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Proper Crimping Techniques are Critical When Terminating Fiber Optic Connectors

Proper Crimping Techniques are Critical When Terminating Fiber Optic Connectors

by: Marcel Buijs | CRIMP: Blog Articles

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Marcel Buijs, EMEA Business Development, Technical Sales, Fiber Optic Center, Inc. with over twenty-five years in the photonics industry, brings this latest information on making the ultimate fiber optic product and improving process yield.

When manufacturing fiber optic cable assemblies, a relatively simple step can have dire consequences if not done accurately. This is true for crimping. During the fiber termination process, proper crimping techniques are critical to ensure you achieve a durable connection. In fact, once all termination steps are complete, the cable can be pulled without coming loose from the connector. Industry specifications – and possibly your customer's requirements – specify the maximum pull force for each fiber optic cable



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assembly. (The maximum pull force is measured in Newtons, for example, “100 Newtons of pulling force.”)

When properly crimped, the cable assembly has the strength to withstand a reasonable amount of pulling that occurs during the final production stages and installation. Even after installation, the cable assembly may need to withstand a certain amount of mechanical forces. For example, a dense rack may have multiple fibers bundled with Velcro®, hanging out of a cabinet – the force of the complete bundle is distributed over all the connectors. Proper crimping ensures that force is transferred to the connector, not the delicate glass fiber.



Crimping – a small but mighty step in the production process – strengthens the cable assembly and protects the fiber. Proper crimping techniques help to ensure the optical connection is maintained, which directly impacts reliability and long-term performance.



Advice for best-practice crimping techniques

The crimping process involves the connector body, a metal crimping sleeve (or ring), and the material to be clamped – normally this is the aramid yarns (also known by the trade name Kevlar®), which is the strength member of the cable. Follow these tips to improve your crimping procedures:

- ***Use the proper crimp tool*** – For each connector body, the connector manufacturer specifies the crimp tool, die set (hexagonal or round die), crimp sleeve, and crimp force to achieve the best crimp and maximum pull force for that assembly. It's absolutely critical to use the proper tools and components. The connector manufacturer's engineers designed this “match made in heaven” with mechanical tolerances in mind. The part of the connector that is crimped usually is not smooth – it is textured and rough because this increases the contact surface area. Such details contribute to the maximum pull force of the total assembly.
- ***Using the wrong crimp tool can result in a damaged cable assembly*** – If the wrong crimp tool or die set is used, the crimp will most likely be too hard or too light. A heavy-handed crimp can crush the connector. If this structure is damaged, the glass optical fiber could also be damaged. If the crimp is too light, the aramid yarns can pull away, which can decrease the maximum pull force. As a side note, you can use the connector manufacturer's recommended manual crimp tool or an automated

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crimp tool, which offers repeatability and yields better process control with decreased operator fatigue.

- ***Train your operators*** – Again, each component requires a specific crimp tool, die, and sleeve. Do not mix and match components! In some production lines, we'll see 10 or 15 die sets with various tools – the operator must know which tool to use for each connector. Here's a tip: Make your tools distinguishable for each different cable assembly product by identifying tools with a number or color code. This will help to ensure your operators use the right tool every time.



Conclusion

Even for a seemingly straightforward process step such as crimping, you need to have good manufacturing procedures, the right tools, good-quality components, and well-trained operators. We encourage you to call Fiber Optic Center if you have questions. We're here to help you make the highest-quality fiber optic cable assemblies in the world.



Please contact us for additional information. Phone numbers are: 800-473-4237 or 508-992-6464 and email is: sales@focenter.com.

Additional resources from the FOC team include:

- [View Crimp Technical Solution Content](#)
- [View the Glossary, Acronyms, Military Specifications for Connectors](#)
- Q&A Resource: email technical questions to AskFOC@focenter.com

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About the Author

Marcel Buijs

Marcel Buijs, EMEA Business Development, Technical Sales Marcel Buijs manages sales and technical support for FOC in the EMEA area. With over twenty five years in the photonics industry, Mr. Buijs' credentials include founding the first Photonics Department

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at a Technical College in The Netherlands, with three fellow teachers, and developing curriculum for the subjects of Opto-Electronics, Fiber Optics and Machine Vision. For more than 17 years, his specific role in research and development for a global fiber optic connector company, was developing processes for making fiber optic products and a broad process portfolio. His specific department was responsible for several important developments in both the single-fiber and multi-fiber optic connector markets. Areas of expertise include laser cleaving, polishing and measurement processes and proven yield and product performance improvements. Marcel's process, analytical and statistical knowledge gives him the ultimate tools to help every FOC customer meeting their specifications in making the ultimate fiber optic product and improve process yield. Marcel has a Bachelor Degree in Electrical Engineering and Information Technology, Saxion University. He and his wife Ellen live in the center of the Netherlands near Holland's largest national park "de hoge Veluwe" with their three children.



Education Resources

- [Fiber Optic Center Cable Assembly Process Consulting](#)
- [Fiber Making Process Development and Manufacturing Consulting](#)
- [Technical Horsepower Consulting with Wayne Kachmar: Optical Cables, Cable/Connector Interfaces, Optical Sensors SERVICES](#)

Light Brigade Certified Training



- [Light Brigade Instructor-Led and Certified Training: Fiber Optics 1-2-3, Certifications, Training Courses](#)

About Fiber Optic Center, Inc.



Fiber Optic Center, Inc., (FOC), is an international leader in distributing fiber optic components, equipment and supplies and has been helping customers make the best cable assemblies in the world for over two decades. Several areas of specialization and expertise, in which they are the industry leader, make them the preferred choice for many of the world's fiber professionals. In these key technology areas, FOC is "at least as technical as the manufacturer" about the products they sell. Striving to "make the business part easy," they offer outstanding and personal customer service, low or no minimum purchase order values, and from-stock delivery on industry-leading products and technology. FOC is the industry connection to the most innovative optical products, technologies and technical experts who integrate their manufacturing knowledge and vast experience into customers' worldwide operations. [@FiberOpticCntr](#)



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