

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					

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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]:					
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			
NOTE 1: 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.					
NOTE 2: For Eagle 3 Electronic Tuning Forks (ETF), instructions to specifically describe the evaluation process per Kustom Signals Service Bulletin 1765 Rev A.					
FOR CONVENTIONAL TUNING FORKS : 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°).			
NOTE: 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:					

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<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> - Decatur / KSI: 35.5 GHz - MPH: 33.8 GHz - Stalker: 34.7 GHz					
22	§V.B.11.e.viii	Each page of test documentation dated and initialed by the analyst			
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]:					
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 ± 5 Hz			
Processes for reviewing and reporting test data and calculations for Conventional Tuning Fork and Eagle 3 ETF, <u>to include</u> [Section V.B.11.g, h]:					
26	§V.B.11.g.i,iii	Verification that measurements of the reference tuning forks were within the acceptance criteria of ±0.5% of the most recent certified values for conventional tuning forks or ±5 Hz for Eagle 3 ETF	TF: 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	TF: ETF:		
28	§V.B.11.g.iv	Data review documented with date and initials of reviewer	TF: ETF:		
29	§V.B.11.g.v	Final reports notarized	TF: ETF:		
30	§V.B.11.h	Processes for customer notification as well as labeling and disposition of tuning forks that fail the certification testing	TF: ETF:		
Notes/Comments:					

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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: NOTE: 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	TF: ETF:		
32	§V.B.12.b	Learning Objectives - a clear statement of the capabilities expected of the technician upon completion of the training	TF: ETF:		
33	§V.B.12.c	Learning Methods and/or Activities - specific actions facilitating the achievement of the learning objectives	TF: ETF:		
34	§V.B.12.d	Documentation - evidence, with signatures and dates, that the learning activities were performed and evaluated	TF: ETF:		
35	§V.B.12.e	Criteria - specific measures and criteria indicating the effectiveness of the training	TF: ETF:		
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	TF: ETF:		
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] 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			
NOTE: 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:					

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Recordkeeping Policies and Practices [Section V.B.14]					
42	§V.B.14.a	Record Retention Policy			
43	§V.B.14.b	Documentation practices			
44	§V.B.14.c	Procedures for ensuring the security and integrity of electronic records			
45	§V.B.15	A sample copy of a certificate issued to customers as it relates to tuning fork certification			
46	§V.B.16	Change sheet to allow historic reconstruction of changes to the Quality Manual			
47	§V.B.17	Annual Review and signature sheet			

Notes/Comments:

DCLS Assessor Review

Initials: _____ Date: _____

Return completed checklist to DCLS (Richmond, VA) with Quality Manual

METHOD CHECKLISTS ARE AN INTERVIEW TOOL USED BY ASSESSORS. ASSESMENT TO COMPLIANCE WITH THIS METHOD MAY REQUIRE REFERENCE TO THE PUBLISHED METHOD FOR ADDITIONAL DETAIL. REFER TO FULL PUBLISHED METHOD WHENEVER INTERNAL AUDITS ARE DONE. THE PUBLISHED METHOD MAY INCLUDE STATEMENTS REGARDING EXPECTED LABORATORY PRACTICES (INCLUDING BUT NOT LIMITED TO PHRASES DESIGNATED WITH "SHOULD") WHICH MAY NOT BE CAPTURED IN THIS CHECKLIST. CHECKLISTS ARE SUBJECT TO CHANGE. PLEASE NOTIFY DCLS IMMEDIATELY BY EMAIL OF ANY IDENTIFIED ERRORS OR OMISSIONS. (Lab_Cert@dgs.virginia.gov)