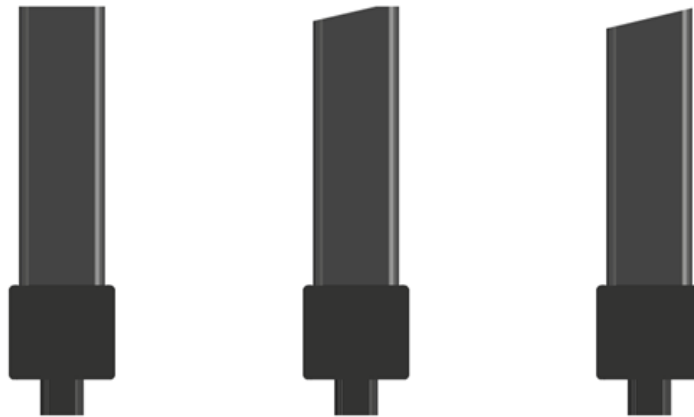


Avoid over-polishing MT Ferrules



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1.0 Introduction

To ensure consistent insertion loss, return loss, and 3D geometry on the MT ferrule, it is very important to have a refined and repeatable polishing process. When it comes to MT 8° angle ferrule polishing, it is considered to be even more critical because of the large number of fibers that need to make contact with each other during mating. The MT angle ferrule's end-face ideally should have a non-polished area (flat surface) and polished area (angled surface). As per the IEC 61754-7, the maximum non-polished (flat area) allowed is 0.8mm in size (approximately 30% non-polished area) and there is no minimum non-polished area (flat surface) defined by the IEC 61754-7 standard. Both the non-polished and polished area surfaces need to be controlled in order to achieve the desired optical performance.

This document will explain how to avoid over polishing the MT ferrule and what can be achieved by controlling the polishing.

2.0 Ferrule size after polishing

As per the IEC 61754-7, total maximum MT ferrule length is 8.1mm which is the starting length of SENKO's MT ferrule. To ensure proper optical performance, IEC recommends having a ferrule length ≥ 7.9 mm after polishing. If over-polishing is done, it can cause result in higher insertion loss, lower return loss, and unstable environmental performance. See below image to understand total ferrule length definition depicted as length B.

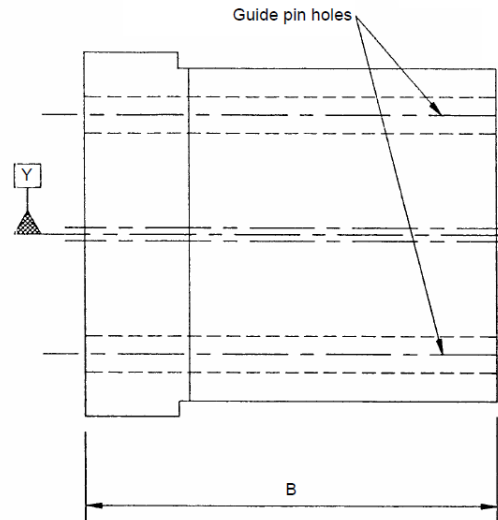


Figure 1: The total length of the ferrule after polishing should be $\geq 7.9\text{mm}$

3.0 MT Angle Polishing

MT angle ferrule polishing is different than flat MT Polishing. Ideally, the MT angle ferrule should have a non-polished surface as well as a polished surface after the initial polishing steps. Controlling the flat area allows for rework if necessary while maintaining high optical performance.

Step 1: End-face After Creating Angle

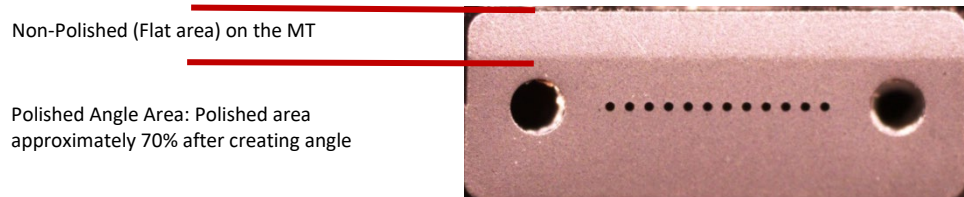


Figure 2: Un-polished area and polished area on the MT ferrule end-face after 1st step

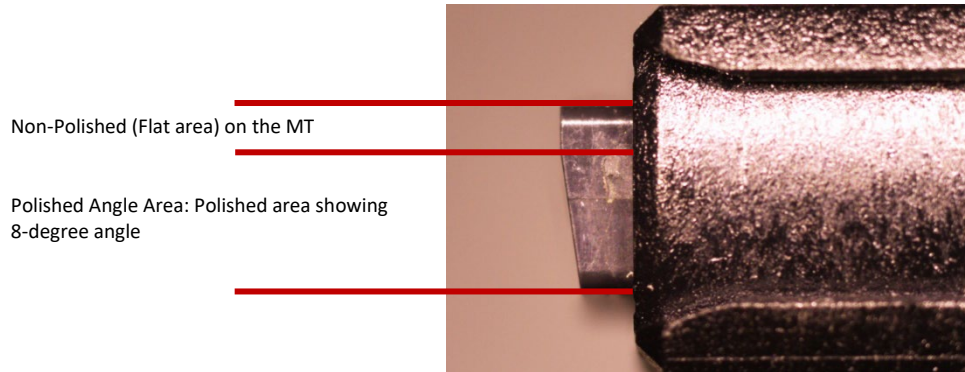


Figure 3: Shows another view of ferrule where unpolished area and angle area can be seen.

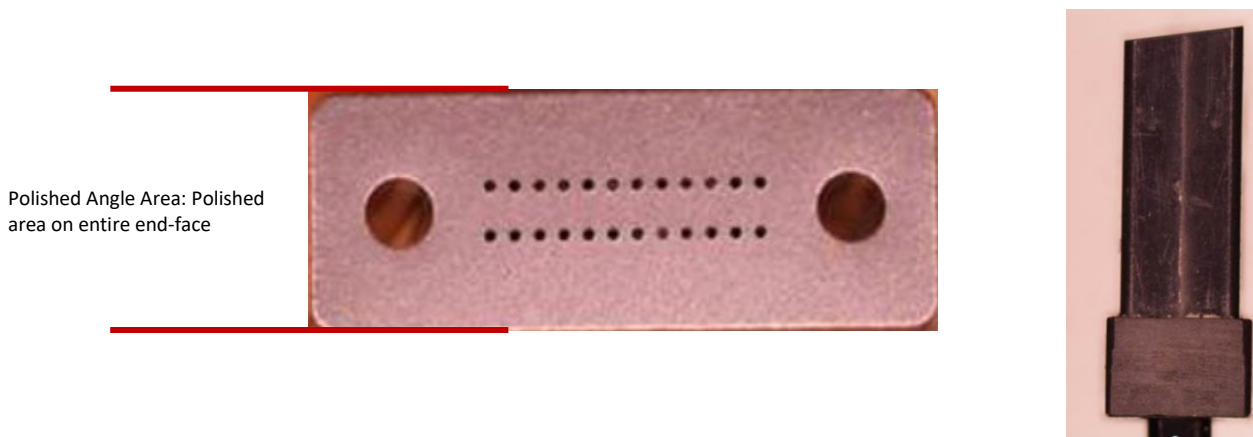


Figure 4: Shows fully polished end-face, length must be checked to be $\geq 7.9\text{mm}$

4.0 Ensuring proper ferrule lengths

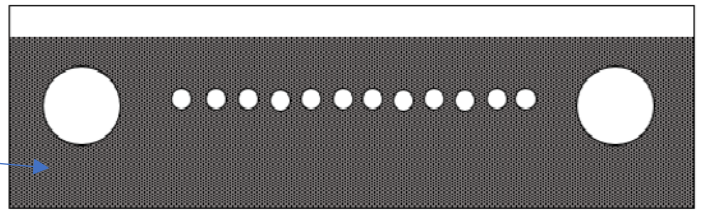
As with all polishing, it is important to have a very consistent epoxy bead in all loaded MT ferrules. SENKO recommends using a mechanical cleaver (such as the Phenix Fibersect). The cleaver produces a flat cut very close to the ferrule end-face, resulting in a repeatable epoxy bead that allows for a polishing process that will result in repeatable angularity and end-face geometry. The cleaver also improves throughput and first pass yield by eliminating air polishing steps. This not only makes it very quick but also reduces the human variability, thereby minimizing re-work which maximizes reliability and precision.

Application Engineering Note

The following two steps typically are 15µm or 30µm Silicon Carbide angle forming followed by the Silicon Carbide 3µm polishing film. This combination after the first two-step of polishing operation should produce about 75-80% angle-polished surface area. The rest of the polishing steps should yield a polished area that extends to roughly 85-90% across the face of the ferrule. Note, that 85 to 90% (0.3mm to 0.5mm un-polished area) is ideal, but 70 to 99.9% is also acceptable as per previously mentioned IEC standard.

Non-polished (Flat area) approx 15% (0.5-0.3mm in size)

Ideally 85-90% polished surface area for SM 8° MT Ferrule



5.0 Reworking

After the MT angle ferrule polishing is completed, SENKO recommends having non-polished surface (flat area) on the MT ferrule endface in a range of 0.3mm ~ 0.5mm which is approximately 10-15% of the total ferrule surface. This is because in the event of the rework, the ferrule typically can be polished two more times starting with 3µm Silicone Carbide without diminishing the overall ferrule length. Therefore, the ideal angle area (polished area) is approximately 85% of the whole ferrule surface. If an operator follows the proper the epoxy injection, controls the bead size, and follows the SENKO recommended polishing procedure, the overall ferrule length can be effectively controlled.

Note 1 – The epoxy bead is important to control to achieve a non-polished (Flat area) and polished area. See SENKO Engineering Application note titled “MT Ferrule Epoxy Injection Techniques”.

Note 2 - If the ferrule is flat, see SENKO Engineering application note titled “Direct MT Angle Polishing from MT Flat Ferrules”.

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