**Appendix A**

Cigarette Paper Band Measurement Procedure

Equipment (to be provided by laboratory): Flatbed optical scanner

Computer with scanner software and network connection

4" x 5" closing (“zip lock”) plastic bags

Fine point “Exacto” knife, scalpel or equivalent

Number of cigarettes to be measured: 10 cigarettes, 5 from each of two packs.

1. Mark the outside of each paper with the cigarette brand style code number and the number 1 through 10 to correspond with the lab notebook entry (e.g. code-1, code-2, code- 3...)

2. Measure and record the overall length of each cigarette to the nearest 0.5 mm.

3. Slit the cigarette along its length.  Separate paper from tobacco and filter.

3.1. Filter cigarettes

3.1.1. Measure and record length of non-tobacco elements (filter and pre-filter element, if present

3.1.2. Length of tobacco column to be computed as the overall length minus the length of the non-tobacco elements.

4. Arrange the 10 cigarette papers, exterior surface down, on a glass plate.  Cover with second plate to flatten papers in a sandwich.  Be sure to orient each paper so that the long axis is parallel with the side of the plate.

5. Place the paper-plate assembly, exterior paper surface down, squarely on the scanner bed and close lid.

6. Set scanner brightness and contrast parameters according to predetermined values for band inspection.

7. Perform optical scan of exterior paper surfaces. Save image by using a filename containing the cigarette code number and “Front” for images of exterior of paper surfaces.

8. Repeat steps (4) to (7) where paper-plate assembly is placed on scanner with interior paper surfaces down.  Save image by using a filename containing the cigarette code number and “Back” for images of interior of paper surfaces.

9. Inspect both Front and Back scan images and determine which scan best reveals bands on the cigarette papers.

10. Determine for each paper sample all relevant positions in “pixels” and record.  This is achieved by placing the cursor at each node point (end point and band margin) and noting the vertical pixel displayed position on the monitor.  Record cigarette code, sample number, and pixel position in the Band Analysis Spreadsheet.

11. Execute Band Analysis spreadsheet algorithms to convert cigarette band raw data to lengths in millimeters.

**Appendix A (cont.)**

12. Record results, to the nearest 0.5 mm, for each of the 10 samples in the data table:

a. length of cigarette paper

b. width of each band

c. distance between bands
d. distance from the lighting end to each band (lighting end to edge of band nearest lighting end)

1. distance from filter (label) end to the closest band [filter (label) end to edge of band nearest filter

(label) end]

13. Verify that the sum of the widths of the bands plus the distances between them and outside them equals the length of the tobacco column.

14. Record results:

* length of cigarette paper (length of tobacco rod)
* width of each band, in order from the lighting end (b 1 , b 2 , b 3  …)
* distance between each band in order from the lighting end (c 1 , c 2  …)
* distance from the lighting end to each band in order from the lighting end (d 1 , d 2 , d 3  …)
* distance from the filter (label) end to the closest band

15. If no bands are present, record “no bands observed”.

16. Upon completion of band analysis, place the 10 cigarette papers, flat and unfolded, in labeled plastic bag.  Label the bag with the cigarette brand style code and date of analysis.

Cigarette Paper Band Measurement Example – cigarette with 2 bands:

Lighting end                                                  Filter (label) end

     │←                 a                                →│

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|     ←   d 1     → ←d 2                  |   ↔b 1     |    ←    c        →                     d 2 →  |   ↔b 2  |         ←   e       →  |

**Appendix A (cont.)**

Cigarette Paper Band Measurement Example – cigarette with 3 bands:

Lighting end                                                                                       Filter (label) end

        │←                                                         a                                   →│

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|      ← d 1 → ←d 2 ←d 3    | ↔b 1  |    ←    c 1               →                              d 2 →  | ↔b 2  |    ←    c 2               →                               d 3 →  | ↔b 3  |            ↔e  |

**This is the current testing to be used unless an updated standard is adopted by OAG.**