

# FIBRE PROCEDURES<sup>1</sup> FOR THE ATTENUATION LENGTH STATION

B. Giesbrecht, A. Heinrichs, Z. Papandreou, E. Plummer and A. Semenov

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## General Remarks

The Fibres from Kuraray come in wooden crates, each containing a number of cardboard boxes. Each box contains two (large) pouches/bags and each of those contains 8-12 sub pouches (or small bags). Each of the sub pouches contains approximately 100 fibres.

1. Two people are always used to transport fibres.
2. Kuraray cardboard boxes in which naked fibres are placed are cleaned with ethanol.
3. The puck board groove and work area at the attenuation length station are cleaned with ethanol and Kim wipes.
4. Ensure that the fibres are only exposed to UV filtered light (yellow film). This means that all measurements are taken with the overhead room lights OFF (even though they are covered with yellow filters), and that only one small desk lamp is on and it is covered with a UV filter. The overhead lights are ON for brief periods, only while moving/gathering fibres.

**NOTE: All fibre handling is done while wearing cotton gloves, with the exception of the hand that is used to clean and/or grease the fibre's end.**

## Specific Procedures

1. Receive fibre crate at the RIC loading dock and move to LB127.
2. Document external condition of crate. Take photos if necessary.
3. Open the crate. Note internal condition and document observations. (Example: Shipment 5 had water droplets inside, although the plastic sheet protected the cardboard boxes from moisture.). Include in the documentation whether the fibre lots (cardboard boxes) were packaged sequentially and incrementally from top to bottom.
4. Open a cardboard box, starting with the ones at the top of the crate and working down into the crate. Document if any box is overstuffed with fibres.
5. Withdraw fibre pouches carefully from the box until they protrude by about 30cm.
6. Carefully cut the protruding end off each pouch to reveal 8-12 sub pouches.
7. Carefully cut the protruding end off all enclosed sub pouches.
8. Carefully remove a fibre from each sub pouch applying a radius of curvature of NOT LESS than 0.5m (typically in the vertical direction) and place it in a cleaned wooden plastic-lined box.
9. Tag each removed fibre with a pre-made paper. The tag includes the fibre code consisting of the pouch, the sub pouch, and the fibre number, which is threaded onto the fibre through two holes in the tag.
10. Blacken the far end of each fibre by dipping them in black enamel (model) paint. The blackened ends of the fibres need to dry by hanging them over the edge of the bench. Inspect and ensure that the far end is thoroughly coated by the paint.

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<sup>1</sup> This document has been renamed from FibreHandling-AttenLen-v1.doc

11. Polish ONLY the near end of all fibres using the FibreFin polisher.
12. Slide the LED housing to the very far end of the puck board.
13. Place each fibre to be tested in turn onto the puck board, after removing its paper tag.
14. Thread the near end of the fibre through the opened Ocean Optics bit chuck leaving about 2.5cm visible on the other end.
15. Dab the near end of the fibre in a small amount of optical grease and thread it through the brass guide towards the photodiode.
16. Push the photodiode onto the fibre until contact is made with the window of the photodiode.
17. Push back the fibre by a few millimeters using the entire photodiode platform until the end of the clamp and the photodiode touch, in order to guarantee that the fibre is in direct contact with the photodiode.
18. Smooth (gently press down) the fibre into the puck board's groove with care and without tugging on the fibre, while wearing cotton gloves.
19. Slide the LED housing all the way across the puck board to the 18 cm mark on the ruler.
20. Turn on the LED and let it warm up for 10 minutes.
21. Record the current reading from the Keithley 6485 pico-ammeter directly into an Excel spreadsheet taken every 20cm along the fibre's length, for a total of 20 data points per fibre. As a guide, the nearest distance should result in a current around 110-120 nA.
22. Do not touch the fibre or LED housing while a measurement is being recorded. There is only one exception to this rule: when the fibre has a permanent curvature (as a result of overstuffing in the pouches) and will not stay down in the groove, hold it down at both sides of the LED housing, with fingers pressing gently.
23. Observe the exponential decrease in the measurements and repeat any measurements that appear out of the ordinary. This may occur due to the fibre "jumping" out of the groove or failure to sit in the full depth of the groove.
24. Slide the LED housing to the far end of the puck board, after the fibre has been tested.
25. Pull the fibre gently out of the opened chuck.
26. Wipe off the optical grease with a Kim wipe.
27. Re-thread the paper label onto the fibre.
28. Move the fibre into the 'test completed' fibre box.
29. Repeat procedure (steps 13-28) for 0.5-1% of fibres in each shipment, corresponding to approximately one fibre per sub pouch.
30. At the end of each shift a 'shift summary' is entered into the Elog.
31. Store the 'test completed' fibre box (when full) on one of the lower shelves against the wall above the attenuation length station. Label the box with the shipment date and number. These fibres will be set aside as reference standard for (nearly) the duration of the build and perhaps used only in the last few modules.
32. Disassemble the photodiode and chuck set up and thoroughly clean the photodiode's window with Kim wipes and ethyl alcohol once a week. Reassemble for reuse.
33. Insert all tested sub pouches into their corresponding cardboard box, being careful not to jam them. If there are too many sub pouches to do this safely, leave out a few.
34. Place tested cardboard box aside and continue the procedure (steps 4-28) for the next box until the shipment is fully tested.
35. Return tested cardboard boxes to their crate; seal and move it from LB127 to LB113.