

Chemistry Unit Open Proficiency Testing Procedures

1 Purpose

This document describes the procedures for the internal and external proficiency testing program of the Chemistry Unit (CU), in compliance with the *FBI Laboratory Practices for Open Proficiency Testing*.

2 Scope

The CU Proficiency Testing Program encompasses both internal and external proficiency testing. Each CU examiner and technician must complete one annual open proficiency test in each “Test Description” listed in the below table in which they routinely perform casework.

Discipline	Test Description	Frequency	Source
Seized Drugs	Drug Analysis	1/year/individual	External
Toxicology	Whole Blood Alcohol/Volatiles (Survey AL1)	1/year/individual	External
	Forensic Toxicology (Survey FTC)	3 team tests/year	External
	Drug Facilitated Crime (Survey DFC)	2 team tests/year	External
Fire Debris and Explosives	Ignitable Liquid Identification	1/year/individual	External
Materials (Trace)	Chemical Unknown	1/year/individual	External
	Paint	1/year/individual	External
	Tape	1/year/individual	External
	Metallurgy (Trace Metal Comparison)	1/year/individual	Internal
	Metallurgy (Steel Quantitation)	1/year/individual	External

3 Distribution

Prior to distribution of any proficiency test, the “Participant & Test Info” and “Test Preparation” sections of the *CU Open Proficiency Test Preparation and Evaluation Form* (Appendix A) will be completed by the CU proficiency test representative (CU PTR). The CU PTR will ensure the proficiency test and associated paperwork is delivered to the test participant. The test participant will sign and date the applicable Memo as an acknowledgment of receipt of the proficiency test and due date. This Memo will be retained in the proficiency test file.

4 Division of Labor for Analyses Conducted on Proficiency Tests

Each examiner will complete his/her proficiency test independently. The only exceptions are the Forensic Toxicology (see section 6.2.2) and Drug Facilitated Crime (see section 6.2.3) tests.

5 Internal Proficiency Tests

5.1 Preparation of Internal Proficiency Tests

The following internal proficiency test will be prepared as needed by the CU PTR and/or an examiner/technician that is authorized in the applicable discipline/sub-discipline. Any other personnel participating in sample preparation will need prior approval from the applicable Technical Leader. This approval will be recorded on the *CU Open Proficiency Test Preparation and Evaluation Form* or attached records.

- Metallurgy (Trace Metal Comparison)

All internal proficiency tests and samples for these tests will be prepared and recorded following the *FBI Laboratory Practices for Open Proficiency Testing*. Sample and test preparation records will be retained permanently in the proficiency test file.

5.2 Test Design

5.2.1 Metallurgy (Trace Metal Comparison)

A wide variety of metals are submitted to the CU for analysis. An examination may be requested to determine the composition of the material and/or to determine if source commonality exists.

5.2.1.1 Internal Proficiency Test Preparation for Metallurgy

The internal proficiency test for metallurgy (i.e., trace metal comparison) will consist of either a positive or negative association based on the composition of the material. All samples provided to the participant will come from a source that has an established composition. The sources include NIST-traceable reference materials or metal samples of known provenance. The samples should be chosen to be homogeneous for the purposes of analysis and should be of sufficient size to allow all necessary analyses to be performed. The individual samples will be placed in appropriate, separate packaging and given unique identifiers. The sample(s) and test preparation information will be provided to the CU PTR. The CU PTR will distribute the test sample(s) to the participant.

5.2.1.1.1 Positive Internal Proficiency Test for Metallurgy

The positive internal proficiency test for metallurgy will consist of a minimum of three splits of samples provided to each participant. At least two of the splits will be from the same source and the remaining split(s) may be from a different source.

5.2.1.1.2 Negative Internal Proficiency Test for Metallurgy

The negative internal proficiency test for metallurgy will consist of a minimum of three splits of samples provided to each participant. All of the splits will be from different sources.

6 External Proficiency Tests

The CU PTR will ensure external proficiency tests are procured for CU. Generally, external proficiency tests are administered as directed by the provider. Additional information is provided below.

6.1 External Proficiency Test for Tape Analysis

In the event that the test sample(s) received consist of a type of tape not routinely analyzed by CU (e.g., office tape, masking tape) Paints and Polymers personnel will prepare an internal proficiency test using retained external proficiency test samples (refer to the *FBI Laboratory Practices for Open Proficiency Testing*).

6.2 External Proficiency Tests for Toxicology

Each examiner and technician working in the Toxicology team will take at least one Whole Blood Alcohol/Volatiles (Survey AL1) proficiency test per year. Each examiner and technician may assist in the analysis of the Forensic Toxicology (Survey FTC) and Drug Facilitated Crime (Survey DFC) tests, but this will not count as an individual proficiency test.

6.2.1 Whole Blood Alcohol/Volatiles (Survey AL1)

A subscription to Survey AL1 provides three tests per year that are shipped at different times. All samples contained within a single Survey AL1 must be analyzed by the test participant. Since the Toxicology team does not routinely perform ethylene glycol testing, this section of the Survey AL1 results form will be left blank.

6.2.2 Forensic Toxicology (Survey FTC)

A subscription to Survey FTC provides three tests per year that are shipped at different times. All samples within the Survey FTC will be analyzed by the Toxicology team in order for the

survey to be considered complete. Each test will be assigned to one examiner who will coordinate the analysis of the samples, collect all data, and assemble the final results.

6.2.3 Drug Facilitated Crime (Survey DFC)

A subscription to the Survey DFC provides two tests per year that are shipped at different times. All samples within the Survey DFC will be analyzed by the Toxicology team in order for the survey to be considered complete. Each test will be assigned to one examiner who will coordinate the analysis of the samples, collect all data, and assemble the final results.

6.3 Metallurgy (Steel Quantitation)

Measurement uncertainty will not be estimated nor reported for this test since it does not influence the interpretation of the results of examinations and ASTM (the external test provider) does not allow it to be reported.

7 Reporting and Evaluation of Proficiency Test Results

Proficiency test results will be reported and evaluated following practices established by the *FBI Laboratory Practices for Open Proficiency Testing* and, when applicable, the external test provider. The requirements for marking case records are the same as for casework, with the exception that the CU Test ID # (analogous to the FBI Laboratory number in casework) only needs to be on the first page of bound examination records.

7.1 Division of Labor for Reporting Results

For a proficiency test assigned to a technician, the technician will provide all notes and analytical data to an examiner authorized in the applicable discipline/sub-discipline. For internal proficiency tests, the technician and examiner will complete their respective portions of the *CU Internal Proficiency Test Results Form* (Appendix B). For external proficiency tests, the examiner will complete the external provider data sheets.

8 Completed Proficiency Test Samples

Upon completion of a proficiency test, all remaining samples will be returned to the CU PTR.

9 Evaluation of Completed Proficiency Tests

The "Evaluation" section of the *CU Open Proficiency Test Preparation and Evaluation Form* will be completed by the CU PTR for each proficiency test administered, with the exception of his or her own proficiency test(s) which will be evaluated by the CU Chief or applicable

Technical Leader. The Evaluator, CU Chief, and Participant will then sign and date the form after reviewing the proficiency test and summary report(s).

10 Records

The CU PTR will ensure that the relevant records associated with a completed proficiency test are maintained permanently. The following records will be maintained in the CU, electronically, and/or in FA:

- *CU Open Proficiency Test Preparation and Evaluation Form*
- Administrative and examination records
- Results of test and sample validations (for internal proficiency tests)
- Memo from the CU PTR to the test participant that accompanies the proficiency test
- *CU Internal Proficiency Test Results Form*
- Results and evaluation notices from external proficiency test providers
- All notices to and from the Laboratory Division Proficiency Test Program Manager (PTPM) concerning a particular test
- Completed external provider data sheets

Rev. #	Issue Date	History
13	12/02/19	Added Ignitable Liquid Identification to Section 7 listing of external tests. Added explanation of Fire Debris proficiency test as Section 7.1. Added approval signature line for Fire Debris Technical Leader. Appendix A updated to include Category of Testing 4.10 Fire Debris. Appendix B updated to include Fire Debris.
14	03/01/21	<p>Removed “qualified” and/or replaced with “authorized” as adjective for examiners/technicians throughout.</p> <p>Removed Bank Security Chemicals proficiency test, updated document throughout.</p> <p>Edited section 2 language for clarity and merged with portion of previous section 3. Also added proficiency tests Table into section 2 (deleted from previous Appx A). Table updated to reflect changes in this revision and new Scope disciplines. Deleted Toxicology T-Series test from table and throughout.</p> <p>Minor edits made to new section 3 for clarity.</p> <p>Deleted first paragraph in new section 4 (covered in Level 1 document).</p> <p>Minor edits made to new section 5.1 for clarity.</p> <p>Sections 5.1, 7.1- changed “category of testing” to “discipline/sub-discipline”.</p> <p>Deleted sentence from new section 5.2.</p> <p>Section 5.2.1.1.- changed to “NIST-traceable reference materials”.</p> <p>Deleted previous sections 6.3, 6.4, 7.1, 8.3, and 10.</p> <p>Simplified new section 6.</p> <p>Edited Toxicology approach in new section 6.2.1.</p> <p>Deleted first sentence in new sections 6.2, 6.2.1, 6.2.2, 6.2.3, and 6.2.4.</p> <p>Edited section 6.2.1 for clarity and added ethylene glycol language.</p> <p>Edited sections 6.2.2 and 6.2.3 for clarity.</p> <p>Added new section 6.3.</p> <p>Edited the last sentence in new section 7.</p> <p>Edited new section 8 for clarity/brevity.</p> <p>Added “or applicable Technical Leader” to section 9.</p> <p>Section 10- changed to “CU PTR” (was UC), allowed for electronic storage of records, and updated bulleted list.</p> <p>Appendix A- form revised (removed “Discipline” and “Category of Testing”, added detail to beginning of “Evaluation” section, updated ABFT requirements for toxicology quantitative evaluation).</p> <p>Appendix B- form revised (changed “Category of Testing” to “Test Description”).</p>

Approval

Redacted - Signatures on File

Fire Debris
Technical Leader: Date: 02/26/2021

General Chemistry
Technical Leader: Date: 02/26/2021

Metallurgy
Technical Leader: Date: 02/26/2021

Paints and Polymers
Technical Leader: Date: 02/26/2021

Toxicology
Technical Leader: Date: 02/26/2021

Chemistry Unit Chief: Date: 02/26/2021

QA Approval

Quality Manager: Date: 02/26/2021

Appendix A: *CU Open Proficiency Test Preparation and Evaluation Form*

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Appendix B: *CU Internal Proficiency Test Results Form*

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