

Model Curriculum

Optical Fiber Splicer

SECTOR: TELECOM

SUB-SECTOR: NETWORK MANAGED SERVICES

OCCUPATION: NETWORK OPERATIONS & MAINTENANCE-OPTICAL

REF ID: TEL/Q6400,V1.0

NSQF LEVEL: 3



Certificate

**COMPLIANCE TO
QUALIFICATION PACK – NATIONAL OCCUPATIONAL
STANDARDS**

is hereby issued by the

TELECOM SECTOR SKILL COUNCIL

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/Qualification Pack: **'Optical Fiber Splicer'**
QP No. **'TEL/Q6400 NSQF Level 3'**

Date of Issuance: November 4th, 2015

Valid up to: November 3rd, 2016

Authorised Signatory
(Telecom Skill Development Council)

* Valid up to the next review date of the Qualification Pack

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Optical Fibre Splicer

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Optical Fiber Splicer”, in the “Telecom” Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Optical Fibre Splicer		
Qualification Pack Name & Reference ID. ID	TEL/Q6400,Version 1.0		
Version No.	1.0	Version Update Date	31 – 05 – 2017
Pre-requisites to Training			
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Formulate and execute strategy for splicing operations: learn various kinds of machines and techniques to perform splicing • Acquaint self with facets of trenching, laying, jointing and blowing of cables: authenticate and confirm cable drum is placed near site, cable marking as per guideline, trenching according to route plan, and clear sites from debris to work in harmony with optical fiber technician • Comprehend inspecting criteria of route plan, clearance, schedule and patrolling: acquire route plans, their clearance and check for safety of the site for cable installation • Ascertain availability of tools and spares: ensure availability of test equipment’s like OTDR and Power meter for carrying out optical tests • Conduct test for effectiveness and Performance of Joint closure: understand the importance of testing and accuracy while working with optical fiber • Aggregate potential knowledge and skill to vouchsafe the importance of health and safety: safeguard compliance of safety regulations, personal protection and environmental conditions. <p>Comprehend and initiate the importance of report and record: ensure cable id, cable markings, drum numbers, OTDR findings, are documented for future reference.</p>		

This course encompasses 5 out of 5 National Occupational Standards (NOS) of “Optical Fibre Splicer” Qualification Pack issued by “TSSC: Telecom Sector Skills Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Introduction</p> <p>Theory Duration (hh:mm) 05:00</p> <p>Practical Duration (hh:mm) 05:00</p> <p>Corresponding NOS Code NA</p>	<ul style="list-style-type: none"> Explaining various types of Optical fiber and their applications Imparting knowledge of working principles of Optical fiber and Fiber optic communication system Making the candidate understand the main characteristics of Optical Fiber like attenuation and bending 	Different types of optical fiber and Different types of connectors and interfaces.
2	<p>Key Learning</p> <p>Theory Duration (hh:mm) 10:00</p> <p>Practical Duration (hh:mm) 15:00</p> <p>Corresponding NOS Code TEL/N6400 TEL/N6401</p>	<ul style="list-style-type: none"> Acquiring the basic information on Splicing, types of splicing and splicing operation Understanding the importance of documenting the steps for splicing Learning to carry out route inspection, cable laying procedure, detailed checks 	Cleaver, Mechanical and fusion Splicing kit, Protection Sleeves, Fiber Stripper, Fiber reinforced plaster during Splicing and Jointing, Optical test equipment like OTDR and power meter
3	<p>Employability and Entrepreneurship skills/ Soft Skills</p> <p>Theory Duration (hh:mm) 20:00</p> <p>Practical Duration (hh:mm) 30:00</p> <p>Corresponding NOS Code NA</p>	<ul style="list-style-type: none"> Understand the concept, importance and characteristics of entrepreneurship Benefits of effective leadership List down different parts of computer Understand the main applications of MS office. Understand about Internet and Network Practice how to type effectively List down the importance of listening skill Practice effective listening skills Use effective speaking skills in your role Demonstrate reading and keep yourself updated on latest news Practice effective writing skills Digital Literacy Learning the benefits of saving money 	Projector, Marker and board Computer lab/set up with basic MS office
4.	<p>Undertake splicing of optical fiber</p> <p>Theory Duration (hh:mm)</p>	<ul style="list-style-type: none"> Acquiring the basic information on Splicing, types of splicing and splicing operation Understanding the importance of documenting the steps for splicing 	Cleaver, Mechanical and fusion Splicing kit, Protection Sleeves, Fiber Stripper, Fiber reinforced plaster

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	<p>45:00</p> <p>Practical Duration (hh:mm) 70:00</p> <p>Corresponding NOS Code TEL/N6400</p>	<ul style="list-style-type: none"> Learning to carry out route inspection, cable laying procedure, detailed checks Educating the importance of safety guidelines and their compliance Acquiring knowledge about personal protective equipment like safety Harness, helmet, gloves, goggles, earplugs, nose mask etc. and their application under different working conditions. Understanding the testing effectiveness of the splice through OTDR and power meter tests Learning about various testing tools and equipment, field tests Understanding the importance of documenting testing procedure Educating the importance of safety guidelines and their compliance Acquiring knowledge about personal protective equipment like safety Harness, helmet, gloves, goggles, earplugs, nose mask etc. and their application under different working conditions. 	<p>during Splicing and Jointing, Optical test equipment like OTDR and power meter, Protection Sleeves, Fiber Stripper, fiber reinforced plaster during splicing</p>
	<p>Installation & Commissioning of Optical fiber cables (OFC)-</p> <p>Theory Duration (hh:mm) 25:00</p> <p>Practical Duration (hh:mm) 60:00</p> <p>Corresponding NOS Code TEL/N6401</p>	<ul style="list-style-type: none"> Co-ordinating trenching cable laying, jointing and cable blowing activities. perform preventive and corrective maintenance task on fibre link. find fibre breakdowns, loss on joints, cable and connectors. Checking the duct joints Appropriate disposal of the cut fibers, sleeves and cable pieces. Measuring the distance, fiber attenuation (dB/km), event loss, link loss, and reflectance using OTDR. 	<p>Cable blowing machines, Optical test equipment like OTDR and power meter, Protection Sleeves, Fiber Stripper</p>
9	<p>Program Wrap - up</p> <p>Theory Duration (hh:mm) 05:00</p>	<ul style="list-style-type: none"> Understand what is an interview Develop the skills to participate in an interview effectively Know commonly asked questions in an interview Revise and integrate learning's of the training program 	<p>Presentation on soft skills and entrepreneurship</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Practical Duration (hh:mm) 05:00 Corresponding NOS Code NA		
	Total Duration Theory Duration 110:00 Practical Duration 190:00	Unique Equipment Required: Classroom Projection System, Black/White Board,	

Grand Total Course Duration: 300Hours, 0 Minutes

(This syllabus/ curriculum has been approved by TSSC: Telecom Sector Skill Council)

Trainer Prerequisites for Job role: “Optical Fiber Splicer” mapped to Qualification Pack: “TEL/Q6400, V. 1.0”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ <u>TEL/Q6400, Version No. 1.0</u> ”.
2	Personal Attributes	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field.
3	Minimum Educational Qualifications	Preferably equivalent to Diploma
4a	Domain Certification	Certified for Job Role: “Optical Fiber Splicer” mapped to QP: “TEL/Q6400”, Version No. 1.0. Minimum accepted score as per respective TSSC guidelines.
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “ <u>TEL/Q6400</u> ”, Version No. 1.0. Minimum accepted score as per respective TSSC guidelines.
5	Experience	<ul style="list-style-type: none"> The trainer should be certified by TSSC as ‘Train the Trainer’ and Assessor And Worked as Optical Fiber Splicer for a minimum of 6-8 months

Annexure: Assessment Criteria

Assessment Criteria	
Job Role	Optical Fiber Splicer
Qualification Pack	TEL/Q6400, V. 1.0
Sector Skill Council	Telecom

Sr. No.	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. TSSC 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 TSSC.
3	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training Centre (as per assessment criteria below)
4	To pass the Qualification Pack, every trainee should score 70% pass overall.
5	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.

Assessment Outcome	Assessment Criteria		Total Mark (200)	Out Of	Theory	Skills Practical
1. TEL/N6400 (Undertake Splicing of Optical Fiber)	Prepare cable for splicing operations	PC1. verify that cable is installed as per the installation plan and visually inspect cable for signs of sheath damage	100	2	2	0
		PC2. ensure minimum bend ratios are maintained according to manufacturer's specifications to prevent cable damage and signal degradation		5	2	3
		PC3. ensure cable is placed on stable jointing pit		3	2	1
		PC4. secure cable according to safe industry practice to avoid cable and sheath damage		3	0	3
		PC5. identify the appropriate fibers to be joined based on color coding, and sequence		6	2	4
		PC6. identify appropriate place for the joint chamber location		4	2	2
		PC7. clean the fibre appropriately as per company/manufacturer's		2	2	0
	Ensure availability of tools and spares	PC1. ensure availability of test equipments like OTDR and Power meter for carrying out optical tests		1	1	0
		PC2. ensure availability of optical equipments like spool, joint closure, connectors, splicer and cleaver		1	1	0
		PC3. ensure that faulty equipments are sent to logistics team for repair and replacement		2	1	1
		PC4. ensure availability of OF joint kits, Pigtails, patchcords, FDF, odB connector, protection sleeves, heat shrinks		1	1	0
		PC5. ensure continuous power supply at site for the splicing operation by use of portable generators or standby heavy duty batteries		1	1	0
		PC6. ensure availability of RCC joint chambers with covers as per specifications		1	1	0
		PC7. ensure availability of sand for filling the chambers		1	1	0
		PC8. ensure availability of one spare cable drum for emergency replacement of laid cables		1	1	0
		PC9. ensure calibration status of equipments to be used (eg.splicing machine, OTDR, power		1	0	1
	Perform splicing operations	PC1. ensure clean environment for splicing operations		2	2	0
		PC2. ensure cables are stripped off their protective coating, at areas where splicing has to be performed as per the standard process		2	2	0
		PC3. ensure the fiber ends are cleaved with a precision cleaver and are inspected with magnifier to ensure appropriateness		6	2	4
		PC4. in case of fusion splicing - Insert fibers strand to the fusion machine in accordance to		6	2	4



	PC5. in case of mechanical splice, align the fibers together by a precision made sleeve and place the prepared fiber in mechanical splicing kit	6	2	4
	PC6. verify the spliced fiber for appropriate splicing in the magnifier window	1	1	0
	PC7. ensure appropriate splice protectors like heat shrink splice protectors are utilized to	2	2	0
Test effectiveness and Perform Joint closure	PC1. test the fiber joint with OTDR to confirm conformance to design requirements	2	2	0
	PC2. ensure optical losses - reflectance, return and insertion are within the defined	4	3	1
	PC3. ensure sealing of Joint closure through heat shrinking/ multi diameter seals/ mechanical seals as appropriate	3	2	1
	PC4. ensure FRP - Fiber reinforced plastic is used to strengthen the joint as required	3	2	1
	PC5. test the fiber at both ends for instances of cross fiber using power source and power meter tests and ensure their elimination	4	2	2
	PC6. ensure joint is placed in the chamber properly	1	0	1
	PC7. ensure spare cable (loop) is coiled appropriately and placed inside the joint	3	1	2
	PC8. ensure that sand is filled in the chamber to the brim and the chamber covers are placed	3	2	1
	PC9. ensure that Joint indicator is planted 1 meter behind the chamber location (away from	1	1	0
	PC10. ensure that the indicator is painted proper colour (for example yellow for joint)	1	1	0
Health and Safety	PC1. ensure appropriate disposal of the cut fibers, sleeves and cable pieces	1	0	1
	PC2. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms	1	1	0
	PC3. ensure that work is carried out in accordance to the level of competence and legal	1	1	0
	PC4. ensure that sites are assessed for health and safety risk as per company's guidelines prior to commencement of work	2	1	1
	PC5. ensure compliance to health and safety guidelines by optical splicer and installation labor	1	1	0
	PC6. ensure that Personal protection equipments like helmets, knee pads, safety boots, safety glasses and trench guards are appropriately used as required.	1	0	1
	PC7. ensure environmental conditions and hazards like Earth Potential Rise (EPR) are considered while carrying out the work	2	0	2

		PC8. ensure escalation of safety incidents to relevant authorities as per guidelines		1	1	0
	Report Records and	PC1. ensure appropriate cable marking and Installation of chamber & route marker for direction and route identification		1	1	0
		PC2. ensure preparation of jointing record for future reference		1	1	0
		PC3. ensure that documents that are required to be updated are identified		1	1	0
		PC4. ensure completion of OTDR register showing complete record of jointing tests		1	1	0
		PC5. ensure that documents are available to all appropriate authorities to inspect		1	1	0
Total					59	41
2.TEL/N6401 (Installation & Commissioning of Optical fiber cables (OFC)- Optional NOS)	Carry out route Inspection	PC1. obtain OFC route plan from the planning team or the supervisors as per which OFC has to be laid	100	3	3	0
		PC2. verify the proposed route to ensure that bend ratios meet manufacturer's specifications		4	2	2
		PC3. ensure that site is made safe and secure for cable installation in coordination with labour		3	3	0
	Arrange for tools and spares	PC1. ensure availability of test equipments like OTDR and Power meter for carrying out optical		2	2	0
		PC2. ensure availability of all required trenching, cable laying, pipe laying, OFC laying and splicing equipments and spares for timely completion of		2	2	0
		PC3. ensure that faulty equipments are sent to logistics team for repair and replacement		1	1	0
	Coordinate trenching, cable laying, jointing and cable blowing activities	PC1. ensure cable drum is placed near site location and test cable on drum for optical		2	2	0
		PC2. ensure trenching is carried out by labour workers as per the detailed route plan requirements and site terrain		3	0	3
		PC3. ensure use of specially designed dispensers to place the ducts in the trench as straight as		2	2	0
		PC4. ensure pipe/ ducts are placed at lower appropriate depths as per the laying standards after approval from competent personnel		5	2	3
		PC5. ensure that ducts are free from twists, collapsed portions and that all such portions are rectified by using appropriate couplers		4	2	2
		PC6. ensure proper uncoiling of PLB ducts		3	1	2
		PC7. ensure duct joints are airtight to ensure smooth cable blowing using cable blowing machines		5	2	3
		PC8. ensure cable blowing/ jetting is carried out using rodder as per standard process		3	0	3



	PC9. ensure availability of additional cable length (loop) at jointing locations, for future use in case of cut	5	2	3
	PC10. ensure that ends of ducts are closed with End Plugs to avoid ingress of mud, water or dust	4	1	3
	PC11. ensure that entire length of the duct is cleaned to remove sand, dust that may damage the optical fiber cable	2	0	2
	PC12. ensure that cables are appropriately prepared for Jointing based on colour and/ or	4	2	2
	PC13. ensure the cables are joined/ spliced as per the standard fusion/ mechanical splicing	2	0	2
	PC14. ensure use of proper protection material such as GI pipes, RCC pipes, RCC half-cut pipes	3	1	2
	PC15. ensure use of Pushfit couplers as duct	1	1	0
	PC16. ensure installation activity is completed within the defined SLAs	1	1	0
	PC17. ensure timely completion of work by monitoring activities performed by the labour	1	1	0
Test effectiveness & close activity	PC1. ensure use of appropriate color for the route indicators and joint indicators as per standards	3	1	2
	PC2. ensure splices are within the quality assurance/ AT standards	2	2	0
	PC3. ensure backfilling and crowning in coordination with the labour workers as per	3	1	2
	PC4. ensure stone marker at the jointing pit has to be provided for identification of route as well	2	0	2
	PC5. ensure appropriate cable markings as per guidelines	2	0	2
	PC6. clear sites from debris and other items	3	1	2
Health and Safety	PC1. ensure appropriate disposal of the cut fibers, sleeves and cable pieces	3	2	1
	PC2. ensure compliance with site risk control, OHS, environmental and quality requirements as per company's norms	2	2	0
	PC3. ensure that work is carried out in accordance to the level of competence and legal	2	2	0
	PC4. ensure that sites are assessed for health and safety risk as per company's guidelines prior to commencement of work	2	2	0
	PC5. ensure that Personal protection equipments like helmets, knee pads, safety boots, safety glasses and trench guards are appropriately used as required	2	2	0
	PC6. ensure adherence to emergency plans in case of safety incidents	2	0	2
	PC7. ensure escalation of safety incidents to relevant authorities as per guidelines legal requirements	2		2

Reports and Record	PC1. ensure cable id/ make and drum numbers are recorded for future fault localization	2	2	0
	PC2. obtain sign-off from the projects team and communicate status to NOC for cable integration	2	2	0
Total			100	35
Grand Total		200	200	112
Percentage Weightage:				50
Minimum Pass% to qualify (aggregate):				70%