

Hands-On

# Fiber Optic ISP / OSP Combo-Tech

Splicing, Termination & Testing



## Course Description

This Hands-On 3-day course has been customized to provide technicians with a practical understanding of fiber optic theory and fiber applications in (ISP)Local Area Network, Security and Closed Circuit TV systems and more in-depth Hands-On focus on a wider array of (OSP) Fiber Optic systems and components, installation, splicing, testing and maintenance techniques...

A Fiber Optic Installer has a general understanding of optical fiber installation, connectorization, splicing, and testing, is familiar with optical fiber, connector, and splice performance characteristics described in TIA/EIA-568B, ITU-T G.671, ITU-T G.652 and Telcordia GR-326 A Fiber Optic Installer can perform connector endface evaluation as described in TIA/EIA-455-57B, is proficient in optical loss testing as described in TIA/EIA-526-14A, and understands the installation requirements described in articles 770 and 250 of the National Electrical Code. A Fiber Optic Installer is proficient at the installation of connectors on various types fiber of optic cables using various types of epoxies, and can perform mechanical and fusion splicing and more...



This course is Accredited by the International Certification Accreditation Council (ICAC)

Optional ETA Exams Available (FOI, FOT, FOT-OSP) Exam (Can be administered at the training location upon request as part of the course, fees apply.)

Type of Certification Stand-Alone  
Renewal / Maintenance Required  
Certification Term 4 Yrs  
Hands-On Required Yes

## Students Will Learn

- **The History Of Fiber Optics & Evolution Of Fiber Systems.**
- **Fiber Manufacturing Methods.**
- **Fiber Optic Theory And Waveguide Functions.**
- **Singlemode (OSP) And Multimode (ISP) Fiber Types.**

- **The Causes Of Attenuation, Optical Reflection And Refraction.**
- **Optical Dispersion Characteristics And Pulse Spreading Issues.**
- **Loose Tube And Unitube Style Trunk Cables**
- **Distribution And Feeder Cables.**
- **Fusion Splicer Applications And Fiber Alignment Systems**
- **Mechanical Splicing Uses And Applications**
- **Optical Connector Styles And Applications**
- **Back Reflection Issues And Angled Physical Contact Connectors**
- **Patch Panels And Functions For Distribution And Transmission**
- **ISP/OSP Style Splice Closure Styles And Function**
- **Cable Entry Methods And Splitter Configurations**
- **Drop Cable Connectivity And Security**
- **Cable Installation Methods As Direct Bury, Aerial And Ducted**
- **Emergency Restoration Issues, Future Planning, Restoration Kits**
- **Safety Practices**
- **Topologies For Urban And Rural Communities**
- **Splitters, ONTs/OLTs/ODNs**
- **Intro To Optical Testing And Troubleshooting.**
- **Visible Light Sources, OTDRs And Power Meters**
- **Testing Methods For ISP/OSP Systems**
- **OTDR Test Functions And Trace Interpretation**
- **Optical Loss Testing Methods**
- **And More**

## Target Audience

Inside Plant/Outside Plant technicians, contractors, union craftsman, electricians, technicians, installers, splicers, engineers, facilities managers, telecom managers and anyone involved in repairing, installing, maintaining, designing, evaluating, or provisioning Fiber Optic Cables and Optical Networks.

## Prerequisites

A basic understanding of telecommunications.  
 This information can be obtained in our courses below or equivalent knowledge  
 TeleCom Networks Today "II"  
 Basic Telephony & Telecom Electronics

## Course Outline

### **MODULE I    FIBER OPTIC GENERAL STUDIES**

## INTRODUCTION

- Common Industry Terminology
- History of Fiber Optics
- Advantages/Disadvantages of Fiber Optics
- Basics of a Fiber Optic Communications System
- Fiber Types and Manufacturing Processes (VIDEO)
- Typical Transmission Rates for Voice, Video & Data Applications
- System Topologies
- Fiber Optic Standards
- And More...

## THEORY TOPICS

- Theory of Light
- Electromagnetic Spectrum
- Total Internal Reflection (Singlemode)
- Refraction (Multimode)
- Index of Refraction (Refractive Index)
- Light Sources (LEDs & LASERS)
- Power (dbm/watts)
- Core/Cladding/Coatings
- Numerical Aperture
- Macro/Microbends
- Wave Division Multiplexing (WDM, CWDM,DWDM, etc.)
- Optical Switching Fundamentals
- And More...

## FIBER TOPICS

- Optical Fiber Types
- Typical Fiber Specifications
- Multimode Optical Fibers
- Singlemode Optical Fibers
- Dispersion Characteristics
- Modal Dispersion
- Chromatic Dispersion
- And More...

## FIBER CABLE TYPES

- Outside Plant
- Inside Plant
- Loose tube Gel Filled (OSP)
- Tight Buffered Distribution (ISP)
- Tight Buffered Breakout (ISP)
- Jumper Cables and Hybrids styles
- Reverse Oscillation Locator (OSP)
- Fiber Color Code
- And More...

## **MODULE II    FIBER OPTIC SAFETY ISSUES**

### **SAFETY FIRST**

- LASER Safety and Warning labels
- Types of LASERS
- LASER Output Power Levels
- Eye Safety Precautions
- Safe Glass Disposal Practices
- Food and Drinks Not Safe
- Proper Person Cleanliness
- Safe Work Surroundings
- Confined Spaces Issues

### **TOOLS:**

- Cable Jacket
- Fiber Coating Strippers
- Mid-Entry Tools
- Ring Tools
- Tube Splitters
- Knives
- Slitters
- Scissors/Snips
- Safety Tweezers
- And More...

## **MODULE III    FIBER OPTIC CABLE INSTALLATION**

### **PROPER PLANNING**

- Project Considerations
- Cable Pre-testing
- Cable Reels Identification and Handling
- Proper Cable Pulling Techniques
- Outdoor Cable Design Characteristics
- Direct Bury Cable Installation
- Directional Boring Methods
- Buried Cable Depths
- Man Holes and Vaults
- Cable Pulling Specifications
- Tensile Strength and Bend Radius
- Avoiding Installation Obstacles
- Grounding and Bonding Fiber Cables
- Identifying Cable Types
- Work Area Protection Issues
- And More...

## **MODULE IV    FIBER OPTIC CONNECTORS**

Connector Types  
Different types  
Use of connectors  
ST Style Connector Assembly; Hand and/or Machine Polishing and Inspection  
SC Style Connector Assembly; Hand and/or Machine Polishing and Inspection  
Also Types: FC, LC, MIL-C Series, Biconic, etc.

#### FIBER OPTIC ENCLOSURES

Applications  
Patch Panels  
Distribution of Fiber  
LAN  
Media outlets  
Fiber Management Bays

#### INSTALLING CONNECTORS

Connector tools  
Each attendee will install connectors

#### TESTING CONNECTORS AND JUMPER LOSS

Measure loss of previously installed connectors  
Test loss of jumpers  
Fiber Testing Parameters  
Continuity Testing

### **MODULE V FIBER OPTIC SPLICING**

#### SPLICING

Mechanical and Fusion Splicing  
Fusion Splicer Types and Operations  
Precision Cleaver Operation  
Set-up Fusion Splicer and Cleaver Work Stations  
Practice Fiber Stripping, Cleaning and Cleaving  
Practice In-Line Fusion Splicing  
Practice Pigtail Fusion Splicing  
Qualify Acceptable Splices  
and More...

### **MODULE VI FIBER OPTIC TESTING**

#### TESTING INFORMATION

The dB Scale and Units of Loss  
OTDR Functions for Testing

OTDR Testing for Splices, Distances and Back Reflection  
OTDR Trace Guidelines  
The Dead Zone  
Trace Events and Interpretation  
Testing at Various Wavelengths  
System Loss Parameters  
Calculating System Loss  
Total System OTDR Testing  
Optical Loss Test Sets (OLTS)  
Referencing the Test Set First  
Measuring Cable System Loss  
Documenting Test results  
And more...

## Notes

Fiber Optic Certification and On-Site Testing Available upon request..

## Delivery Method

Instructor led with numerous Hands-On labs and exercises.

## Equipment Requirements

**(This apply's to our hands-on courses only)**

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

## Course Length

3 Days