South Coast
Air Quality Management District
South Coast AQMD
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 · www.aqmd.gov

SOURCE TEST REPORT

16-333

CONDUCTED AT

Anaplex Corporation
15547 Garfield Avenue
Paramount, CA 90723

HEXAVALENT CHROMIUM
EMISSIONS FROM THREE TYPES OF PROCESS TANKS

TESTED:	November 16, 2016
ISSUED:	December 9, 2016
REPORTED BY:	Wayne Stredwick Air Quality Engineer II

REVIEWED BY:

Michael Garibay
Supervising Air Quality Engineer

SOURCE TEST ENGINEERING BRANCH

MONITORING & ANALYSIS DIVISION

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SUMMARY

a. Firm .... Anaplex Corporation

b. Test Location .... 15547 Garfield Avenue, Paramount, CA 90723

c. Unit Tested .... Various Metal Finishing Tanks

d. Test Requested by .... Matt Miyasato (DEO), (909) 396-3249, SCAQMD

e. Reason for Test Request..................... High ambient air monitor readings of Cr(VI)

f. Date of Test .... November 16, 2016

g. Source Test Performed by.................. Mike Garibay, Wayne Stredwick Bill Welch, Eric Padilla

h. Test Arrangements Made Through .... Carmen Campbell (President) Anaplex Corporation (562) 634-5700

g. Source Test Observed by .... B. L. Griffiths Cast Metals Services, Inc. (909)374-0270

j. Company I.D. No. 16951

k. Permit No. 513707

RESULTS

Table 1. Summary of Test Conditions

Tank - 11/16/2016	Chromate Content
Sodium Dichromate Seal Tank #22	3.2 %
Chemical Film Tank #43	0.5 %
Chromic Acid Anodizing Tank #19	8.7 %

Table 2. Summary of Emissions

HEXAVALENT CHROMIUM EMISSIONS 11/16/2016

Emissions Source	Concentration (ng/m^3) *	Tank Operating Temperature (deg F)	Surface Tension (dynes/cm)	Air Agitation
Sodium Dichromate Seal Tank #22	682,000	194-212	70.2	NO
Chromate Film Tank #43	8,340	Ambient	70.3	YES
Chromic Acid Anodizing Tank #19	6,880	91-99	23.8	YES
Three Run Average	232,000	-	-	-

* The concentrations are reported in the same units as the recent ambient air monitoring data, which was 14 ng/m3 - average 11/5 through 11/17 from Monitor 1978471 located immediately outside the facility roll up door near the tanks listed above.

EXECUTIVE SUMMARY

Source testing was conducted at Anaplex Corporation to identify the specific causes of elevated ambient hexavalent chromium levels measured recently very near to the facility. The emissions above three hexavalent chromium containing tanks within the facility were measured for concentration. The tanks were classified into three types: electrolytic tanks where anodizing is taking place, heated seal tanks where the tanks are heated to near boiling, and agitated tanks where air is bubbled through the tanks. The testing included one of each of the three classifications of tanks that were closest in proximity to the ambient monitor with elevated readings. The results were obtained for purposes of identifying potential sources of the elevated ambient readings and to rank them for their relative potential impacts.

The average ambient concentration adjacent to the facility was 14 ng/m^3 for the period surrounding the test date, as compared to the measured source concentrations from the facility which was 232,000 ng/m3 as the average of the three tanks tested. This elevated source concentration at 16,600 times the ambient, is considered positive identification that the facility is contributing to the nearby elevated ambient concentrations. Of the three types of tanks tested, the heated seal tank is the largest identified contributor with a measured emissions concentration of 632,000 ng/m^3. The other two tanks types, air agitated and anodizing, were also positively identified with elevated hexavalent chromium emissions over ambient at 8,340 ng/m^3 and 6,880 ng/m^3 respectively. Additionally, it is likely that several tanks in the facility similar to all three types tested, are all contributing to the nearby elevated ambient concentrations.

INTRODUCTION

On November 16, 2016, Engineers from the South Coast Air Quality Management District (SCAQMD) Source Test Engineering (STE) branch conducted source testing at Anaplex Corporation in Paramount, California. The purpose of the testing was to identify the specific causes of elevated ambient hexavalent chromium levels measured very near to the Anaplex facility. For purposes of clarification, when the terms chromate and chromic acid are used in describing the equipment at this facility, the chromium in chromate and chromic acid are in the hexavalent state.

Several operations at the facility were identified that contain or process hexavalent chromium containing materials. It is possible that there are several potential sources of hexavalent chromium at the facility including the chromic acid anodizing tank, and several chromate or chromic acid containing tanks. Some of these tanks are also heated and air agitated (also called sparging). The tanks that contain hexavalent chromium were classified into three types that are potential emission sources:

1. Electrolytic tanks where anodizing is taking place.
2. Heated seal tanks where the tanks are heated to near boiling.
3. Agitated tanks where air is continuously bubbled through the tanks for mixing the tank contents.

One tank from each of these categories was tested. The facility had also previously sprayed chromate based coatings in their spray booths, but this process was not tested since it was not nearest to the ambient monitor with elevated readings, and the facility had claimed that they no longer use chromate containing coatings.

Sources whose emissions are measured as greater than that of the downwind monitor are considered to be potential contributors to the hexavalent chromium measured by the monitor, with those exhibiting the greater concentrations more positively identified as contributors.

The Discussion/Test Critique section of this report includes conclusions that can be drawn from the results.

EQUIPMENT AND PROCESS DESCRIPTION

Anaplex Corporation provides finishing services such as anodizing, plating and coating for aerospace products. The facility operates several permitted units in their process. The equipment tested, sampling locations, and facility tank location diagram are shown in Figures 1 – 4. Specifics of the tank sizes are specified on the facility's permit. None of the tanks tested employ add on control devices. The anodizing tank uses only mist suppressant for emissions control. The facility formerly used Atotech Fumetrol 140 mist suppressant, but recently switched to the Hunter HCA 8.4 PFOS free mist suppressant to comply with the recent PFOS ban. Both mist suppressant products have been previously approved by SCAQMD and CARB as certified for the Rule 1469 0.01 mg/A-hr limit.

The emissions from the tanks escape the building through either powered roof vents and/or roll up doors on either end of the buildings. The anodizing building roll up doors were open during the testing, with the east facing door located in close proximity to the SCAQMD Ambient Monitor 1978472 located on a sidewalk utility pole on Garfield Avenue.

Previously, according to the facility, they had discontinued the use of chromate containing coatings inside their spray booths. John Anderson of the SCAQMD Enforcement group, noted chromate containing coatings, were found at the facility, but were not observed being sprayed.

SAMPLING AND ANALYTICAL PROCEDURES

Three locations were identified for one sample run at each location for emissions information testing. The three source testing samples were obtained for purposes of identifying emission sources and to rank them on their relative potential impacts. Three sources of potential hexavalent chromium emissions were selected as possibly having the greatest potential for causing elevated ambient hexavalent chromium near the facilities. The samples were taken from the air above the sources as to represent emissions that are diluted and transported by air currents that are diluted and move towards the direction of the ambient monitors. The locations chosen were emissions above the Chromic Acid Anodizing Tank #19, emissions above the Dichromate Seal Tank #22, and emissions above the Chemical Film Tank #43. These locations were based on previous ambient monitoring results from low volume samplers located on Garfield Avenue in the city of Paramount, California.

Hexavalent Chromium Sampling

Testing was conducted based on California Air Resources Board Method 425 applied to the non-stack open air above the tanks, with the procedures of the method specific to stack sampling omitted. Three samples were taken at single non-isokinetic sample points for informational purposes. Each sampling train consisted of a sampling line, which was used to draw the stack sample from the source. The sample was then drawn through two impingers each filled with an aqueous solution of 0.1N $NaHCO_3$ (per section 21.2), an empty impinger, a 2” filter, and an impinger bubbler filled with tared silica gel. Each sampling train was connected to a leak free vacuum pump, a dry gas meter, and a calibrated orifice. The impingers were contained in an ice bath to condense water vapor and other condensable matter present in the sample stream (see Figure 5).

The samples were extracted using the sampling trains. The pH of the solution in the first impinger was measured after the test, but prior to recovery, at pH 9. The impinger solutions were recovered within 24 hours and the SCAQMD laboratory analyzed the hexavalent chromium in the samples by CARB SOP MLD039. Hexavalent chromium deposited in the filter, sample line and impingers were extracted and analyzed by an Ion Chromatograph equipped with a post-column reactor (IC/PCR) and a visible wavelength detector. Moisture content was determined gravimetrically and volumetrically.

DISCUSSION/TEST CRITIQUE

For purposes of interpreting the test results, the typical ambient Los Angeles Basin average for hexavalent chromium measured during the most recent SCAQMD Multiple Air Toxics Exposure Study (MATES) IV study is less than 0.1 ng/m^3. While all of the results are substantially higher than the background, it should be noted that it takes a significant volume of air at source concentrations substantially higher than the background to able to affect the ambient air levels and is a function of distance away from the facility due to air dilution and deposition. The intent of this test was to identify sources that are at least several times higher than the background levels to identify the major contributors and to provide a focus for potential remediation. The average ambient concentration adjacent to the facility was 14 ng/m^3 for the period surrounding the test date, as compared to the measured source concentrations from the facility which was 232,000 ng/m^3 as the average of the three tanks tested. These elevated source concentrations at 16,600 times the ambient, are considered as positive identification that the facility is contributing to the nearby elevated ambient concentrations. Additionally, it is likely that several tanks in the facility of all three types tested, are all contributing to the nearby elevated ambient concentrations.

The CARB Method 425 sampling method isokinetic requirements could not be met due to the samples being taken in the open space above the tanks and not in a stack of their control devices since there were no control devices present. This resulted in an over isokinetic condition of over 110% as allowed in the method. General isokinetic theory dictates that an over isokinetic condition results in dilution of the emissions particles and a resulting low bias in the measured emissions. Although a low bias may have occurred, the results are considered to be suitable for purposes of their intended use, since the emissions are certain to be present at concentrations at or above that which was measured during the testing.

Fugitive emissions from Dichromate Seal Tank (#22) were identified as the most significant contributor. However, emissions were also high from Chemical Film Tank (#43), and Chromic Acid Anodizing Tank (#19.) Of the three tanks that were tested, only the chromic acid anodizing tank uses mist suppressant to reduce toxic air emissions. The mechanism for causing the hexavalent chromium in each tank to become airborne is different for each process. It is thought that the seal tanks cause elevated emissions when the temperature begins to approach the boiling point, perhaps 10 – 40 degrees before boiling, when the tanks begin to generate visible steam. The emissions from the air agitated chromate tanks are thought to be driven by the smaller droplets created by the bubbling that are entrained with the rising air and into the airspace above the tanks. The emissions from the anodizing tanks are generated by a similar droplet formation from bubbling formed both during plating and air agitation.

Dichromate Seal Tank (#22) is not air agitated, but it is heated to over 200°F. Visible steam generated from the tank are indicators that elevated temperatures may be the cause of the elevated hexavalent emissions. Possible options to reduce emissions from these tanks would include lowering the tank temperature, employing an alternative non-chromate containing seal technique, or installing add on controls with 100% capture efficiency. The facility has an existing hot water and a nickel acetate seal tank, but it is unknown whether they are acceptable substitutes. While it is possible that a reduction in the tank's surface tension may also help reduce emissions, there is no test data to confirm the effectiveness of this approach. While the tank does not operate above the boiling point of water, the tank does use a steam coil to heat the tank and micro boiling was observed at the water/ heating coil surface.

Chromate Film Tank (#43) operates at ambient temperature, but uses air agitation. Chromic acid Anodizing Tank (#19) operates at 91-99 ºF and utilizes air agitation with a mist suppressant. Mechanical agitation is an option instead of air agitation to reduce toxic air emissions for both types of tanks. Alternative means of mixing the tanks such as submerged eductors have been employed at other facilities. Many plating and/or anodizing facilities do not use air agitation. If a suitable alternative can be employed, the practice of air agitating chromate containing tanks may be producing emissions unnecessarily. If the air agitation cannot be eliminated, add on controls with 100% capture efficiency would then be an option.

Other solutions that could be applied to any tank type includes using polyball type material to blanket the tank's liquid surface and also reducing tank freeboard.

Anaplex Corporation also utilizes large building fans on the roof of the plating and anodizing area to cool the building and remove tank emissions from the building. A view of the roof of Anaplex Corporation using Google Maps indicates discoloration around each roof vent (see Figure 6.) This discoloration is most likely due to residue from the emissions from the tanks below the fans. This residue may be an additional source of hexavalent chromium, which may also need to be removed once the sources inside the building are controlled.

Aside from those specific tanks that were tested, there are other tanks within the facility that contain hexavalent chromium. These include several chromate seal and dip tanks of which some are heated as well as others that contain chromic acid, nickel and cadmium. It is possible that these other tanks could be contributing to the facility wide emissions. Although the spray booths were not specifically included in the testing, they should not be ruled out as potential sources due to residual overspray from chromate containing coatings used in the past.

Finally, while these ideas discussed can be used to reduce hexavalent chromium emissions in the immediate future, the ideal solution would be for all chromate tanks to be ventilated to emission control systems using HEPA filters with vent systems designed according to the American Conference of Governmental Industrial Hygienists guidelines. An even more encompassing approach would be enclosing the buildings and venting the buildings to approved control devices. Any of the control techniques discussed should be discussed and approved by the SCAQMD Engineering and Permitting group.

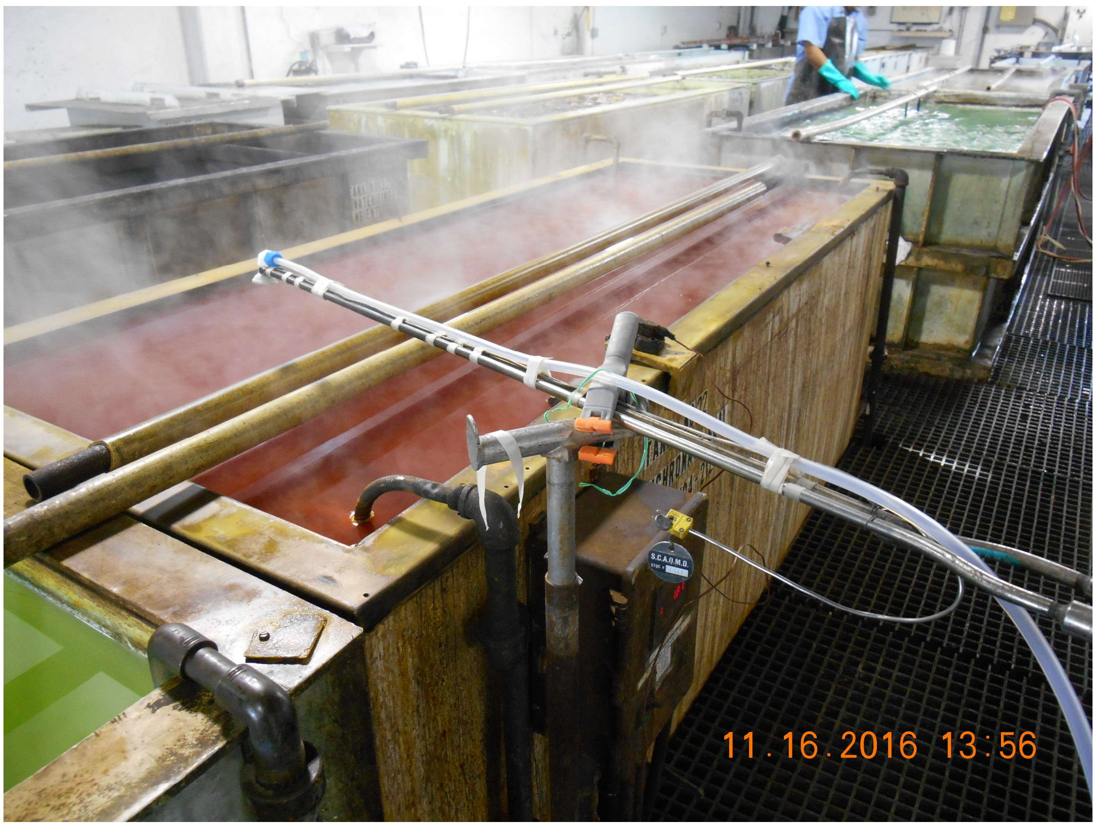


Figure 1: Heated Dichromate Seal Tank #22

Figure 2: Air Agitated Chromate Film Tank #43

Figure 3: Air Agitated Chromic Acid Anodizing Tank #19

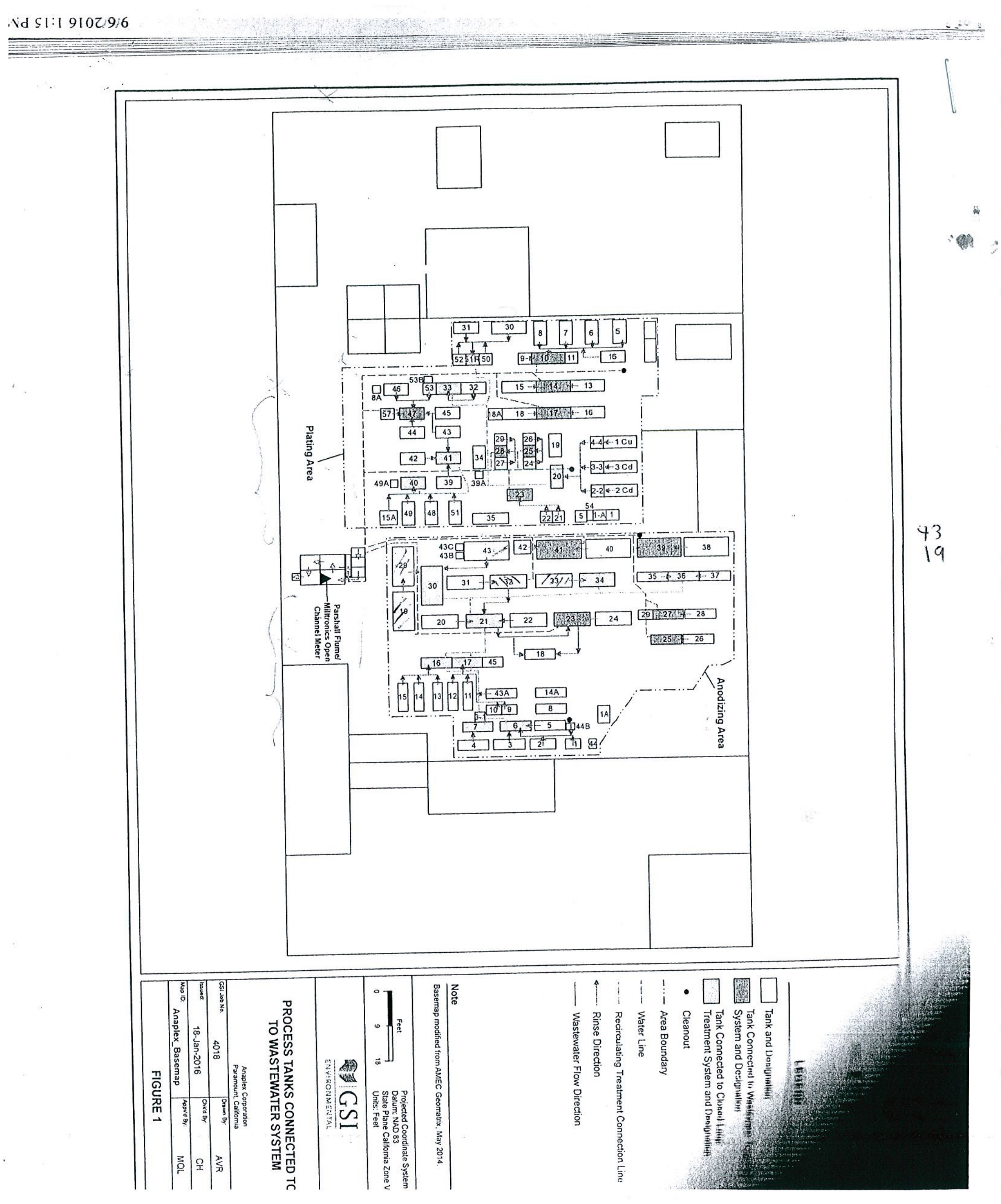


Figure 4: Analplex Corporation's Tank Location

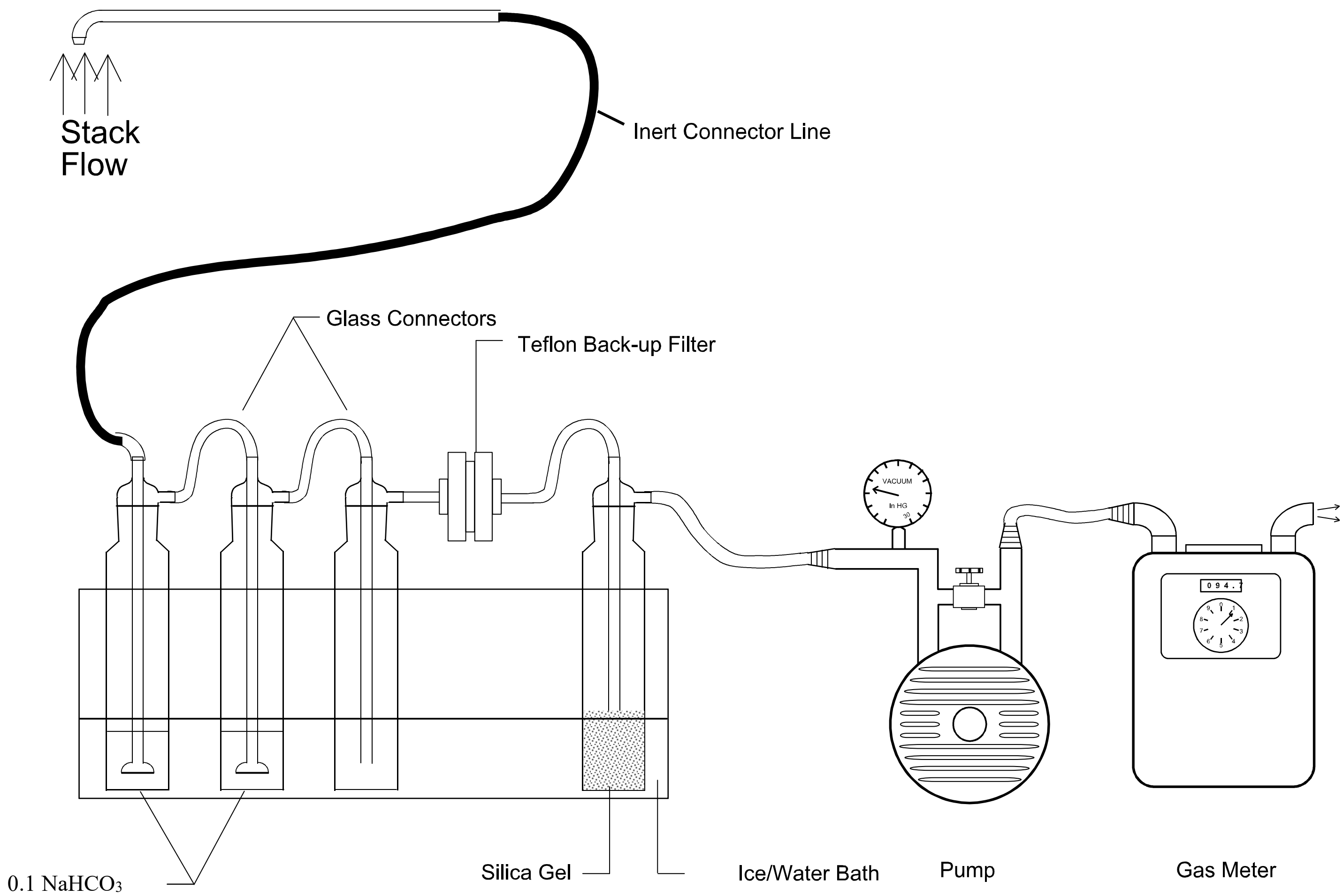


Figure 5: CARB Method 425

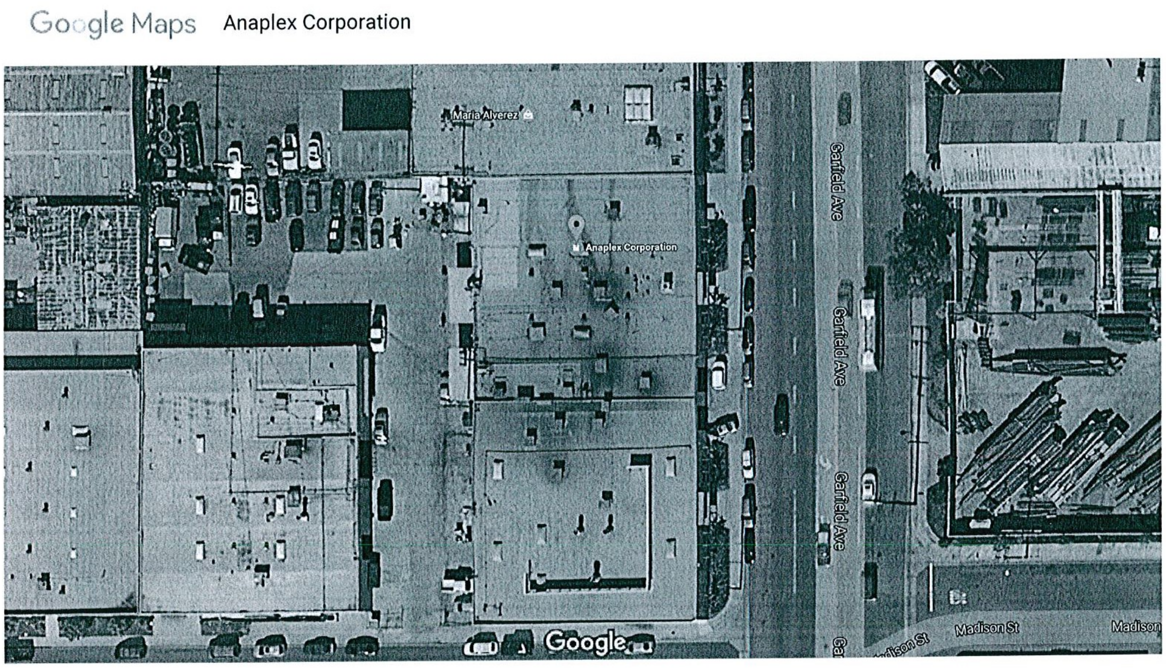


Figure 6: Roof View of Anaplex Corporation

CHROMIUM CALCULATIONS

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 E. Copley Dr. Diamond Bar, California 91765-4182

Test No. 16-333 Test Date: 11/16/2016

SOURCE TEST CALCULATIONS

Product Tested: Fugitive Emissions from Sodium Dichromate Seal Tank #22
Sample Train: Train #13 Input by: W. Stredwick

SUMMARY

A. Average Traverse Velocity	0.00	fps
B. Gas Meter Temperature (Use 60 deg.F for Temp Comp. Meters)	79.69	deg F
C. Gas Meter Correction Factor	1.0075	
D. Average Orifice Pressure	7.00	"$H_2$0
E. Nozzle Diameter	0.0000	inch
E1. Plating Amps		A

F. Stack Inside Diameter	0	inch	M. Pitot Correction Factor	0.84	
G. Stack Cross Sect. Area	0.000	ft2	N. Sampling Time	120	min
H. Average Stack Temp	0.0	deg F	O. Nozzle X-Sect. Area	0.00000	ft
I. Barometric Pressure	28.75	"HgA	P. Hex Chrome Sample Collection	3.23	mg
J. Gas Meter Pressure (I+(D/13.6))	29.26	"HgA	Q. Total Chrome Sample Collection		mg
K. Static Pressure	0.000	"$H_2$0	R. Water Vapor Condensed	82.8	ml
L. Total Stack Pressure (I+(K/13.6))	28.75	"HgA	S. Gas Volume Metered	176.138	dcf

T. Corrected Gas Volume [(S x J/29.92) x 520/(460+B) x C	167.240	dscf

PERCENT MOISTURE/GAS DENSITY

U. Percent Water Vapor in Gas Sample ((4.64 x R)/((0.0464 x R) + T))	2.25	%

V. Average Molecular Weight (Wet):

Component	Vol. Fract.	x	Moist. Fract.	x	Molecular Wt.	=	Wt./Mole
Water	0.022		1.000		18.0	,	0.40
Carbon Dioxide	0.0000	Dry Basis	0.978		44.0	,	0.00
Carbon Monoxide	0.0000	Dry Basis	0.978		28.0	,	0.00
Oxygen	0.2090	Dry Basis	0.978		32.0	,	6.54
Nitrogen & Inerts	0.791	Dry Basis	0.978		28.2	,	21.81
						,	
						Sum	28.75

FLOW RATE

W. Gas Density Correction Factor (28.95/V)^.5	1.00	
X. Velocity Pressure Correction Factor (29.92/L)^.5	1.02	
Y. Corrected Velocity (A x M x W x X)	0.00	fps
Z. Flow Rate (Y x G x 60)	0	cfm
AA. Flow Rate (Standard) {Z x (L/29.92) x [520/(460+H)]}	0	scfm
BB. Dry Flow Rate (AA x (1-U/100))	0	dscfm

SAMPLE CONCENTRATION/EMISSION RATE

CC. Sample Concentration [0.01543 x (P/T)]	2.98E-04	gr/dscf
DD. Sample Concentration [54,143xCC/ 51.996 (Molecular Wt.)]	3.10E-01	ppm
EE. Hexavalent Chrome Emission Rate (0.00857 x BB xCC)	0.00E+00	lb/hr
FF. Total Chrome Emission Rate [(0.0001322 x Q x BB)/T]	0.00E+00	lb/hr
GG. Sample Concentration [P/T x 1,000,000 x 35.3145]	6.82E+05	ng/m^3
HH. Hexavalent Chrome Emission Rate (453592 x EE)	0.000	mg/hr
JJ. Hexavalent Chrome Emission Factor (HH/E1)	#DIV/0!	mg/A-hr
KK. Total Chrome Emission Rate (453592 x FF)	0.000	mg/hr
LL. Total Chrome Emission Factor (KK/E1)	#DIV/0!	mg/A-hr
MM Hexavalent Chrome Concentration (2288.3 x CC)		mg/dscm

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 E. Copley Dr. Diamond Bar, California 91765-4182

Test No. 16-333 Test Date: 11/16/2016

SOURCE TEST CALCULATIONS

Product Tested: Fugitive Emissions from Chemical Film Tank #43
Sample Train: Train #11 Input by: W. Stredwick

SUMMARY

A. Average Traverse Velocity	0.00	fps
B. Gas Meter Temperature (Use 60 deg.F for Temp Comp. Meters)	79.69	deg F
C. Gas Meter Correction Factor	1.0293	
D. Average Orifice Pressure	6.80	"H2O
E. Nozzle Diameter	0.0000	inch
E1. Plating Amps	0	A

F. Stack Inside Diameter	0 inch		M. Pitot Correction Factor	0.84	
G. Stack Cross Sect. Area	0.000	ft2	N. Sampling Time	60	min
H. Average Stack Temp	0.0	deg F	O. Nozzle X-Sect. Area	0.00000	ft
I. Barometric Pressure	28.75	"HgA	P. Hex Chrome Sample Collection	0.01921	mg
J. Gas Meter Pressure (I+(D/13.6))	29.25	"HgA	Q. Total Chrome Sample Collection	0	mg
K. Static Pressure	0.000	"H2O	R. Water Vapor Condensed	16.4	ml
L. Total Stack Pressure (I+(K/13.6))	28.75	"HgA	S. Gas Volume Metered	83.925	dcf

T. Corrected Gas Volume [(S x J/29.92) x 520/(460+B) x C ..... 81.365 dscf

PERCENT MOISTURE/GAS DENSITY

U. Percent Water Vapor in Gas Sample ((4.64 x R)/((0.0464 x R) + T)) ..... 0.93 %

V. Average Molecular Weight (Wet):

Component	Vol. Fract.		x	Moist. Fract.	x	Molecular Wt.	=	Wt./Mole
Water	0.009			1.000		18.0	,	0.17
Carbon Dioxide	0.0000	Dry Basis		0.991		44.0	,	0.00
Carbon Monoxide	0.0000	Dry Basis		0.991		28.0	,	0.00
Oxygen	0.2090	Dry Basis		0.991		32.0	,	6.63
Nitrogen & Inerts	0.791	Dry Basis		0.991		28.2	,	22.10
							,	
						Sum		28.89

FLOW RATE

W. Gas Density Correction Factor (28.95/V)^.5	1.00	
X. Velocity Pressure Correction Factor (29.92/L)^.5	1.02	
Y. Corrected Velocity (A x M x W x X)	0.00	fps
Z. Flow Rate (Y x G x 60)	0	cfm
AA. Flow Rate (Standard) {Z x (L/29.92) x [520/(460+H)]}	0	scfm
BB. Dry Flow Rate (AA x (1-U/100))	0	dscfm

SAMPLE CONCENTRATION/EMISSION RATE

CC. Sample Concentration [0.01543 x (P/T)]	3.64E-06	gr/dscf
DD. Sample Concentration [54,143xCC/ 51.996 (Molecular Wt.)]	3.79E-03	ppm
EE. Hexavalent Chrome Emission Rate (0.00857 x BB xCC)	0.00E+00	lb/hr
FF. Total Chrome Emission Rate [(0.0001322 x Q x BB)/T]	0.00E+00	lb/hr
GG. Sample Concentration [P/T x 1,000,000 x 35.3145]	8.34E+03	ng/m^3
HH. Hexavalent Chrome Emission Rate (453592 x EE)	0.000	mg/hr
JJ. Hexavalent Chrome Emission Factor (HH/E1)	#DIV/0!	mg/A-hr
KK. Total Chrome Emission Rate (453592 x FF)	0.000	mg/hr
LL. Total Chrome Emission Factor (KK/E1)	#DIV/0!	mg/A-hr
MM Hexavalent Chrome Concentration (2288.3 x CC)		mg/dscm

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 E. Copley Dr. Diamond Bar, California 91765-4182

Test No. 16-333 Test Date: 11/16/2016

SOURCE TEST CALCULATIONS

Product Tested: Fugitive Emissions from Chromic Acid Anodizing Tank #19
Sample Train: Train #7 Input by: W. Stredwick

SUMMARY

A. Average Traverse Velocity		fps
B. Gas Meter Temperature (Use 60 deg.F for Temp Comp. Meters)	83.36	deg F
C. Gas Meter Correction Factor	1.0075	
D. Average Orifice Pressure	1.73	"H_20
E. Nozzle Diameter	0.0000	inch
E1. Plating Amps		A

F. Stack Inside Diameter		inch	M. Pitot Correction Factor	0.84	
G. Stack Cross Sect. Area	0.000	ft2	N. Sampling Time	60	min
H. Average Stack Temp		deg F	O. Nozzle X-Sect. Area	0.00000	ft
I. Barometric Pressure	28.75	"HgA	P. Hex Chrome Sample Collection	0.00746	mg
J. Gas Meter Pressure (I+(D/13.6))	28.88	"HgA	Q. Total Chrome Sample Collection	0	mg
K. Static Pressure	0.000	"H_20	R. Water Vapor Condensed	10.4	ml
L. Total Stack Pressure (I+(K/13.6))	28.75	"HgA	S. Gas Volume Metered	41.160	dcf

T. Corrected Gas Volume [(S x J/29.92) x 520/(460+B) x C .... 38.302 dscf

PERCENT MOISTURE/GAS DENSITY

U. Percent Water Vapor in Gas Sample ((4.64 x R)/((0.0464 x R) + T)) .... 1.24 %

V. Average Molecular Weight (Wet):

Component	Vol. Fract.	x	Moist. Fract.	x	Molecular Wt.	=	Wt./Mole
Water	0.012		1.000		18.0	,	0.22
Carbon Dioxide	0.0000	Dry Basis	0.988		44.0	,	0.00
Carbon Monoxide	0.0000	Dry Basis	0.988		28.0	,	0.00
Oxygen	0.2090	Dry Basis	0.988		32.0	,	6.60
Nitrogen & Inerts	0.791	Dry Basis	0.988		28.2	,	22.03
						,	
						Sum	28.86

FLOW RATE

W. Gas Density Correction Factor (28.95/V)^.5	1.00	
X. Velocity Pressure Correction Factor (29.92/L)^.5	1.02	
Y. Corrected Velocity (A x M x W x X)	0.00	fps
Z. Flow Rate (Y x G x 60)	0	cfm
AA. Flow Rate (Standard) {Z x (L/29.92) x [520/(460+H)]}	0	scfm
BB. Dry Flow Rate (AA x (1-U/100))	0	dscfm

SAMPLE CONCENTRATION/EMISSION RATE

CC. Sample Concentration [0.01543 x (P/T)]	3.01E-06	gr/dscf
DD. Sample Concentration [54,143xCC/ 51.996 (Molecular Wt.)]	3.13E-03	ppm
EE. Hexavalent Chrome Emission Rate (0.00857 x BB xCC)	0.00E+00	lb/hr
FF. Total Chrome Emission Rate [(0.0001322 x Q x BB)/T]	0.00E+00	lb/hr
GG. Sample Concentration [P/T x 1,000,000 x 35.3145]	6.88E+03	ng/m^3
HH. Hexavalent Chrome Emission Rate (453592 x EE)	0.000	mg/hr
JJ. Hexavalent Chrome Emission Factor (HH/E1)	#DIV/0!	mg/A-hr
KK. Total Chrome Emission Rate (453592 x FF)	0.000	mg/hr
LL. Total Chrome Emission Factor (KK/E1)	#DIV/0!	mg/A-hr
MM Hexavalent Chrome Concentration (2288.3 x CC)	6.88E-03	mg/dscm

APPENDICES

APPENDIX A

Field Data

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Drive, Diamond Bar, California 91765

South Coast Air Quality Management District

Test No. ________ Company: Anaplex Date: 11/14/16
Sampling Location: Tank #43 Sample Train: 11

Traverse Source Test Data

Pre-Test Leak Check:
Filter: 0.0 cfm @ 15 "Hg vac
Probe: 0.003 cfm @ 15 "Hg vac
Pitot Tube Leak Check: Pass / Fail

Post-Test Leak Check:
Filter: ______ cfm @ ______ "Hg vac
Probe: 0.002 cfm @ 15 "Hg vac
Pitot Tube Leak Check: Pass / Fail

Time	Sample Point #	Gas Meter Reading (dcf) Start:	Stack Velocity Head ("H_2O)	Stack Temp. °F	Calculated Velocity (fps)	Calculated Sampling Rate (cfm)	Calculated Orifice ΔP ("H_2O)	Probe Temp. °F	Filter Temp. °F	Imp. Temp. °F	Meter Temp. °F In	Meter Temp. °F Out	Vacuum " Hg
11:00		780.447						81	80				
+5		787.1					6.7	82	80				13
+10		794.0						83	80				
+15		801.0					6.9	83	81				13
+20		808.1						84	81				
+25		815.0					6.8	84	81				13
+30		822.0						85	82				
+35		829.5					6.8	85	82				13
+40		836.1						86	83				
+45		843.15					6.7	86	83				13
+50		850.2						86	84				
+55		857.3					6.7	86	84				13
		864.372											
(Net Vol. Uncorr.)			Avg.										

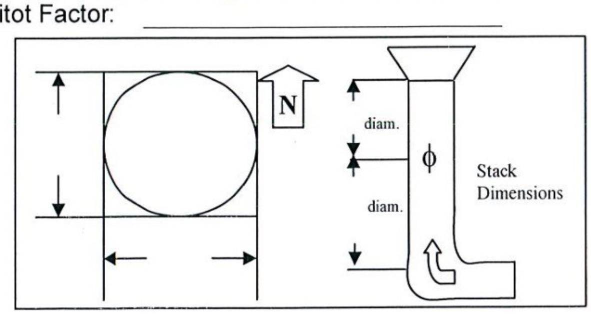
K-Factor: 0.5821 Stack Moisture: ________ Canister #: ________ Start: ________ "Hg vac

Nozzle Diameter: ________ "
Barometric Pressure: 28.75 " HgA
Static Pressure in Stack: + / - ________ " H_2O

Recorded By: BW
Pitot Factor: ________

Calibration Data

Inclined Manometer	________	(Cal: N/A)
Magnehelic No.	________	(Cal: ________)
Pitot Tube No.	________	(Cal: ________)
Potentiometer No.	N0315	(Cal: 11-15-16)
Thermocouple No.	________	(Cal: ________)
Gas Meter No.	N0715	(Cal: 11-15-16)
Meter Corr. Factor:	1.0292	



Sampling Probe: Stainless Steel / Borosilicate / Quartz

Stack: Horizontal / Vertical Rectangular / Circular

South Coast Air Quality Management District

Test No. 16-333 Company: Anaplex CORP. Date: 11-16-16
Sampling Location: TANK #22 - Dichromate Seal Sample Train: #13
TANK TEMP SP 194-212°F **Traverse Source Test Data**

Pre-Test Leak Check:
Filter: ______ cfm @ ______ "Hg vac
Probe: 0 cfm @ 15 "Hg vac
Pitot Tube Leak Check: Pass / Fail

Post-Test Leak Check:
Filter: ______ cfm @ ______ "Hg vac
Probe: 0 cfm @ 15 "Hg vac
Pitot Tube Leak Check: Pass / Fail

Time	Sample Point #	Gas Meter Reading (dcf)	Stack		Calculated			Probe Temp. °F	TANK ~~Filter~~ Temp. °F	Imp. Temp. °F	Meter Temp. °F		Vacuum " Hg
		Start: 1016.362	Velocity Head ("H_2O)	Temp. °F	Velocity (fps)	Sampling Rate (cfm)	Orifice ΔP ("H_2O)				In	Out	
12:15							7.0		163		76	74	15
+10		1030.980					7.0		169		76	74	15
+20		1045.800					7.0		171		78	75	15
+30		1059.900					7.0		176		78	76	15
+40		1075.800					7.0		179		78	76	15
+50		1089.750					7.0		183		80	77	15
+60		1104.600					7.0		185		81	78	15
+70		1118.995					7.0		187		81	78	15
+80		1134.605					7.0		190		84	80	15
+90		1148.640					7.0		192		85	80	15
+100		1162.950					7.0		193		86	80	15
+110		1177.980					7.0		195		88	81	15
+120		1192.500					7.0		197		90	82	15
(Net Vol. Uncorr.)			Avg.										

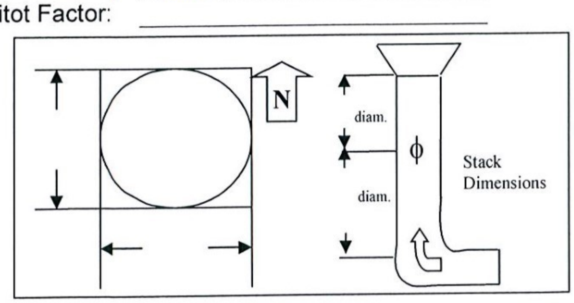
K-Factor: 0.6109 Stack Moisture: ______ Canister #: ______ Start: ______ "Hg vac

Nozzle Diameter: ______ "
Barometric Pressure: 28.75 " HgA
Static Pressure in Stack: + / - ______ " H_2O

Recorded By: WS
Pitot Factor: ______

Calibration Data

Inclined Manometer		(Cal: N/A)
Magnehelic No.		(Cal:)
Pitot Tube No.		(Cal:)
Potentiometer No.	N0311	(Cal: 11-15-16)
Thermocouple No.		(Cal:)
Gas Meter No.	N0711	(Cal: 11-15-16)
Meter Corr. Factor:	1.0075	



Sampling Probe: Stainless Steel / Borosilicate / Quartz PIPE Stack: Horizontal / Vertical Rectangular / Circular

South Coast Air Quality Management District

Test No. 16-333 Company: Anaplex Corporation Date: 11-16-16
Sampling Location: Tank #19 - Chromic Acid Anodizing Sample Train: 7
AQMD Tank #1-23

Traverse Source Test Data

Pre-Test Leak Check:
Filter: ______ cfm @ ______ "Hg vac
Probe: 0 cfm @ 15 "Hg vac
Pitot Tube Leak Check: Pass / Fail

Post-Test Leak Check:
Filter: ______ cfm @ ______ "Hg vac
Probe: 0.018 cfm @ 15 "Hg vac
Pitot Tube Leak Check: Pass / Fail

Time	Sample Point #	Gas Meter Reading (dcf)	Stack Velocity Head ("H₂O)	Stack Temp. °F	Calculated Velocity (fps)	Calculated Sampling Rate (cfm)	Calculated Orifice ΔP ("H₂O)	Probe Temp. °F	~~Filter Temp. °F~~ Amp Meter	Tank ~~Imp.~~ Temp. °F	Meter Temp. °F In	Meter Temp. °F Out	Vacuum " Hg
		Start: 974,020											
11:55 AM							0.90		516202	86	82	80	15
+10		980,320					0.91		516205	86	82	80	15
+20		985,660					0.80		516209	88	84	82	15
+30		990,835					0.75		516214	88	85	82	15
+40		996,000					0.70		516217	89	85	83	15
+50		1004,300					4.0		516221	90	86	84	15
+60		1015,180					4.0		516226	90	87	85	15
										93			
1:30 PM													
2:00 PM									516284				
(Net Vol. Uncorr.)			Avg.										

20 Amps DC
22 Volts DC

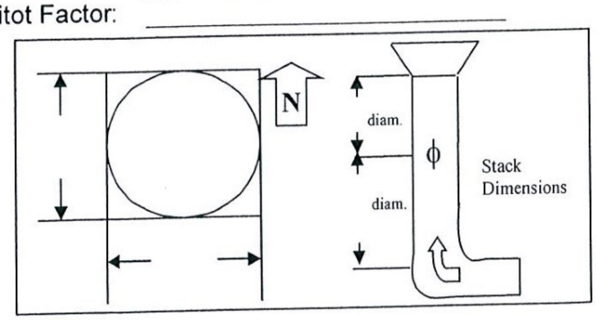
K-Factor: 0.6109 Stack Moisture: ______ Canister #: ______ Start: ______ "Hg vac

Nozzle Diameter: ______ "
Barometric Pressure: 28.75 " HgA
Static Pressure in Stack: + / - ______ " H₂O

Recorded By: WS
Pitot Factor: ______

Calibration Data

Inclined Manometer		(Cal: N/A)
Magnehelic No.		(Cal:)
Pitot Tube No.		(Cal:)
Potentiometer No.	N0311	(Cal: 11-15-16)
Thermocouple No.		(Cal:)
Gas Meter No.	N0711	(Cal: 11-15-16)
Meter Corr. Factor:	1.0075	



Sampling Probe: Stainless Steel / Borosilicate / Quartz / PTFE

Stack: Horizontal / Vertical Rectangular / Circular

APPENDIX B

District Laboratory Data

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
SOURCE TEST REQUEST FOR EQUIPMENT/ANALYSIS

Company TBD Anaplex Source Test No. 16-333
Address Date 11-10-16
Basic Control Device

Source Test Requested by Team No.
For Compliance, Rule(s)
Other (Specify)

ALTERNATE COMPANY*

New Company Name Source Test No.
Address Date
Basic Control Device

Source Test Requested by Wayne Stredwick Team No.
For Compliance, Rule(s)
Other (Specify) ~~PARAMOUNT PROJECT~~
Paramount Saturation

SAMPLE EQUIPMENT REQUEST

Quantity and Description	Laboratory No. 1631506 I.D. Nos.
I { 3 ~~4~~ Hex Chrome Train (w/ 11/15/16)	Train No 11, 13, 7
+ 2 Probes	Ref: Bleu Book No. 21
	Pages 118, 120

SAMPLE EQUIPMENT ANALYSIS REQUEST

Source Test No. Sample Description	~~Laboratory No.~~ Analysis Requested
II { Trains 7, 11, 13	Hex + Total Chrome
3 Sample Bottles	Hex + Total Chrome, surface tension
1 - Chromate Rinse Tank #43	
2 - Chromate Seal Tank #22	
3 - Chromate Anodizing Tank #19	

SAMPLE EQUIPMENT CHAIN OF CUSTODY

Sample Equipment #	From	To	For (S/T, Analysis, Cleanup, Not Used)	Date	Time
I	[signature]	[signature]	S T	11-15-16	1:20
II	[signature]	[signature]	Analysis	11-17-16	7:20 AM

*Reason for testing at a different company:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Dr., Diamond Bar, CA 91765-4182
Page 1 of 1

MONITORING & ANALYSIS
REPORT OF LABORATORY ANALYSIS

TO	Mike Garibay, Supervising AQ Engineer Source Test Engineering	**LABORATORY NO**	1631506
		SOURCE TEST NO	16-333
SAMPLE(S) DESCRIBED AS	3 Hex Chrome trains	**DATE RECEIVED**	11/17/2016
		PROJECT/ RULE	Paramount
SAMPLING LOCATION	Anaplex 15547 Garfield Avenue Paramount, CA 90723	**REQUESTED BY**	Wayne Stredwick
		DATE ANALYZED	11/17/2016

ANALYTICAL WORK PERFORMED, METHOD OF ANALYSIS AND RESULTS
Moisture and Hexavalent Chrome by CARB 425 (Sodium Bicarbonate solution)

	TRAIN 7	**TRAIN 11**	**TRAIN 13**
Moisture gain, g	10.4	16.4	82.8
Silica gel% expended	60	80-85	25
Filter gain, mg	<1	<1	<1
Recovery notes	No Probe Tube only	No Probe Tube only	No Probe Tube only
Cr^{+6} total μg	7.46	19.21	3228

Cr^{+6} blank ND

NOTE (1) Additional significant figures provided for calculation purposes.

REF STR-113-63

Date Approved: 11/28/16 Approved By: Solomon Teffera

Solomon Teffera, Acting Senior Manager
Laboratory Services
(909) 396-2391

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Dr., Diamond Bar, CA 91765-4182

MONITORING & ANALYSIS
REPORT OF LABORATORY ANALYSIS
Page 1 of 2

TO Mike Garibay
Supervising AQ Engineer
Source Testing

LABORATORY NO 1631506-11 to -13

DATE RECEIVED 11/17/2016

SAMPLE(S) DESCRIBED AS

Three chromate solutions

FACILITY ID 16951

REQUESTED BY Wayne Stredwick

SOURCE TEST NO 16-333

SAMPLING LOCATION
Anaplex
15547 Garfield Ave
Paramount, CA 90723

PROJECT/ RULE R 1469

Analytical Work Performed, Method of Analysis and Results
Chromic acid and Hexavalent Chromium by Sodium Thiosulfate Titration
True surface tension (S) at deg C by EPA Method 306B, Fisher Model 20 Tensiometer

Lab No(s)	Sample Description	Temp C	S dynes/cm	Cr^{+6} g/l	CrO_3 oz/gal	CrO_3 %
1631506-11	Sample 1 chromate rinse tank #43	24	70.3	2.7	0.7	0.5
1631506-12	Sample 2 chromate seal tank #22	24	70.2	16.9	4.4	3.15
1631506-13	Sample 3 chromate anodizing tank #19	24	23.8	48.6	12.8	8.70

Approved by Date 12/6/2016

Aaron Katzenstein
Senior Manager
Laboratory Services
909-396-2219

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Dr., Diamond Bar, CA 91765-4182

MONITORING & ANALYSIS
REPORT OF LABORATORY ANALYSIS
Page 2 of 2

SAMPLE(S) DESCRIBED AS
Three chromate solutions

LABORATORY NO 1631506

REQUESTED BY Wayne Stredwick

Chromic acid and Hexavalent Chromium by Sodium Thiosulfate Titration
True surface tension (S) at deg C by EPA Method 306B, Fisher Model 20 Tensiometer

QUALITY CONTROL SUMMARY (SURFACE TENSION)

Reference Material	$S_{measured}$	$S_{theoretical}$	Percent of theoretical
Water at 24.0 °C	70.0	72.1	97%
Water at 23.6 °C	70.8	72.2	98%

Reference Material	$S_{measured}$	$S_{theoretical}$	Percent of theoretical
1,1,1-TCE at 24.0 °C	25.2	25.2	100%
1,1,1-TCE at 23.9 °C	25.2	25.2	100%

S=True ST
Temp

Date sample(s) received	11/17/2016
Date sample(s) analyzed for surface tension	11/18/2016
Date sample(s) analyzed for chromic acid	11/30/2016

APPENDIX C

Equipment Calibrations

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
DATA SHEET FOR THERMOCOUPLE/POTENTIOMETER CALIBRATION

Field Meter STQC#: N0303 & N0305
Ref. Thermometer #: Jofra
Temperature Source(s): ASTM 08340

Date: 11-15-16
Calibration By: T.N.
Calibration Period:
Semiannual: X
Bimonthly:
Other:

		N0303				N0305				
		Lead Wire STQC# NR				Lead Wire STQC# NR				
Temp.*	A	B		(B-A)100 / A **		B		(B-A)100 / A **		
Sensor STQC#	Ref. Temp.	Ch#1	Ch#2	Ch#1	Ch#2	Ch#1	Ch#2	Ch#1	Ch#2	COMMENTS
N0105	212	211	212			212	212			
10104	212	211	212			212	211			
N0105	710	711	712			711	711			
10104	710	712	712			711	711			
N0105	410	411	410			411	410			
N0104	410	411	410			410	410			

* All temperatures are in degrees F.
**Percent (%) difference should not exceed +/- 1.5%.

Page Number 34

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
DRY GAS METER CALIBRATION WORKSHEET

Page 1

DATE: 11-15-2016 PERFORMED BY: T.Nguyen

AMBIENT AIR 75 o F

PBAR: 29.43 In.Hg DRY GAS METER ID : N0711

STANDARD DRY GAS METER ID#: 7812470

TRIAL	CFM	TOTAL cubicF	TEMP	H2O PRESSURE IN	OUT	H2O	METER READ1 (in cubic F)	READ2	TOTAL cubicF	HRS	MIN	SEC	TIME Decimal	UC FL RT CFM
1	1/4	15.0	74	1.2	1.25	1.2	185.0	200.0	15.0		47	11.05	47.18	0.3179
2	1/4	13.1	74	1.2	1.25	1.2	200.1	213.2	13.1		41	25.60	41.43	0.3162
3	1/4	31.8	74	1.2	1.25	1.2	213.4	245.2	31.8	1	40	30.55	100.51	0.3164
1	1/2	30.2	74	2.8	2.8	2.8	272.5	302.7	30.2		56	4.80	56.08	0.5385
2	1/2	20.1	74	2.8	2.8	2.8	302.8	322.9	20.1		37	14.61	37.24	0.5397
3	1/2	21.9	74	2.8	2.8	2.8	323.1	345.0	21.9		40	38.34	40.64	0.5389
1	3/4	32.4	74	5.6	5.6	5.6	353.1	385.5	32.4		40	17.70	40.30	0.8041
2	3/4	16.3	74	5.6	5.6	5.6	400.9	417.2	16.3		21	55.77	21.93	0.7433
3	3/4	22.0	74	5.6	5.6	5.6	417.4	439.4	22.0		29	36.34	29.61	0.7431
1	1	19.6	74	9.5	9.5	9.5	463.2	482.8	19.6		18	51.76	18.86	1.0391
2	1	21.7	74	9.5	9.5	9.5	483.0	504.7	21.7		20	52.99	20.88	1.0391
3	1	18.4	74	9.5	9.5	9.5	505.3	523.7	18.4		17	44.30	17.74	1.0373

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
DRY GAS METER CALIBRATION WORKSHEET

Page 2

DATE: 11-15-2016

PERFORMED BY: T.Nguyen

DRY GAS METER ID : N0711

TRIAL	CFM	TOTAL cubicF	TEMP	H2O PRESSURE IN	H2O PRESSURE OUT	H2O	METER READ1 (in cubic F)	METER READ2 (in cubic F)	CubicF	HRS	MIN	SEC	TIME Decimal	UC FL RT CFM
1	1/4	15.1	74	1.0	0.3	0.7	591.1	606.2	15.1		47	40.33	47.67	0.3167
2	1/4	13.1	74	1.0	0.3	0.7	606.3	619.4	13.1		41	30.55	41.51	0.3156
3	1/4	31.8	74	1.0	0.3	0.7	619.6	651.4	31.8	1	40	51.96	100.87	0.3153
1	1/2	30.0	74	2.7	1.0	1.8	678.5	708.5	30.0		56	39.60	56.66	0.5295
2	1/2	20.0	74	2.7	1.0	1.8	708.6	728.6	20.0		37	41.43	37.69	0.5306
3	1/2	21.6	74	2.7	1.0	1.8	728.7	750.3	21.6		40	0.29	40.00	0.5399
1	3/4	32.2	74	5.4	2.1	3.8	758.4	790.6	32.2		40	36.79	40.61	0.7928
2	3/4	16.6	74	5.4	2.1	3.8	805.7	822.3	16.6		22	26.55	22.44	0.7397
3	3/4	21.8	74	5.4	2.1	3.8	822.4	844.2	21.8		29	4.80	29.08	0.7497
1	1	19.7	74	9.3	3.0	6.2	868.1	887.8	19.7		18	44.35	18.74	1.0513
2	1	21.6	74	9.3	3.0	6.2	888.0	909.6	21.6		20	32.25	20.54	1.0517
3	1	18.7	74	9.3	3.0	6.2	909.8	928.5	18.7		18	14.36	18.24	1.0253

DATE: 11-15-2016

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
DRY GAS METER CALIBRATION WORKSHEET

Page 3

DATE : 11-15-2016
PERFORMED BY: T.Nguyen

DRY GAS METER COEFFICIENT CALCULATIONS

STANDARD DRY GAS METER ID#: 7812470
With Coefficient of 1.0000

DRY GAS METER ID : N0713

TRIAL	CFM	U/C FlowRate	TEMP	H2O	Corrected FlowRate	U/C FlowRate	TEMP	H2O	Corrected FlowRate	COEF	AVE:	OVERALL
1	1/4	0.3179	74	1.23	0.3054	0.3167	74	0.65	0.3039	1.0051	1.0045	1.0075
2	1/4	0.3162	74	1.23	0.3038	0.3156	74	0.65	0.3028	1.0034		
3	1/4	0.3164	74	1.23	0.3040	0.3153	74	0.65	0.3025	1.0050		
1	1/2	0.5385	74	2.8	0.5194	0.5295	74	1.83	0.5095	1.0195	1.0132	
2	1/2	0.5397	74	2.8	0.5206	0.5306	74	1.83	0.5106	1.0195		
3	1/2	0.5389	74	2.8	0.5198	0.5399	74	1.83	0.5195	1.0005		
1	3/4	0.8041	74	5.6	0.7809	0.7928	74	3.75	0.7665	1.0188	1.0080	
2	3/4	0.7433	74	5.6	0.7219	0.7397	74	3.75	0.7151	1.0095		
3	3/4	0.7431	74	5.6	0.7217	0.7497	74	3.75	0.7248	0.9958		
1	1	1.0391	74	9.5	1.0189	1.0513	74	6.15	1.0224	0.9966	1.0043	
2	1	1.0391	74	9.5	1.0189	1.0517	74	6.15	1.0229	0.9961		
3	1	1.0373	74	9.5	1.0171	1.0253	74	6.15	0.9971	1.0201		

DRY GAS METER ID : N0711
DATE: 11-15-2016

CORRECTION FACTOR: 1.0075