

Environmental Protection Agency

Pt. 53, Subpt. B, App. A

**APPENDIX A TO SUBPART B OF PART 53—
OPTIONAL FORMS FOR REPORTING
TEST RESULTS**

**TABLE B-5—SYMBOLS AND ABBREVIATIONS—
Continued**

TABLE B-5—SYMBOLS AND ABBREVIATIONS

B_L	Analyzer reading at specified <i>LDL</i> concentration.	P_{20}	Precision at 20 percent of <i>URL</i> .
B_0	Analyzer reading at 0 concentration for <i>LDL</i> test.	P_{80}	Precision at 80 percent of <i>URL</i> .
<i>DM</i>	Digital meter.	R	Analyzer reading of pollutant alone for <i>IE</i> test.
C_{max}	Maximum analyzer reading during 12ZD test.	R_I	Analyzer reading with interferent added for <i>IE</i> test.
C_{min}	Minimum analyzer reading during 12ZD test.	r_i	The <i>i</i> -th <i>DM</i> reading for noise test.
<i>i</i>	Subscript indicating the <i>i</i> -th quantity in a series.	S	Standard deviation of noise readings.
<i>IE</i>	Interference equivalent.	S_0	Noise value (<i>S</i>) measured at 0 concentration.
L_1	First analyzer zero reading for 24ZD test.	S_{80}	Noise value (<i>S</i>) measured at 80 percent of <i>URL</i> .
L_2	Second analyzer zero reading for 24ZD test.	S_n	Average of $P_7 \dots P_{12}$ for the <i>n</i> -th test day.
M_n	Average of $P_1 \dots P_6$ for the <i>n</i> -th test day.	S'_n	Adjusted span reading at 80 percent of <i>URL</i> on the <i>n</i> -th test day.
M'_n	Adjusted span reading at 20 percent of <i>URL</i> on the <i>n</i> -th test day.	<i>URL</i>	Upper range limit.
<i>MSD</i>	Span drift at 20 percent of <i>URL</i> .	<i>USD</i>	Span drift at 80 percent of <i>URL</i> .
<i>n</i>	Subscript indicating the test day number.	Z	Average of L_1 and L_2 .
<i>P</i>	Analyzer reading for precision test.	Z_n	Average of L_1 and L_2 on the <i>n</i> -th test day.
P_i	The <i>i</i> -th analyzer reading for precision test.	Z'_n	Adjusted zero reading on the <i>n</i> -th test day.
		<i>ZD</i>	Zero drift.
		12ZD	12-hour zero drift.
		24ZD	24-hour zero drift.

Applicant _____ Date _____

Test No. _____

Analyzer _____ Range _____

READING NUMBER (i)	TIME	0% of URL		80% of URL	
		DM READING	r_i , ppm	DM READING	r_i , ppm
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
$\sum_{i=1}^{25} r_i$					
$\sum_{i=1}^{25} r_i^2$					
s			$s_0 =$		$s_{80} =$

Figure B-2. Form for noise data.

Applicant _____		Range _____														
Analyzer _____		TEST NUMBER														
TEST PARAMETER	READING OR CALCULATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LOWER DETECTABLE LIMIT	B_2															
	B_L															
	$LDL = B_L - B_2$															
INTERFERENCE EQUIVALENT	R_1															
	R_{11}															
	$IE_1 = R_{11} \cdot R_1$															
	R_2															
	R_{12}															
2	$IE_2 = R_{12} \cdot R_2$															
	R_3															
	R_{13}															
3	$IE_3 = R_{13} \cdot R_3$															
	R_4															
	R_{14}															
4	$IE_4 = R_{14} \cdot R_4$															
	R_5															
	R_{15}															
5	$IE_5 = R_{15} \cdot R_5$															
	TOTAL	$IE_T = \sum_{i=1}^n IE_i$														

Figure B-3. Form for data and calculations for lower detectable limit and interference equivalent.

Applicant _____
 Analyzer _____ Range _____

TEST DAY (n)	DATE	ANALYZER READING, ppm	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P_1																		
P_2																		
P_3																		
P_4																		
P_5																		
P_6																		
$\sum_{i=1}^6 P_i^2$																		
P_7																		
P_8																		
P_9																		
P_{10}																		
P_{11}																		
P_{12}																		
$\sum_{i=7}^{12} P_i^2$																		
L_1																		
L_2																		
Z'_n																		
M'_n																		
S'_n																		
C_{max}																		
C_{min}																		

Figure B-4. Form recording data for drift and precision.

Applicant _____		Range _____														
Analyzer _____		n - th TEST DAY														
TEST PARAMETER	CALCULATION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Zero drift	12ZD = $C_{max} - C_{min}$															
	$Z = \frac{1}{2}(L_1 + L_2)$															
24 hour	24ZD = $Z_n - Z_{n-1}$															
	24ZD _n = $Z_n - Z'_{n-1}$															
20% URL	$M_n = \frac{1}{6} \sum_{i=1}^6 P_i$															
	$MSD_n = \frac{M_n - M_{n-1}}{M_{n-1}} \times 100\%$															
	$MSD_n = \frac{M'_n - M'_{n-1}}{M'_{n-1}} \times 100\%$															
Span drift	$S_n = \frac{1}{6} \sum_{i=7}^{12} P_i$															
	$USD_n = \frac{S_n - S_{n-1}}{S_{n-1}} \times 100\%$															
80% URL	$USD_n = \frac{S'_n - S'_{n-1}}{S'_{n-1}} \times 100\%$															
	$P_{20} = \sqrt{\frac{1}{5} \left[\sum_{i=1}^6 P_i^2 - \frac{1}{6} \left(\sum_{i=1}^6 P_i \right)^2 \right]}$															
Precision	$P_{80} = \sqrt{\frac{1}{5} \left[\sum_{i=7}^{12} P_i^2 - \frac{1}{6} \left(\sum_{i=7}^{12} P_i \right)^2 \right]}$															

Figure B-5. Form for calculating zero drift, span drift and precision.

Applicant _____		Analyst _____															
Analyzer _____		Range _____															
PERFORMANCE PARAMETER	Table B-1 spec.	TEST										No. of test failures					
NOISE, ppm	0% URL (S ₀)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	80% URL (S ₈₀)																
LDL (must be 2 × noise)																	
INTER-FERENCE EQUIVALENT, ppm	IE ₁																
	IE ₂																
	IE ₃																
	IE ₄																
	IE ₅																
TOTAL (IE _T)																	
ZERO DRIFT, ppm	12 hour (12ZD)																
	24 hour (24ZD)																
SPAN DRIFT, %	20% URL (MSD)																
	80% URL (USD)																
LAG TIME, min																	
RISE TIME, min																	
FALL TIME, min																	
PRECISION, ppm	20% URL (P ₂₀)																
	80% URL (P ₈₀)																

^aCompare each test LDL reading with the corresponding noise measurements. LDL reading must exceed the 0% URL noise value by a factor of 2 to pass the test for LDL.

Figure B-6. Form for summary of test results.

[40 FR 7049, Feb. 18, 1975, as amended at 40 FR 18169, Apr. 25, 1975]

Subpart C—Procedures for Determining Comparability Between Candidate Methods and Reference Methods

SOURCE: 71 FR 61278, Oct. 17, 2006, unless otherwise noted.

§ 53.30 General provisions.

(a) *Determination of comparability.* The test procedures prescribed in this subpart shall be used to determine if a candidate method is comparable to a reference method when both methods measure pollutant concentrations in