

* QUALIFICATIONSPACK-OCCUPATIONALSTANDARDSFORINSTRUMENTATION
AUTOMATION SURVEILLANCE & COMMUNICATION INDUSTRY

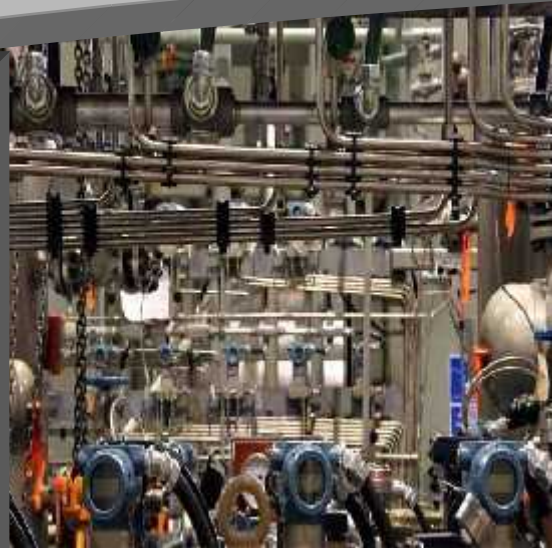
What are Occupational Standards (OS)?

□ OS describe what individuals need to do, know and understand in order to carry out a particular job role or function

□ OS are performance standards that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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Introduction

Qualifications Pack - Technician-Cabling (Multi Skill)

SECTOR: INSTRUMENTATION AUTOMATION SURVEILLANCE & COMMUNICATION

SUB-SECTOR: Instrumentation / Automation

OCCUPATION: Installation & Commissioning

REFERENCE ID: IAS/Q0204

ALIGNED TO: NCO-2015/ NIL

Brief Job Description: Technician - Cabling (Multi Skill) is a multi-skilled person who can plan and lay the cables and do the termination and interconnection work involved in diverse environments such as process plants, factory automation and building automation projects.

Personal Attributes: This job requires discipline and attention to details, interdisciplinary aptitude and ability to learn. The person should be willing to work for long hours to meet deadlines and be able to cope with pressure.

Qualifications Pack For Technician - Cabling (Multi Skill)

Job Details	Qualifications Pack Code	IAS/Q0204		
	Job Role	Technician - Cabling (Multi Skill)		
	Credits (NSQF)	TBD	Version number	1.0
	Sector	Instrumentation, Automation, Surveillance, Communication	Drafted on	09/10/2017
	Sub-sector	Instrumentation / Automation	Last reviewed on	09/10/2017
	Occupation	Installation & Commissioning	Next review date	09/10/20179

Job Role	Technician - Cabling (Multi Skill)
Role Description	A multi-skilled person who can plan and lay the cables and do the termination and interconnection work involved in diverse environments such as process plants, factory automation and building automation projects.
NSQF level	4
Minimum Educational Qualifications*	ITI Electronics or equivalent
Maximum Educational Qualifications*	Not Applicable
Training (Suggested but not mandatory)	Practical Training in a factory, installation site, building and commercial premises. Exposure of CCTV and LAN essential
Minimum Job Entry Age	19 years
Experience	At least one-year hands-on experience in cabling in factory, installation site, building and commercial premises. Exposure of CCTV and LAN essential.
Applicable National Occupational Standards (NOS)	<p>Compulsory:</p> <ol style="list-style-type: none"> 1. IAS/N0215 Planning and Laying of Instrumentation Cabling 2. IAS/N0216 Planning and Laying of Low Voltage Power Cabling 3. IAS/N0217 Planning and Laying of CCTV Cabling 4. IAS/N0218 Laying of Copper/Fiber LAN Cable 5. IAS/N2105 Work Effectively With Teams 6. IAS/N2003 Health and Safety at Workplace
Performance Criteria	As described in the relevant OS units

Qualifications Pack For Technician - Cabling (Multi Skill)

Definitions	Keywords /Terms	Description
	Core skills/generic skills	Core skills or generic skills are a group of skills that are key to learning and working 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.
	Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a data base to verify that this is the appropriate OS they are looking for.
	Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or group of persons.
	Instrumentation	Instrumentation is the variety of measuring instruments to monitor and control a process. It is the art and science of measurement and control of process variables within a production, laboratory, or manufacturing area.
	Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
	Knowledge and understanding	Knowledge and understanding statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standards.
	National occupational standards	NOS are occupational standards which apply uniquely in the Indian context.
	Occupation	Occupation is a set of job roles under which role holders perform similar/related set of functions in an industry.
	Organizational context	Organizational context includes the way the organization is structured and how it operates, including the operative knowledge managers have of their relevant areas of responsibility.
	OS (Occupational Standards)	OS specify the standards of performance an individual must achieve when carrying out a function in the work place together with the knowledge and understanding they need to meet that standard consistently. Occupational standards are applicable both in Indian and global contexts.
Performance Criteria	Performance criteria are statements that together specify the standards of performance required when carrying out a task.	
Qualification pack code	Qualification pack code is a unique reference code that identifies a qualification pack.	
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with, carrying out the function which has a critical impact on the quality of performance required.	
Sector	Sector is a conglomeration of different business operation having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.	

Qualifications Pack For Technician - Cabling (Multi Skill)

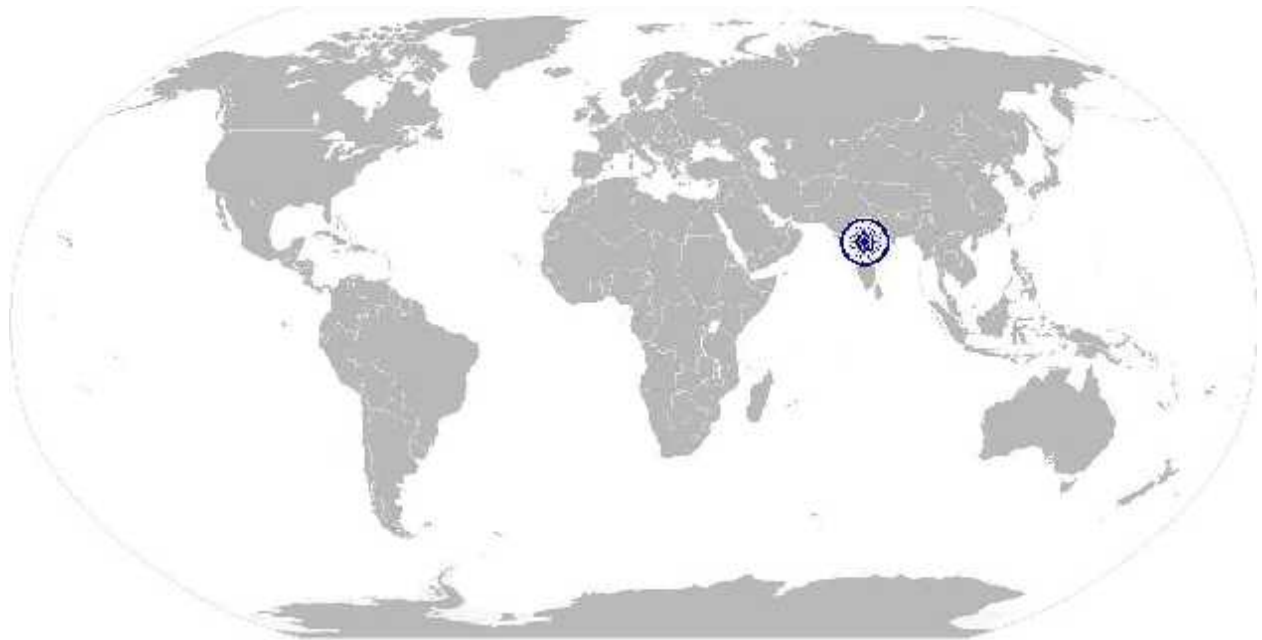
Sub Sector	Sub sector is derived from a further breakdown based on the characteristics and interests of its components.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Traceability	Ability to correlate calibration of equipment to national and international standards - ultimately to secondary and primary standards.
Unit Code	Unit code is a unique identifier for an 'OS' unit which can be denoted with either 'O' or 'N'.
Unit title	Unit title gives clear overall statement about what the incumbent should be able to do.

Acronyms

Keywords/Terms	Description
BOQ	Bill of Quantities
CCTV	Closed Circuit Television
ESD	Electro Static Discharge
RF	Radio Frequency
ESCOM	Electricity Supply Company
HVAC	Heating, Ventilation and Air Conditioning
I&C	Installation & Commissioning
GI	Galvanized iron
THD	Total Harmonic Distortion
HT/LT	High Tension / Low Tension AC Power Supply

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National Occupational Standard



Overview

This OS Unit about Planning and Laying of Instrumentation Cabling in a factory or other industrial premises according to the design, BOQ and the material provided.

IAS/N0215

Planning and Laying of Instrumentation Cabling

National Occupational Standard

Unit Code	IAS/N0215
Unit Title (Task)	Planning and Laying of Instrumentation Cabling
Description	This OS Unit about Planning and Laying of Instrumentation Cabling in a factory or other industrial premises according to the design, BOQ and the material provided.
Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • Perform Preparatory Work • Laying of conduits and pulling of cables per supplied drawings • Termination of cables on the equipment, per supplied drawings • Verification of connections
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Perform Preparatory Work	<p>The user/ individual on the job needs to know and understand how to:</p> <p>PC1. Get familiar with the customer, the plant, processes and procedures</p> <p>PC2. Study and understand documents relating to cabling, wiring, connected equipment and plant layout.</p> <p>PC3. Plan cable routing and scheduling</p> <p>PC4. Estimate quantity of cables, conduits, raceways and other associated components</p> <p>PC5. Get materials from stores / customer</p>
Lay conduits, Raceways and Pull Cables	<p>The user/ individual on the job needs to know and understand how to :</p> <p>PC6. Locate and mark the position for conduiting, referring to layout drawings and specifications.</p> <p>PC7. Measure required lengths of raceways, cable trays and conduiting for each section of cabling</p> <p>PC8. Drill holes for mounting brackets etc. in the supporting structure, for mounting the making cable trays etc. Make sure that it does not interfere with any existing fittings or cause obstruction.</p> <p>PC9. Install raceways, cable trays and conduiting as per procedure and drawings for the instrumentation wires/cables.</p> <p>PC10. Ensure that Power cable and instrumentation cable are not run in same conduit or trench to avoid cross talk.</p> <p>PC11. Measure required length (plus additional margin for termination) of cable of appropriate type for each conduit</p> <p>PC12. Run cables through the conduits and raceways, along with earth wires if specified, per approved drawings and procedures.</p> <p>PC13. Seal the conduit ends using approved material/device.</p> <p>PC14. Route the cables to respective Junction Boxes / Panels using flexible hoses or other approved methods, leaving adequate length of cable for termination</p> <p>PC15. Insert the cables through Glands in the receiving enclosure and fix</p> <p>PC16. Strip the sheath/outer covering/ shield to suitable length and dress the</p>

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Planning and Laying of Instrumentation Cabling

	<p>cable per approved practices PC17. Mark cables for identification using proved procedure PC18. Follow accepted color coding practices</p>
Terminate Cables on Junction Boxes / Panels	<p>The user/ individual on the job needs to know and understand how to : PC19. Follow wire color codes as specified in drawings. PC20. Route the stripped end of the cable through the internal cable trays/guides to the appropriate terminals. Use cable ties appropriately to tie the wires neatly. PC21. Mark all individual wires using standard ferrules with tag numbers / identification as provided in the drawing for ease of identification. PC22. Strip the wire with approved tools and terminate on lugs/spade terminals etc. using approved crimping tools. PC23. Check that the shield connection is made to specified terminal. Ensure that the shield is not grounded at both ends, as it causes Ground Loop, which is harmful for the signal.</p>
Verify Connections	<p>The user/ individual on the job needs to know and understand how to: PC24. Crosscheck with wiring list and follow the recommended verification procedure PC25. Perform continuity check of wires</p>
Knowledge and Understanding (K)	
A. Organizational Context (Knowledge of the company / organization and its processes)	<p>The user/individual on the job needs to know</p> <p>KA1. Company hierarchy and reporting structure KA2. Company code of conduct KA3. company culture KA4. Company documentation policy KA5. Quality and standards systems followed in the company KA6. Company business, locations, products, services and clients KA7. Company website, contacts KA8. Partners, their products and services KA9. Company sales and after sales policies KA10. Working hours, shifts, off days and leave entitlements</p>
B. Technical Knowledge	<p>The individual on the job needs to know and understand:</p> <p>KB1 . The purpose of the project, the workflow and procedure involved. KB2. Site conditions and how these impact the cabling work. KB3. Rules and regulations to be followed under normal and emergency conditions KB4. The job description and responsibility, if any. KB5. Knows about types of instrumentation cables, their characteristics and usage KB6. Knows about cabling tools, equipment and accessories used KB7. Knows about standards and practices relating to instrumentation cabling KB8. Knows safety precaution in handling of the electrical equipment and providing first aid in the event of accidental electrocution. KB9. Type of hand tools, accessories and their locations that falls under the</p>

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Planning and Laying of Instrumentation Cabling

	individual's domain of work.
Skills (S) [Optional]	
A. Core Skills/ Generic Skills	Writing Skills
	The user/ individual on the job needs to know and understand how to: SA1. Compose e-mails, letters and other official documents SA2. Write schedules and timelines SA3. Use Formats and check list for Site Readiness planning and reports SA4. Fill forms for material issue and return
	Reading Skills
	The user/ individual on the job needs to know and understand how to : SA5. Company policy related to site safety precaution and readiness SA6. Formats for site Readiness check sheets, lists etc. SA7. Written instructions from Installation Engineer SA8. Read technical specifications, drawings, manuals, instructions SA9. Read standards and regulatory compliance documents SA10. Read schedules and timelines
	Oral Communication (Listening and Speaking skills)
	The user/ individual on the job needs to know and understand how to: SA11. Discuss schedules and work items with co-workers SA12. Keep customer, vendors and partners informed about progress SA13. Report issues and problems in clear terms to the Supervisor / Engineer SA14. Report progress to Supervisor/ Engineer
B. Professional Skills	Decision Making
	The user/individual on the job needs to know and understand how to: SB1. Take decisions pertaining to the installation SB2. Take pragmatic decisions to keep the project on track when issues arise with the work done by partners or vendors, without compromising the quality
	Plan and Organize
	The user/individual on the job needs to know and understand how to: SB3. Execute the plan for the installation and detail its activities so that it can be finished on time. SB4. Help the I&C Engineer in preparing the installation plan.
	Customer Centricity
	The user/ individual on the job needs to know and understand how to: SB5. Real needs of the customer and suggest most appropriate solution SB6. Support customers when they need help
	Problem-solving

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Planning and Laying of Instrumentation Cabling

	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB7. Think through the problem, evaluate the possible solution(s) and suggest an optimum /best possible solution(s)</p> <p>SB8. Identify immediate or temporary solutions to resolve delays</p>
	<p>Analytical Thinking</p>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SB9. Use the existing information to arrive at actionable decision points</p> <p>SB10. Use the existing information for improving the customer satisfaction</p> <p>SB11. Use the existing information to optimize solution and company business</p> <p>SB12. Analyze problems and identify causes and possible solutions</p>
	<p>Critical Thinking</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB13. Apply, analyze, and evaluate the information gathered from observation, experience, reasoning, or communication, as a guide to thought and action</p> <p>SB14. Analyze the way in which the existing facility layout is in operation and think of more economic and feasible measures for existing layout modification.</p>

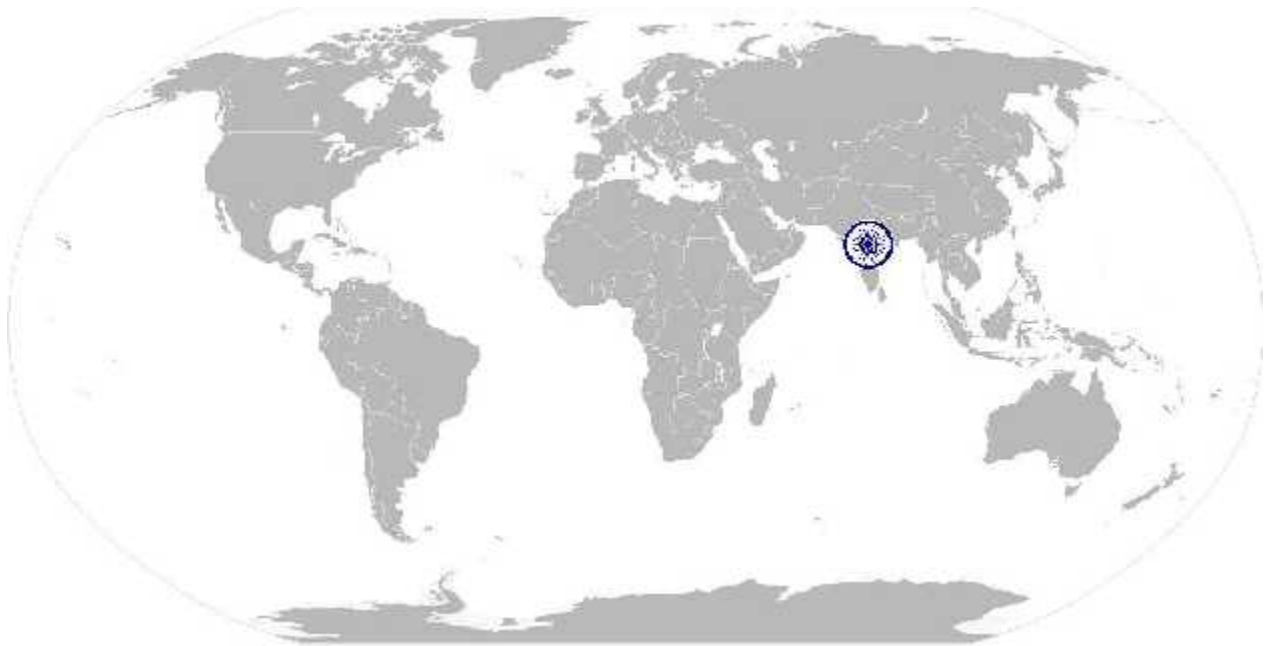


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Planning and Laying of Instrumentation Cabling

NOS Version Control

NOS Code	ISA/N0215		
Credits (NSQF)	TBD	Version number	1.0
Industry	Instrumentation, Automation, Surveillance, Communication	Drafted on	30/09/2017
Industry Sub-sector	Instrumentation / Automation	Last reviewed on	09/10/2017
Occupation	Installation & Commissioning	Next review date	09/10/20179



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National Occupational Standard



Overview

This OS Unit about Planning and Laying of Low Voltage Power Cabling in a factory, industrial or business premises according to the design, BOQ and the material provided.

IAS/N0216

Planning and Laying of Low Voltage Power Cabling

National Occupational Standard

Unit Code	IAS/N0216
Unit Title (Task)	Planning and Laying of Low Voltage Power Cabling
Description	This OS Unit about Planning and Laying of Low Voltage Power Cabling in a factory, industrial or business premises according to the design, BOQ and the material provided.
Scope	<p>This unit task covers the following:</p> <ul style="list-style-type: none"> • Perform Preparatory Work • Laying of conduits and pulling of cables per supplied drawings • Termination of cables on the equipment, per supplied drawings • Verification of connections
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Perform Preparatory Work	<p>The user/ individual on the job needs to know and understand how to:</p> <p>PC1. Get familiar with the customer location and work procedures followed</p> <p>PC2. Study and understand existing documents relating to cabling, wiring, connected equipment and site layout.</p> <p>PC3. Verify whether concealed conduits exist in the premises, if so, get the layout drawing. If conduits do not exist, these will be laid on the walls and will be exposed.</p> <p>PC4. Plan routing and scheduling. Understand/plan color coding of insulated single core wires.</p> <p>PC5. Estimate the quantity of cables, insulated wires of single/multi-strand copper conductors, conduits, electrical parts and accessories of appropriate specifications.</p> <p>PC6. Get materials from stores / customer</p>
Lay conduits, Raceways and Pull Cables	<p>The user/ individual on the job needs to know and understand how to:</p> <p>PC7. Locate and mark the position for conduiting, referring to layout drawings and specifications.</p> <p>PC8. Measure required lengths of raceways, cable trays and conduiting for each section of cabling</p> <p>PC9. Drill holes for mounting brackets etc. in the supporting structure, for mounting the making cable trays etc. Make sure that it does not interfere with any existing fittings or cause obstruction.</p> <p>PC10. Install raceways, cable trays and conduiting as per procedure and drawings for the instrumentation wires/cables.</p> <p>PC11. Ensure that Power cable and instrumentation cable are not run in same conduit or trench to avoid cross talk.</p> <p>PC12. Measure required length (plus additional margin for termination) of cable of appropriate type for each conduit</p> <p>PC13. Run cables through the conduits and raceways, along with earth wires if specified, per approved drawings and procedures.</p> <p>PC14. Seal the conduit ends using approved material/device.</p> <p>PC15. Route the cables to respective Junction Boxes / Panels using flexible hoses</p>

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Planning and Laying of Low Voltage Power Cabling

	<p>or other approved methods, leaving adequate length of cable for termination</p> <p>PC16. If applicable, insert the cables through Glands in the receiving enclosure and fix</p> <p>PC17. Strip the armor/sheath/outer covering to suitable length and dress the exposed conductors per approved practices.</p> <p>PC18. Mark cables for identification using proved procedure</p> <p>PC19. Follow accepted color coding practices</p>
<p>Terminate Cables on Junction Boxes / Panels</p>	<p>The user/ individual on the job needs to know and understand how to:</p> <p>PC20. Follow wire color codes as specified in drawings.</p> <p>PC21. Route the individual conductors of the cable through the internal cable trays/guides to the appropriate terminals. Use cable ties appropriately to tie the wires neatly.</p> <p>PC22. Mark all individual wires using standard ferrules with tag numbers / identification as provided in the drawing for ease of identification.</p> <p>PC23. Strip the wire with approved tools and terminate on lugs/spade terminals etc. using approved crimping tools.</p> <p>PC24. Check that the shield connection is made to specified terminal. Ensure that the shield is not grounded at both ends, as it causes Ground Loop which is harmful for the signal.</p>
<p>Verify Connections</p>	<p>The user/ individual on the job needs to know and understand how to:</p> <p>PC25. Crosscheck with wiring list and follow the recommended verification procedure</p> <p>PC26. Perform continuity check of wires</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organizational Context (Knowledge of the company / organization and its processes)</p>	<p>The individual on the job needs to know and understand:</p> <p>KA1. Company hierarchy and reporting structure</p> <p>KA2. Company code of conduct</p> <p>KA3. company culture</p> <p>KA4. Company documentation policy</p> <p>KA5. Quality and standards systems followed in the company</p> <p>KA6. Company business, locations, products, services and clients</p> <p>KA7. Company website, contacts</p> <p>KA8. Partners, their products and services</p> <p>KA9. Company sales and after sales policies</p> <p>KA10. Working hours, shifts, off days and leave entitlements</p>

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Planning and Laying of Low Voltage Power Cabling

<p>B. Technical Knowledge</p>	<p>The individual on the job needs to know and understand:</p> <p>KB1. The purpose of the project, the workflow and procedure involved.</p> <p>KB2. Site conditions and how these impact the cabling works.</p> <p>KB3. Rules and regulations to be followed under normal and emergency conditions</p> <p>KB4. The job description and responsibility, if any.</p> <p>KB5. Knows about types of cables and wires, their material, gauges, current ratings, characteristics and usage</p> <p>KB6. Knows about cabling tools, equipment and accessories used</p> <p>KB7. Knows about standards and practices relating to low voltage power cabling</p> <p>KB8. Safety precaution in handling of the electrical equipment and providing first aid in the event of accidental electrocution.</p> <p>KB9. Type of hand tools, accessories and their locations that falls under the individual's domain of work.</p>
<p>Skills (S) [Optional]</p>	
<p>C. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. Compose e-mails, letters and other official documents</p> <p>SA2. Write schedules and timelines</p> <p>SA3. Use Formats and check list for Site Readiness planning and reports</p> <p>SA4. Fill forms for material issue and return</p> <p>Reading Skills</p> <p>The individual on the job needs to know and understand :</p> <p>SA5. Company policy related to site safety precaution and readiness</p> <p>SA6. Formats for site Readiness check sheets, lists etc.</p> <p>SA7. Written instructions from Installation Engineer</p> <p>SA8. Read technical specifications, drawings, manuals, instructions</p> <p>SA9. Read standards and regulatory compliance documents</p> <p>SA10. Read schedules and timelines</p>
	<p>Oral Communication (Listening and Speaking skills)</p> <p>The individual on the job needs to know and understand how to:</p> <p>SA11. Discuss schedules and work items with co-workers</p> <p>SA12. Keep customer, vendors and partners informed about progress</p> <p>SA13. Report issues and problems in clear terms to the Supervisor / Engineer</p> <p>SA14. Report progress to Supervisor/ Engineer</p>
<p>D. Professional Skills</p>	<p>Decision Making</p> <p>The individual on the job needs to know and understand how-to:</p> <p>SB1. Take decisions pertaining to the installation</p> <p>SB2. Take pragmatic decisions to keep the project on track when issues arise with the work done by partners or vendors, without compromising the quality</p> <p>Plan and Organize</p>

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Planning and Laying of Low Voltage Power Cabling

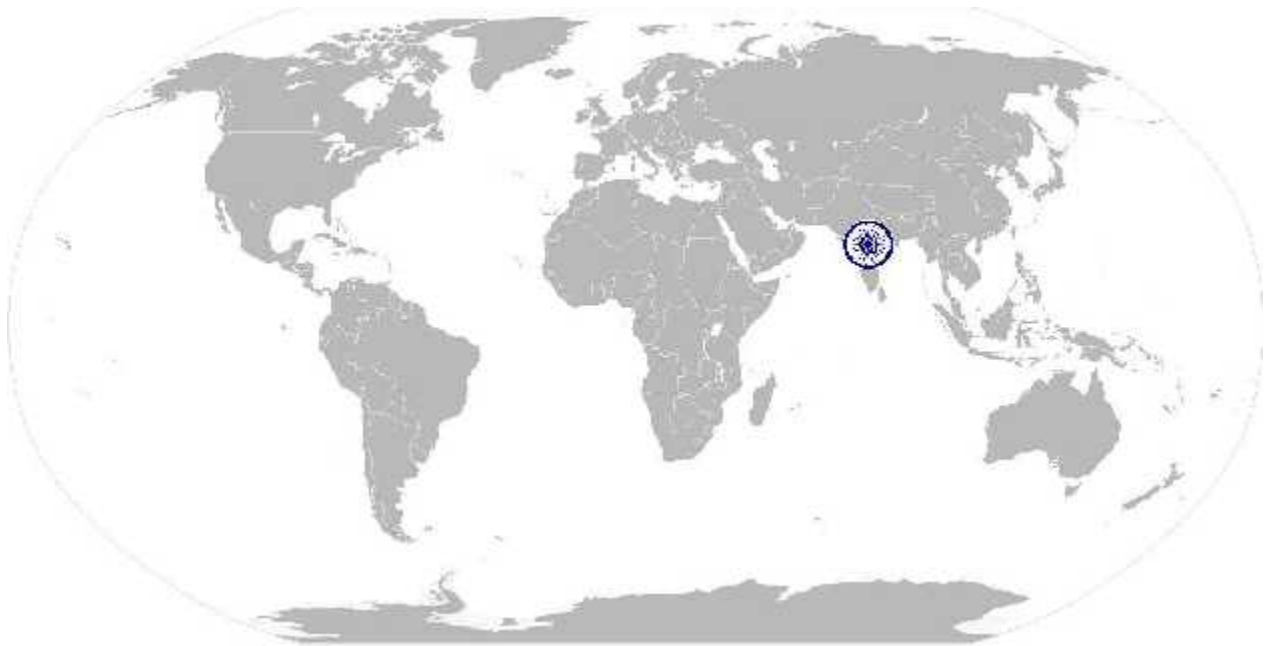
	<p>The individual on the job needs to know and understand:</p> <p>SB3. Execute the plan for the installation and detail its activities so that it can be finished on time.</p> <p>SB4. Help the I&C Engineer in preparing the installation plan.</p>
	<p>Customer Centricity</p>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SB5. Real needs of the customer and suggest most appropriate solution SB6. Support customers when they need help</p>
	<p>Problem Solving</p>
	<p>The individual on the job needs to know and understand how-to:</p> <p>SB7. Think through the problem, evaluate the possible solution(s) and suggest an optimum /best possible solution(s)</p> <p>SB8. Identify immediate or temporary solutions to resolve delays</p>
	<p>Analytical Thinking</p>
	<p>The individual on the job needs to know and understand how to:</p> <p>SB9. Use the existing information to arrive at actionable decision points</p> <p>SB10. Use the existing information for improving the customer satisfaction</p> <p>SB11. Use the existing information to optimize solution and company business</p> <p>SB12. Analyze problems and identify causes and possible solutions</p>
	<p>Critical Thinking</p>
<p>The individual on the job needs to know and understand how to:</p> <p>SB13. Apply, analyze, and evaluate the information gathered from observation, experience, reasoning, or communication, as a guide to thought and action</p> <p>SB14. Analyze the way in which the existing facility layout is in operation and think of more economic and feasible measures for existing layout modification.</p>	

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Planning and Laying of Low Voltage Power Cabling

NOS Version Control

NOS Code	ISA/N0216		
Credits (NSQF)	TBD	Version number	1.0
Industry	Instrumentation, Automation, Surveillance, Communication	Drafted on	30/09/2017
Industry Sub-sector	Instrumentation / Automation	Last reviewed on	09/10/2017
Occupation	Installation & Commissioning	Next review date	09/10/20179



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National Occupational Standard



Overview

This OS Unit about Planning and Laying of CCTV Cabling in a factory, industrial or business premises according to the design, BOQ and the material provided.

IAS/N0217

Planning and Laying of CCTV Cabling

National Occupational Standard

Unit Code	IAS/N0217
Unit Title (Task)	Planning and Laying of CCTV Cabling
Description	This OS Unit about Planning and Laying of CCTV Cabling in a factory, industrial or business premises according to the design, BOQ and the material provided.
Scope	<p>This unit task covers the following:</p> <ul style="list-style-type: none"> • Perform Preparatory Work • Laying of conduits and pulling of cables per supplied drawings • Termination of cables on the equipment, per supplied drawings • Verification of connections
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Perform Preparatory Work	<p>The user/ individual on the job needs to know and understand how to:</p> <p>PC1. Get familiar with the customer location and work procedures followed</p> <p>PC2. Study and understand existing documents and drawings relating to site layout cabling, wiring and connected equipment.</p> <p>PC3. Verify whether outdoor mounting of cameras on poles is required and whether poles/other structures exist.</p> <p>PC4. Plan erection of support structure (if needed), routing and scheduling. Communicate the plan to customer representative at site and ensure availability of any support infrastructure.</p> <p>PC5. The types of cables to be laid - Power Supply (low voltage DC/AC), Video and LAN/PoE cable (for IP Cameras) etc.</p> <p>PC6. Estimate the quantity of cables of different types, conduits, cable trays, brackets, and other accessories of appropriate specifications.</p> <p>PC7. Get materials from stores / customer</p>
Lay conduits, Raceways and Pull Cables	<p>The user/individual on the job needs to know and understand how to :</p> <p>PC8. For outdoors mounting, locate and mark the position for support structure, referring to layout drawings and specifications.</p> <p>PC9. For fresh conduiting indoors, locate and mark the position for conduiting, referring to layout drawings and specifications.</p> <p>PC10. For fresh conduiting, measure required lengths of conduiting for each section of cabling</p> <p>PC11. Drill holes for mounting brackets etc. in the supporting structure, for mounting cable trays/conduits/raceways. Make sure that it does not interfere with any existing fittings or cause obstruction. Where crossing of beams/pillars etc. occurs, use of flexible conduit may be possible. Consult site Engineer if needed.</p> <p>PC12. Install cable trays/ raceways/conduits as per recommended practice. Use joins / bends where appropriate to connect conduits</p> <p>PC13. Determine number and type of cables to be run through the cable tray / each conduit section</p> <p>PC14. Measure required length (plus additional margin for termination) of cables of appropriate types, for each section / conduit</p>

IAS/N0217

Planning and Laying of CCTV Cabling

	<p>PC15. Lay cables on the cable tray/ Pull cable through the conduits / raceways as applicable.</p> <p>PC16. Route the cables to respective Devices / Panels / Junction boxes etc. as applicable leaving adequate length of cable for termination. Use flexible hoses if required.</p> <p>PC17. If applicable, insert the cables through Glands in the receiving enclosure and fix</p> <p>PC18. Strip the sheath/outer covering/ shield to suitable length and dress the cable per approved practices</p> <p>PC19. Mark cables for identification using proved procedure</p>
<p>Terminate Cables on Junction Boxes / Panels</p>	<p>The user/ individual on the job needs to know and understand how to:</p> <p>PC20. Route cables (power and video/IP) to target devices and terminate on appropriate connectors using the right tools (crimping/soldering/screw etc.). Plug the connectors to the devices, ensuring proper mating.</p> <p>PC21. Before termination, test the coax cable for continuity, open circuit and possible short circuit using multimeter / continuity tester.</p> <p>PC22. For termination inside panels, route the cables through the internal cable trays/guides to the appropriate device. Use cable ties appropriately to tie the wires neatly. Terminate cables on appropriate connectors using the right tools (crimping/soldering/screw etc.). Plug the connectors to the devices, ensuring proper mating.</p> <p>PC23. Mark all cables using standard ferrules / cable markers/ identification as provided in the drawing for ease of identification.</p>
<p>Verify Connections</p>	<p>The user/ individual on the job needs to know and understand how to:</p> <p>PC24. Crosscheck with wiring list and follow the recommended verification procedure</p> <p>PC25. Perform continuity check of wires</p> <p>PC26. Use shielded cable testing equipment if available.</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organizational Context (Knowledge of the company / organization and its processes)</p>	<p>The individual on the job needs to know and understand:</p> <p>KA1. Company hierarchy and reporting structure</p> <p>KA2. Company code of conduct</p> <p>KA3. company culture</p> <p>KA4. Company documentation policy</p> <p>KA5. Quality and standards systems followed in the company</p> <p>KA6. Company business, locations, products, services and clients</p> <p>KA7. Company website, contacts</p> <p>KA8. Partners, their products and services</p> <p>KA9. Company sales and after sales policies</p> <p>KA10. Working hours, shifts, off days and leave entitlements</p>

IAS/N0217

Planning and Laying of CCTV Cabling

<p>B. Technical Knowledge</p>	<p>The individual on the job needs to know and understand:</p> <p>KB1. The purpose of the project, the workflow and procedure involved.</p> <p>KB2. Site conditions and how these impact the cabling works.</p> <p>KB3. Rules and regulations to be followed under normal and emergency conditions</p> <p>KB4. The job description and responsibility, if any.</p> <p>KB5. Knows about types of cables used in CCTV applications, their characteristics and usage</p> <p>KB6. Knows about cabling tools, equipment and accessories used</p> <p>KB7. Knows about standards and practices relating to CCTV cabling</p> <p>KB8. Safety precaution in handling of the electrical equipment and providing first aid in the event of accidental electrocution.</p> <p>KB9. Type of hand tools, accessories and their locations that falls under the individual's domain of work.</p>
<p>Skills (S) [Optional]</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The user/ individual needs to know and understand how to:</p> <p>SA1. Compose e-mails, letters and other official documents</p> <p>SA2. Write schedules and timelines</p> <p>SA3. Use Formats and check list for Site Readiness planning and reports</p> <p>SA4. Fill forms for material issue and return</p> <p>Reading Skills</p> <p>The user/individual on the job needs to know and understand :</p> <p>SA5. Company policy related to site safety precaution and readiness</p> <p>SA6. Formats for site Readiness check sheets, lists etc.</p> <p>SA7. Written instructions from Installation Engineer</p> <p>SA8. Read technical specifications, drawings, manuals, instructions</p> <p>SA9. Read standards and regulatory compliance documents</p> <p>SA10. Read schedules and timelines</p>
	<p>Oral Communication (Listening and Speaking skills)</p> <p>The individual on the job needs to know and understand how to:</p> <p>SA11. Discuss schedules and work items with co-workers</p> <p>SA12. Keep customer, vendors and partners informed about progress</p> <p>SA13. Report issues and problems in clear terms to the Supervisor / Engineer</p> <p>SA14. Report progress to Supervisor/ Engineer</p>
<p>B. Professional Skills</p>	<p>Decision Making</p> <p>The individual on the job needs to know and understand how-to:</p> <p>SB1. Take decisions pertaining to the installation</p> <p>SB2. Take pragmatic decisions to keep the project on track when issues arise with the work done by partners or vendors, without compromising the quality</p> <p>Plan and Organize</p>

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Planning and Laying of CCTV Cabling

	<p>The individual on the job needs to know and understand:</p> <p>SB3. Execute the plan for the installation and detail its activities so that it can be finished on time.</p> <p>SB4. Help the I&C Engineer in preparing the installation plan.</p>
	<p>Customer Centricity</p>
	<p>The individual on the job needs to know and understand how to:</p> <p>SB5. Understand the needs of the customer and suggest most appropriate solution</p> <p>SB6. Support customers when they need help</p>
	<p>Problem Solving</p>
	<p>The individual on the job needs to know and understand how-to:</p> <p>SB7. Think through the problem, evaluate the possible solution(s) and suggest an optimum /best possible solution(s)</p> <p>SB8. Identify immediate or temporary solutions to resolve delays</p>
	<p>Analytical Thinking</p>
	<p>The individual on the job needs to know and understand how to:</p> <p>SB9. Use the existing information to arrive at actionable decision points</p> <p>SB10. Use the existing information for improving the customer satisfaction</p> <p>SB11. Use the existing information to optimize solution and company business</p> <p>SB12. Analyze problems and identify causes and possible solutions</p>
	<p>Critical Thinking</p>
<p>The individual on the job needs to know and understand how to:</p> <p>SB13. Apply, analyze, and evaluate the information gathered from observation, experience, reasoning, or communication, as a guide to thought and action</p> <p>SB14. Analyze the way in which the existing facility layout is in operation and think of more economic and feasible measures for existing layout modification.</p>	

IAS/N0217

Planning and Laying of CCTV Cabling

NOS Version Control

NOS Code	IAS/N0217		
Credits (NSQF)	TBD	Version number	1.0
Industry	Instrumentation, Automation, Surveillance, Communication	Drafted on	30/09/2017
Industry Sub-sector	Instrumentation / Automation	Last reviewed on	09/10/2017
Occupation	Installation & Commissioning	Next review date	09/10/20179



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National Occupational Standard



Overview

This OS Unit about Planning and Laying of Low Voltage Power Cabling in a factory, industrial or business premises according to the design, BOQ and the material provided.

IAS/N0218

Laying of Copper/Fiber LAN Cable

National Occupational Standard

Unit Code		IAS/N0218
Unit Title (Task)		Laying of Copper/Fiber LAN Cable
Description	This OS Unit about Planning and Laying of Copper/Fiber LAN Cable in a factory, industrial or business premises according to the design, BOQ and the material provided.	
Scope	<p>This unit task covers the following:</p> <ul style="list-style-type: none"> • Perform Preparatory Work • Laying of conduits and pulling of cables per supplied drawings • Termination of cables on the equipment, per supplied drawings • Verification of connections 	
Performance Criteria(PC) w.r.t. the Scope		
Element	Performance Criteria	
Perform Preparatory Work	<p>The user/ individual on the job needs to know and understand how to:</p> <p>PC1. Get familiar with the customer location and work procedures followed</p> <p>PC2. Study and understand existing documents relating to cabling, wiring, connected equipment and site layout.</p> <p>PC3. Verify whether concealed conduits exist in the premises, if so, get the layout drawing. If conduits do not exist, these will be laid on the walls and will be exposed.</p> <p>PC4. Plan routing and scheduling. Understand/plan color coding of insulated single core wires.</p> <p>PC5. Estimate the quantity of cables, insulated wires of single/multi-strand copper conductors, conduits, electrical parts and accessories of appropriate specifications.</p> <p>PC6. Get materials from stores / customer</p>	
Lay conduits, Raceways and Pull Cables	<p>The user/ individual on the job needs to know and understand how to:</p> <p>PC7. Locate and mark the position for conduiting, referring to layout drawings and specifications.</p> <p>PC8. Measure required lengths of raceways, cable trays and conduiting for each section of cabling</p> <p>PC9. Drill holes for mounting brackets etc. in the supporting structure, for mounting the making cable trays etc. Make sure that it does not interfere with any existing fittings or cause obstruction.</p> <p>PC10. Install raceways, cable trays and conduiting as per procedure and drawings for the instrumentation wires/cables.</p> <p>PC11. Ensure that Power cable and instrumentation cable are not run in same conduit or trench to avoid cross talk.</p> <p>PC12. Measure required length (plus additional margin for termination) of cable of appropriate type for each conduit</p> <p>PC13. Run cables through the conduits and raceways, along with earth wires if specified, per approved drawings and procedures.</p> <p>PC14. Seal the conduit ends using approved material/device.</p> <p>PC15. Route the cables to respective Junction Boxes / Panels using flexible hoses</p>	

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Laying of Copper/Fiber LAN Cable

	<p>or other approved methods, leaving adequate length of cable for termination</p> <p>PC16. If applicable, insert the cables through Glands in the receiving enclosure and fix</p> <p>PC17. Strip the armor/sheath/outer covering to suitable length and dress the exposed conductors per approved practices.</p> <p>PC18. Mark cables for identification using proved procedure</p> <p>PC19. Follow accepted color coding practices</p>
<p>Terminate Cables on Junction Boxes / Panels</p>	<p>The user/ individual on the job needs to know and understand how to:</p> <p>PC20. Follow wire color codes as specified in drawings.</p> <p>PC21. Route the individual conductors of the cable through the internal cable trays/guides to the appropriate terminals. Use cable ties appropriately to tie the wires neatly.</p> <p>PC22. Mark all individual wires using standard ferrules with tag numbers / identification as provided in the drawing for ease of identification.</p> <p>PC23. Strip the wire with approved tools and terminate on lugs/spade terminals etc. using approved crimping tools.</p> <p>PC24. Check that the shield connection is made to specified terminal. Ensure that the shield is not grounded at both ends, as it causes Ground Loop which is harmful for the signal.</p>
<p>Verify Connections</p>	<p>The user/ individual on the job needs to know and understand how to:</p> <p>PC25. Crosscheck with wiring list and follow the recommended verification procedure</p> <p>PC26. Perform continuity check of wires</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organizational Context (Knowledge of the company / organization and its processes)</p>	<p>The individual on the job needs to know and understand:</p> <p>KA1. Company hierarchy and reporting structure</p> <p>KA2. Company code of conduct</p> <p>KA3. company culture</p> <p>KA4. Company documentation policy</p> <p>KA5. Quality and standards systems followed in the company</p> <p>KA6. Company business, locations, products, services and clients</p> <p>KA7. Company website, contacts</p> <p>KA8. Partners, their products and services</p> <p>KA9. Company sales and after sales policies</p> <p>KA10. Working hours, shifts, off days and leave entitlements</p>

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Laying of Copper/Fiber LAN Cable

<p>B. Technical Knowledge</p>	<p>The user/ individual on the job needs to know and understand:</p> <p>KB1. The purpose of the project, the workflow and procedure involved.</p> <p>KB2. Site conditions and how these impact the cabling works.</p> <p>KB3. Rules and regulations to be followed under normal and emergency conditions</p> <p>KB4. The job description and responsibility, if any.</p> <p>KB5. Knows about types of copper LAN cables, crimping tools, test equipment and accessories used</p> <p>KB6. Knows about types of Fiber LAN cables, connectors, splicing tools, test equipment and accessories used</p> <p>KB7. Knows about Standards and Practices relating to copper LAN cables - especially relating to maximum lengths at different speeds, insertion loss etc.</p> <p>KB8. Knows about Standards and Practices relating to Fiber LAN cables - especially relating to maximum lengths for different types, insertion loss etc.</p> <p>KB9. Precautions in handling Fiber cables and connectors</p> <p>KB10. Safety precaution in handling of the electrical equipment and providing first aid in the event of accidental electrocution.</p> <p>KB11. Type of hand tools, accessories and their locations that falls under the individual's domain of work.</p>
<p>Skills (S) [Optional]</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The user/individual needs to know and understand how to:</p> <p>SA1. Compose e-mails, letters and other official documents</p> <p>SA2. Write schedules and timelines</p> <p>SA3. Use Formats and check list for Site Readiness planning and reports</p> <p>SA4. Fill forms for material issue and return</p> <p>Reading Skills</p> <p>The user/ individual on the job needs to know and understand :</p> <p>SA5. Company policy related to site safety precaution and readiness</p> <p>SA6. Formats for site Readiness check sheets, lists etc.</p> <p>SA7. Written instructions from Installation Engineer</p> <p>SA8. Read technical specifications, drawings, manuals, instructions</p> <p>SA9. Read standards and regulatory compliance documents</p> <p>SA10. Read schedules and timelines</p>
	<p>Oral Communication (Listening and Speaking skills)</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA11. Discuss schedules and work items with co-workers</p> <p>SA12. Keep customer, vendors and partners informed about progress</p> <p>SA13. Report issues and problems in clear terms to the Supervisor / Engineer</p> <p>SA14. Report progress to Supervisor/ Engineer</p>
<p>B. Professional Skills</p>	<p>Decision Making</p>

IAS/N0218

Laying of Copper/Fiber LAN Cable

	<p>The user/ individual on the job needs to know and understand how-to:</p> <p>SB1. Take decisions pertaining to the installation</p> <p>SB2. Take pragmatic decisions to keep the project on track when issues arise with the work done by partners or vendors, without compromising the quality</p>
	<p>Plan and Organize</p>
	<p>The user/ individual on the job needs to know and understand:</p> <p>SB3. Execute the plan for the installation and detail its activities so that it can be finished on time.</p> <p>SB4. Help the I&C Engineer in preparing the installation plan.</p>
	<p>Customer Centricity</p>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SB5. The needs of the customer and suggest most appropriate solution</p> <p>SB6. Support customers when they need help</p>
	<p>Problem Solving</p>
	<p>The user/ individual on the job needs to know and understand how-to:</p> <p>SB7. Think through the problem, evaluate the possible solution(s) and suggest an optimum /best possible solution(s)</p> <p>SB8. Identify immediate or temporary solutions to resolve delays</p>
	<p>Analytical Thinking</p>
	<p>The user/ individual on the job needs to know and understand how to:</p> <p>SB9. Use the existing information to arrive at actionable decision points</p> <p>SB10. Use the existing information for improving the customer satisfaction</p> <p>SB11. Use the existing information to optimize solution and company business</p> <p>SB12. Analyze problems and identify causes and possible solutions</p>
	<p>Critical Thinking</p>
<p>The user/ individual on the job needs to know and understand how to:</p> <p>SB13. Apply, analyze, and evaluate the information gathered from observation, experience, reasoning, or communication, as a guide to thought and action</p> <p>SB14. Analyze the way in which the existing facility layout is in operation and think of more economic and feasible measures for existing layout modification.</p>	

IAS/N0218

Laying of Copper/Fiber LAN Cable

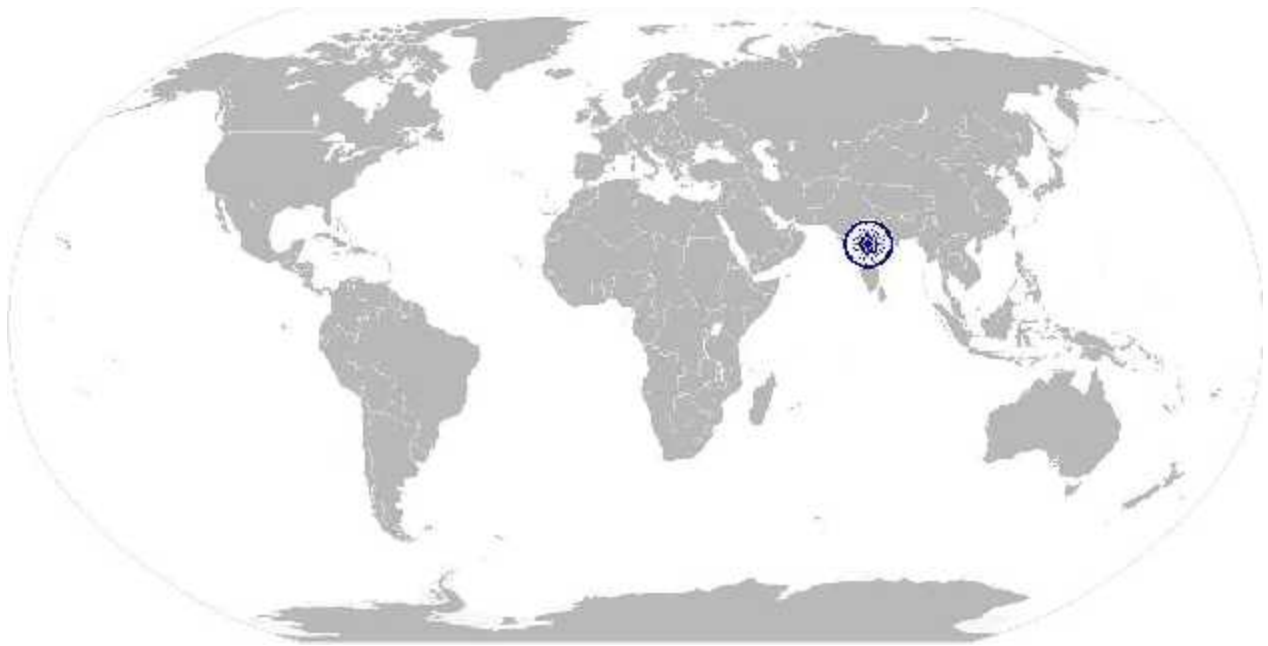
NOS Version Control

NOS Code	ISA/N0218		
Credits (NSQF)	TBD	Version number	1.0
Industry	Instrumentation, Automation, Surveillance, Communication	Drafted on	30/09/2017
Industry Sub-sector	Instrumentation / Automation	Last reviewed on	09/10/2017
Occupation	Installation & Commissioning	Next review date	09/10/20179



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National Occupational Standard



Overview

This unit is about working effectively with colleagues, in own work group and in other work groups within the organization.

IAS/N2105

Work Effectively With Teams

National Occupational Standard

UnitCode	IAS/N2105
Unit Title(Task)	Work Effectively With Teams
Description	This NOS unit is about building relationships and working with people and groups inside and outside the organization, using skills and habits, to achieve the team goals and objectives.
Scope	<p>This unit/task covers the following:</p> <ul style="list-style-type: none"> • Creating team environment • Communicating - giving and receiving • Working cooperatively • Participating in team decision making • Demonstrating Sense of Responsibility • Showing respect for opinions, customs and preferences
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Create Team Environment	<p>To be competent, the individual on the job must be able to:</p> <p>PC1. Know and understand the team objectives and goals</p> <p>PC2. Know team members by name. Greet them appropriately and respond to their greetings.</p> <p>PC3. Know the roles and responsibilities of team members. Ensure others know about you and your role in the team</p> <p>PC4. Learn about the culture and preferences of team members – especially if they belong to other organizations or nationalities</p> <p>PC5. Follow organization’s policies and procedures for working with team members within and outside the organization – especially relating to privacy, confidentiality and security.</p> <p>PC6. Create an environment of trust and mutual respect</p>
Communicate – Give and Receive	<p>To be competent, the individual on the job must be able to:</p> <p>PC7. Use appropriate mode of communication – verbal, written, mail, phone or text and clearly articulate your message to ensure that the recipient understands the message.</p> <p>PC8. Listen to team members and try to understand what they want to say. Seek or provide clarifications if you see any gap in understanding</p> <p>PC9. Communicate professionally and follow organization protocols. Do not overload the team members with unnecessary and unsolicited information</p> <p>PC10. Share important information with the team timely.</p> <p>PC11. Respond to communications promptly.</p>

IAS/N2105

Work Effectively With Teams

<p>Work Cooperatively</p>	<p>To be competent, the individual on the job must be able to:</p> <p>PC12. Perform own role and produce output in time for other team members to consume</p> <p>PC13. Receive inputs from others and work upon it per role requirement</p> <p>PC14. Make adjustments within the permissible rules so that work flows smoothly.</p> <p>PC15. Help team members to perform their role effectively and provide any clarifications and support they need</p> <p>PC16. Share tools and common resources fairly, taking cognizance of others' needs and schedules</p> <p>PC17. Resolve any contentious issues amicably, involving the team lead or the supervisor if needed</p> <p>PC18. Let team members know in good time if you cannot carry out your commitments, explaining the reasons and alternate solutions, if any. Let the team lead know about this.</p>
<p>Participate in Team Decision making</p>	<p>To be competent, the individual on the job must be able to:</p> <p>PC19. Think positively and make constructive suggestions to meet the goals</p> <p>PC20. Accept and give suggestions with open mind</p> <p>PC21. Take initiatives and volunteer to contribute</p> <p>PC22. Help team members with facts and figures to arrive at workable decisions</p> <p>PC23. Accept decisions professionally and support these, even if these do not match your suggestions and personal views</p>
<p>Demonstrate Sense of Responsibility</p>	<p>To be competent, the individual on the job must be able to:</p> <p>PC24. Act in the interest of the team and the organization to ensure that things do not 'fall through the gap' and team goals are achieved.</p> <p>PC25. Take initiative to correct the situation if something seems to be going wrong.</p> <p>PC26. Seek help or escalate if the situation demands</p>
<p>Show Respect for Opinions, Customs and Preferences</p>	<p>To be competent, the individual on the job must be able to:</p> <p>PC27. Follow organization's and statutory guidelines about making references or comments to social customs or preferences</p> <p>PC28. Refrain from making any comments to hurt sentiments</p> <p>PC29. Accommodate team members' preferences to the extent feasible. If these come in the way of fulfilling team goals, discuss with the supervisor/ team leader.</p> <p>PC30. Seek information and clarifications from others if you do not understand any customs.</p>
<p>Knowledge and Understanding(K)</p>	

IAS/N2105

Work Effectively With Teams

<p>A. Organizational Context (Knowledge of the company/ organization and its processes)</p>	<p>The user/ individual on the job needs to know and understand:</p> <p>KA1.Theorganization’spoliciesandproceduresforworkingwithcolleagues,roles and responsibilities in relation to this</p> <p>KA2.Theimportanceofeffectivecommunicationand establishing good working relationships with colleagues</p> <p>KA3.Differentmethodsof communication and the circumstances in which it is appropriate to use these</p> <p>KA4.Theimportanceofcreatinganenvironmentoftrustandmutualrespect</p> <p>KA5.Theimplicationsofownwork on the work and schedule of others</p>
<p>B. Technical Knowledge</p>	<p>The user/ individual on the job needs to know and understand:</p> <p>KB1. Different types of information that colleagues might need and the importance of providing this information when it is required</p> <p>KB2. The importance of helping colleagues with problems, in order to meet quality and time standards as a team</p>
<p>Skills(S) [Optional]</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p>
	<p>The user/individual on the job needs to know and understand:</p> <p>SA1.Complete written work with attention to detail</p>
	<p>Readings skills</p>
	<p>The user/individual on the job needs to know and understand:</p> <p>SA2.Read instructions, guidelines/procedures</p>
	<p>Oral Communication (Listening and Speaking skills)</p>
<p>The user/ individual on the job needs to know and understand:</p> <p>SA3.Listen effectively and orally communicate information</p> <p>SA4.Ask for clarification and advice from the concerned person</p>	
<p>B. Professional Skills</p>	<p>Decision Making</p>
	<p>The user/ individual on the job needs to know and understand:</p> <p>SB1. Make decisions on a suitable course of action response keeping in view resource utilization while meeting commitments</p>
	<p>Plan and Organize</p>

IAS/N2105

Work Effectively With Teams

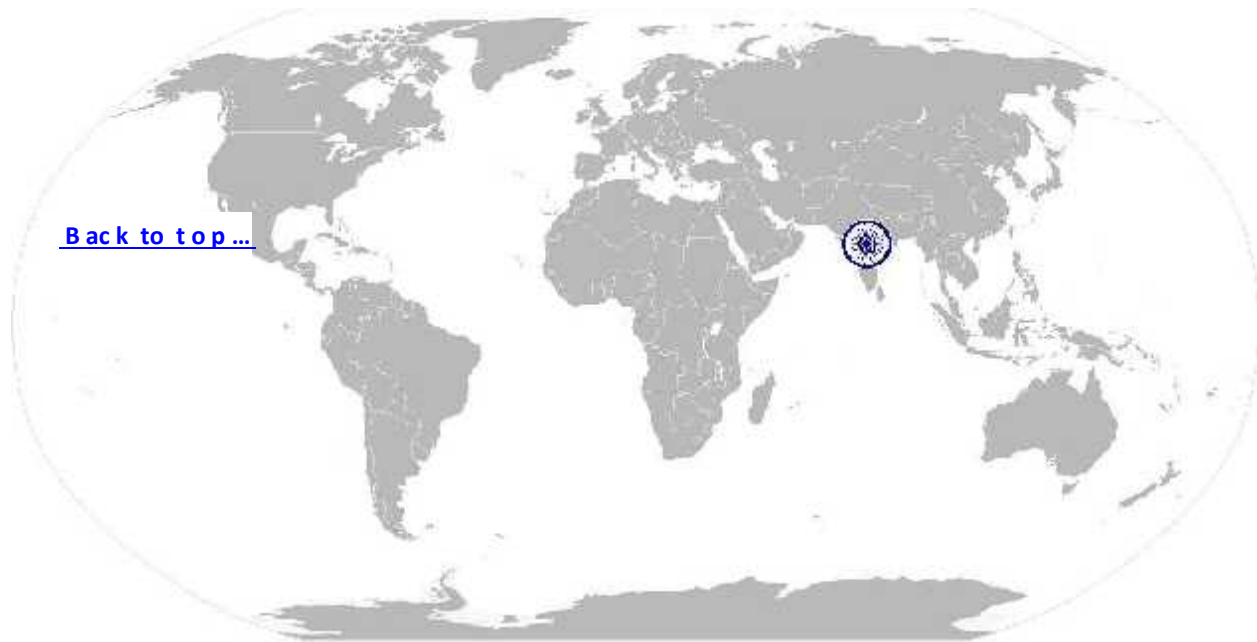
	<p>The user/individual on the job needs to know and understand:</p> <p>SB2. Plan and organize work to achieve targets and deadlines</p>
	<p>Customer Centricity</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB3. Understand real needs of the customer and suggest most appropriate solution</p> <p>SB4. Support customer when they need help</p>
	<p>Problem-solving</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB5. Apply problem solving approaches in different situations</p>
	<p>Analytical Thinking</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB6. Use the existing information to arrive at actionable decision points</p> <p>SB7. Use the existing information for improving the customer satisfaction</p> <p>SB8. Use the existing information to optimize solution and company business</p> <p>SB9. Analyze problems and identify causes and possible solutions</p>
	<p>Critical Thinking</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <p>SB10. Apply balanced judgments to different situations</p>

IAS/N2105

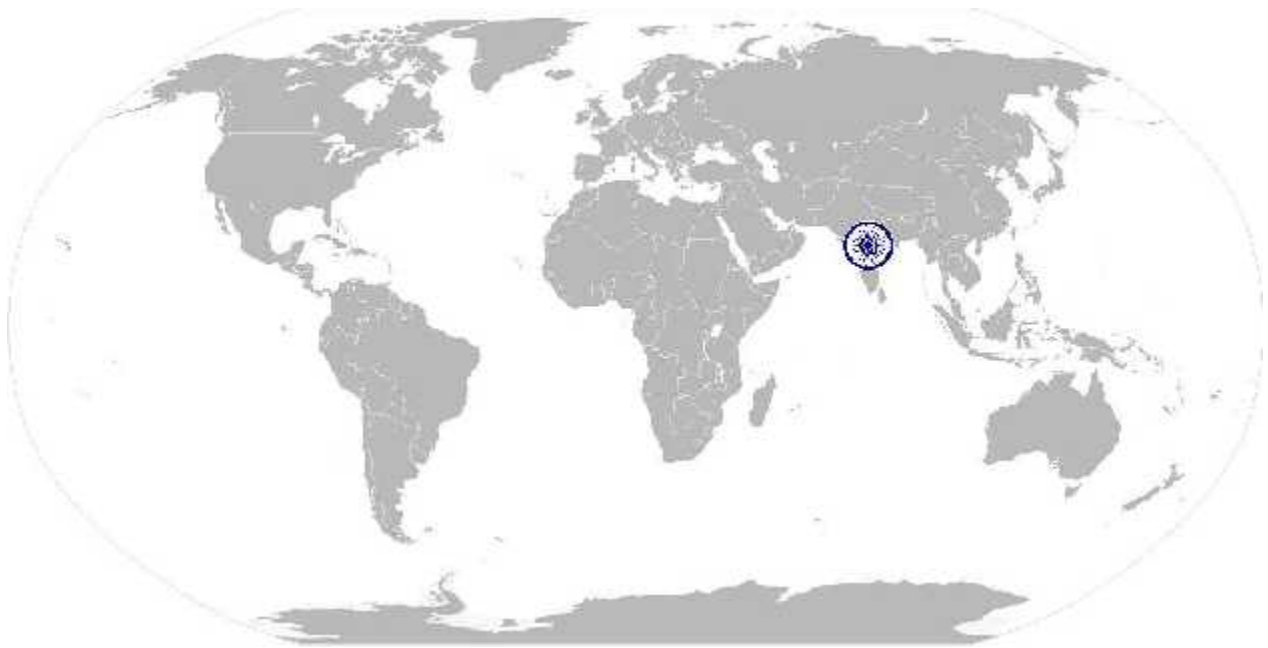
Work Effectively With Teams

NOS Version Control

NOS Code	IAS/N2105		
Credits (NSQF)	TBD	Version number	1.0
Industry	Instrumentation, Automation, Surveillance, Communication	Drafted on	09/10/2017
Industry Sub-sector	Instrumentation / Automation	Last reviewed on	09/10/2017
Occupation	Installation & Commissioning	Next review date	09/10/20179



National Occupational Standard



Overview

This unit is about maintaining a safe, healthy and secure working environment.

IAS/N2003

Health and Safety at Workplace

National Occupational Standard

Unit Code	IAS/N2003
Unit Title(Task)	Health and Safety in Workplace
Description	This OS unit is about following adequate safety procedures to make work environment safe
Scope	This unit/ task covers the following: <ul style="list-style-type: none"> ☐ Follow standard safety procedures of the company ☐ Maintain good health and posture
Performance Criteria(PC) w.r.t. the Scope	
Element	Performance Criteria
Follow standard safety procedures of the company	<p>To be competent, the user/ individual must be able to:</p> <p>PC1. Comply with general safety procedures followed in the company</p> <p>PC2. Follow standard safety procedures while handling an equipment, hazardous material or tool</p> <p>PC3. Remove finger rings or any other metal objects which may interfere with the work before working on the unit</p> <p>PC4. Use safety materials such as goggles, gloves, earplugs, caps, ESD pins, covers, shoes, etc.</p> <p>PC5. Escalate about any hazardous materials or things found in the premises</p> <p>PC6. Report about any breach of safety procedure in the company</p> <p>PC7. Ensure zero accidents at work</p> <p>PC8. Avoid damage of components due to negligence in ESD procedures</p> <p>PC9. Participate regularly in fire drills or other safety related workshops organized by the company</p> <p>PC10. Ensure no loss for company due to safety negligence</p>
Maintain good health and posture	<p>To be competent, the user/ individual must be able to:</p> <p>PC11. Maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials</p> <p>PC12. Participate in company organized health sessions such as yoga, physiotherapy or games</p> <p>PC13. Handle heavy and hazardous materials with care and using appropriate tools and handling equipment such as trolleys, jacks and ladders</p>
Knowledge and Understanding(K)	

IAS/N2003

Health and Safety at Workplace

<p>A. Organizational Context (Knowledge of the company/ organization and its processes)</p>	<p>The individual on the job needs to know and understand:</p> <p>KA1. Company's policies on: incentives, delivery standards, and personnel management</p> <p>KA2. Company occupational safety and health policy followed</p> <p>KA3. Company emergency evacuation procedure</p> <p>KA4. Company's medical policy</p>
<p>B. Technical Knowledge</p>	<p>The individual on the job needs to know and understand:</p> <p>KB1. How to maintain the work area safe and secure</p> <p>KB2. How to handle hazardous materials, tools and equipment</p> <p>KB3. Emergency procedures to be followed such as fire accidents, electrocution etc.</p> <p>KB4. Long term value of good posture and use of appropriate handling equipment</p> <p>KB5. Safety regulations and standards and how to apply these</p> <p>KB6. Electrical grounding practices</p>
<p>Skills(S) [Optional]</p>	
<p>A. Core Skills/ Generic Skills (Knowledge of the company/ organization and its processes)</p>	<p>Writing Skills</p>
	<p>The individual on the job needs to know and understand:</p> <p>SA1. Compose e mails, letters, memos, reminders, and other documents clearly</p> <p>SA2. Share knowledge, issues, problems and resolutions relating to safety</p>
	<p>Readings kills</p>
	<p>The individual on the job needs to know and understand:</p> <p>SA3. Read mails, messages, alerts</p> <p>SA4. Read pictures, drawings, notes relating to safety and health</p>
	<p>Oral Communication (Listening and Speaking skills)</p>
<p>The individual on the job needs to know and understand:</p> <p>SA5. Question co-workers in order to understand the safety and health issues</p> <p>SA6. Inform co-workers about safety and health issues</p> <p>SA7. Report issues and problems relating to safety and health to managers in clear terms</p>	
<p>B. Professional Skills</p>	<p>Decision Making</p> <p>The individual on the job needs to know and understand how to:</p> <p>SB1. Make decisions pertaining to safety and health issues at workplace</p> <p>SB2. Make decisions about escalating safety and health issues at workplace to managers</p>
	<p>Plan and Organize</p>

	<p>The individual on the job needs to know and understand: SB3. Plan and organize work conforming to the safety and health norms of the company</p>
	<p>Customer Centricity</p>
	<p>The individual on the job needs to know and understand how to: SB4. Real needs of the customer and suggest most appropriate solution SB5. Support customers when they need help</p>
	<p>Problem Solving</p>
	<p>The individual on the job needs to know and understand how to: SB6. Discuss problems relating to the safety and health, evaluate the possible solution(s) and arrive at optimum /best possible solution(s) in consultation with concerned people</p>
	<p>Analytical Thinking</p>
	<p>The individual on the job needs to know and understand how to: SB7. Use the existing information to arrive at actionable decision points SB8. Use the existing information for improving the customer satisfaction SB9. Use the existing information to optimize solution and company business SB10. Analyze problems and identify causes and possible solutions</p>
	<p>Critical Thinking</p>
	<p>The individual on the job needs to know and understand how to: SB11. Apply, analyze, and evaluate the information gathered from observation, experience, reasoning, or communication, as a guide to thought and action SB12. Anticipate problems, risks and opportunities and utilize these for mitigation and business optimization</p>

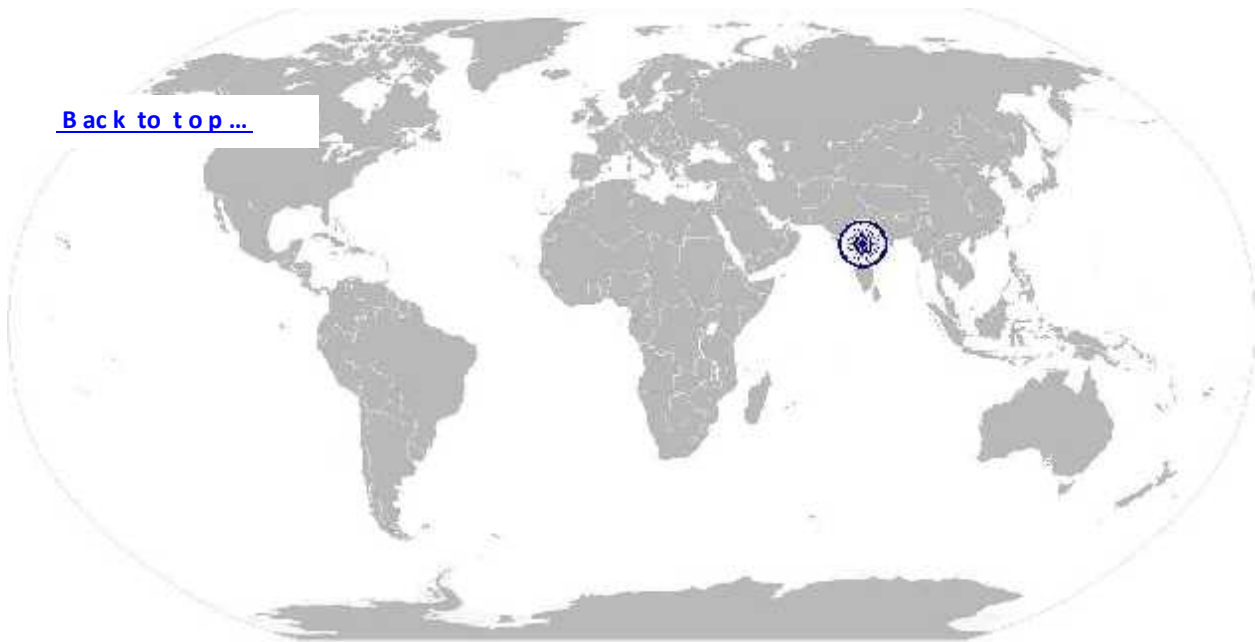
IAS/N2003

Health and Safety at Workplace

NOS Version Control

NOS Code	ISA/N2003		
Credits (NSQF)	TBD	Version number	1.0
Industry	Instrumentation, Automation, Surveillance, Communication	Drafted on	09/10/2017
Industry Sub-sector	Instrumentation / Automation	Last reviewed on	09/10/2017
Occupation	Installation & Commissioning	Next review date	09/10/20179

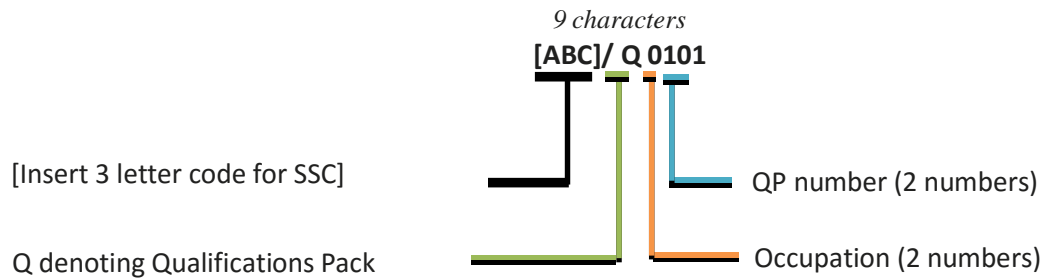
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Annexure

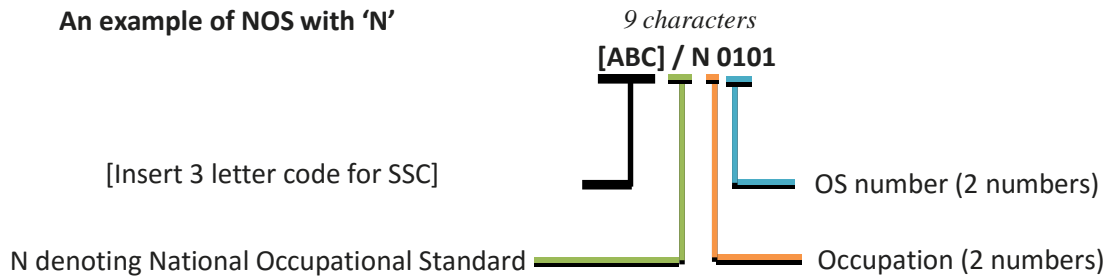
Nomenclature for QP and NOS

Qualifications Pack



Occupational Standard

An example of NOS with 'N'



Qualifications Pack For Technician - Cabling (Multi Skill)

The following acronyms/codes have been used in the nomenclature above:

Sub-sector	Range of Occupation numbers
Installation & Commissioning	01-29
Operation & Maintenance	30-49
Calibration	50-55
Design, Fabrication / Manufacturing	56-79
Design, Fabrication, Installation & Commissioning	80-89
General	90-99

Sequence	Description	Example
Three letters	Industry name	IAS
Slash	/	/
Next letter	Whether QP or NOS	N
Next two numbers	Occupation code	01
Next two numbers	OS number	01

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Qualifications Pack For Technician - Cabling (Multi Skill)

CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role: Technician - Cabling (Multi Skill)

Qualification Pack: IAS/Q0204

Sector Skill Council: Instrumentation Automation Surveillance & Communication

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. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below)
5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on this criteria
6. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS
7. 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

Relative Weight of NOSs in the Assessment			
Sl. No.	NOS no.	NOS Name	% Weightage
1	IAS/N0215	Planning and Laying of Instrumentation Cabling	20
2	IAS/N0216	Planning and Laying of Low Voltage Power Cabling	20
3	IAS/N0217	Planning and Laying of CCTV Cabling	20
4	IAS/N0218	Laying of Copper/Fiber LAN Cable	20
5	IAS/N2105	Work Effectively With Teams	10
6	IAS/N2003	Health and Safety at Workplace	10
			100%

Qualifications Pack For Technician - Cabling (Multi Skill)

Assessment outcomes	Assessment Criteria for outcomes	Marks Allocation			
		Total Mark (110+115+115+115+75+50)	Out Of	Theory	Skills Practical
1. IAS/N0215 Planning and Laying of Instrumentation Cabling	PC1. Get familiar with the customer, the plant, processes and procedures	110	5	2	3
	PC2. Study and understand documents relating to cabling, wiring, connected equipment and plant layout.		5	2	3
	PC3. Plan cable routing and scheduling		5	2	3
	PC4. Estimate quantity of cables, conduits, raceways and other associated components		6	2	4
	PC5. Get materials from stores / customer		3	1	2
	PC6. Locate and mark the position for conduiting, referring to layout drawings and specifications.		3	1	2
	PC7. Measure required lengths of raceways, cable trays and conduiting for each section of cabling		3	1	2
	PC8. Drill holes for mounting brackets etc. in the supporting structure, for mounting the making cable trays etc. Make sure that it does not interfere with any existing fittings or cause obstruction.		3	1	2
	PC9. Install raceways, cable trays and conduiting as per procedure and drawings for the instrumentation wires/cables.		3	1	2
	PC10. Ensure that Power cable and instrumentation cable are not run in same conduit or trench to avoid cross talk.		3	1	2
	PC11. Measure required length (plus additional margin for termination) of cable of appropriate type for each conduit		3	1	2
	PC12. Run cables through the conduits and raceways, along with earth wires if specified, per approved drawings and procedures.		3	1	2
	PC13. Seal the conduit ends using approved material/device.		5	2	3
	PC14. Route the cables to respective Junction Boxes / Panels using flexible hoses or other approved methods, leaving adequate length of cable for termination		5	2	3
	PC15. Insert the cables through Glands in the receiving enclosure and fix		5	2	3
	PC16. Strip the sheath/outer covering/ shield to suitable length and dress the cable per approved practices		5	2	3
	PC17. Mark cables for identification using proved procedure		5	2	3
	PC18. Follow accepted color coding practices		5	2	3
	PC19. Follow wire color codes as specified in drawings.		5	2	3
	PC20. Route the stripped end of the cable through the internal cable trays/guides to the appropriate terminals. Use cable ties appropriately to tie the wires neatly.		5	2	3
	PC21. Mark all individual wires using standard ferrules with tag numbers / identification as provided in the drawing for ease of		5	2	3

Qualifications Pack For Technician - Cabling (Multi Skill)

	identification.				
	PC22. Strip the wire with approved tools and terminate on lugs/spade terminals etc. using approved crimping tools.		5	2	3
	PC23. Check that the shield connection is made to specified terminal. Ensure that the shield is not grounded at both ends, as it causes Ground Loop which is harmful for the signal.		5	2	3
	PC24. Crosscheck with wiring list and follow the recommended verification procedure		5	2	3
	PC25. Perform continuity check of wires		5	2	3
	Total		110	42	68
2. IAS/N0216 Planning and Laying of Low Voltage Power Cabling	PC1. Get familiar with the customer location and work procedures followed		5	2	3
	PC2. Study and understand existing documents relating to cabling, wiring, connected equipment and site layout.		5	2	3
	PC3. Verify whether concealed conduits exist in the premises, if so, get the layout drawing. If conduits do not exist, these will be laid on the walls and will be exposed.		5	2	3
	PC4. Plan routing and scheduling. Understand/plan color coding of insulated single core wires.		5	2	3
	PC5. Estimate the quantity of cables, insulated wires of single/multi-strand copper conductors, conduits, electrical parts and accessories of appropriate specifications.		6	2	4
	PC6. Get materials from stores / customer		3	1	2
	PC7. Locate and mark the position for conduiting, referring to layout drawings and specifications.		3	1	2
	PC8. Measure required lengths of raceways, cable trays and conduiting for each section of cabling		3	1	2
	PC9. Drill holes for mounting brackets etc. in the supporting structure, for mounting the making cable trays etc. Make sure that it does not interfere with any existing fittings or cause obstruction.	115	3	1	2
	PC10. Install raceways, cable trays and conduiting as per procedure and drawings for the instrumentation wires/cables.		3	1	2
	PC11. Ensure that Power cable and instrumentation cable are not run in same conduit or trench to avoid cross talk.		3	1	2
	PC12. Measure required length (plus additional margin for termination) of cable of appropriate type for each conduit		3	1	2
	PC13. Run cables through the conduits and raceways, along with earth wires if specified, per approved drawings and procedures.		3	1	2
	PC14. Seal the conduit ends using approved material/device.		5	2	3
	PC15. Route the cables to respective Junction Boxes / Panels using flexible hoses or other approved methods, leaving adequate length of cable for termination		5	2	3
	PC16. If applicable, insert the cables through Glands in the receiving enclosure and fix		5	2	3
	PC17. Strip the armor/sheath/outer covering to suitable length and dress the exposed conductors per approved practices.		5	2	3

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	PC18. Mark cables for identification using proved procedure	5	2	3
	PC19. Follow accepted color coding practices	5	2	3
	PC20. Follow wire color codes as specified in drawings.	5	2	3
	PC21. Route the individual conductors of the cable through the internal cable trays/guides to the appropriate terminals. Use cable ties appropriately to tie the wires neatly.	5	2	3
	PC22. Mark all individual wires using standard ferrules with tag numbers / identification as provided in the drawing for ease of identification.	5	2	3
	PC23. Strip the wire with approved tools and terminate on lugs/spade terminals etc. using approved crimping tools.	5	2	3
	PC24. Check that the shield connection is made to specified terminal. Ensure that the shield is not grounded at both ends, as it causes Ground Loop which is harmful for the signal.	5	2	3
	PC25. Crosscheck with wiring list and follow the recommended verification procedure	5	2	3
	PC26. Perform continuity check of wires	5	2	3
	Total	115	44	71
3. IAS/N0217 Planning and Laying of CCTV Cabling	PC1. Get familiar with the customer location and work procedures followed	5	2	3
	PC2. Study and understand existing documents and drawings relating to site layout cabling, wiring and connected equipment.	5	2	3
	PC3. Verify whether outdoor mounting of cameras on poles is required and whether poles/other structures exist.	5	2	3
	PC4. Plan erection of support structure (if needed), routing and scheduling. Communicate the plan to customer representative at site and ensure availability of any support infrastructure.	5	2	3
	PC5. Understand the types of cables to be laid - Power Supply (low voltage DC/AC), Video and LAN/PoE cable (for IP Cameras) etc.	6	2	4
	PC6. Estimate the quantity of cables of different types, conduits, cable trays, brackets, and other accessories of appropriate specifications.	3	1	2
	PC7. Get materials from stores / customer	3	1	2
	PC8. For outdoors mounting, locate and mark the position for support structure, referring to layout drawings and specifications.	3	1	2
	PC9. For fresh conduiting indoors, locate and mark the position for conduiting, referring to layout drawings and specifications.	3	1	2
	PC10. For fresh conduiting, measure required lengths of conduiting for each section of cabling	3	1	2
	PC11. Drill holes for mounting brackets etc. in the supporting structure, for mounting cable trays/conduits/raceways. Make sure that it does not interfere with any existing fittings or cause obstruction. Where crossing of beams/pillars etc. occurs, use of	3	1	2
	115			

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	flexible conduit may be possible. Consult site Engineer if needed.			
	PC12. Install cable trays/ raceways/conduits as per recommended practice. Use joins / bends where appropriate to connect conduits	3	1	2
	PC13. Determine number and type of cables to be run through the cable tray / each conduit section	3	1	2
	PC14. Measure required length (plus additional margin for termination) of cables of appropriate types, for each section / conduit	5	2	3
	PC15. Lay cables on the cable tray/ Pull cable through the conduits / raceways as applicable.	5	2	3
	PC16. Route the cables to respective Devices / Panels / Junction boxes etc. as applicable leaving adequate length of cable for termination. Use flexible hoses if required.	5	2	3
	PC17. If applicable, insert the cables through Glands in the receiving enclosure and fix	5	2	3
	PC18. Strip the sheath/outer covering/ shield to suitable length and dress the cable per approved practices	5	2	3
	PC19. Mark cables for identification using proved procedure	5	2	3
	PC20. Route cables (power and video/IP) to target devices and terminate on appropriate connectors using the right tools (crimping/soldering/screw etc.). Plug the connectors to the devices, ensuring proper mating.	5	2	3
	PC21. Before termination, test the coax cable for continuity, open circuit and possible short circuit using multimeter / continuity tester.	5	2	3
	PC22. For termination inside panels, route the cables through the internal cable trays/guides to the appropriate device. Use cable ties appropriately to tie the wires neatly. Terminate cables on appropriate connectors using the right tools (crimping/soldering/screw etc.). Plug the connectors to the devices, ensuring proper mating.	5	2	3
	PC23. Mark all cables using standard ferrules / cable markers/ identification as provided in the drawing for ease of identification.	5	2	3
	PC24. Crosscheck with wiring list and follow the recommended verification procedure	5	2	3
	PC25. Perform continuity check of wires	5	2	3
	PC26. Use shielded cable testing equipment if available.	5	2	3
		115	44	71
4. IAS/N0218 Laying of Copper/Fiber LAN Cable	PC1. Get familiar with the customer location and work procedures followed	5	2	3
	PC2. Study and understand existing documents relating to cabling, wiring, connected equipment and site layout.	5	2	3
	PC3. Verify whether concealed conduits exist in the premises, if so, get the layout drawing. If conduits do not exist, these will be laid on the walls and will be exposed.	5	2	3
		115		

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PC4. Plan routing and scheduling. Understand/plan color coding of insulated single core wires.	5	2	3
PC5. Estimate the quantity of cables, insulated wires of single/multi-strand copper conductors, conduits, electrical parts and accessories of appropriate specifications.	6	2	4
PC6. Get materials from stores / customer	3	1	2
PC7. Locate and mark the position for conduiting, referring to layout drawings and specifications.	3	1	2
PC8. Measure required lengths of raceways, cable trays and conduiting for each section of cabling	3	1	2
PC9. Drill holes for mounting brackets etc. in the supporting structure, for mounting the making cable trays etc. Make sure that it does not interfere with any existing fittings or cause obstruction.	3	1	2
PC10. Install raceways, cable trays and conduiting as per procedure and drawings for the instrumentation wires/cables.	3	1	2
PC11. Ensure that Power cable and instrumentation cable are not run in same conduit or trench to avoid cross talk.	3	1	2
PC12. Measure required length (plus additional margin for termination) of cable of appropriate type for each conduit	3	1	2
PC13. Run cables through the conduits and raceways, along with earth wires if specified, per approved drawings and procedures.	3	1	2
PC14. Seal the conduit ends using approved material/device.	5	2	3
PC15. Route the cables to respective Junction Boxes / Panels using flexible hoses or other approved methods, leaving adequate length of cable for termination	5	2	3
PC16. If applicable, insert the cables through Glands in the receiving enclosure and fix	5	2	3
PC17. Strip the armor/sheath/outer covering to suitable length and dress the exposed conductors per approved practices.	5	2	3
PC18. Mark cables for identification using proved procedure	5	2	3
PC19. Follow accepted color coding practices	5	2	3
PC20. Follow wire color codes as specified in drawings.	5	2	3
PC21. Route the individual conductors of the cable through the internal cable trays/guides to the appropriate terminals. Use cable ties appropriately to tie the wires neatly.	5	2	3
PC22. Mark all individual wires using standard ferrules with tag numbers / identification as provided in the drawing for ease of identification.	5	2	3
PC23. Strip the wire with approved tools and terminate on lugs/spade terminals etc. using approved crimping tools.	5	2	3
PC24. Check that the shield connection is made to specified terminal. Ensure that the shield is not grounded at both ends, as it causes Ground Loop which is harmful for the signal.	5	2	3
PC25. Crosscheck with wiring list and follow the recommended verification procedure	5	2	3
PC26. Perform continuity check of wires	5	2	3

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		Total	115	44	71
5. IAS/N2105 Work Effectively With Teams	PC1. Know and understand the team objectives and goals	75	3	1	2
	PC2. Know team members by name. Greet them appropriately and respond to their greetings.		2	1	1
	PC3. Know the roles and responsibilities of team members. Ensure others know about you and your role in the team		2	1	1
	PC4. Learn about the culture and preferences of team members – especially if they belong to other organizations or nationalities		5	1	4
	PC5. Follow organization’s policies and procedures for working with team members within and outside the organization – especially relating to privacy, confidentiality and security.		2	1	1
	PC6. Create an environment of trust and mutual respect		3	1	2
	PC7. Use appropriate mode of communication – verbal, written, mail, phone or text and clearly articulate your message to ensure that the recipient understands the message.		2	1	1
	PC8. Listen to team members and try to understand what they are wanting to say. Seek or provide clarifications if you see any gap in understanding		3	1	2
	PC9. Communicate professionally and follow organization protocols. Do not overload the team members with unnecessary and unsolicited information		4	1	3
	PC10. Share important information with the team timely.		3	1	2
	PC11. Respond to communications promptly.		3	1	2
	PC12. Perform own role and produce output in time for other team members to consume		3	1	2
	PC13. Receive inputs from others and work upon it per role requirement		2	1	1
	PC14. Make adjustments within the permissible rules so that work flows smoothly.		2	1	1
	PC15. Help team members to perform their role effectively and provide any clarifications and support they need		2	1	1
	PC16. Share tools and common resources fairly, taking cognizance of others’ needs and schedules		2	1	1
	PC17. Resolve any contentious issues amicably, involving the team lead or the supervisor if needed		2	1	1
	PC18. Let team members know in good time if you cannot carry out your commitments, explaining the reasons and alternate solutions, if any. Let the team lead know about this.		2	1	1
	PC19. Think positively and make constructive suggestions to meet the goals		2	1	1
	PC20. Accept and give suggestions with open mind		2	1	1
	PC21. Take initiatives and volunteer to contribute		2	1	1
	PC22. Help team members with facts and figures to arrive at workable decisions		2	1	1
	PC23. Accept decisions professionally and support these, even if these do not match your suggestions and personal views		4	1	3
	PC24. Act in the interest of the team and the organization to ensure that things do not ‘fall through the gap’ and team goals are achieved.		4	1	3
	PC25. Take initiative to correct the situation if something seems to be going wrong.		2	1	1
	PC26. Seek help or escalate if the situation demands		2	1	1

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	PC27. Follow organization's and statutory guidelines about making references or comments to social customs or preferences		2	1	1
	PC28. Refrain from making any comments to hurt sentiments		2	1	1
	PC29. Accommodate team members' preferences to the extent feasible. If these come in the way of fulfilling team goals, discuss with the supervisor/ team leader.		2	1	1
	PC30. Seek information and clarifications from others if you do not understand any customs.		2	1	1
	Total		75	30	45
6. IAS/N2003 Health and Safety in Workplace	PC1. Comply with general safety procedures followed in the company	50	3	2	1
	PC2. Follow standard safety procedures while handling an equipment, hazardous material or tool		2	1	1
	PC3. Remove finger rings or any other metal objects likely to interfere with the work before working on the unit		4	2	2
	PC4. Use of safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.		4	1	3
	PC5. Escalate about any hazardous materials or things found in the premises		4	1	3
	PC6. Report about any breach of safety procedure in the company		3	1	2
	PC7. Ensure zero accidents at work		5	2	3
	PC8. Avoid damage of components due to negligence in ESD procedures		4	1	3
	PC9. Participate regularly in fire drills or other safety related workshops organized by the company		5	2	3
	PC10. Ensure no loss for company due to safety negligence		4	1	3
	PC11. Maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials		4	2	2
	PC12. Participate in company organized health sessions such as yoga, physiotherapy or games		4	2	2
	PC13. Handle heavy and hazardous materials with care and using appropriate tools and handling equipment such as trolleys, jacks and ladders		4	2	2
Total		50	20	30	

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