

O/o DC (MSME),

Ministry of Micro, Small and Medium Enterprises

Nirman Bhawan,

Maulana Azad Road,

New Delhi - 110108

Name and Contact Details of Individual dealing with submission:

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List of documents submitted in support of the Qualification File:

1. Detailed Curriculum **(Annexure-I)**
2. Minutes of the meeting **(Annexure-II)**

SUMMARY

Qualification Title: **CERTIFICATE COURSE IN FITTER & RIGGER (MSME / CCFR / 69)**
Nature and Purpose of the Qualification: **Nature:** Certificate Course **Purpose:** • To make the learner competent in maintenance of material handling machineries used in Iron and Steel Industries or similar kind of industries and heavy material handling.
Body/bodies which will award the Qualification: MSME Technology Centre, Ministry of Micro, Small and Medium Enterprises, New Delhi
Body which will accredit providers to offer courses leading to the qualification: MSME Technology Centre, Ministry of Micro, Small and Medium Enterprises, New Delhi
Body/bodies which will be responsible for assessment: Examination Cell of MSME Technology Centre
Occupation(s) to which the Qualification gives access: Mechanical Fitter/ Rigger/ Junior Operative Technician
Proposed level of the Qualification in the NSQF: Level-4
Anticipated volume of training /learning required to complete the Qualification: 6 month (780 Hours)
Entry requirements/recommendations: 10th Pass
Progression from the qualification: After completion of course the trainee can work in steel or Aluminium Industry as Mechanical Fitter or Rigger and after 3 years of field experience the trainee can work as Senior Operative Technician and then after that 5 years of experience, the person can work as a Supervisor. At the supervisory level the trainee can building up his team to take over material handling as contract basis or can develop maintenance team to take over the AMC of steel plant machineries independently.
Planned arrangements for the Recognition of Prior Learning (RPL) Yes
International comparability where known: SINGAPORE: A course 'Suspended Scaffolding Riggers' of 24 hours duration is available which is not integrated with maintenance work. UAE: Similar course 'Advance Rigging and Slinging' is conducted at various locations of the Country. However, the duration of the course is not known. PHILIPPINES: Site Skill Training, Centennial Road, Clark Freeport Zone, Pampanga, Philippines 2023 conducts a course on 'Perform Basic Rigging' of 5 days duration.

Level of the above courses could not be established due to unavailability of sufficient information.

Formal Structure of the Qualification:

Title of component	Mandatory/ optional	Estimated size (learning hours)	Level
Safety at Workplace.	M	40	Level-4
Bench Work & Fitting.	M	80	Level-4
Machining (Lathe, Milling, Grinding and Drilling).	M	80	Level-4
Power transmission& Drives.	M	100	Level-4
Hydraulics and Pneumatics.	M	100	Level-4
Mechanical System.	M	100	Level-4
Mechanical Pump.	M	80	Level-4
Rigging.	M	100	Level-4
Installation and maintenance of machine and equipment.	M	100	Level-4
Total		**780**	

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

Give the titles and other relevant details of the document(s) here. Include page references showing where to find the relevant information.

SECTION 1

ASSESSMENT

Body/Bodies which will carry out Assessment:
Examination Cell of MSME Technology Centre

Will the Assessment Body be responsible for RPL Assessment?
Yes

How will RPL assessment be managed and who will carry it out?
Learners who have met the requirements of any Unit Standard that forms part of this qualification may apply for recognition of prior learning to the MSME TECHNOLOGY CENTER. The applicant must be assessed against the specific outcomes and with the assessment criteria for the relevant Unit Standards through the specific experts available in the steel plants.

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.

1. ASSESSMENT GUIDELINE:

- Criteria for assessment based on each learning outcome, will be assigned marks proportionately to its importance.
- The assessment for the theory & practical part is based on knowledge bank of questions created by trainers and approved by Examination cell of MSME Technology Centre
- For each Individual batch, Examination cell will create unique question papers for theory part as well as practical for each examination.
- To pass the Qualification, every trainee should score a minimum of 70% cumulatively (Theory and Practical)
- Assessment comprises the following components:
  - Job carried out in labs/workshop
  - Record book/ daily diary
  - Answer sheet of assessment
  - Viva –voce
  - Progress chart
  - Attendance and punctuality

2. ASSESSORS:

MSME Technology Centre faculty looking after the course "**CERTIFICATE COURSE IN FITTER AND RIGGER**", also assesses the students as per guidelines set by Examination of MSME Technology Centre. Faculties have been trained from time to time to upgrade their skills on various aspects such as conduct of assessments, teaching methodology etc. These training are usually conducted at Xavier Institute of Management (XIMB), Bhubaneswar, Xavier Labor Relations Institute (XLRI), Jamshedpur and other renowned Institutions/Establishments of the country.

3. ELIGIBILITY TO APPEAR IN THE EXAM:
Minimum 80% attendance is compulsory for the students to appear for the assessments.

4. MARKING SCHEME:

Sr.No.	Method of Assessments	Weightage (Max. marks)	Evaluator
1	Written Test	20	Trainer + Course coordinator + Examiner nominated by Examination Cell of CTTC, Bhubaneswar
2	Practical Test	40	
3	Viva-voce	10	
4	Class/Workshop/Lab performance	10	
5	Project	20	
TOTAL		**100**	

5. PASSING MARKS:
Passing criteria is based on marks obtained in attendance record, term works, assignments, practical performance, viva or oral exam, module test, practical exam and final exam.

Minimum Marks to pass practical exam – 60%
Minimum Marks to pass theory exam – 40%

6. RESULTS AND CERTIFICATION:
The assessment results are backed by evidences collected by assessors. Successful trainees are awarded the certificates by MSME Technology Centre Ministry of MSME.

ASSESSMENT EVIDENCE:
Assessment evidence comprises the following components document in the form of records:

- 1) Job carried out in labs/workshop
- 2) Record book/ daily diary
- 3) Answer sheet of assessment

- 4) Viva –voce
- 5) Progress chart
- 6) Attendance and punctuality

Qualification Outcomes

Outcome to be assessed	Assessment criteria for the outcome
Demonstrate workshop safety rules and use of personal protective equipment (PPE). Demonstrate the safety environment	Use PPE like helmet, safety shoes, safety belt, ear and nose mask, goggles, hand gloves etc. while working in the workshop.
Demonstrate the safety attitude	Use safety chat in the work place.
Demonstrate Safety inspections	Follow the proper inspection methods.
Aware about Unsafe acts and conditions	Distinguish the Unsafe acts and conditions at the work place.
Identify the type of Injuries	Avoid the injuries in the work place.
Demonstrate First aid box& used	Use First aid box at the injury place.
Demonstrate Personal hygiene	Use personal hygiene equipment.
Demonstrate Housekeeping & 5S& their use.	Follow the 5s rules and regulations (Sort, Set in order, Shine, Standardize, Sustain).
Demonstrate of hand tool and used and care of hand tool file, chisel, hacksaw, hammer etc.	Identify tool materials and their properties.
Demonstrate the workshop tools like vice, v-block, surface plate, anvil etc.	Identify and explain the usage and care for tools used in work shop.
Demonstrate of power tool use and care for power drills, angle grinder, power saw etc.	Practice exercises on power drills, angle grinder, power saw
Demonstrate use of marking media, types of marking tool and there used.	Identify marking tool and use it.
Demonstrate of measuring tool, types and used of measuring instrument	Identify measuring tools and their properties.
Demonstrate the fitting and do the T & square fitting.	Identify and square fittings.
Define the threading and known the type of threading and do the threading used of different type threading.	Practice on different types of threading.

Demonstration of T-fitting, Manufacturing and fitting of a taper key,	Identify fitting block, tapping and thread cutting.

Demonstrate and main part of the milling machine and specification of milling machine	Identify the parts and its function of milling machine.
Classified of the milling machine, types of milling operation, type of milling cutter are used and their specification,	Follow the SOP for manufacturing.
Demonstrate and main part of the lathe machine and specification of lathe machine	Identify all the parts and mechanism used in lathe**.**
Classify the lathe machine, types of lathe operation, type of lathe cutter are used and their specification,	Follow the SOP for manufacturing.
Demonstrate and main part of the grinding machine and specification & function of grinding machine	Identify the parts and its function of grinding machine.
Classified of the grinding machine, types of grinding operation, type of grinding wheel are used and their specification,	Follow the SOP for manufacturing.
Demonstration of various Mechanical power Transmission Method.	List out various Mechanical power transmission methods and find out their advantages and disadvantages.
Demonstration of drives and its applications	Identify various Drives.
Explanation of flexible type coupling, rigid flange coupling, Gear coupling, Pin and disc coupling, Universal coupling	Identify various couplings and understand the method and practice of coupling arrangements.
Demonstrate different gear drives, belt drives.	Identify various types of gear and assemble the gear.
Demonstrate different type belts, chain and sprocket.	Identify various types of belts chains and sprockets and assemble the chain belt and sprockets.
Demonstrate the methods of dismantling and Mounting of pulleys	Practice on mounting and dismounting of pulleys.

Demonstrate Pneumatics, Basic controlling equipment and its use.	Make different control circuits by using Pneumatic Control Valves and Components.
Demonstrate Pneumatics, Basic controlling equipment and its use.	Practice and prepare diagram to operate Double Acting Cylinder using 4/2 Direction Control Valve in Pneumatics.
Demonstrate types of Pump , Compressor and its related equipment.	Draw different symbols of different valves and pneumatics components as: Compressor and its related equipment.
Demonstration of Cylinder, valve and its type	Do Actuation of single acting cylinder by 3/2 D.C. valve. Electro Pneumatics.
Demonstrate Electro-Pneumatics, Basic controlling equipment and its use.	Prepare electro-pneumatic control circuit Using solenoid actuated 5/2 DC valves.
Demonstration on Hydraulics, Purpose of fluids and Basic controlling equipment used in hydraulics.	Use Hydraulic Control Valves and various Components and Draw the Circuit diagram to operate Double Acting Cylinder using 4/2 Direction Control Valve in Hydraulics
Demonstrate and mark internal parts of a Power pack and its related equipment.	Do a Sequential Circuit with limited Clamping Pressure. Do a Hydraulic circuit for Rapid traverse and Feed circuit.
Demonstrate about Cylinder, valve and its type.	Do Actuation of single acting cylinder by 4/3 D.C. valve. Electro Hydraulics.
Demonstrate Quality requirements of oil.	Do Counter Balance circuit to operate load such that even if the pump is switched off load should not get actuated.
Demonstrate Properties of fluid, Pump and its type.	Do a Hydraulic circuit for Clamping and Drilling operation by Sequence circuit.

Demonstrate the types of bearings. Mounting and dismounting of different types of bearings	Use different bearing and do mounting and dismounting of bearings by hot method and pneumatic and hydraulics.
Demonstrate needs for lubrication, types of lubrication. Explain viscosity, selection of lubricants.Explain Safe handling method for lubricants	Use different grade of lubricants and use it in proper places.
Identify different types of brakes, Alignment of brake drum, selection of correct torque on a brake system. Maintenance of Brake system.	Demonstrate different types of brakes. Do proper alignment of brake drum. Maintain a brake properly.
Identify different type of gear and gear box. Assembly of gear in different shaft like Lay Shaft and Bearing Shaft.	Do Assembling of different gears. Do common maintenance of Gears.
Explain different types of pumps and its industrial applications.	Identify the different types of pumps looking from outside.
Demonstrate about single stage centrifugal pump, double diaphragm pump.	Remove and dismantle single stage centrifugal pump and double diaphragm pump
Demonstrate about Magnetic drive pump.	Remove and dismantle Magnetic drive pump.
Demonstrate about glands their specifications selection and use in individual pump.	Remove and displace glands
Demonstrate packing their specifications selection and use in individual pump.	Remove and displace packing,
Demonstrate mechanical seal their specifications selection and use in individual pump.	Remove and displace mechanical seal.
Demonstrate faults on pumps.	Detect the faults in pumps and maintain it.
Demonstrate Rigging methods and techniques.	Prepare a chart for rigging methods and techniques.

Estimate load & Centre of gravity.	Prepare a chart for load estimation.
Demonstratetechnical skills of fastening, rigging knots, limit, fit tolerance.	Practice rigging knots and limit fit tolerance..
Selection and use of rigging equipment	Do practice for proper selection of rigging equipment
Demonstrateaccident prevention and emergency response in lifting and rigging.	Follow the accidental prevention methods in lifting and rigging.
Execution of the rigging operation	Do practice the execution methods for operation of rigging.
Demonstration of 3-step lifting & lowering method	Practice on 3-step lifting & lowering method
Demonstration of rigging outside the workshop.	Practice of rigging outside the workshop.

Demonstrate types and activities of plant maintenance and Documentary report.	Do weekly, quarterly, monthly preventive and breakdown maintenance of lathe, milling and Grinding machine.
Demonstrate about Planning System, spare part Inventory, quality requirement and awareness.	Do Preventive and breakdown maintenance of other conventional Machine.
Demonstrate to find Source, part inventory repairing, purchasing and cause and factor analysis for all machines.	Do Preventive and breakdown maintenance of other workshop related machinery equipment
Demonstrate Maintenance of different machine as: turning, milling, and grinding, drilling, radial grinding of different manufacture company.	Do the maintenance procedure for finding Source, part inventory repairing, purchasing and cause and factor analysis for all machines. Do the Maintenance of different machine.
Demonstration of Installation of machine & equipment.	Practice installation of Equipment of different Machines
Demonstrate alignment and balancing on machines.	Practice on alignment and balancing of machines.
Means of assessment-1 Assessing the daily work schedule sheet. Conducting written test after completion of this component.	
Means of assessment-2 Conducting Final skill test after completion of this Component.	
Pass/Fail Scoring more than 40% in written test and more than 60% in practical test will be declared as competent. Otherwise, he/she will be declared as not yet competent.	

SECTION 2

Evidence of Level

Title/Name of the qualification/Component: Certificate Course in Mechanical Fitter and Rigger			**Level-4**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the job role relates to the NSQF level descriptors**	**NSQF Level**
Process	Carry out various conventional manufacturing operations like Bench work and fitting, Turning, Milling, and Grinding safely and securely according to given drawing within required level accuracy using specified process independently. Assemble and disassemble the bearing for various revolving parts. Identify the faults with mechanical pumps, hydraulic and pneumatic elements Carry out safe lifting and lowering the heavy loads by using various rigging equipment	The job role after attaining this qualification "CCFR" is to manufacture and assemble the desired jobs/components within tolerance provided as per the drawing using specific/limited manufacturing process like fitting, turning Milling, and Grinding as a part of maintenance work, Maintenance of bearing, Hydraulic and Pneumatic equipment, which falls within familiar, predictable, and routine in nature. The role also involves study and understand the drawing and prepare and use various rigging and slinging to lift lower heavy jobs with utmost care.	**4**
Professional Knowledge	Study and analyze the job/ component drawing provided to manufacture the same within prescribed tolerance and check/measure the job/component with suitable measuring instruments. Select the proper cutting speed, feed and depth of cut to manufacture the job. Select the correct processes along with the manufacturing principles while selecting the manufacturing process of the component. Study and analyse the working principle of pump, its construction, uses and troubleshoot the problem during the working.	The job holder in this job role must have knowledge and understanding of basic facts, defined processes and principles with respect to different kinds of machining, maintenance work, Fastening of heavy loads for shifting from one place to other. Understand how to extract information from Engineering drawings with respect to machining; various machining sequences and procedures; suitability of work pieces and consumable to the jobs; correct techniques and procedures to carry out specific machining operations; etc. Identify various types of bearing, load acting on the bearing along with the principle of operation. The candidate must be able to apply the basic hydraulic and pneumatic	**4**

		principles as applicable to different type of actuating elements.	
Professional Skill	Develop/Manufacture the job/ component according to specified drawing using correct sequence of operations with desired accuracy by solving inline manufacturing problems. Identify the material which will be used for making the finished product and fitted to the appropriate place. Identify and rectify the bearing, hydraulic and pneumatic valves, mechanical power transmission devices with methodical approach Prepare different kinds of slings for lifting the heavy load.	The Job holder must know to solve the problems commonly encountered during machining operations by selecting the correct method, tools and materials as per operating manual/organizational guidelines; etc. Also the job holder adopts the correct maintenance procedure for different kind of maintenance involved. Not only confined to the maintenance, but also competent to raise or lower the heavy loads by using various type of hooking and fastening devices while shifting the load. These skills are routine and repetitive in nature and narrow range of application which requires appropriate method and tools.	**4**
Core Skill	Calculate the machining parameters like cutting speed, feed and depth of cut. Read the drawing and conceive the idea to get the finished product. Aware about the social as well as Environmental situations during working and communicate the same to the coworkers.	The job holder is required to have desired numerical and computational abilities, communications, health, safety, first aid. He must also be able to read drawing and complete documentation as per organizational procedures which could be in local or English language.	**4**
Responsibility	Capabilities of studying the drawings of the component, need to be manufactured. Responsible for own work. Before starting the machining work check the machine for lubrication of sliding mechanism, coolant level in the tank. Check the measuring instruments to be used for its error or proper working. Use PPE as per job requirement. Clean and lubricate the machine	Taking responsibility of proper functioning of the Machines and his actions for the operation, quality and accuracy of the work. The candidate with this job role works independently and also took responsibility for his learning.	**4**

	after completion of the machining work.		

SECTION 3

Evidence of Need

What Evidence is there that the Qualification is needed:

- Decision of the management review meeting.
- Meeting conducted at TATA Steel and Jindal Steel and Power Limited.

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

- The estimated uptake of this qualification in the year of 2017-18 is 40.
- The basis of this estimation is the requirements of the concerned industries.

Trainees Trained/Trainees Opted for Placement/Trainees placed as on date.

NEW COURSE

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

The qualification is originally designed by curriculum committee comprising the training head, steel industry experts.

The work group under the guidance of curriculum development committee already conducted desk search as well as refers the qualification packs for as a supporting document for the mapping of curriculum.

As per the search it is found that, the certificate course is not available for the skill development of the candidates in Certificate Course in Fitter and Rigger of 6 months duration under any Sector Skill Council.

What arrangements are in the 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?

- The curriculum committee meeting for review will be in the month of Jan 2018 which comprising industrial expert, Training Head, Representative from existing employers.

- The data used for revision or update will be impact analysis (student and industries) and new subject area opportunities, multiple entry and exits incorporated or RPL strategy implementations.

- The curriculum review and updates, in consultation with industries and expert of respective domain, NOS approved by NSDA will also be referred to from time to time.

SECTION 4

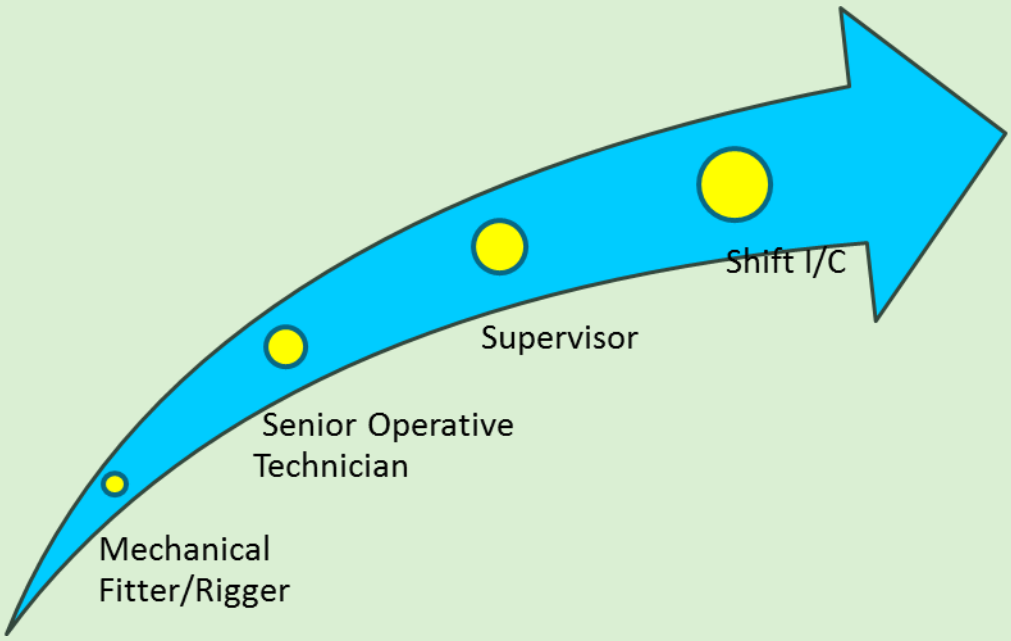
EVIDENCE OF RECOGNITION AND PROGRESSION

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 this qualification proper care is taken to linkup with the skill development in the field of maintenance of machineries used by steel industries and shifting of heavy loads from one place to other particularly in the Iron and Steel Industries

Qualifying trainee will obtain a Certificate in 'Certificate Course in Fitter and Rigger'. They will be appointed as Mechanical Fitter/Rigger. After 3 years of experience give the opportunities to the trainees to work as Senior Operative Technician as a career progression with this position and experience of 5 years gives career scope of Supervisor. The below mention diagrams represent the vertical mobility for the job holder as a job progression in Iron and Steel Industries.

VERTICAL PROGRESSION



HORIZONTAL PROGRESSION