

CHEMetrics, Incorporated MANUFACTURING QUALITY CONTROL

REAGENT BATCH PERFORMANCE DATA SHEET - 0-1,500 PPM (mg/Liter) COD VIALS PRODUCT LINE

CAT CODE: 7360
 RUN NO.: 53738
 DOM: 7/21/2000
 QC DATE: 8/7/2000

ANALYTE: COD
 SPEC 21 ID: C
 SPEC 21 RANGE: 1500
 WAVELENGTH: 620
 CAL. TABLE VER.: 2779-2
 INSP BY: RT/PT

HACH DR-2010 SERIAL #: 97070004218
 DR-2010 RANGE: 1500
 WAVELENGTH: 620

| Reagent Check Points | HACH COD VIALS | | | | | CHEMetrics COD VIALS | | | PERFORMANCE STATISTICS | | | | | | ACCEPTANCE/REJECTION CRITERIA | | | | | | | | |
|----------------------|-------------------------------------|---------|-----------------|------|------|----------------------|------|------|--------------------------|-----------------------|----------------------|---------------------------|-----------------------|----------------------|-------------------------------|-----------|-------|----------|------------------|-----------|-------|----------|--|
| | NIST Traceable | | REFERENCE BATCH | | | NEW REAGENT BATCH | | | SPEC 21 | | | DR-2010 | | | SPEC 21 | | | | DR-2010 | | | | |
| | Analytical Standards PPM (mg/Liter) | | SPEC 21 | | | DR-2010 | | | --- % BIAS --- | | | --- % BIAS --- | | | Pass/Fail Status | | | | Pass/Fail Status | | | | |
| | SPEC 21 | DR-2010 | %T | PPM | PPM | %T | PPM | PPM | Reference Batch VS. STDS | New Reagent VS. STDS. | New Reagent VS. REF. | Reference Batch VS. STDS. | New Reagent VS. STDS. | New Reagent VS. REF. | ☆ | VS. STDS. | ☆ | VS. REF. | ☆ | VS. STDS. | ☆ | VS. REF. | |
| Zero | 0.0 | 0.0 | 100.0 | -3 | 2 | 100.0 | -3 | 0 | | | | | | | | | | | | | | | |
| | | | 100.0 | -3 | 0 | 100.0 | -3 | 0 | | | | | | | | | | | | | | | |
| | | | 100.0 | -3 | 1 | 98.5 | 12 | -1 | | | | | | | | | | | | | | | |
| | | | 100.0 | -3 | 7 | 100.0 | -3 | -1 | | | | | | | | | | | | | | | |
| | | | 100.0 | -3 | 2 | 99.5 | 2 | -1 | | | | | | | | | | | | | | | |
| Min | | | | | 0 | | | -1 | | | | | | | | | | | | | | | |
| Max | | | | | 7 | | | 0 | | | | | | | | | | | | | | | |
| Average | | | | | 2 | | | -1 | | | | | | | | | | | | | | | |
| 25% of Full Scale | 500.0 | 500.0 | 60.0 | 507 | 514 | 59.5 | 516 | 518 | 1.49% | 3.17% | 1.65% | 2.80% | 3.60% | 0.50% | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | |
| | | | 60.5 | 507 | 517 | 60.0 | 507 | 516 | 1.49% | 1.49% | | 3.40% | 3.20% | | | | | | | | | | |
| | | | 60.0 | 507 | 521 | 60.0 | 507 | 515 | 1.49% | 1.49% | | 4.20% | 3.00% | | | | | | | | | | |
| | | | 60.0 | 507 | 516 | 59.0 | 524 | 529 | 1.49% | 4.85% | | 3.20% | 5.80% | | | | | | | | | | |
| | | | 60.0 | 507 | 518 | 59.0 | 524 | 521 | 1.49% | 4.85% | | 3.60% | 4.20% | | | | | | | | | | |
| Min | | | | | 514 | | | 515 | | | | | | | | | | | | | | | |
| Max | | | | | 521 | | | 529 | | | | | | | | | | | | | | | |
| Average | | | | | 517 | | | 520 | | | | | | | | | | | | | | | |
| 75% of Full Scale | 1000.0 | 1000.0 | 36.0 | 1018 | 1023 | 36.0 | 1018 | 1026 | 1.79% | 1.79% | 0.55% | 2.30% | 2.60% | 0.31% | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | |
| | | | 36.5 | 1004 | 1021 | 36.5 | 1004 | 1017 | 0.42% | 0.42% | | 2.10% | 1.70% | | | | | | | | | | |
| | | | 36.0 | 1018 | 1022 | 36.0 | 1018 | 1026 | 1.79% | 1.79% | | 2.20% | 2.60% | | | | | | | | | | |
| | | | 36.5 | 1004 | 1021 | 36.0 | 1018 | 1027 | 0.42% | 1.79% | | 2.10% | 2.70% | | | | | | | | | | |
| | | | 36.5 | 1004 | 1023 | 36.0 | 1018 | 1030 | 0.42% | 1.79% | | 2.30% | 3.00% | | | | | | | | | | |
| Min | | | | | 1021 | | | 1017 | | | | | | | | | | | | | | | |
| Max | | | | | 1023 | | | 1030 | | | | | | | | | | | | | | | |
| Average | | | | | 1022 | | | 1025 | | | | | | | | | | | | | | | |

Reagent Color: DARK YELLOW W / WHITE PRECIPITATE

| REAGENT LEVELS | |
|----------------|---|
| High | |
| Low | |
| Good | X |
| Choppy | |

STANDARD CONTROL NUMBERS

| | |
|--|-------------------------------------|
| Reference Batch Control #: | Hach COD Vials Batch A0123 - May 05 |
| Accessory Solution Control #: | G-COD4 COMAR 25066 |
| Accessory Solution Control #: | D-0214 REC'D 5/9/00 24796 |
| Accessory Solution Control #: | |
| NIST Traceable Analytical Standards Lot #: | 52796 |

COD Vials Product Batch Final Acceptance/Rejection Status

| INSTRUMENT | ☆ | % BIAS VS. STDS. | ☆ | % BIAS VS. REF. | PRODUCT FINAL STATUS |
|---------------------------------|-------|------------------|-------|-----------------|----------------------|
| SPEC 21 | 5.00% | PASS | 5.00% | PASS | PASS |
| DR-2010 | 5.00% | PASS | 5.00% | PASS | |
| QC VERSION #2 | | | | | |
| QC INSPECTOR: RT | | | | | |
| APPROVED BY: RT | | | | | |
| PRODUCT RELEASE DATE: 8/22/2000 | | | | | |
| PRODUCT ROUTING: WIP | | | | | |

Comments: USE 2ML PIPETTE MEASURED (2.00 X 10) SET STD AND RUN 100%T WITH 1ST 96°

Comments:

| | | | | | | |
|--------------------------|-------------------|-----|------|------|------|------|
| Blank on Spec 21 (100%T) | Reference Batch | 96° | 96.0 | 96.0 | 96.0 | 96.0 |
| | New Reagent Batch | 96° | 96.0 | 96.0 | 96.0 | 96.0 |

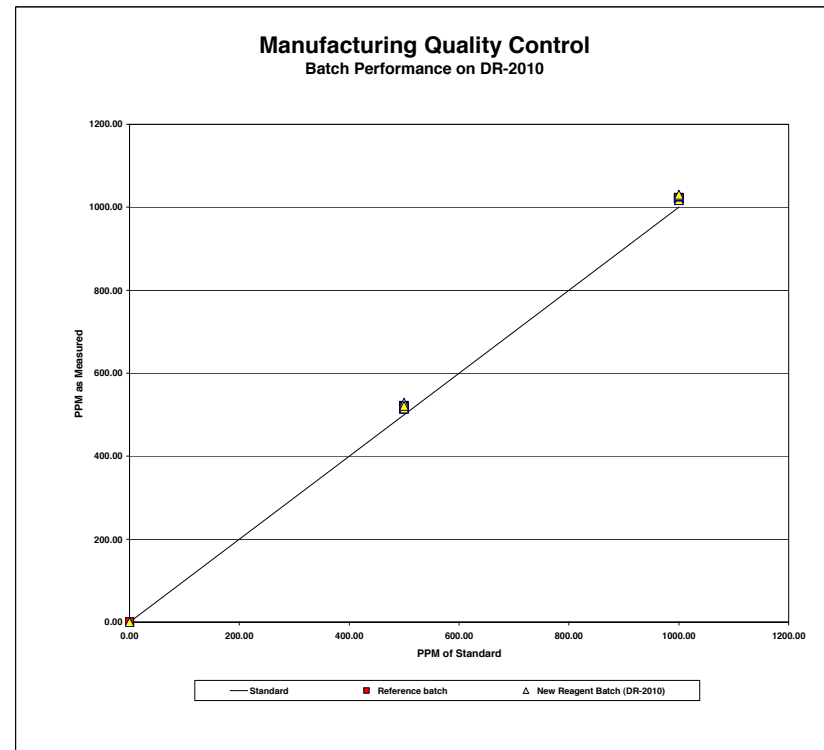
CHEMetrics, Incorporated MANUFACTURING QUALITY CONTROL

REAGENT BATCH PERFORMANCE DATA SHEET - 0-1,500 PPM (mg/Liter) COD VIALS PRODUCT LINE

CAT CODE: 7360
 RUN NO.: 53738
 DOM: 7/21/2000
 QC DATE: 8/7/2000

ANALYTE: COD
 SPEC 21 ID: C
 SPEC 21 RANGE: 1500
 WAVELENGTH: 620
 CAL. TABLE VER.: 2779-2
 INSP BY: RT/PT

HACH DR-2010 SERIAL #: 970700004218
 DR-2010 RANGE: 1500
 WAVELENGTH: 620



CHEMetrics, Incorporated MANUFACTURING QUALITY CONTROL

REAGENT BATCH PERFORMANCE DATA SHEET - 0-1,500 PPM (mg/Liter) COD VIALS PRODUCT LINE

CAT CODE:
 RUN NO.:
 DOM:
 QC DATE:

ANALYTE:
 SPEC 21 ID:
 SPEC 21 RANGE:
 WAVELENGTH:
 CAL. TABLE VER.:
 INSP BY:

HACH DR-2010 SERIAL #:
 DR-2010 RANGE:
 WAVELENGTH:

| | | HACH COD VIALS | | | | CHEMetrics COD VIALS | | | | PERFORMANCE STATISTICS | | | | | | ACCEPTANCE/REJECTION CRITERIA | | | | | | | |
|----------------------|---------|-------------------------------------|-------|------|------|----------------------|-----|------|--------------------------|------------------------|----------------------|--------------------------|----------------------|----------------------|-------|-------------------------------|-------|----------|-------|------------------|-------|----------|--|
| | | REFERENCE BATCH | | | | NEW REAGENT BATCH | | | | SPEC 21 | | | DR-2010 | | | SPEC 21 | | | | DR-2010 | | | |
| | | Analytical Standards PPM (mg/Liter) | | | | | | | | --- % BIAS --- | | | --- % BIAS --- | | | Pass/Fail Status | | | | Pass/Fail Status | | | |
| Reagent Check Points | SPEC 21 | DR-2010 | %T | PPM | PPM | %T | PPM | PPM | Reference Batch vs. STDS | New Reagent vs. STDS | New Reagent vs. REF. | Reference Batch vs. STDS | New Reagent vs. STDS | New Reagent vs. REF. | ☆ | VS. STDS. | ☆ | VS. REF. | ☆ | VS. STDS. | ☆ | VS. REF. | |
| Zero | 0.0 | 0.0 | 100.0 | -3 | 0 | 100.0 | -3 | 0 | | | | | | | | | | | | | | | |
| | | | 100.0 | -3 | 1 | 100.0 | -3 | 0 | | | | | | | | | | | | | | | |
| | | | 100.0 | -3 | 2 | 100.0 | -3 | 0 | | | | | | | | | | | | | | | |
| | | | 100.0 | -3 | 1 | 100.0 | -3 | -1 | | | | | | | | | | | | | | | |
| | | | 100.0 | -3 | 0 | 100.0 | -3 | 1 | | | | | | | | | | | | | | | |
| Min | | | | | 0 | | | -1 | | | | | | | | | | | | | | | |
| Max | | | | | 2 | | | 1 | | | | | | | | | | | | | | | |
| Average | | | | | 1 | | | 0 | | | | | | | | | | | | | | | |
| 25% of Full Scale | 500.0 | 500.0 | 60.0 | 507 | 517 | 61.0 | 491 | 502 | 1.49% | -1.81% | -1.96% | 3.40% | 0.40% | -2.51% | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | |
| | | | 60.5 | 499 | 514 | 60.5 | 499 | 507 | -0.16% | -0.16% | | 2.80% | 1.40% | | | | | | | | | | |
| | | | 60.0 | 507 | 522 | 60.5 | 499 | 509 | 1.49% | -0.16% | | 4.40% | 1.80% | | | | | | | | | | |
| | | | 60.0 | 507 | 522 | 60.5 | 499 | 505 | 1.49% | -0.16% | | 4.40% | 1.00% | | | | | | | | | | |
| | | | 60.0 | 507 | 518 | 61.0 | 491 | 505 | 1.49% | -1.81% | | 3.60% | 1.00% | | | | | | | | | | |
| Min | | | | | 514 | | | 502 | | | | | | | | | | | | | | | |
| Max | | | | | 522 | | | 509 | | | | | | | | | | | | | | | |
| Average | | | | | 519 | | | 506 | | | | | | | | | | | | | | | |
| 75% of Full Scale | 1000.0 | 1000.0 | 36.5 | 1004 | 1022 | 37.0 | 991 | 1012 | 0.42% | -0.94% | -1.35% | 2.20% | 1.20% | -1.31% | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | |
| | | | 36.5 | 1004 | 1019 | 37.0 | 991 | 1006 | 0.42% | -0.94% | | 1.90% | 0.60% | | | | | | | | | | |
| | | | 36.5 | 1004 | 1025 | 37.0 | 991 | 1012 | 0.42% | -0.94% | | 2.50% | 1.20% | | | | | | | | | | |
| | | | 36.5 | 1004 | 1022 | 37.0 | 991 | 1004 | 0.42% | -0.94% | | 2.20% | 0.40% | | | | | | | | | | |
| | | | 36.5 | 1004 | 1024 | 37.0 | 991 | 1011 | 0.42% | -0.94% | | 2.40% | 1.10% | | | | | | | | | | |
| Min | | | | | 1019 | | | 1004 | | | | | | | | | | | | | | | |
| Max | | | | | 1025 | | | 1012 | | | | | | | | | | | | | | | |
| Average | | | | | 1022 | | | 1009 | | | | | | | | | | | | | | | |

Reagent Color:

| REAGENT LEVELS | |
|----------------|---|
| High | |
| Low | |
| Good | X |
| Choppy | |

Comments:

| Blank on Spec 21 (100%T) | Reference Batch | 95.5 | 95.5 | 95.5 | 95.5 |
|--------------------------|-------------------|------|------|------|------|
| | New Reagent Batch | 97.0 | 97.0 | 97.0 | 97.0 |

STANDARD CONTROL NUMBERS

| | |
|--|-------------------------------------|
| Reference Batch Control #: | Hach COD Vials Batch A0123 - May 05 |
| Accessory Solution Control #: | G-COD4 COMAR 25066 |
| Accessory Solution Control #: | D-0214 REC'D 5/9/00 24796 |
| Accessory Solution Control #: | 0 |
| NIST Traceable Analytical Standards Lot #: | 52796 |

Comments:

| COD Vials Product Batch Final Acceptance/Rejection Status | | | | | |
|--|-------|------------------|-------|-----------------|----------------------|
| INSTRUMENT | ☆ | % BIAS vs. STDS. | ☆ | % BIAS vs. REF. | PRODUCT FINAL STATUS |
| SPEC 21 | 5.00% | PASS | 5.00% | PASS | PASS |
| DR-2010 | 5.00% | PASS | 5.00% | PASS | |
| QC VERSION #2 with pipette | | | | | |
| QC INSPECTOR: RT | | | | | |
| APPROVED BY: RT | | | | | |
| PRODUCT RELEASE DATE: 9/13/2000 | | | | | |
| PRODUCT ROUTING: WIP | | | | | |

CHEMetrics, Incorporated MANUFACTURING QUALITY CONTROL

REAGENT BATCH PERFORMANCE DATA SHEET - 0-1,500 PPM (mg/Liter) COD VIALS PRODUCT LINE

CAT CODE: 7361

RUN NO.: 54080

DOM: 9/8/2000

QC DATE: 9/13/2000

ANALYTE: COD

SPEC 21 ID: C

SPEC 21 RANGE: 1500

WAVELENGTH: 620

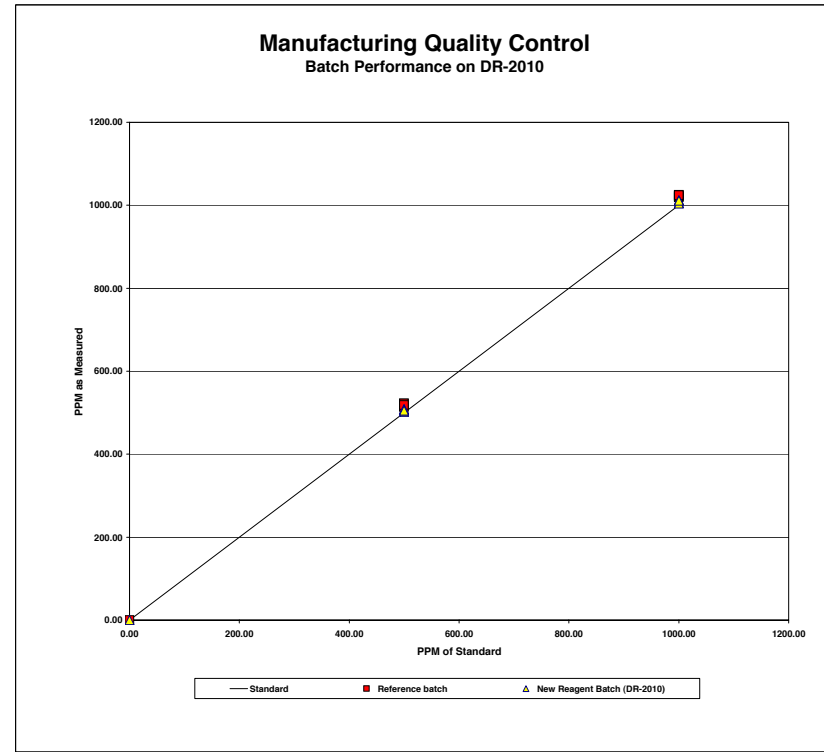
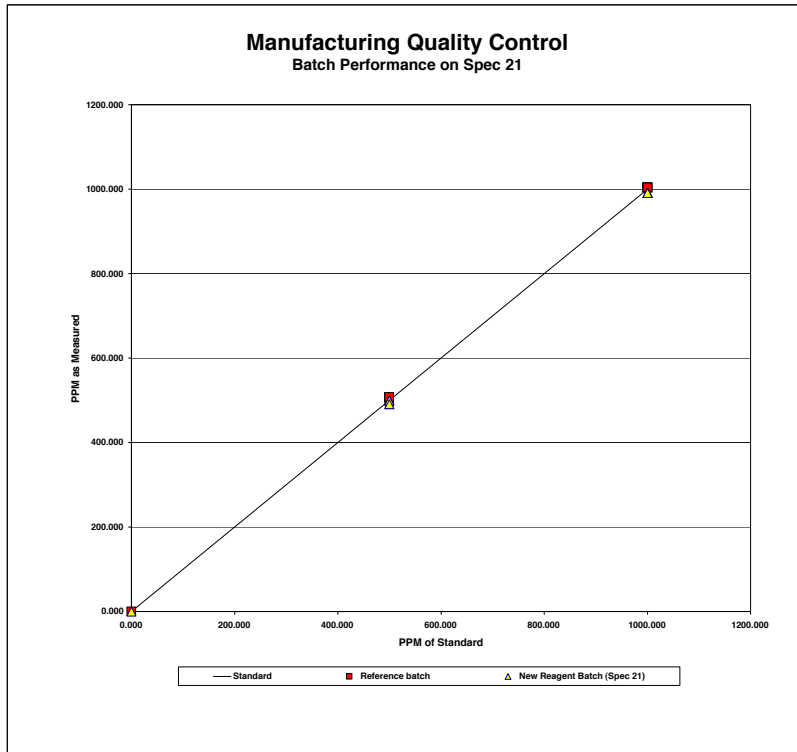
CAL. TABLE VER.: 2779-2

INSP BY: PT/RT

HACH DR-2010 SERIAL #: 970700004218

DR-2010 RANGE: 1500

WAVELENGTH: 620



CHEMetrics, Incorporated MANUFACTURING QUALITY CONTROL

REAGENT BATCH PERFORMANCE DATA SHEET - 0-150 PPM (mg/Liter) COD VIALS PRODUCT LINE

CAT CODE:
 RUN NO.:
 DOM:
 QC DATE:

ANALYTE:
 SPEC 21 ID:
 SPEC 21 RANGE:
 WAVELENGTH:
 CAL. TABLE VER.:
 INSP BY:

HACH DR-2010 SERIAL #:
 DR-2010 RANGE:
 WAVELENGTH:

| | | HACH COD VIALS | | | | CHEMetrics COD VIALS | | | | PERFORMANCE STATISTICS | | | | | | ACCEPTANCE/REJECTION CRITERIA | | | | | | | |
|----------------------|---------|-------------------------------------|------|-----|-----|----------------------|-----|-----|---------------------------|------------------------|----------------------|---------------------------|-----------------------|----------------------|-------|-------------------------------|-------|----------|-------|------------------|-------|----------|--|
| | | REFERENCE BATCH | | | | NEW REAGENT BATCH | | | | SPEC 21 | | | DR-2010 | | | SPEC 21 | | | | DR-2010 | | | |
| | | Analytical Standards PPM (mg/Liter) | | | | | | | | --- % BIAS --- | | | --- % BIAS --- | | | Pass/Fail Status | | | | Pass/Fail Status | | | |
| Reagent Check Points | SPEC 21 | DR-2010 | %T | PPM | PPM | %T | PPM | PPM | Reference Batch VS. STDS. | New Reagent VS. STDS. | New Reagent VS. REF. | Reference Batch VS. STDS. | New Reagent VS. STDS. | New Reagent VS. REF. | ☆ | VS. STDS. | ☆ | VS. REF. | ☆ | VS. STDS. | ☆ | VS. REF. | |
| Zero | 0.0 | 0.0 | 30.3 | 1 | 2 | 30.0 | -1 | 0 | | | | | | | | | | | | | | | |
| | | | 30.3 | 1 | -1 | 30.5 | 2 | 3 | | | | | | | | | | | | | | | |
| | | | 30.0 | -1 | 0 | 30.5 | 2 | 2 | | | | | | | | | | | | | | | |
| | | | 29.8 | -2 | -1 | 30.3 | 2 | 3 | | | | | | | | | | | | | | | |
| | | | 30.0 | -1 | 0 | 30.3 | 1 | 1 | | | | | | | | | | | | | | | |
| Min | | | | | -1 | | | 0 | | | | | | | | | | | | | | | |
| Max | | | | | 2 | | | 3 | | | | | | | | | | | | | | | |
| Average | | | | | 0 | | | 2 | | | | | | | | | | | | | | | |
| 25% of Full Scale | 50.0 | 50.0 | 43.0 | 52 | 52 | 43.0 | 52 | 51 | 4.08% | 4.08% | 3.28% | 4.00% | 2.00% | 3.21% | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | |
| | | | 42.2 | 49 | 49 | 43.0 | 52 | 52 | -1.41% | 4.08% | | -2.00% | 4.00% | | | | | | | | | | |
| | | | 42.8 | 51 | 51 | 42.9 | 52 | 51 | 2.38% | 3.40% | | 2.00% | 2.00% | | | | | | | | | | |
| | | | 42.8 | 51 | 50 | 43.0 | 52 | 51 | 2.38% | 4.08% | | 0.00% | 2.00% | | | | | | | | | | |
| | | | 41.8 | 48 | 47 | 43.0 | 52 | 52 | -4.20% | 4.08% | | -6.00% | 4.00% | | | | | | | | | | |
| Min | | | | | 47 | | | 51 | | | | | | | | | | | | | | | |
| Max | | | | | 52 | | | 52 | | | | | | | | | | | | | | | |
| Average | | | | | 50 | | | 51 | | | | | | | | | | | | | | | |
| 75% of Full Scale | 125.0 | 125.0 | 71.0 | 125 | 124 | 71.8 | 127 | 125 | 0.37% | 1.68% | 1.08% | -0.80% | 0.00% | 0.48% | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | |
| | | | 71.0 | 125 | 124 | 71.3 | 126 | 124 | 0.37% | 0.78% | | -0.80% | -0.80% | | | | | | | | | | |
| | | | 70.8 | 125 | 123 | 72.0 | 128 | 125 | -0.05% | 2.01% | | -1.60% | 0.00% | | | | | | | | | | |
| | | | 71.0 | 125 | 124 | 72.0 | 128 | 125 | 0.37% | 2.01% | | -0.80% | 0.00% | | | | | | | | | | |
| | | | 72.3 | 128 | 127 | 72.3 | 128 | 126 | 2.41% | 2.41% | | 1.60% | 0.80% | | | | | | | | | | |
| Min | | | | | 123 | | | 124 | | | | | | | | | | | | | | | |
| Max | | | | | 127 | | | 126 | | | | | | | | | | | | | | | |
| Average | | | | | 124 | | | 125 | | | | | | | | | | | | | | | |

Reagent Color:

| REAGENT LEVELS | |
|----------------|-------------|
| High | |
| Low | |
| Good | 24.75-25.25 |
| Choppy | |

Comments:

| Blank on Spec 21 (100%T) | Reference Batch | 20.5 | 20.3 | 20.0 | 19.9 | 19.9 |
|--------------------------|-------------------|------|------|------|------|------|
| | New Reagent Batch | 21.0 | 21.0 | 21.0 | 21.0 | 22.3 |

STANDARD CONTROL NUMBERS

| | |
|--|---------------------------------------|
| Reference Batch Control #: | Hach COD Vials Batch A0105 exp Apr 05 |
| Accessory Solution Control #: | G-CD05 25125 |
| Accessory Solution Control #: | D-0214 24796 Rec'd 07/03/00 |
| Accessory Solution Control #: | |
| NIST Traceable Analytical Standards Lot #: | 53140 (1008 ppm) |

Comments:

| COD Vials Product Batch Final Acceptance/Rejection Status | | | | | |
|--|-------|------------------|-------|-----------------|----------------------|
| INSTRUMENT | ☆ | % BIAS vs. STDS. | ☆ | % BIAS vs. REF. | PRODUCT FINAL STATUS |
| SPEC 21 | 5.00% | PASS | 5.00% | PASS | PASS |
| DR-2010 | 5.00% | PASS | 5.00% | PASS | |
| QC VERSION # 2 | | | | | |
| QC INSPECTOR: PT | | | | | |
| APPROVED BY: PT | | | | | |
| PRODUCT RELEASE DATE: 9/14/2000 | | | | | |
| PRODUCT ROUTING: WIP | | | | | |

CHEMetrics, Incorporated MANUFACTURING QUALITY CONTROL

REAGENT BATCH PERFORMANCE DATA SHEET - 0-150 PPM (mg/Liter) COD VIALS PRODUCT LINE

CAT CODE: 7350

RUN NO.: 54056.2

DOM: 9/6/2000

QC DATE: 9/13/2000

ANALYTE: COD

SPEC 21 ID: C

SPEC 21 RANGE: 150

WAVELENGTH: 420

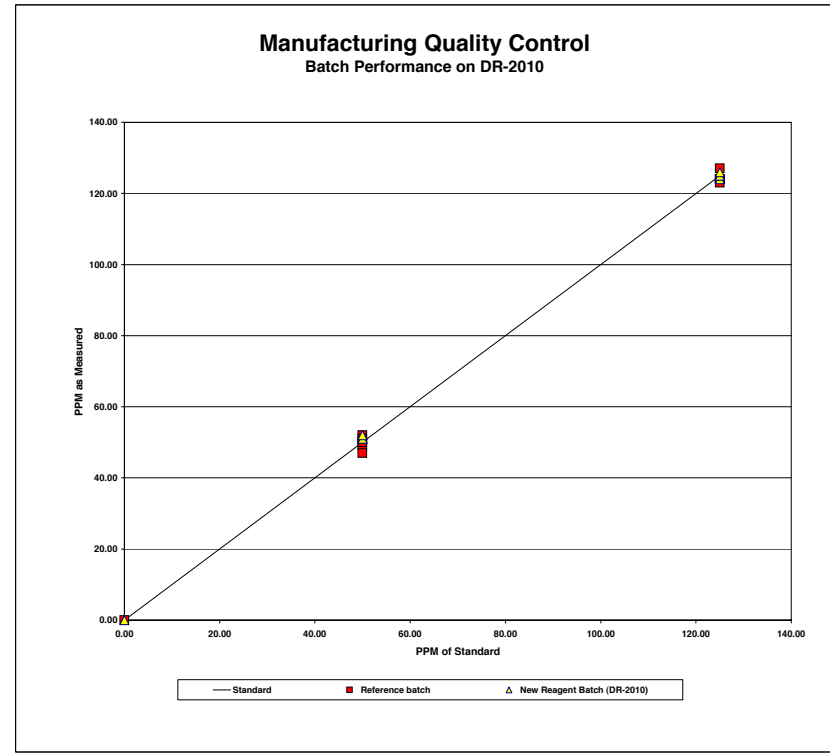
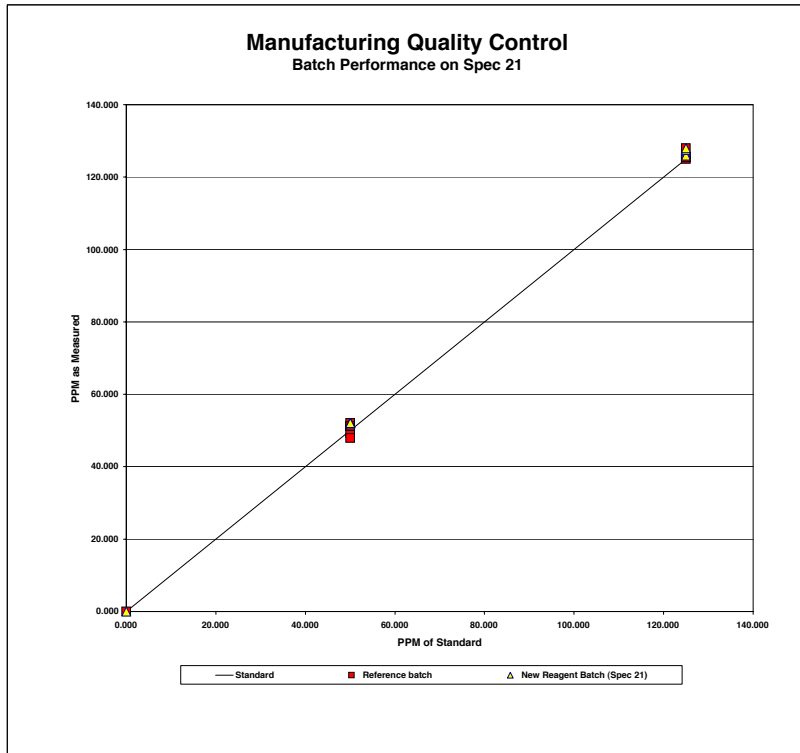
CAL. TABLE VER.: 2778-2

INSP BY: PT

HACH DR-2010 SERIAL #: 970700004218

DR-2010 RANGE: 150

WAVELENGTH: 420



CHEMetrics, Incorporated MANUFACTURING QUALITY CONTROL

REAGENT BATCH PERFORMANCE DATA SHEET - 0-150 PPM (mg/Liter) COD VIALS PRODUCT LINE

CAT CODE:
 RUN NO.:
 DOM:
 QC DATE:

ANALYTE:
 SPEC 21 ID:
 SPEC 21 RANGE:
 WAVELENGTH:
 CAL. TABLE VER.:
 INSP BY:

HACH DR-2010 SERIAL #:
 DR-2010 RANGE:
 WAVELENGTH:

| Reagent Check Points | HACH COD VIALS | | | | | CHEMetrics COD VIALS | | | | PERFORMANCE STATISTICS | | | | | | ACCEPTANCE/REJECTION CRITERIA | | | | | | | | | |
|----------------------|-------------------------------------|---------|-----------------|-----|-----|----------------------|-----|-----|---------------------------|------------------------|----------------------|---------------------------|-----------------------|----------------------|----------------|-------------------------------|-------|------------------|-------|-----------|-------|------------------|--|--|--|
| | NIST Traceable | | REFERENCE BATCH | | | NEW REAGENT BATCH | | | | SPEC 21 | | | DR-2010 | | | SPEC 21 | | | | DR-2010 | | | | | |
| | Analytical Standards PPM (mg/Liter) | | SPEC 21 | | | SPEC 21 | | | DR-2010 | | | --- % BIAS --- | | | --- % BIAS --- | | | Pass/Fail Status | | | | Pass/Fail Status | | | |
| | SPEC 21 | DR-2010 | %T | PPM | PPM | %T | PPM | PPM | Reference Batch VS. STDS. | New Reagent VS. STDS. | New Reagent VS. REF. | Reference Batch VS. STDS. | New Reagent VS. STDS. | New Reagent VS. REF. | ☆ | VS. STDS. | ☆ | VS. REF. | ☆ | VS. STDS. | ☆ | VS. REF. | | | |
| Zero | 0.0 | 0.0 | 30.8 | -1 | 0 | 30.4 | 1 | 3 | | | | | | | | | | | | | | | | | |
| | | | 29.8 | -2 | -1 | 29.8 | -2 | -1 | | | | | | | | | | | | | | | | | |
| | | | 30.3 | 1 | 2 | 29.9 | -1 | 1 | | | | | | | | | | | | | | | | | |
| | | | 30.3 | 1 | 1 | 30.0 | -1 | 1 | | | | | | | | | | | | | | | | | |
| | | | 29.8 | -2 | -2 | 30.4 | 1 | 2 | | | | | | | | | | | | | | | | | |
| Min | | | | | -2 | | | -1 | | | | | | | | | | | | | | | | | |
| Max | | | | | 2 | | | 3 | | | | | | | | | | | | | | | | | |
| Average | | | | | 0 | | | 1 | | | | | | | | | | | | | | | | | |
| 25% of Full Scale | 50.0 | 50.0 | 41.8 | 48 | 47 | 43.0 | 52 | 53 | -4.55% | 4.08% | 2.70% | -6.00% | 6.00% | 3.36% | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | | | |
| | | | 41.8 | 48 | 48 | 41.8 | 48 | 49 | -4.55% | -4.55% | | -4.00% | -2.00% | | | | | | | | | | | | |
| | | | 41.3 | 46 | 48 | 41.8 | 48 | 48 | -8.08% | -4.55% | | -4.00% | -4.00% | | | | | | | | | | | | |
| | | | 41.8 | 48 | 47 | 41.8 | 48 | 50 | -4.55% | -4.55% | | -6.00% | 0.00% | | | | | | | | | | | | |
| | | | 42.1 | 49 | 48 | 42.2 | 49 | 46 | -2.11% | -1.41% | | -4.00% | -8.00% | | | | | | | | | | | | |
| Min | | | | | 47 | | | 46 | | | | | | | | | | | | | | | | | |
| Max | | | | | 48 | | | 53 | | | | | | | | | | | | | | | | | |
| Average | | | | | 48 | | | 49 | | | | | | | | | | | | | | | | | |
| 75% of Full Scale | 125.0 | 125.0 | 70.8 | 125 | 123 | 71.0 | 125 | 125 | -0.05% | 0.37% | 0.81% | -1.60% | 0.00% | 1.65% | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | | | |
| | | | 69.8 | 123 | 120 | 70.5 | 124 | 124 | -1.71% | -0.46% | | -4.00% | -0.80% | | | | | | | | | | | | |
| | | | 70.0 | 123 | 121 | 70.3 | 124 | 122 | -1.29% | -0.88% | | -3.20% | -2.40% | | | | | | | | | | | | |
| | | | 69.8 | 123 | 121 | 70.8 | 125 | 122 | -1.63% | -0.05% | | -3.20% | -2.40% | | | | | | | | | | | | |
| | | | 69.4 | 122 | 120 | 69.6 | 123 | 122 | -2.30% | -1.96% | | -4.00% | -2.40% | | | | | | | | | | | | |
| Min | | | | | 120 | | | 122 | | | | | | | | | | | | | | | | | |
| Max | | | | | 123 | | | 125 | | | | | | | | | | | | | | | | | |
| Average | | | | | 121 | | | 123 | | | | | | | | | | | | | | | | | |

Reagent Color:

| REAGENT LEVELS | |
|----------------|---|
| High | |
| Low | |
| Good | X |
| Choppy | |

Comments:

| Blank on Spec 21 (100%T) | Reference Batch | 20.1 | 19.9 | 20.4 | 20.4 | 20.0 |
|--------------------------|-------------------|------|------|------|------|------|
| | New Reagent Batch | 22.1 | 21.9 | 21.9 | 22.0 | 22.3 |

STANDARD CONTROL NUMBERS

| | |
|--|---------------------------------------|
| Reference Batch Control #: | Hach COD Vials Batch A0105 exp Apr 05 |
| Accessory Solution Control #: | G-CD05 25125 |
| Accessory Solution Control #: | D-0214 24796 Rec'd 07/03/00 |
| Accessory Solution Control #: | |
| NIST Traceable Analytical Standards Lot #: | 53140 (1008 ppm) |

Comments:

| COD Vials Product Batch Final Acceptance/Rejection Status | | | | | |
|--|-------|------------------|-------|-----------------|----------------------|
| INSTRUMENT | ☆ | % BIAS vs. STDS. | ☆ | % BIAS vs. REF. | PRODUCT FINAL STATUS |
| SPEC 21 | 5.00% | PASS | 5.00% | PASS | PASS |
| DR-2010 | 5.00% | PASS | 5.00% | PASS | |
| QC VERSION # 2 | | | | | |
| QC INSPECTOR: PT | | | | | |
| APPROVED BY: PT | | | | | |
| PRODUCT RELEASE DATE: 8/30/2000 | | | | | |
| PRODUCT ROUTING: WIP | | | | | |

CHEMetrics, Incorporated MANUFACTURING QUALITY CONTROL

REAGENT BATCH PERFORMANCE DATA SHEET - 0-150 PPM (mg/Liter) COD VIALS PRODUCT LINE

CAT CODE: 7350

RUN NO.: 54006.1

DOM: 8/29/2000

QC DATE: 8/30/2000

ANALYTE: COD

SPEC 21 ID: C

SPEC 21 RANGE: 150

WAVELENGTH: 420

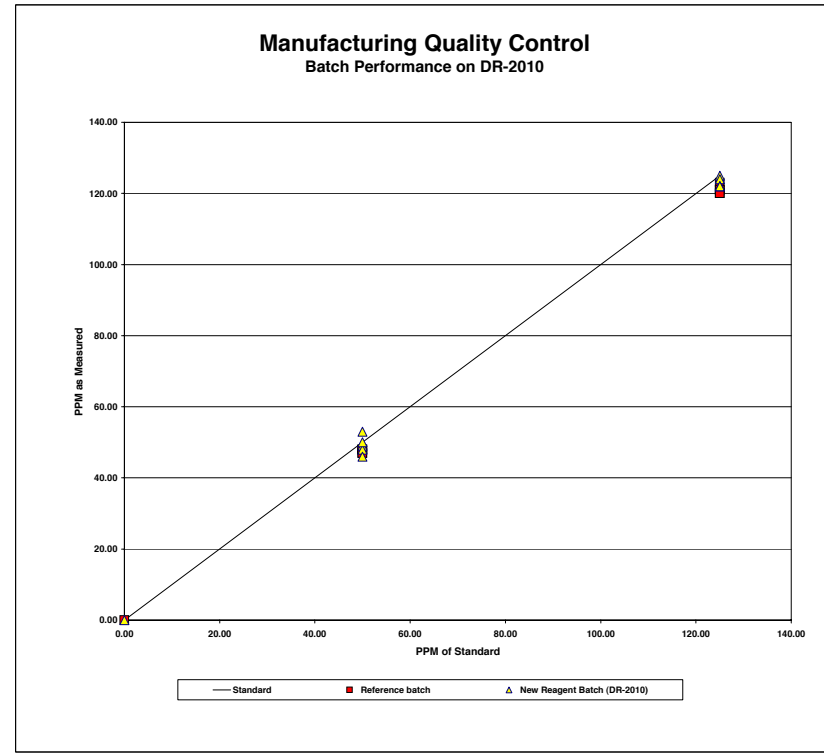
CAL. TABLE VER.: 2778-2

INSP BY: PT

HACH DR-2010 SERIAL #: 970700004218

DR-2010 RANGE: 150

WAVELENGTH: 420



CHEMetrics, Incorporated MANUFACTURING QUALITY CONTROL

REAGENT BATCH PERFORMANCE DATA SHEET - 0-1,500 PPM (mg/Liter) COD VIALS PRODUCT LINE

CAT CODE: 7360
 RUN NO.: 53917
 DOM: 8/15/2000
 QC DATE: 8/22/2000

ANALYTE: COD
 SPEC 21 ID: C
 SPEC 21 RANGE: 1500
 WAVELENGTH: 620
 CAL. TABLE VER.: 2779-2
 INSP BY: RT

HACH DR-2010 SERIAL #: 970700004218
 DR-2010 RANGE: 1500
 WAVELENGTH: 620

| | | HACH COD VIALS | | | | CHEMetrics COD VIALS | | | | PERFORMANCE STATISTICS | | | | | | ACCEPTANCE/REJECTION CRITERIA | | | | | | | |
|----------------------|---------|-------------------------------------|-------|-----|------|----------------------|------|------|--------------------------|------------------------|----------------------|---------------------------|-----------------------|----------------------|-------|-------------------------------|-------|----------|-------|------------------|-------|----------|--|
| | | REFERENCE BATCH | | | | NEW REAGENT BATCH | | | | SPEC 21 | | | DR-2010 | | | SPEC 21 | | | | DR-2010 | | | |
| | | Analytical Standards PPM (mg/Liter) | | | | | | | | --- % BIAS --- | | | --- % BIAS --- | | | Pass/Fail Status | | | | Pass/Fail Status | | | |
| Reagent Check Points | SPEC 21 | DR-2010 | %T | PPM | PPM | %T | PPM | PPM | Reference Batch VS. STDS | New Reagent VS. STDS. | New Reagent VS. REF. | Reference Batch VS. STDS. | New Reagent VS. STDS. | New Reagent VS. REF. | ☆ | VS. STDS. | ☆ | VS. REF. | ☆ | VS. STDS. | ☆ | VS. REF. | |
| Zero | 0.0 | 0.0 | 100.0 | -3 | 0 | 100.0 | -3 | 0 | | | | | | | | | | | | | | | |
| | | | 100.0 | -3 | 0 | 99.0 | 7 | 0 | | | | | | | | | | | | | | | |
| | | | 99.0 | 7 | 0 | 99.5 | 2 | -2 | | | | | | | | | | | | | | | |
| | | | 99.0 | 7 | 1 | 99.0 | 7 | -1 | | | | | | | | | | | | | | | |
| | | | 100.0 | -3 | 0 | 99.5 | 2 | -2 | | | | | | | | | | | | | | | |
| Min | | | | | 0 | | | -2 | | | | | | | | | | | | | | | |
| Max | | | | | 1 | | | 0 | | | | | | | | | | | | | | | |
| Average | | | | | 0 | | | -1 | | | | | | | | | | | | | | | |
| 25% of Full Scale | 500.0 | 500.0 | 61.0 | 491 | 509 | 60.0 | 507 | 510 | -1.81% | 1.49% | 2.67% | 1.80% | 2.00% | 0.20% | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | |
| | | | 61.0 | 491 | 508 | 60.0 | 507 | 511 | -1.81% | 1.49% | | 1.60% | 2.20% | | | | | | | | | | |
| | | | 60.5 | 499 | 509 | 60.0 | 507 | 505 | -0.16% | 1.49% | | 1.80% | 1.00% | | | | | | | | | | |
| | | | 61.0 | 491 | 509 | 59.5 | 516 | 516 | -1.81% | 3.17% | | 1.80% | 3.20% | | | | | | | | | | |
| | | | 60.0 | 507 | 518 | 60.0 | 507 | 516 | 1.49% | 1.49% | | 3.60% | 3.20% | | | | | | | | | | |
| Min | | | | | 508 | | | 505 | | | | | | | | | | | | | | | |
| Max | | | | | 518 | | | 516 | | | | | | | | | | | | | | | |
| Average | | | | | 511 | | | 512 | | | | | | | | | | | | | | | |
| 75% of Full Scale | 1000.0 | 1000.0 | 37.0 | 991 | 1007 | 36.5 | 1004 | 1006 | -0.94% | 0.42% | 0.82% | 0.70% | 0.60% | 0.22% | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | |
| | | | 37.0 | 991 | 1007 | 36.5 | 1004 | 1009 | -0.94% | 0.42% | | 0.70% | 0.90% | | | | | | | | | | |
| | | | 37.0 | 991 | 1001 | 37.0 | 991 | 1002 | -0.94% | -0.94% | | 0.10% | 0.20% | | | | | | | | | | |
| | | | 37.0 | 991 | 1005 | 37.0 | 991 | 1005 | -0.94% | -0.94% | | 0.50% | 0.50% | | | | | | | | | | |
| | | | 37.0 | 991 | 1007 | 36.5 | 1004 | 1016 | -0.94% | 0.42% | | 0.70% | 1.60% | | | | | | | | | | |
| Min | | | | | 1001 | | | 1002 | | | | | | | | | | | | | | | |
| Max | | | | | 1007 | | | 1016 | | | | | | | | | | | | | | | |
| Average | | | | | 1005 | | | 1008 | | | | | | | | | | | | | | | |

Reagent Color: DARK YELLOW W / WHITE PRECIPITATE

| REAGENT LEVELS | |
|----------------|---|
| High | |
| Low | |
| Good | X |
| Choppy | |

Comments: USE 2ML PIPETTE MEASURED (2.00 X 10) SET STD AND RUN 100%T WITH 1ST 96*

| Blank on Spec 21 (100%T) | Reference Batch | 96* | 96.0 | 96.0 | 96.0 | 96.0 |
|--------------------------|-------------------|-----|------|------|------|------|
| | New Reagent Batch | 96* | 96.0 | 96.0 | 96.0 | 96.0 |

STANDARD CONTROL NUMBERS

| | |
|--|-------------------------------------|
| Reference Batch Control #: | Hach COD Vials Batch A0123 - May 05 |
| Accessory Solution Control #: | G-COD4 COMAR 25066 |
| Accessory Solution Control #: | D-0214 REC'D 5/9/00 24796 |
| Accessory Solution Control #: | |
| NIST Traceable Analytical Standards Lot #: | 52796 |

Comments:

| COD Vials Product Batch Final Acceptance/Rejection Status | | | | | |
|--|-------|------------------|-------|-----------------|----------------------|
| INSTRUMENT | ☆ | % BIAS vs. STDS. | ☆ | % BIAS vs. REF. | PRODUCT FINAL STATUS |
| SPEC 21 | 5.00% | PASS | 5.00% | PASS | PASS |
| DR-2010 | 5.00% | PASS | 5.00% | PASS | |
| QC VERSION #2 | | | | | |
| QC INSPECTOR: RT | | | | | |
| APPROVED BY: RT | | | | | |
| PRODUCT RELEASE DATE: 8/22/2000 | | | | | |
| PRODUCT ROUTING: WIP | | | | | |

CHEMetrics, Incorporated MANUFACTURING QUALITY CONTROL

REAGENT BATCH PERFORMANCE DATA SHEET - 0-1,500 PPM (mg/Liter) COD VIALS PRODUCT LINE

CAT CODE: 7360

RUN NO.: 53917

DOM: 8/15/2000

QC DATE: 8/22/2000

ANALYTE: COD

SPEC 21 ID: COD

SPEC 21 RANGE: 1500

WAVELENGTH: 620

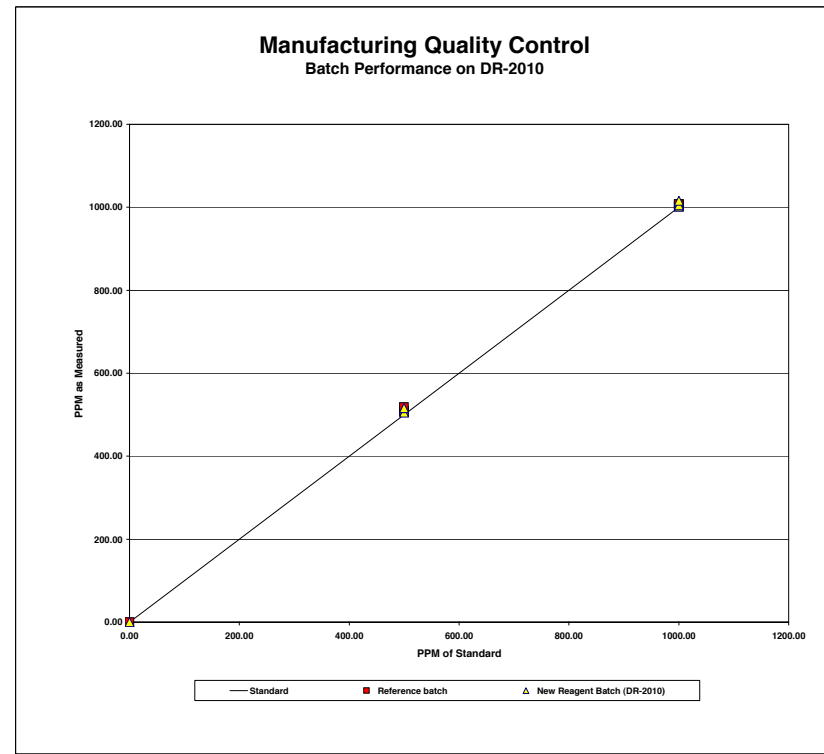
CAL. TABLE VER.: 2779-2

INSP BY: RT

HACH DR-2010 SERIAL #: 970700004218

DR-2010 RANGE: 1500

WAVELENGTH: 620



CHEMetrics, Incorporated MANUFACTURING QUALITY CONTROL

REAGENT BATCH PERFORMANCE DATA SHEET - 0-150 PPM (mg/Liter) COD VIALS PRODUCT LINE

CAT CODE:
 RUN NO.:
 DOM:
 QC DATE:

ANALYTE:
 SPEC 21 ID:
 SPEC 21 RANGE:
 WAVELENGTH:
 CAL. TABLE VER.:
 INSP BY:

HACH DR-2010 SERIAL #:
 DR-2010 RANGE:
 WAVELENGTH:

| Reagent Check Points | HACH COD VIALS | | | | | CHEMetrics COD VIALS | | | | PERFORMANCE STATISTICS | | | | | | ACCEPTANCE/REJECTION CRITERIA | | | | | | | |
|----------------------|-------------------------------------|---------|-----------------|-----|-----|----------------------|-----|-----|---------------------------|------------------------|----------------------|---------------------------|-----------------------|----------------------|------------------|-------------------------------|-------|----------|------------------|-----------|-------|----------|--|
| | NIST Traceable | | REFERENCE BATCH | | | NEW REAGENT BATCH | | | SPEC 21 | | | DR-2010 | | | SPEC 21 | | | | DR-2010 | | | | |
| | Analytical Standards PPM (mg/Liter) | | SPEC 21 | | | DR-2010 | | | --- % BIAS --- | | | --- % BIAS --- | | | Pass/Fail Status | | | | Pass/Fail Status | | | | |
| | SPEC 21 | DR-2010 | %T | PPM | PPM | %T | PPM | PPM | Reference Batch VS. STDS. | New Reagent VS. STDS. | New Reagent VS. REF. | Reference Batch VS. STDS. | New Reagent VS. STDS. | New Reagent VS. REF. | ☆ | VS. STDS. | ☆ | VS. REF. | ☆ | VS. STDS. | ☆ | VS. REF. | |
| Zero | 0.0 | 0.0 | 30.8 | 3 | 3 | 30.0 | -1 | 0 | | | | | | | | | | | | | | | |
| | | | 29.8 | -2 | -2 | 30.0 | -1 | 0 | | | | | | | | | | | | | | | |
| | | | 30.0 | -1 | 0 | 30.0 | -1 | 0 | | | | | | | | | | | | | | | |
| | | | 30.0 | -1 | 0 | 30.2 | 0 | 1 | | | | | | | | | | | | | | | |
| | | | 29.9 | -1 | -2 | 29.9 | -1 | -1 | | | | | | | | | | | | | | | |
| Min | | | | | -2 | | | -1 | | | | | | | | | | | | | | | |
| Max | | | | | 3 | | | 1 | | | | | | | | | | | | | | | |
| Average | | | | | 0 | | | 0 | | | | | | | | | | | | | | | |
| 25% of Full Scale | 50.0 | 50.0 | 43.0 | 52 | 52 | 42.8 | 51 | 51 | 4.08% | 2.72% | -3.13% | 4.00% | 2.00% | -1.94% | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | |
| | | | 42.8 | 51 | 50 | 42.8 | 51 | 51 | 2.38% | 2.72% | | 0.00% | 2.00% | | | | | | | | | | |
| | | | 43.5 | 54 | 52 | 42.5 | 50 | 50 | 7.47% | 0.66% | | 4.00% | 0.00% | | | | | | | | | | |
| | | | 43.3 | 53 | 53 | 42.5 | 50 | 51 | 5.78% | 0.66% | | 6.00% | 2.00% | | | | | | | | | | |
| | | | 43.0 | 52 | 51 | 42.5 | 50 | 50 | 4.08% | 0.66% | | 2.00% | 0.00% | | | | | | | | | | |
| Min | | | | | 50 | | | 50 | | | | | | | | | | | | | | | |
| Max | | | | | 53 | | | 51 | | | | | | | | | | | | | | | |
| Average | | | | | 52 | | | 51 | | | | | | | | | | | | | | | |
| 75% of Full Scale | 125.0 | 125.0 | 69.8 | 123 | 121 | 69.8 | 123 | 121 | -1.71% | -1.71% | -1.19% | -3.20% | -3.20% | -0.50% | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | 5.00% | PASS | |
| | | | 71.0 | 125 | 123 | 69.0 | 121 | 120 | 0.37% | -2.98% | | -1.60% | -4.00% | | | | | | | | | | |
| | | | 69.8 | 123 | 121 | 69.3 | 122 | 121 | -1.71% | -2.56% | | -3.20% | -3.20% | | | | | | | | | | |
| | | | 69.8 | 123 | 120 | 69.0 | 121 | 120 | -1.71% | -2.98% | | -4.00% | -4.00% | | | | | | | | | | |
| | | | 69.3 | 122 | 120 | 69.0 | 121 | 120 | -2.56% | -2.98% | | -4.00% | -4.00% | | | | | | | | | | |
| Min | | | | | 120 | | | 120 | | | | | | | | | | | | | | | |
| Max | | | | | 123 | | | 121 | | | | | | | | | | | | | | | |
| Average | | | | | 121 | | | 120 | | | | | | | | | | | | | | | |

Reagent Color:

| REAGENT LEVELS | |
|----------------|---|
| High | |
| Low | |
| Good | X |
| Choppy | |

STANDARD CONTROL NUMBERS

| | |
|--|-----------------------------|
| Reference Batch Control #: | Hach COD Vials Batch A0105 |
| Accessory Solution Control #: | G-CD04 24649 |
| Accessory Solution Control #: | D-0214 24903 Rec'd 05/09/00 |
| Accessory Solution Control #: | |
| NIST Traceable Analytical Standards Lot #: | 53140 (1008 ppm) |

| COD Vials Product Batch Final Acceptance/Rejection Status | | | | | |
|--|-------|------------------|-------|-----------------|----------------------|
| INSTRUMENT | ☆ | % BIAS vs. STDS. | ☆ | % BIAS vs. REF. | PRODUCT FINAL STATUS |
| SPEC 21 | 5.00% | PASS | 5.00% | PASS | PASS |
| DR-2010 | 5.00% | PASS | 5.00% | PASS | |
| QC VERSION # 2 | | | | | |
| QC INSPECTOR: PT | | | | | |
| APPROVED BY: PT | | | | | |
| PRODUCT RELEASE DATE: 8/11/2000 | | | | | |
| PRODUCT ROUTING: WIP | | | | | |

Comments: Se 30%T with (STD - 19.5) (New Reagent Batch - 20.25). Used micro pipetter. Readings are (3x1.99) (3x1.98) (4x2.00).

Comments:

| Blank on Spec 21 (100%T) | Reference Batch | 20.3 | 19.3 | 19.8 | 19.8 |
|--------------------------|-------------------|------|------|------|------|
| | New Reagent Batch | 20.3 | 20.3 | 20.5 | 20.3 |

CHEMetrics, Incorporated MANUFACTURING QUALITY CONTROL

REAGENT BATCH PERFORMANCE DATA SHEET - 0-150 PPM (mg/Liter) COD VIALS PRODUCT LINE

CAT CODE: 7351

RUN NO.: 53897.3

DOM: 8/10/2000

QC DATE: 8/11/2000

ANALYTE: COD

SPEC 21 ID: C

SPEC 21 RANGE: 150

WAVELENGTH: 420

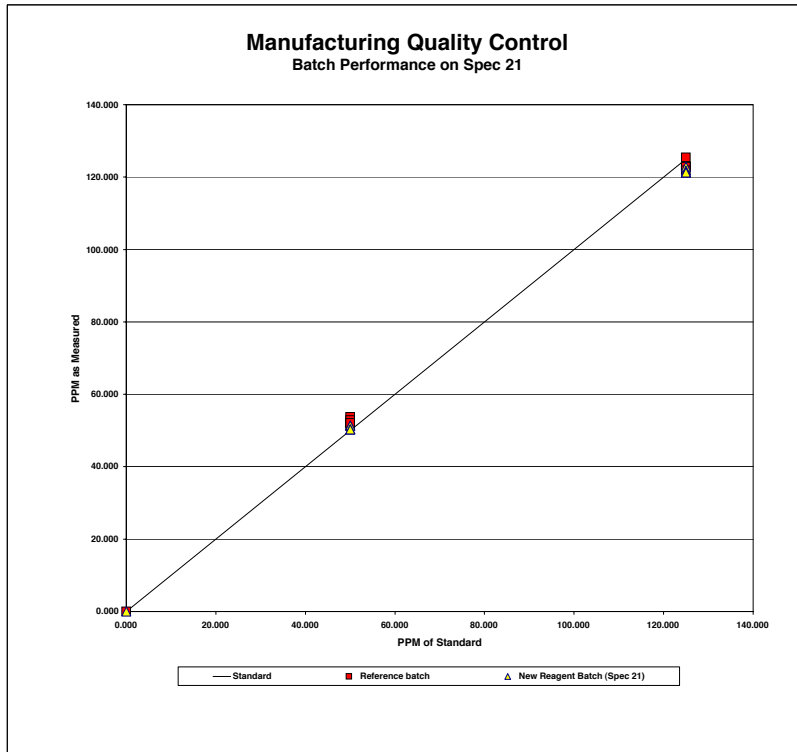
CAL. TABLE VER.: 2778-2

INSP BY: PT

HACH DR-2010 SERIAL #: 970700004218

DR-2010 RANGE: 150

WAVELENGTH: 420



CHEMetrics, Incorporated

CHEMetrics' COD Vials Product Line - Reagent Composition Equivalency Vs. USEPA Method 410.4 and Jirka/ Carter Micro Semi-Automated Procedure*

| Reagent Composition | USEPA Method 410.4 (3 - 900 ppm) | | | CHEMetrics COD Vials Product (0 - 1500 ppm) | | | | Jirka/ Carter Micro Semi-Automated Procedure | | |
|----------------------------------|-------------------------------------|---|---|--|---|--|---|---|---|--|
| | Reagent in gms or mL (1) | Conc. In grams/Liter or mL/Liter (2) | Amount Normalized for sample size: gm/mL or mL/mL sample (3) | Reagent in gms or mL (1) | Conc. In grams/Liter or mL/Liter (2) | Amount Normalized for sample size gm/mL or mL/mL sample (3) | Test normalized to 900ppm instead of 1500 ppm (4) | Reagent in gms or mL (1) | Conc. In grams/Liter or mL/Liter (2) | Amount Normalized for sample size gm/mL or mL/mL sample (3) |
| Digestion Solution | | | | | | | | | | |
| Potassium Dichromate | 10.2 | 10.2 | | 43.74 | 29.16 | | | 10.2 | 10.2 | |
| Sulfuric Acid (conc) | 167 | 167 | | 250 | 166.7 | | | 167 | 167 | |
| Mercuric Sulfate | 33.3 | 33.3 | | 72 | 48 | | | 33.3 | 33.3 | |
| Catalyst Solution | | | | | | | | | | |
| Silver Sulfate | 22 | 9.87 | | 50.86 | 12.72 | | | 22 | 9.87 | |
| Sulfuric Acid | 2228 | 1000 | | 3500 | 875 | | | 2228 | 1000 | |
| Manual Sample size/ ml | 10 | | | 2 | | | | | | |
| Digestion Solution use | 6 | | | 0.84 | | | | | | |
| Potassium Dichromate | | 0.061 | 0.0061 | | 0.024 | 0.012 | 0.0073 | | | |
| Sulfuric Acid (conc) | | 1.00 | 0.10 | | 0.14 | 0.07 | | | | |
| Mercuric Sulfate | | 0.20 | 0.02 | | 0.04 | 0.02 | | | | |
| Catalyst Solution use | 14 | | | 2.46 | | | | | | |
| Silver Sulfate | | 0.138 | 0.014 | | 0.031 | 0.016 | | | | |
| Sulfuric Acid | | 14 | 1.40 | | 2.15 | 1.08 | | | | |
| Auto Analyzer Sample size | 2.5 | | | | | | | 2.5 | | |
| Digestion Solution use | 1.5 | | | | | | | 1.5 | | |
| Potassium Dichromate | | 0.015 | 0.0061 | | | | | | 0.015 | 0.0061 |
| Sulfuric Acid (conc) | | 0.251 | 0.10 | | | | | | 0.251 | 0.100 |
| Mercuric Sulfate | | 0.050 | 0.02 | | | | | | 0.050 | 0.02 |
| Catalyst Solution use | 3.5 | | | | | | | 3.5 | | |
| Silver Sulfate | | 0.035 | 0.014 | | | | | | 0.035 | 0.014 |
| Sulfuric Acid | | 3.5 | 1.40 | | | | | | 3.5 | 1.40 |
| Measurement Wavelength | 600 nm | | | 620 nm | | | | 600 nm | | |

*References: 1. USEPA Methods for Analysis of Waters & Wastes, method 410.4 (1993).
2. A.M. Jirka and M.J. Carter, "Micro Semi-Automated Analysis of Surface and Wastewaters for Chemical Oxygen Demand", Analytical Chemistry, Vol. 47, p. 1397 (1975)

(cod_working_solutions.EPA)