सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

Qualification Pack

N·S·D·C National Skill Development Corporation
Transforming the skill landscape

Structural Steel NDT Tester

Electives: UT/ MPT/ DPT

QP Code: CON/Q3503

Version: 2.0

NSQF Level: 4

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CON/Q3503: Structural Steel NDT Tester

Brief Job Description

This job role is responsible for performing non-destructive tests on structural steel components and welded sections by using Dye Penetration Test, Magnetic Particle Test, and Ultrasonic Test. The individual should display sound technical knowledge and will have to maintain safe and quality working practices

Personal Attributes

This job role requires the individual to be physically and mentally strong enough to oversee the quality control work at a construction site. The individual should be having strong organizational, interpersonal and communication skills, along with comprehensive technical knowledge of quality assurance and quality control operations

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. CON/N9001: Work according to personal health, safety and environment protocol at construction site

Electives*(mandatory to select at least one):*

Elective 1: UT

The Job holder is required to perform non-destructive tests on structural steel components and welded sections by using Ultrasonic Test (UT).

1. CON/N0411: Perform ultrasonic testing on structural steel components and welded sections

Elective 2: MPT

The Job holder is required to perform non-destructive tests on structural steel components and welded sections by using Magnetic Particle Test (MPT).

1. CON/N0412: Perform Magnetic Particle test on structural steel welded joints

Elective 3: DPT

The Job holder is required to perform non-destructive tests on structural steel components and welded sections by using Dye Penetration Test (DPT).

1. CON/N0413: Perform liquid /dye penetration test on structural steel welded joints

Qualification Pack (QP) Parameters

Sector	Construction
Sub-Sector	Real Estate and Infrastructure construction
Occupation	Quality Assurance & Quality Control
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/3111.0100
Minimum Educational Qualification & Experience	10th Class (ASNT level 1 qualified)
Minimum Level of Education for Training in School	Not Applicable
Pre-Requisite License or Training	NIL
Minimum Job Entry Age	18 Years
Last Reviewed On	19/06/2020
Next Review Date	24/07/2023
Deactivation Date	24/07/2023
NSQC Approval Date	22/08/2019
Version	2.0
Reference code on NQR	2019/CON/CSDCI/3293
NQR Version	2

CON/N9001: Work according to personal health, safety and environment protocol at construction site

Description

This NOS covers the skill and knowledge required for an individual to work according to personal health, safety and environmental protocol at construction site

Scope

The scope covers the following :

- Follow safety norms as defined by organization
- Adopt healthy & safe work practices
- Implement good housekeeping and environment protection process and activities

Elements and Performance Criteria

Follow safety norms as defined by organization

To be competent, the user/individual on the job must be able to:

PC1. identify and report any hazards, risks or breaches in site safety to the appropriate authority

PC2. follow emergency and evacuation procedures in case of accidents, fires, natural calamities

PC3. follow recommended safe practices in handling construction materials, including chemical and hazardous material whenever applicable

PC4. participate in safety awareness programs like Tool Box Talks, safety demonstrations, mock drills, conducted at site

PC5. select and operate different types of fire extinguishers corresponding to types of fires as per EHS guideline

PC6. identify near miss , unsafe condition and unsafe act

Adopt healthy & safe work practices

To be competent, the user/individual on the job must be able to:

PC7. use appropriate Personal Protective Equipment (PPE) as per work requirements including: Head Protection (Helmets), Ear protection Fall Protection, Foot Protection, Face and Eye Protection, Hand and Body Protection, Respiratory Protection (if required)

PC8. handle all required tools, tackles , materials & equipment safely

PC9. follow safe disposal of waste, harmful and hazardous materials as per EHS guidelines

PC10. install and apply properly all safety equipment as instructed

PC11. follow safety protocol and practices as laid down by site EHS department

PC12. undertake and pass height pass test as per EHS guideline

Implement good housekeeping practices

To be competent, the user/individual on the job must be able to:

PC13. collect and deposit construction waste into identified containers before disposal, separate containers that may be needed for disposal of toxic or hazardous wastes

PC14. apply ergonomic principles wherever required

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. reporting procedures in cases of breaches or hazards for site safety, accidents, and emergency situations as per guidelines
KU2. types of safety hazards at construction sites
KU3. basic ergonomic principles as per applicability
KU4. the procedure for responding to accidents and other emergencies at site
KU5. use of appropriate personal protective equipment to be used based on various working conditions
KU6. importance of handling tools, equipment and materials as per applicable
KU7. health and environments effect of construction materials as per applicability
KU8. various environmental protection methods as per applicability
KU9. storage of waste including the following at appropriate location: non-combustible scrap material and debris, combustible scrap material and debris, general construction waste and trash (non-toxic, non-hazardous), any other hazardous wastes and any other flammable wastes
KU10. how to use hazardous material, in a safe and appropriate manner as per applicability
KU11. types of fire
KU12. procedure of operating different types of fire extinguishers
KU13. safety relevant to tools, tackles, & requirement as per applicability
KU14. housekeeping activities relevant to task

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. write in at least one language, preferably in the local language of the site
GS2. fill safety formats for near miss, unsafe conditions and safety suggestions
GS3. read in one or more language, preferably in the local language of the site
GS4. read sign boards, notice boards relevant to safety
GS5. speak in one or more language, preferably in one of the local language of the site
GS6. listen instructions / communication shared by site EHS and superiors regarding site safety, and conducting tool box talk
GS7. communicate reporting of site conditions, hazards, accidents, etc.
GS8. not create unsafe conditions for others
GS9. keep the workplace clean and tidy
GS10. identify safety risks that affect the health, safety and environment for self and others working in the vicinity, tackle it if within limit or report to appropriate authority
GS11. assess and analyze areas which may affect health, safety and environment protocol on the site
GS12. ensure personal safety behavior

GS13. respond to emergency

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Follow safety norms as defined by organization	**9**	**21**	**-**	**-**
PC1. identify and report any hazards, risks or breaches in site safety to the appropriate authority	-	-	-	-
PC2. follow emergency and evacuation procedures in case of accidents, fires, natural calamities	-	-	-	-
PC3. follow recommended safe practices in handling construction materials, including chemical and hazardous material whenever applicable	-	-	-	-
PC4. participate in safety awareness programs like Tool Box Talks, safety demonstrations, mock drills, conducted at site	-	-	-	-
PC5. select and operate different types of fire extinguishers corresponding to types of fires as per EHS guideline	-	-	-	-
PC6. identify near miss , unsafe condition and unsafe act	-	-	-	-
Adopt healthy & safe work practices	**15**	**35**	**-**	**-**
PC7. use appropriate Personal Protective Equipment (PPE) as per work requirements including: Head Protection (Helmets), Ear protection Fall Protection, Foot Protection, Face and Eye Protection, Hand and Body Protection, Respiratory Protection (if required)	-	-	-	-
PC8. handle all required tools, tackles , materials & equipment safely	-	-	-	-
PC9. follow safe disposal of waste, harmful and hazardous materials as per EHS guidelines	-	-	-	-
PC10. install and apply properly all safety equipment as instructed	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. follow safety protocol and practices as laid down by site EHS department	-	-	-	-
PC12. undertake and pass height pass test as per EHS guideline	-	-	-	-
Implement good housekeeping practices	**6**	**14**	**-**	**-**
PC13. collect and deposit construction waste into identified containers before disposal, separate containers that may be needed for disposal of toxic or hazardous wastes	-	-	-	-
PC14. apply ergonomic principles wherever required	-	-	-	-
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	CON/N9001
NOS Name	Work according to personal health, safety and environment protocol at construction site
Sector	Construction
Sub-Sector	Generic
Occupation	Generic
NSQF Level	4
Credits	TBD
Version	4.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	

CON/N0411: Perform ultrasonic testing on structural steel components and welded sections

Description

This unit describes the skills and knowledge required to perform ultrasonic testing on structural steel components and welded sections

Scope

The scope covers the following :

- Perform ultrasonic testing on structural steel components and sections to detect deformities present inside the weld, between weld and parent material, rolling deflects under the surface of base material

Elements and Performance Criteria

Perform ultrasonic testing on structural steel components and sections to detect deformities present inside the weld, between weld and parent material, rolling deflects under the surface of base material

To be competent, the user/individual on the job must be able to:

PC1.	read and interpret the quality plan, WPS, fabrication shop drawings etc. to understand the technical specifications, locations of testing and method to be adopted
PC2.	identify the location of joint or section for conducting the test as per specification
PC3.	estimate the quantity of materials and time required for completion of test
PC4.	read and interpret the standard specifications and perform the test in accordance to the same
PC5.	carry out pre-test cleaning activities using solvents, brushes, scrubs etc. to remove any paint, dust, oil, grease or scale etc. from the test surface
PC6.	identify the transducers, instruments and calibration standards to be used based upon conditions of testing, location and accessibility of testing and purpose of test
PC7.	ensure that the instrument is calibrated as per schedule before starting the test
PC8.	run diagnostic checks using calibration standards to ensure that readings obtained are accurate
PC9.	apply coating of gel, water or solvent on the surface to be tested appropriately as per manufactures guidelines or standard practices
PC10.	ensure that the test specimen is properly immersed in solvent in case of immersed type of ultrasonic test
PC11.	ensure that transducers are properly coated and ready for use
PC12.	choose normal or angle beam as per test requirement and instructions
PC13.	set the frequency of ultrasound as per test specifications and requirements
PC14.	ensure that the position and movement of both pieces is correct and simultaneous in case of dual element transducers

PC15.	ensure that the single piece transducer is moving appropriately and required test area is covered
PC16.	read the graphs and other details mentioned on the display to compute the size and type of defect

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1.	standard practices for quality control works
KU2.	safety rules and regulations for handling and storing required tools, equipment and materials
KU3.	personal protection including the use of related safety gears & equipments
KU4.	service request procedures for tools, materials and equipments
KU5.	statutory compliance requirement related to working at height
KU6.	statutory compliance requirement related to workmen engagement
KU7.	different types of testing carried out on fabricated materials
KU8.	destructive and non-destructive testing, difference, pros and cons
KU9.	how the sound is transmitted, properties of sound
KU10.	concept of wave and related parameters
KU11.	principle of ultrasonic testing
KU12.	different methods and procedures of performing ultrasonic testing
KU13.	different equipments used in ultrasonic testing , their range, area of application, classification and principles of operation
KU14.	how to operate various settings on the instrument and their implication on testing
KU15.	application of ultrasonic testing
KU16.	limitations of ultrasonic testing
KU17.	type of defects inspected by ultrasonic testing
KU18.	precautions to be taken while conducting ultrasonic testing
KU19.	importance of cleaning the surface before and after conducting ultrasonic testing test
KU20.	different methods of cleaning metal surface
KU21.	interpret the readings and graphs shown on the display
KU22.	how to classify the sample based upon the test report
KU23.	how to calibrate the instrument

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1.	write in at least two language, preferably in the local language of the site and basic English
GS2.	provide clear and simple instructions, details & sketches to sub-ordinate
GS3.	record and document daily productivity report, daily labour attendance & details regarding work

GS4. prepare basic status updates for the superiors in the prescribed format
GS5. read one or more language, preferably in the local language of the site
GS6. read drawing, specification and standards related to relevant work
GS7. read key documents including quality standards and standard working methods
GS8. read various, sign boards, safety rules and safety tags , instructions related to exit routes during emergency at the workplace
GS9. speak in one or more language, preferably in one of the local languages of the site
GS10. listen and follow instructions clearly given by the superior
GS11. provide clear instructions to subordinates for completion of task as per work plan, time schedule and quality
GS12. estimate required material and resources for work
GS13. decide alternate course of action in case of hindrance to work
GS14. determine appropriate location of joint / segment for conducting the test
GS15. determine the transducers, instruments and calibration standards for completion of the test
GS16. decide on whether the instruments required for testing are calibrated
GS17. determine whether test specimen is appropriately immersed in the solvent
GS18. decide on normal or angle beam as per requirements
GS19. plan work & organize required resource in coordination with team members and superior
GS20. plan work targets, allocate time schedule to sub-ordinates and organize completion of task within allocated time
GS21. ensure completion of work as per agreed time schedule and quality
GS22. resolve and solve any conflict within the team
GS23. compute the size and type of defect basis readings
GS24. report to superiors in case of any defects or shortage in tested components and sections
GS25. assess quantity of materials for day work
GS26. optimize resources
GS27. minimize wastages
GS28. ensure correct positioning of components for testing to avoid safety violations
GS29. assess whether readings obtained are accurate basis diagnostic tests
GS30. assess complexity of the tasks and provide guidance for carrying out corrective action as per requirement
GS31. identify and assess how violation of any safety norms may lead to accidents

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Perform ultrasonic testing on structural steel components and sections to detect deformities present inside the weld, between weld and parent material, rolling deflects under the surface of base material	**30**	**70**	**-**	**-**
PC1. read and interpret the quality plan, WPS, fabrication shop drawings etc. to understand the technical specifications, locations of testing and method to be adopted	-	-	-	-
PC2. identify the location of joint or section for conducting the test as per specification	-	-	-	-
PC3. estimate the quantity of materials and time required for completion of test	-	-	-	-
PC4. read and interpret the standard specifications and perform the test in accordance to the same	-	-	-	-
PC5. carry out pre-test cleaning activities using solvents, brushes, scrubs etc. to remove any paint, dust, oil, grease or scale etc. from the test surface	-	-	-	-
PC6. identify the transducers, instruments and calibration standards to be used based upon conditions of testing, location and accessibility of testing and purpose of test	-	-	-	-
PC7. ensure that the instrument is calibrated as per schedule before starting the test	-	-	-	-
PC8. run diagnostic checks using calibration standards to ensure that readings obtained are accurate	-	-	-	-
PC9. apply coating of gel, water or solvent on the surface to be tested appropriately as per manufactures guidelines or standard practices	-	-	-	-
PC10. ensure that the test specimen is properly immersed in solvent in case of immersed type of ultrasonic test	-	-	-	-
PC11. ensure that transducers are properly coated and ready for use	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. choose normal or angle beam as per test requirement and instructions	-	-	-	-
PC13. set the frequency of ultrasound as per test specifications and requirements	-	-	-	-
PC14. ensure that the position and movement of both pieces is correct and simultaneous in case of dual element transducers	-	-	-	-
PC15. ensure that the single piece transducer is moving appropriately and required test area is covered	-	-	-	-
PC16. read the graphs and other details mentioned on the display to compute the size and type of defect	-	-	-	-
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	CON/N0411
NOS Name	Perform ultrasonic testing on structural steel components and welded sections
Sector	Construction
Sub-Sector	Real Estate and Infrastructure construction
Occupation	Quality Assurance & Quality Control
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	

CON/N0412: Perform Magnetic Particle test on structural steel welded joints

Description

This unit describes the skills and knowledge required to perform Magnetic Particle test on structural steel welded joints

Scope

The scope covers the following :

- Perform Magnetic Particle test on structural steel welded joints to detect deformities present on the surface, or originating from the surface

Elements and Performance Criteria

Perform Magnetic Particle test on structural steel welded joints to detect deformities present on the surface, or originating from the surface

To be competent, the user/individual on the job must be able to:

PC1. read and interpret the quality plan, WPS, fabrication shop drawings etc. to understand the technical specifications, locations of testing and method to be adopted

PC2. identify the location of joint or section for conducting the test as per specification

PC3. estimate the quantity of materials and time required for completion of test

PC4. read and interpret the standard specifications and perform the test in accordance to the same

PC5. confirm that the surface to be tested can be magnetized

PC6. carry out pre-test cleaning activities using solvents, brushes, scrubs etc. to remove any paint, dust, oil, grease or scale etc. from the test surface

PC7. ensure that the temperature of the test specimen is within applicable limits prescribed in the test procedure

PC8. ensure proper storage of consumables to avoid contamination

PC9. ensure that lighting arrangements are appropriate and compatible to type of indicator used

PC10. apply suspended magnetic particles to the test surface using appropriate method

PC11. apply dry powder indicators to the surface of the test specimen

PC12. select the suitable method for application of magnetic field to the test specimen

PC13. apply the magnetic fields in two directions perpendicular to each other of required or instructed magnitude

PC14. check the proper application of magnetic field

PC15. clean the particulate matter after getting approval from the seniors

PC16. setup reverse magnetic field to demagnetized the component or structure under inspection

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. standard practices for quality control works
KU2. safety rules and regulations for handling and storing required tools, equipment and materials
KU3. personal protection including the use of related safety gears & equipments
KU4. service request procedures for tools, materials and equipments
KU5. statutory compliance requirement related to working at height
KU6. statutory compliance requirement related to workmen engagement
KU7. principle of magnetic particle test
KU8. standard procedure for conducting the magnetic particle test
KU9. fundamentals and concepts of magnetic field
KU10. concept of flux leakage
KU11. different equipments and methods used for creating a magnetic field, their limitations and advantages, areas of application
KU12. methods of measuring magnetic field, various instruments used for the same, their range, principle of operation, area of operation and limitations
KU13. limitations of magnetic particle method
KU14. type of defects inspected by magnetic particle test
KU15. precautions to be taken while conducting magnetic particle test
KU16. importance of cleaning the surface before and after conducting magnetic particle test
KU17. different methods of cleaning metal surface
KU18. different types of indicators, their application and auxiliary items required by them
KU19. what is carrier, its properties and effects
KU20. interpretation of magnetic patterns developed by particles on the surface of test specimen

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. write in at least two language, preferably in the local language of the site and basic English
GS2. provide clear and simple instructions, details & sketches to sub-ordinate
GS3. record and document daily productivity report, daily labour attendance & details regarding work
GS4. prepare basic status updates for the superiors in the prescribed format
GS5. read one or more language, preferably in the local language of the site
GS6. read drawing, specification and standards related to relevant work
GS7. read key documents including quality standards and standard working methods
GS8. read various, sign boards, safety rules and safety tags , instructions related to exit routes during emergency at the workplace
GS9. speak in one or more language, preferably in one of the local languages of the site
GS10. listen and follow instructions clearly given by the superior

GS11. provide clear instructions to subordinates for completion of task as per work plan, time schedule and quality

GS12. estimate required material and resources for work

GS13. determine the location of joint / segment for testing

GS14. determine whether the surface to be tested can be magnetized

GS15. determine appropriate method for applying suspended metal particles to the test surface

GS16. determine appropriate method for applying magnetic field to the test specimen

GS17. determine and check for proper application of magnetic field

GS18. plan work targets, allocate time schedule to sub-ordinates and organize completion of task within allocated time

GS19. ensure completion of work as per agreed time schedule and quality

GS20. report to superiors in case of any defects or shortage in tested components and sections

GS21. assess quantity of materials for day work

GS22. optimize resources

GS23. minimize wastages

GS24. assess whether the temperature of the specimen is within applicable range

GS25. assess complexity of the tasks and provide guidance for carrying out corrective action as per requirement

GS26. identify and assess how violation of any safety norms may lead to accidents

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Perform Magnetic Particle test on structural steel welded joints to detect deformities present on the surface, or originating from the surface	**30**	**70**	**-**	**-**
PC1. read and interpret the quality plan, WPS, fabrication shop drawings etc. to understand the technical specifications, locations of testing and method to be adopted	-	-	-	-
PC2. identify the location of joint or section for conducting the test as per specification	-	-	-	-
PC3. estimate the quantity of materials and time required for completion of test	-	-	-	-
PC4. read and interpret the standard specifications and perform the test in accordance to the same	-	-	-	-
PC5. confirm that the surface to be tested can be magnetized	-	-	-	-
PC6. carry out pre-test cleaning activities using solvents, brushes, scrubs etc. to remove any paint, dust, oil, grease or scale etc. from the test surface	-	-	-	-
PC7. ensure that the temperature of the test specimen is within applicable limits prescribed in the test procedure	-	-	-	-
PC8. ensure proper storage of consumables to avoid contamination	-	-	-	-
PC9. ensure that lighting arrangements are appropriate and compatible to type of indicator used	-	-	-	-
PC10. apply suspended magnetic particles to the test surface using appropriate method	-	-	-	-
PC11. apply dry powder indicators to the surface of the test specimen	-	-	-	-
PC12. select the suitable method for application of magnetic field to the test specimen	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. apply the magnetic fields in two directions perpendicular to each other of required or instructed magnitude	-	-	-	-
PC14. check the proper application of magnetic field	-	-	-	-
PC15. clean the particulate matter after getting approval from the seniors	-	-	-	-
PC16. setup reverse magnetic field to demagnetized the component or structure under inspection	-	-	-	-
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	CON/N0412
NOS Name	Perform Magnetic Particle test on structural steel welded joints
Sector	Construction
Sub-Sector	Real Estate and Infrastructure construction
Occupation	Quality Assurance & Quality Control
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	

CON/N0413: Perform liquid /dye penetration test on structural steel welded joints

Description

This unit describes the skills and knowledge required to perform liquid /dye penetration test on structural steel welded joints

Scope

The scope covers the following :

- Perform liquid /dye penetration test on structural steel components and sections to detect deformities present on the surface, or originating from the surface

Elements and Performance Criteria

Perform liquid /dyepenetration test on structural steel components and sections to detect deformities present on the surface, or originating from the surface

To be competent, the user/individual on the job must be able to:

PC1. read and interpret the quality plan, WPS, fabrication shop drawings etc to understand the technical specifications, locations of testing and method to be adopted

PC2. identify the location of joint or section for conducting the test as per specification

PC3. estimate the quantity of penetrants and developers and time required for completion of test

PC4. read and interpret the standard specifications and perform the test in accordance to the same

PC5. confirm the compatibility of penetrants and developers with each other, with base metal and with conditions of testing

PC6. out pre-test cleaning activities using solvents, brushes, scrubs etc. to remove any paint, dust, oil, grease or scale etc. from the test surface

PC7. ensure that area surrounding the test surface is also adequately cleaned and free from impurities

PC8. identify and use suitable means to apply penetrant on the test surface

PC9. apply the penetrant uniformly across the test specimen and allow it to sock into the flaw for instructed or specified period of time

PC10. remove excess penetrant from the surface of test specimen using suitable means as per type of penetrant used and manufactures guidelines

PC11. avoid direct application of removers/solvents to the test surface

PC12. select and use appropriate developers based upon the type of penetrant and inspection condition

PC13. apply the developer uniformly across the test specimen as per manufactures guidelines or standard procedure

PC14. ensure that developer is not disturbed for specified period of time as per instructions for blotting action to take place correctly

PC15. inform the superiors about the completion of blotting period and development of penetrant on the test surface

PC16. clean the developer and penetrant post inspection of seniors

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. standard practices for quality control works

KU2. safety rules and regulations for handling and storing required tools, equipment and materials

KU3. personal protection including the use of related safety gears & equipments

KU4. service request procedures for tools, materials and equipments

KU5. statutory compliance requirement related to working at height

KU6. statutory compliance requirement related to workmen engagement

KU7. principle of dye penetration test

KU8. different materials on which dye penetration test can be carried out

KU9. how to select materials used in dye penetration test for various conditionsof testing

KU10. type of defects inspected by dye penetration test

KU11. limitations of dye penetration test

KU12. precautions to be taken while conducting dye penetration test

KU13. importance of cleaning the surface before and after conducting dyepenetration test

KU14. different methods of cleaning metal surface

KU15. different types of penetrants

KU16. different methods of application of penetrants

KU17. different types of developers

KU18. different methods of application of developers

KU19. manufacturers guidelines for application of and development time of various penetrants and developers

KU20. safety parameters to be undertaken while conducting the dye penetrationtest

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. write in at least two language, preferably in the local language of the site and basic English

GS2. provide clear and simple instructions, details & sketches to sub-ordinate

GS3. record and document daily productivity report, daily labour attendance &details regarding work

GS4. prepare basic status updates for the superiors in the prescribed format

GS5. read one or more language, preferably in the local language of the site

GS6. read drawing, specification and standards related to relevant work

GS7. read key documents including quality standards and standard workingmethods

GS8. read various, sign boards, safety rules and safety tags , instructions relatedto exit routes during emergency at the workplace

GS9. speak in one or more language, preferably in one of the local languages ofthe site

GS10. listen and follow instructions clearly given by the superior

GS11. provide clear instructions to subordinates for completion of task as per work plan, time schedule and quality

GS12. estimate required material and resources for work

GS13. determine the location of joint / segment for testing

GS14. determine appropriate location of joint / segment for testing

GS15. determine quantity of developers and penetrants and assess compatibilitywith base metal and testing conditions

GS16. determine appropriate method for uniform application of penetrant and developer

GS17. plan work targets, allocate time schedule to sub-ordinates and organize completion of task within allocated time

GS18. ensure completion of work as per agreed time schedule and quality

GS19. report to superiors in case of any defects or shortage in tested components and sections

GS20. check for impurities / dirt on test surface and rectify

GS21. check for excess penetrant on the surface and remove the same

GS22. ensure that removers / solvents are not directly applied to the test surface

GS23. assess quantity of materials for day work

GS24. optimize resources

GS25. minimize wastages

GS26. assess complexity of the tasks and provide guidance for carrying out corrective action as per requirement

GS27. identify and assess how violation of any safety norms may lead to accidents

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Perform liquid /dyepenetration test on structural steel components and sections to detect deformities present on the surface, or originating from the surface	**30**	**70**	**-**	**-**
PC1. read and interpret the quality plan, WPS, fabrication shop drawings etc to understand the technical specifications, locations of testing and method to be adopted	-	-	-	-
PC2. identify the location of joint or section for conducting the test as per specification	-	-	-	-
PC3. estimate the quantity of penetrants and developers and time required for completion of test	-	-	-	-
PC4. read and interpret the standard specifications and perform the test in accordance to the same	-	-	-	-
PC5. confirm the compatibility of penetrants and developers with each other, with base metal and with conditions of testing	-	-	-	-
PC6. out pre-test cleaning activities using solvents, brushes, scrubs etc. to remove any paint, dust, oil, grease or scale etc. from the test surface	-	-	-	-
PC7. ensure that area surrounding the test surface is also adequately cleaned and free from impurities	-	-	-	-
PC8. identify and use suitable means to apply penetrant on the test surface	-	-	-	-
PC9. apply the penetrant uniformly across the test specimen and allow it to sock into the flaw for instructed or specified period of time	-	-	-	-
PC10. remove excess penetrant from the surface of test specimen using suitable means as per type of penetrant used and manufactures guidelines	-	-	-	-
PC11. avoid direct application of removers/solvents to the test surface	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. select and use appropriate developers based upon the type of penetrant and inspection condition	-	-	-	-
PC13. apply the developer uniformly across the test specimen as per manufactures guidelines or standard procedure	-	-	-	-
PC14. ensure that developer is not disturbed for specified period of time as per instructions for blotting action to take place correctly	-	-	-	-
PC15. inform the superiors about the completion of blotting period and development of penetrant on the test surface	-	-	-	-
PC16. clean the developer and penetrant post inspection of seniors	-	-	-	-
NOS Total	**30**	**70**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	CON/N0413
NOS Name	Perform liquid /dye penetration test on structural steel welded joints
Sector	Construction
Sub-Sector	Real Estate and Infrastructure construction
Occupation	Quality Assurance & Quality Control
NSQF Level	4
Credits	TBD
Version	2.0
Last Reviewed Date	NA
Next Review Date	NA
NSQC Clearance Date	

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

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 knowledge part will be based on knowledge bank of questions created by Assessment Bodies subject to approval by SSC

3. Individual assessment agencies will create unique question papers for knowledge/theory part for assessment of candidates as per assessment criteria given below

4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on assessment criteria.

5. The passing percentage for each QP will be 70%. To pass the Qualification Pack, every trainee should score a minimum of 70% individually in each NOS.

6. The Assessor shall check the final outcome of the practices while evaluating the steps performed to achieve the final outcome.

7. The trainee shall be provided with a chance to repeat the test to correct his procedures in case of improper performance, with a deduction of marks for each iteration.

8. After the certain number of iteration as decided by SSC the trainee is marked as fail, scoring zero marks for the procedure for the practical activity.

9. In case of successfully passing only certain number of NOSs, the trainee is eligible to take subsequent assessment on the balance NOSs to pass the Qualification Pack within the specified time frame set by SSC.

10. Minimum duration of Assessment of each QP shall be of 4hrs/trainee.

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
CON/N9001.Work according to personal health, safety and environment protocol at construction site	30	70	-	-	100	10
Total	**30**	**70**	**-**	**-**	**100**	**10**

Elective: 1 UT

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
CON/N0411.Perform ultrasonic testing on structural steel components and welded sections	30	70	-	-	100	90
Total	**30**	**70**	**-**	**-**	**100**	**90**

Elective: 2 MPT

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
CON/N0412.Perform Magnetic Particle test on structural steel welded joints	30	70	-	-	100	90
Total	**30**	**70**	**-**	**-**	**100**	**90**

Elective: 3 DPT

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
CON/N0413.Perform liquid /dye penetration test on structural steel welded joints	30	70	-	-	100	90
Total	**30**	**70**	**-**	**-**	**100**	**90**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.