

Commonwealth of Virginia  
Department of General Services  
Division of Consolidated Laboratory Services  
Richmond, Virginia

### Tuning Fork Laboratory Quality Manual Checklist

Facility Name: \_\_\_\_\_ LAB ID: \_\_\_\_\_

#### REFERENCE DOCUMENT

DCLS #2364: PROTOCOL FOR THE CERTIFICATION OF LABORATORIES PERFORMING CERTIFICATION OF TUNING FORKS

#### LABORATORY INSTRUCTIONS

RECORD THE QUALITY MANUAL OR SOP PAGE NUMBER AND SECTION NUMBER IN THE "LABORATORY REFERENCE" COLUMN INDICATING WHERE EACH REQUIREMENT CAN BE FOUND. RETURN THIS COMPLETED FORM TO DCLS PRIOR TO THE ON-SITE EVALUATION ALONG WITH A CURRENT COPY OF THE QUALITY MANUAL.

#### Protocol for the Certification of Laboratories Performing Certification of Tuning Forks, Section V.B.

At a minimum, the following information must be included or referenced in the Quality Manual:

#	Protocol Reference	Quality Manual Requirement	Laboratory Reference	DCLS INTERNAL USE ONLY	
				Document Compliant	Assessor's Notes
1	§V.B.1	Company name and address			
2	§V.B.2	Statements affirming the laboratory's commitments to quality assurance and data integrity			
3	§V.B.3	Minimum personnel qualifications including education and any specialized training in communications electronics, radar calibration and repair, or frequency measurement			
4	§V.B.4	Log of printed names, handwritten initials and signatures of all laboratory personnel authorized to perform tuning fork testing, data review, and/or certificate notarization			
5	§V.B.5	List of all testing equipment—including manufacturer, model, and serial number—used in the certification procedure			
6	§V.B.6	Information describing the accuracy, range and reproducibility for each instrument and item of support equipment used for the testing and certification of tuning forks <i>NOTE: An excerpt from the instrument manual with this information will satisfy this requirement.</i>			
7	§V.B.7	Corrective Action Policy for response when instrumentation fails to meet fitness for use acceptance criteria			
8	§V.B.8	Schedules for instrument calibration and maintenance including requirements for documenting calibration and maintenance			
9	§V.B.9	Description of circumstances that would require recertification of reference tuning forks			
10	§V.B.10	Description of processes and procedures for ensuring traceability of measurements to nationally recognized standards			

Notes/Comments

Document #:6957

Revision: 11

Date Published: 06/04/24

Issuing Authority: Group Manager

#	Protocol Reference	Quality Manual Requirement	Laboratory Reference	DCLS INTERNAL USE ONLY	
				Document Compliant	Assessor's Notes
<b>Description of procedures being performed, equipment being used, calculations, and examples, adjustments (if any), and references. This information may be included in the Quality Manual or may be a separate Standard Operating Procedure (SOP). At a minimum, the information shall include [Section V.B.11]:</b>					
11	§V.B.11.a	Sample receiving and tracking procedures			
12	§V.B.11.b	Sample Rejection Policy describing the circumstances under which a tuning fork would not be accepted for testing			
13	§V.B.11.c	Procedures for labeling and disposition of rejected tuning forks			
14	§V.B.11.d	Instructions for instrument setup, fitness for use testing and documentation, and acceptance criteria			
<b>NOTE 1:</b> For conventional tuning forks, instructions to include striking the tuning fork on a nonmetallic object and waiting for a stable output before recording the observed frequency.					
<b>NOTE 2:</b> For Eagle 3 Electronic Tuning Forks (ETF), instructions to specifically describe the evaluation process per Kustom Signals Service Bulletin 1765 Rev A.					
<b>FOR CONVENTIONAL TUNING FORKS :</b> The procedure and criteria for testing tuning forks submitted by law enforcement agencies for certification and documenting test results, <u>to include</u> [Section V.B.11.e]:					
15	§V.B.11.e.i	Time allowed for tuning forks to come to temperature equilibrium prior to testing			
16	§V.B.11.e.ii	Reference tuning forks tested prior to beginning testing and at the conclusion of each day on which testing occurred			
17	§V.B.11.e.iii	Frequency of oscillation of each reference tuning fork shall be within $\pm 0.5\%$ of that specified by the manufacturer or the most recent independent certification			
18	§V.B.11.e.iv	Temperature of the test environment recorded prior to testing each sample set and at the end of the sample set			
19	§V.B.11.e.v	Temperature of the test environment not less than 20°C (68°) and not greater than 30°C (86°).			
<b>NOTE:</b> A laboratory should consider monitoring humidity at the testing site if the possibility of exceeding 10%-85% is suspected.					
20	§V.B.11.e.vi	At least 2 frequency observations recorded and averaged for the calculation of MPH			
21	§V.B.11.e.vii	A description of calculations used with sufficient detail to ensure the report produced by the analyst can be verified by reconstructing the calculation			
Notes/Comments:					

#	Protocol Reference	Quality Manual Requirement	Laboratory Reference	DCLS INTERNAL USE ONLY	
				Document Compliant	Assessor's Notes
<u>Operating frequencies and calculations</u> K band: 24,050 MHz K band speed, mph = Average observed frequency (Hz) / 72.0301 Ka band: 33,400 MHz to 36,000 MHz Ka band speed, mph = Average observed frequency (Hz) / (2.983135 x nominal microwave frequency, GHz)					
<u>Nominal Ka Microwave frequencies by manufacturer:</u> <ul style="list-style-type: none"> <li>Decatur / KSI: 35.5 GHz</li> <li>MPH: 33.8 GHz</li> <li>Stalker: 34.7 GHz</li> </ul>					
22	§V.B.11.e.viii	Each page of test documentation dated and initialed by the analyst			
<b>FOR <i>EAGLE 3 ETF</i> : The procedure and criteria for testing tuning forks submitted by law enforcement agencies for certification and documenting test results, <u>to include</u> [Section V.B.11.f]:</b>					
23	§V.B.11.f.i	A minimum of 2 repetitions of the Service Bulletin 1765 Rev A procedure, results recorded, duplicates matching or a third repetition done			
24	§V.B.11.f.ii	Each page of test documentation dated and initialed by the analyst			
25	§V.B.11.f.v	Certification to occur when specifications of Service Bulletin 1765 Rev A are met, within $\pm 5$ Hz			
<b>Processes for reviewing and reporting test data and calculations, <u>to include</u> [Section V.B.11.g, h]:</b>					
26	§V.B.11.g.i,iii	Verification that measurements of the reference tuning forks were within the acceptance criteria of $\pm 0.5\%$ of the most recent certified values for conventional tuning forks or $\pm 5$ Hz for Eagle 3 ETF			
27	§V.B.11.g.ii	Review of the new certificate generated by the lab against the raw test data and sample submission information for each tuning fork tested			
28	§V.B.11.g.iv	Data review documented with date and initials of reviewer			
29	§V.B.11.g.v	Final reports notarized			
30	§V.B.11.h	Processes for customer notification as well as labeling and disposition of tuning forks that fail the certification testing			
Notes/Comments: <div style="border: 1px solid black; height: 150px; margin-top: 5px;"></div>					

#	Protocol Reference	Quality Manual Requirement	Laboratory Reference	DCLS INTERNAL USE ONLY	
				Document Compliant	Assessor's Notes
<b>Training procedures per Section 12 must address, separately, both the training for conventional tuning fork testing and for the Eagle 3 ETF, if applicable, as follows:</b>					
<b>NOTE:</b> Form 55131 may be used to document Eagle 3 ETF training					
31	§V.B.12.a	Training Goal - a concise statement identifying the overall training goal and results expected			
32	§V.B.12.b	Learning Objectives - a clear statement of the capabilities expected of the technician upon completion of the training			
33	§V.B.12.c	Learning Methods and/or Activities - specific actions facilitating the achievement of the learning objectives			
34	§V.B.12.d	Documentation - evidence, with signatures and dates, that the learning activities were performed and evaluated			
35	§V.B.12.e	Criteria - specific measures and criteria indicating the effectiveness of the training			
36	§V.B.12.f	Evaluation - an assessment of the documentation against the criteria to determine whether the learning objectives were achieved, or whether additional training may be necessary			
<b>A Demonstration of Capability (DOC) procedure that outlines a procedure for establishing technician competence in testing and establishes acceptance criteria for the evaluation of analyst capability. [Section V.B.13]</b>					
Each technician employed by a commercial facility shall perform a demonstration of capability as follows:					
37	§V.B.13.a	<u>Conventional TF</u> : Perform a minimum of 20 consecutive frequency observations of each reference tuning fork			
38	§V.B.13.a	<u>Conventional TF</u> : Calculate the mean and standard deviation of each data set; reviewed against evaluation criteria			
39	§V.B.13.b	<u>Eagle 3 ETF</u> : Demonstrate correct identification of TP5 and ground on the remote control device			
40	§V.B.13.b	<u>Eagle 3 ETF</u> : Perform a minimum, of 5 consecutive cycles recording 2 frequency readings per cycle			
41	§V.B.13.b	<u>Eagle 3 ETF</u> : Calculate the mean; review data against evaluation criteria			
<b>NOTE:</b> At a minimum, the frequency of oscillation of each reference tuning fork shall be within $\pm 0.5\%$ of that specified by the manufacturer or the most recent independent certification. [§V.B.13.b]					
Notes/Comments:					

