SOURCE TEST REPORT

17-338

CONDUCTED AT

Press Forge
7700 Jackson Street
Paramount, CA 90723

HEXAVALENT CHROMIUM
EMISSIONS FROM FURNACES and GRINDING AREAS

TESTED: April 20 and May 3, 2017
ISSUED: September 1, 2017
REPORTED BY: William Welch
Air Quality Engineer II

REVIEWED BY:

Michael Garibay
Supervising Air Quality Engineer

SOURCE TEST ENGINEERING BRANCH
MONITORING & ANALYSIS DIVISION

Cleaning the air that we breathe...
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</tbody>
</table>
SUMMARY

a. Firm .................................................. Press Forge 7700 Jackson Street, Paramount, CA 90723

b. Test Location .................................................. Grinding Room Baghouses and Furnaces

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

e. Reason for Test Request .................................................. High ambient air monitor readings of Cr\textsuperscript{6+}

f. Dates of Tests .................................................. April 20 and May 3, 2017

g. Source Tests Performed by .................................................. Stredwick, Bill Welch, Eric Padilla

h. Test Arrangements Made Through .................................................. Kyle Nelson (EHS Manager, Press Forge)

i. Source Test Observed by .................................................. Kyle Nelson

j. Company I.D. No .................................................. 000136

k. Permit No .................................................. N/A
RESULTS

Summary of Test Conditions:

During the source test on 4/20/17, Furnace #1304 was operating at approximately 1750 °F. The parts inside the furnace were titanium; containing no chromium. In the Billet Grinding Area, three grinding stations were being used to process titanium parts. During the source test on 5/3/17, the North Slot Furnace was operating at approximately 2192 °F, and the South Slot Furnace was operating at approximately 2252 °F. The parts inside the furnace were 300 Series and 400 series stainless steels, containing 10% – 30% chromium. 300 series are austenitic grades of stainless steel, whereas 400 Series are ferritic/martensitic grades of stainless steel. In the Hand Grinding/Inspection Area, both grinding stations were being used to process the 3XX and 4XX stainless steel parts. Due to the nature and configuration of the process, testing was performed as a screening test, non-isokinetically, lacking sampling ports to determine exhaust rate.

Three ambient monitors are located in close proximity to the facility, Monitors 19, 26, and 27. The map in Figure 1 displays the locations of the ambient monitors in relation to the facility. Table 2 shows monitoring results for three different days recent to the test date.
Results:

Table 1: Summary of Hexavalent Chromium Emissions

<table>
<thead>
<tr>
<th>Date</th>
<th>Emissions Source</th>
<th>Concentration (ng/m³) *</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/20/17</td>
<td>Furnace #1304 (titanium)</td>
<td>82.3</td>
</tr>
<tr>
<td>4/20/17</td>
<td>Billet Grinding Area Baghouse (titanium)</td>
<td>18.5</td>
</tr>
<tr>
<td>5/3/17</td>
<td>North Slot Furnace (300 and 400 series stainless steel)</td>
<td>34.6</td>
</tr>
<tr>
<td>5/3/17</td>
<td>South Slot Furnace (300 and 400 series stainless steel)</td>
<td>49.3</td>
</tr>
<tr>
<td>5/3/17</td>
<td>Hand Grinding/Inspection Area Baghouse (300 and 400 series stainless steel)</td>
<td>7.82</td>
</tr>
</tbody>
</table>

* The concentrations are reported in the same units as the ambient air monitoring data (see Table 2).

Table 2: Ambient Air Monitoring Data (ng/m³)

<table>
<thead>
<tr>
<th>Date</th>
<th>Monitor 19</th>
<th>Monitor 26</th>
<th>Monitor 27</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/19/17</td>
<td>2.37</td>
<td>Invalid</td>
<td>1.89</td>
</tr>
<tr>
<td>4/22/17</td>
<td>0.65</td>
<td>0.12</td>
<td>0.54</td>
</tr>
<tr>
<td>4/25/17</td>
<td>3.71</td>
<td>0.75</td>
<td>1.33</td>
</tr>
<tr>
<td>4/28/17</td>
<td>0.8</td>
<td>0.82</td>
<td>0.85</td>
</tr>
<tr>
<td>5/1/17</td>
<td>NS</td>
<td>0.34</td>
<td>0.82</td>
</tr>
</tbody>
</table>

NS – No Sample
**EXECUTIVE SUMMARY**

Due to ongoing citizen complaints and elevated nearby monitoring results prior to testing, Source Test engineers from the SCAQMD Source Test Branch conducted screening source tests on April 20 and May 3, 2017 at Press Forge to determine hexavalent chromium emissions from several processes at the facility. The testing resulted in hexavalent chromium emissions that were higher than the average ambient monitor readings in the days surrounding the test date, but on the lower end of the range of other furnace emissions that have been tested by the SCAQMD.

**INTRODUCTION**

On April 20 and May 3, 2017, engineers from the South Coast Air Quality Management District (SCAQMD) Source Test Engineering (STE) branch conducted source testing at Press Forge 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 facility.

Several processes at the facility were identified as containing chromium materials. Processing of these materials can result in emissions of hexavalent chromium. Emissions testing was conducted on five of these processes: Furnace #1304, the Billet Grinding Area baghouse, the North Slot Furnace, the South Slot Furnace, and a Grinding/Inspection Area baghouse.

According to the facility, the material processed in Furnace #1304 and the Billet Grinding Area baghouse was titanium (non-chromium). The material processed in the slot furnaces and the Grinding/Inspection Area baghouse was 3XX and 4XX stainless steel, containing 10% – 30% chromium by weight. Type 3XX stands for austenitic grades of stainless steel, whereas the 4XX stands for ferritic/martensitic grades of stainless steel.

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.

**EQUIPMENT AND PROCESS DESCRIPTION**

Press Forge performs the grinding of stainless steel and non-stainless steel parts for the aerospace industry. Parts are heated in forge furnaces to a specified temperature endpoint dependent upon the product and are then subjected to presses to shape them to meet specific product parameters. Grinding is carried out to remove imperfections and to finish the product cycle.

Furnaces and presses are arranged so that heated parts may be removed at their appropriate temperature and shaped in an expedient manner. Testing was performed only on heating and grinding processes.
SAMPLING AND ANALYTICAL PROCEDURES

Five sampling trains were utilized during testing. Train #27 was used for the testing of Furnace #1304, Train #5 was used for the Billet Grinding Area, Train #19 was used for the testing of the South Slot Furnace, Train #36 was used for the testing of the North Slot Furnace, and Train #6 was used for the Grinding/Inspection Area.

The furnaces did not have exhaust stacks. Furnace #1304 had an outlet for the hot air controlled by a damper. The sampling probe was secured with the nozzle facing into the damper opening to collect emissions from the furnace as they were emitted into the atmosphere. Care was taken to prevent the probe from being stuck by the movement of the damper or for interfering with that movement. Because of the lack of a suitable stack, the testing was performed non-isokinetically. The North and South Slot Furnaces had openings at the top of the doors where exhaust gases were vented. The sampling probes were secured with the nozzles facing into the openings at the top of the doors.

The Billet Grinding Area and Grinding/Inspection Area are largely enclosed, with ventilation systems venting to cyclone/baghouse control devices. The inlet tubing for these samples were secured to a sample port downstream of the baghouses.

Hexavalent Chromium Sampling (CARB Method 425)

Testing was conducted based on California Air Resources Board Method 425 applied to the furnace exhausts and the grinding areas, with the procedures of the method specific to stack sampling omitted. Five samples were taken at single non-isokinetic sample points as described above for informational purposes. Each sampling train consisted of a sampling line, which was used to draw the stack sample from the source. The furnace samples used quartz probes and nozzles. Samples were drawn through two impingers each filled with an aqueous solution of 0.1N NaHCO₃ (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 2).

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 of at least 9 (the method requires a pH of 8.0 or higher). The impinger solutions were recovered within 24 hours and the SCAQMD laboratory analyzed the hexavalent chromium in the samples by CARB Method 425. 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

Isokinetic sampling was not possible due to exhaust stacks that were not conducive to isokinetics. Exhausts were extracted at a constant rate and the total volume of the samples were used to determine the mass emissions at each location. More precisely representative emissions samples would require the addition of a portable stack or other method for sampling isokinetically. The purpose of the screening samples were to identify potential sources of high hexavalent chromium levels so that further testing may be conducted, if necessary.

To more effectively interpret the test results, the results of the most recent Multiple Air Toxics Exposure Study (MATES), MATES IV, conducted by SCAQMD, should be considered. In that study, the typical ambient level of hexavalent chromium in the Los Angeles Basin averaged 0.06 ng/m$^3$. The emissions from the five sources tested, ranging from 7.82 – 82.3 ng/m$^3$, were orders of magnitude higher than this average. Though it should be noted that levels of source emissions are reduced over distance as dilution occurs, the elevated levels at the ambient monitors indicate that high levels of hexavalent chrome are being emitted in Paramount. The processes tested indicate that they may be contributors to the high ambient readings.

As of the issue date of this report, SCAQMD has measured a wide variation of furnace emissions concentrations from 19 to 24,400 ng/m$^3$. Although the emissions from Furnace #1304, Slot Furnaces, and Grinding Areas are on the lower end of the range and may not have a large impact on the ambient monitoring readings, it is thought that the overall effect of the numerous furnaces emitting at various emissions levels at the facility may individually and/or cumulatively have a significant effect on the measured ambient concentrations.
Figure 1: Facility and Ambient Monitor Location
Figure 2: CARB Method 425 Train Diagram
Figure 3: Sampling Equipment Location (Furnace #1304)
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Drive, Diamond Bar, California 91765

Test No. 17-336
Date: 4/20/2017 and 5/3/2017

CALCULATIONS

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

Test No. 16-338
Test Date: 4/20/2017

SOURCE TEST CALCULATIONS

Sampling Location: Press Forge - Furnace No. 1304
Sample Train: 27-(Hex-Chrome)
Input by: B. Welch

SUMMARY
A. Average Traverse Velocity ...................................................... fps
B. Gas Meter Temperature (Use 60 deg.F for Temp Comp. Meters) ....... deg F
C. Gas Meter Correction Factor ....................................................
D. Average Orifice Pressure ....................................................... *HgA
E. Nozzle Diameter ........................................................................ inch

F1. Stack Diameter or Dimension #1 .............................................. inch
F2. Stack Dim #2 (blank if circular) ................................................ inch
G. Stack Cross Sect. Area .............................................................. ft
H. Average Stack Temp .............................................................. deg F
I. Barometric Pressure .............................................................. *HgA
J. Gas Meter Pressure .............................................................. *HgA
K. Static Pressure .........................................................................
L. Total Stack Pressure .............................................................. *HgA

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

PERCENT MOISTURE/GAS DENSITY
U. Percent Water Vapor in Gas Sample (((4.64 x R)/(0.0464 x R) + T))......................... %
V. Average Molecular Weight (Wet):

<table>
<thead>
<tr>
<th>Component</th>
<th>Vol. Fract. x</th>
<th>Moist. Fract. x</th>
<th>Molecular Wt. x</th>
<th>Wt./Mole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>0.061</td>
<td>1.000</td>
<td>18.0</td>
<td>1.09</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>0.000</td>
<td>0.939</td>
<td>44.0</td>
<td>0.00</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>0.000</td>
<td>0.939</td>
<td>28.0</td>
<td>0.00</td>
</tr>
<tr>
<td>Oxygen</td>
<td>0.209</td>
<td>0.939</td>
<td>32.0</td>
<td>6.28</td>
</tr>
<tr>
<td>Nitrogen &amp; Inerts</td>
<td>0.791</td>
<td>0.939</td>
<td>28.2</td>
<td>20.96</td>
</tr>
<tr>
<td>Sum</td>
<td></td>
<td></td>
<td>28.33</td>
<td></td>
</tr>
</tbody>
</table>

FLOW RATE
W. Gas Density Correction Factor (28.95/V)^.5 .................................................. 1.01
X. Velocity Pressure Correction Factor (29.92/L)^.5 ........................................... 1.00
Y. Corrected Velocity (A x M x W x X) ............................................................... fps
Z. Flow Rate (Y x G x 60) ....................................................................................... cfm
AA. Flow Rate (Standard) (Z x (L/29.92) x [520/(460+H)]) .................................... scfm
BB. Dry Flow Rate (AA x (1/100)) ................................................................. dscfm

SAMPLE CONCENTRATION/EMISSION RATE
CC. Sample Concentration (0.01543 x P/T) ................................................................. gr/dscf
DD. Sample Concentration (Molecular Wt.) .............................................................. ppm
EE. Sample Concentration (228837506.65 X CC) ................................................... ng/m3

DATE:
4/20/2017 and 5/3/2017

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

Sample Train: 27-(Hex-Chrome)
Input by: B. Welch

SUMMARY
A. Average Traverse Velocity ...................................................... fps
B. Gas Meter Temperature (Use 60 deg.F for Temp Comp. Meters) ....... deg F
C. Gas Meter Correction Factor ....................................................
D. Average Orifice Pressure ....................................................... *HgA
E. Nozzle Diameter ........................................................................ inch

F1. Stack Diameter or Dimension #1 .............................................. inch
F2. Stack Dim #2 (blank if circular) ................................................ inch
G. Stack Cross Sect. Area .............................................................. ft
H. Average Stack Temp .............................................................. deg F
I. Barometric Pressure .............................................................. *HgA
J. Gas Meter Pressure .............................................................. *HgA
K. Static Pressure .........................................................................
L. Total Stack Pressure .............................................................. *HgA

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

PERCENT MOISTURE/GAS DENSITY
U. Percent Water Vapor in Gas Sample (((4.64 x R)/(0.0464 x R) + T))......................... %
V. Average Molecular Weight (Wet):

<table>
<thead>
<tr>
<th>Component</th>
<th>Vol. Fract. x</th>
<th>Moist. Fract. x</th>
<th>Molecular Wt. x</th>
<th>Wt./Mole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>0.061</td>
<td>1.000</td>
<td>18.0</td>
<td>1.09</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>0.000</td>
<td>0.939</td>
<td>44.0</td>
<td>0.00</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>0.000</td>
<td>0.939</td>
<td>28.0</td>
<td>0.00</td>
</tr>
<tr>
<td>Oxygen</td>
<td>0.209</td>
<td>0.939</td>
<td>32.0</td>
<td>6.28</td>
</tr>
<tr>
<td>Nitrogen &amp; Inerts</td>
<td>0.791</td>
<td>0.939</td>
<td>28.2</td>
<td>20.96</td>
</tr>
<tr>
<td>Sum</td>
<td></td>
<td></td>
<td>28.33</td>
<td></td>
</tr>
</tbody>
</table>

FLOW RATE
W. Gas Density Correction Factor (28.95/V)^.5 .................................................. 1.01
X. Velocity Pressure Correction Factor (29.92/L)^.5 ........................................... 1.00
Y. Corrected Velocity (A x M x W x X) ............................................................... fps
Z. Flow Rate (Y x G x 60) ....................................................................................... cfm
AA. Flow Rate (Standard) (Z x (L/29.92) x [520/(460+H)]) .................................... scfm
BB. Dry Flow Rate (AA x (1/100)) ................................................................. dscfm

SAMPLE CONCENTRATION/EMISSION RATE
CC. Sample Concentration (0.01543 x P/T) ................................................................. gr/dscf
DD. Sample Concentration (Molecular Wt.) .............................................................. ppm
EE. Sample Concentration (228837506.65 X CC) ................................................... ng/m3
Source Test Calculations

Sampling Location: Press Forge - Billet Grinding Area Baghouse
Sample Train: 5-(Hex-Chrome)  Input by: B. Welch

Summary

A. Average Traverse Velocity ................................................................. #DIV/0! fps
B. Gas Meter Temperature (Use 60 deg. F for Temp Comp. Meters) ...... 90.4444 deg F
C. Gas Meter Correction Factor ............................................................... 0.9910
D. Average Orifice Pressure ................................................................. 3.81 "Hg
E. Nozzle Diameter ................................................................. inch
F1. Stack Diameter or Dimension #1 ................................. inch
F2. Stack Dim #2 (blank if circular) ........................................................ inch
G. Stack Cross Sect. Area ................................. 0.000 ft2
H. Average Stack Temp ................................................................. #DIV/0! deg F
I. Barometric Pressure ................................................................. 29.66 "HgA
J. Gas Meter Pressure (K=D/13.6) ...... 29.94 "HgA
K. Static Pressure ................................................................. "HgA
L. Total Stack Pressure (K+13.6) ...... 29.66 "HgA

T. Corrected Gas Volume [(S x J/29.92) x 520/(460+B) x C] .......................... 114.590 dscf

Percent Moisture/Gas Density

U. Percent Water Vapor in Gas Sample ((4.64 x R)/(0.0464 x R) + T)) .......................... 0.21 %

V. Average Molecular Weight (Wet):

<table>
<thead>
<tr>
<th>Component</th>
<th>Vol. Fract. x</th>
<th>Moist. Fract. x</th>
<th>Molecular Wt. x</th>
<th>Wt./Mole</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>0.002</td>
<td>1.000</td>
<td>18.0</td>
<td>0.04</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>0.000</td>
<td>0.998</td>
<td>44.0</td>
<td>0.00</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>0.000</td>
<td>0.998</td>
<td>28.0</td>
<td>0.00</td>
</tr>
<tr>
<td>Oxygen</td>
<td>0.209</td>
<td>0.998</td>
<td>32.0</td>
<td>6.87</td>
</tr>
<tr>
<td>Nitrogen &amp; Inerts</td>
<td>0.791</td>
<td>0.998</td>
<td>28.2</td>
<td>22.26</td>
</tr>
<tr>
<td>Sum</td>
<td></td>
<td></td>
<td></td>
<td>28.97</td>
</tr>
</tbody>
</table>

Flow Rate

W. Gas Density Correction Factor (28.95/V)^.5 .................................................. 1.00
X. Velocity Pressure Correction Factor (29.92/L)^.5 .......................................... 1.00
Y. Corrected Velocity (A x M x W x X) ................................................................. #DIV/0! fps
Z. Flow Rate (Y x G x 60) ................................................................. #DIV/0! cfm
AA. Flow Rate (Standard) [Z x (L/29.92) x 520/(460+B)] ......................................... #DIV/0! scfm
BB. Dry Flow Rate (AA x (U/100)) ................................................................. #DIV/0! dscf

Sample Concentration/Emission Rate

CC. Sample Concentration [0.01543 x (P/T)] .......................................................... 8.08E-09 gr/dscf
DD. Sample Concentration [54.143xCC] ................................................................. 4.37E-06 ppm
EE. Sample Concentration [2288373506.65 X CC] .................................................. 18.5 ng/m3
SOURCE TEST CALCULATIONS

Sampling Location: Press Forge
Sample Train: Slot Furnace North (Train #36)
Input by: W. Stredwick

SUMMARY
A. Average Traverse Velocity................................................................. #DIV/0! fps
B. Gas Meter Temperature (Use 60 deg.F for Temp Comp. Meters)...... 95.75 deg F
C. Gas Meter Correction Factor.............................................................. 1.0051
D. Average Orifice Pressure................................................................. 2.30 "Hg0
E. Nozzle Diameter................................................................................ inch

F1. Stack Diameter or Dimension #1....................................................... inch
F2. Stack Dim #2 (blank if circular)....................................................... inch
G. Stack Cross Sect. Area................................................................. 0.000 ft²
H. Average Stack Temp................................................................. #DIV/0! deg F
I. Barometric Pressure................................................................. 29.25 "HgA
J. Gas Meter Pressure (I+(D/13.6)).................................................... 29.42 "HgA
K. Static Pressure.............................................................................. "Hg0
L. Total Stack Pressure (L+(K/13.6)).................................................. 29.25 "HgA

T. Corrected Gas Volume [(S x J/29.92) x 520/(460+B) x C].................. 91.894 dscf

PERCENT MOISTURE/GAS DENSITY
U. Percent Water Vapor in Gas Sample ((4.64 x R)/((0.0464 x R) + T))......................... 2.07 %

V. Average Molecular Weight (Wet):

<table>
<thead>
<tr>
<th>Component</th>
<th>Vol. Fract.</th>
<th>x</th>
<th>Moist. Fract.</th>
<th>x</th>
<th>Molecular Wt.</th>
<th>=</th>
<th>Wt./Mole</th>
</tr>
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<tbody>
<tr>
<td>Water</td>
<td>0.021</td>
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<td>1.000</td>
<td></td>
<td>18.0</td>
<td></td>
<td>0.37</td>
</tr>
<tr>
<td>Carbon Dioxide</td>
<td>0.001</td>
<td>Dry Basis</td>
<td>0.979</td>
<td></td>
<td>44.0</td>
<td>.</td>
<td>0.02</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>0.000</td>
<td>Dry Basis</td>
<td>0.979</td>
<td></td>
<td>28.0</td>
<td>.</td>
<td>0.00</td>
</tr>
<tr>
<td>Oxygen</td>
<td>0.209</td>
<td>Dry Basis</td>
<td>0.979</td>
<td></td>
<td>32.0</td>
<td>.</td>
<td>6.55</td>
</tr>
<tr>
<td>Nitrogen &amp; Inerts</td>
<td>0.791</td>
<td>Dry Basis</td>
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<td>21.83</td>
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</tbody>
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Sum 28.77

FLOW RATE
W. Gas Density Correction Factor (28.95/V)^.5.................................. #DIV/0!
X. Velocity Pressure Correction Factor (29.92/L)^.5.......................... 1.01
Y. Corrected Velocity (A x M x W x X)............................................................. #DIV/0! fps
Z. Flow Rate (Y x G x 60)........................................................................... #DIV/0! cfm
AA. Flow Rate (Standard) [Z x (L/29.92) x ([520/(460+B)])].................. #DIV/0! scfm
BB. Dry Flow Rate (AA x (U/100))................................................................. #DIV/0! dscfm

SAMPLE CONCENTRATION/EMISSION RATE
CC. Sample Concentration [(0.01543 x (P/T)).......................................... 1.51E-08 gr/dscf
DD. Sample Concentration [(54.143 x CC).............................................. 1.57E-05 ppm
EE. Hex Chrome Concentration (2288373506.65 X CC).......................... 3.46E+01 ng/m³
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Drive, Diamond Bar, California 91765

Test No. 17-336 -15- Date(s): 4/20/2017 and 5/3/2017

SOURCE TEST CALCULATIONS

Sampling Location: Press Forge
Sample Train: Slot Furnace South (Train #19) Input by: W. Stredwick

SUMMARY
A. Average Traverse Velocity #DIV/0! fps
B. Gas Meter Temperature (Use 60 deg.F for Temp Comp. Meters) 96.75 deg F
C. Gas Meter Correction Factor 0.9910
D. Average Orifice Pressure 2.90 "HgO
E. Nozzle Diameter #DIV/0! inch

PERCENT MOISTURE/GAS DENSITY
U. Percent Water Vapor in Gas Sample ((4.64 x R)/((0.0464 x R) + T)) 1.75 %

V. Average Molecular Weight (Wet):

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FLOW RATE
W. Gas Density Correction Factor (28.95/V)^.5 1.00
X. Velocity Pressure Correction Factor (29.92/L)^.5 1.01
Y. Corrected Velocity (A x M x W x X) #DIV/0! fps
Z. Flow Rate (Y x G x 60) #DIV/0! cfm
AA. Flow Rate (Standard) [Z x (L/29.92) x [520/(460+H)]]) #DIV/0! scfm
BB. Dry Flow Rate (AA x (U/100)) #DIV/0! dscfm

SAMPLE CONCENTRATION/EMISSION RATE
CC. Sample Concentration [0.01543 x (P/T)] 2.15E-08 gr/dscf
DD. Sample Concentration [54.143xCC 51.996 (Molecular Wt.)] 2.24E-05 ppm
EE. Hex Chrome Concentration (2288373506.65 X CC) 4.93E+01 ng/m3
**SOURCE TEST CALCULATIONS**

**Sampling Location:** Press Forge  
**Sample Train:** Grinding/Inspection Baghouse Exhaust (Train #6)  
**Input by:** W. Stredwick

### SUMMARY

- **A. Average Traverse Velocity:** #DIV/0! fps
- **B. Gas Meter Temperature (Use 60 deg F for Temp Comp. Meters):** 96.15 deg F
- **C. Gas Meter Correction Factor:** 1.0024
- **D. Average Orifice Pressure:** #DIV/0! *HgA
- **E. Nozzle Diameter:** #DIV/0! inch

### PERCENT MOISTURE/GAS DENSITY

- **U. Percent Water Vapor in Gas Sample:** ((4.64 x R)/((0.0464 x R) + T))...... 1.52 %

### V. Average Molecular Weight (Wet):

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<th>x Molecular Wt.</th>
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**Sum:** 28.84

### FLOW RATE

- **W. Gas Density Correction Factor:** (28.95/V)^.5...... 1.00
- **X. Velocity Pressure Correction Factor:** (29.92/L)^.5...... 1.01
- **Y. Corrected Velocity (A x M x W x X):** #DIV/0! fps
- **Z. Flow Rate (Y x G x 60):** #DIV/0! scfm
- **AA. Flow Rate (Standard) (Z x (L/29.92) x [520/(460+H)]):** #DIV/0! scfm
- **BB. Dry Flow Rate (AA x (U/100)):** #DIV/0! dscfm

### SAMPLE CONCENTRATION/EMISSION RATE

- **CC. Sample Concentration:** [(0.01543 x (P/T))]...... 3.42E-09 gr/dscf
- **DD. Sample Concentration:** [(54.143 x CC)]...... 3.56E-06 ppm
- **EE. Hex Chrome Concentration:** (2288373506.65 X CC)...... 7.82E+00 ng/m3
**APPENDIX A**

Field Data

---

**South Coast Air Quality Management District**

**Test No. 17-336**

**Company:** Press Forge

**Date(s): 4/20/2017 and 5/3/2017**

**Pre-Test Leak Check:**
- Filter: 600 cfm @ 10" Hg vac
- Probe: 600 cfm @ 10" Hg vac

**Post-Test Leak Check:**
- Filter: 600 cfm @ 10" Hg vac
- Probe: 600 cfm @ 10" Hg vac

**Traverse Source Test Data**

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<th>Time (min)</th>
<th>Sample Port No.</th>
<th>Gas Meter Reading (scf)</th>
<th>Stack Velocity Head (fps)</th>
<th>Temp. °F</th>
<th>Velocity Sampling Rate (cfm)</th>
<th>Calculated Orifice ΔP (H2O)</th>
<th>Imp. Temp. °F</th>
<th>Meter Temp. °F</th>
<th>Vacuum *Hg vac</th>
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(Net Vol. Uncorr.)  Avg

**K-Factor:**

**Stack Moisture:**

**Canister #:**

Start: *Hg vac

**Nozzle Diameter:**

**Barometric Pressure:**

**Static Pressure in Stack:**

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<th>Calibration Data</th>
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<td>Inclined Manometer (Cal: N/A)</td>
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<td>Magnehelic No. (Cal: )</td>
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<td>Pilot Tube No. (Cal: )</td>
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<td>Meter Corr. Factor:</td>
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**Sampling Probe:** Stainless Steel / Borosilicate / Quartz

**Stack Dimensions:**

---

**Recorded By:** B. W. K.
Test No. 17-336  
Date(s): 4/20/2017 and 5/3/2017

South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, California 91765

Traverse Source Test Data

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<tr>
<th>Time (min)</th>
<th>Sample Point #</th>
<th>Gas Meter Reading (cfm)</th>
<th>Velocity Head (&quot;H2O)</th>
<th>Temp. °F</th>
<th>Velocity (fps)</th>
<th>Sampling Rate (cfm)</th>
<th>Orifice DP (&quot;H2O)</th>
<th>Probe Temp. °F</th>
<th>Filter Temp. °F</th>
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K-Factor: 0.5526  Stack Moisture: __________  Canister #: __________  Start: __________ "Hg vac

Nozzle Diameter: __________  Barometric Pressure: 29.66 "HgA  Static Pressure in Stack: 1"H2O

Pressure Drop 8.6"H2O Across Filter

Calibration Data

Inclined Manometer: __________ (Cal: N/A)  Magnehelic No.: __________  Pitot Tube No.: __________  Potentiometer No.: 0.915 (Cal: 3/23/17)  Thermocouple No.: 0.915 (Cal: 3/23/17)  Gas Meter No.: 0.915 (Cal: 3/23/17)  Meter Corr. Factor: 0.910

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

Revision 01/09
South Coast Air Quality Management District

Date(s): 4/20/2017 and 5/3/2017

Test No. 17-336

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<th>Calculated</th>
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K-Factor: __________ Stack Moisture: __________

Barometric Pressure: 29.25” HgA
Static Pressure in Stack: +1” H2O

Calibration Data

Inclined Manometer (Cal: N/A)
Magnetic No. (Cal: )
Potentiometer No. (Cal: )
Thermocouple No. (Cal: )
Gas Meter No. (Cal: )
Meter Corr. Factor: -0.05

Sampling Probe: Stainless Steel / Borosilicate / Quartz

Stack: Horizontal / Vertical Rectangular / Circular
Test No. 17-336

Test No.: 17-336
Sampling Location: FURNACE (SOUTH)

Date(s): 4/20/2017 and 5/3/2017

Pre-Test Leak Check:
- Filter: 0.00 cfm @ 7/10 Hg vac
- Probe: 0.00 cfm @ 3/10 Hg vac
- Pilot Tube Leak Check: Pass / Fail

Post-Test Leak Check:
- Filter: 0.00 cfm @ 11/10 Hg vac
- Probe: N/A
- Pilot Tube Leak Check: Pass / Fail

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Net Volume Uncorr: 0.55526

K-Factor: 0.55526

Nozzle Diameter: 29.25 " HgA
Barometric Pressure: 29.25 " Hg
Static Pressure in Stack: +1/- " H2O

Calibration Data
- Inclined Manometer: 315 (Cal: N/A)
- Magnehelic No.: N/A (Cal: N/A)
- Pilot Tube No.: N/A (Cal: N/A)
- Potentiometer No.: 34037/15 (Cal: 383/17)
- Thermocouple No.: 300836/17 (Cal: 383/17)
- Gas Meter No.: 340715 (Cal: 383/17)
- Meter Corr. Factor: 0.9916

Sampling Probe: Stainless Steel / Borosilicate / Quartz

Stack Dimensions
- Horizontal / Vertical
- Rectangular / Circular

Above Furnace Door
South Set Point 225° Actua 225°

Atmosphere inside Furnace became Hazy
### Traverse Source Test Data

**Company:** Press Forge  
**Sampling Location:** Baghouse Exhaust Grind Room North  
**Sample Train:** 6  
**Date(s):** 4/20/2017 and 5/3/2017

<table>
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<tr>
<th>Time</th>
<th>Sample Point #</th>
<th>Gas Meter Reading (dcf)</th>
<th>Stack Velocity (fps)</th>
<th>Velocity (cfs)</th>
<th>Sampling Rate (cfm)</th>
<th>Orifice AP (H2O)</th>
<th>Probe Temp. °F</th>
<th>Filter Temp. °F</th>
<th>Imp. Temp. °F</th>
<th>Meter Temp. °F</th>
<th>Vacuum °Hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-55</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
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<td>9.5</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>40</td>
</tr>
</tbody>
</table>

**K-Factor:** 0.5682  
**Stack Moisture:**  
**Canister #:** Start:  
**Recorded By:** W.S.  
**Pitot Factor:** NA

**Inclined Manometer:** (Cal: N/A)  
**Magnehelic No.:** (Cal: N/A)  
**Pitot Tube No.:** (Cal: N/A)  
**Potentiometer No.:** (Cal: BF2Y-97)  
**Thermocouple No.:** (Cal: S-2-17)  
**Gas Meter No.:** (Cal: N/A)  
**Meter Corr. Factor:** 1.0024

**Sampling Probe:** Stainless Steel / Borosilicate / Quartz (N/A)

---

**Diagram:**  
- **Stack Dimensions:**  
  - Stack: Horizontal / Vertical / Rectangular / Circular
  - Stack Dimensions:  
    - Diameter: 38"
APPENDIX B

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

Page 1 of 2

MONITORING & ANALYSIS
REPORT OF LABORATORY ANALYSIS

TO  Mike Garibay  
Supervising A.Q. Engineer  
Source Test & Engineering

LABORATORY NO  171807

SOURCE TEST NO  17338

DATE RECEIVED  04/21/17

RULE NO  NA

REQUESTED BY  Wayne Stredwick

DATE ANALYZED  4/21/2017

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

ANALYTICAL WORK PERFORMED, METHOD OF ANALYSIS AND RESULTS

Moisture and Hexavalent Chromium by CARB 425 (Sodium Bicarbonate(NaHCO₃) solution)

<table>
<thead>
<tr>
<th></th>
<th>Train 31</th>
<th>Train 27</th>
<th>Train 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture gain, g</td>
<td>0.4</td>
<td>131</td>
<td>5.2</td>
</tr>
<tr>
<td>Silica ge% expended</td>
<td>1</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>Filter gain, g</td>
<td>-0.0007</td>
<td>-0.0017</td>
<td>0.0166</td>
</tr>
<tr>
<td>Impinger 1 pH</td>
<td>9-10</td>
<td>9-10</td>
<td>9-10</td>
</tr>
<tr>
<td>Impinger 2 pH</td>
<td>9-10</td>
<td>9-10</td>
<td>9-10</td>
</tr>
<tr>
<td>Recovery notes</td>
<td>Field Blank</td>
<td>Quartz Probe &amp; Tubing</td>
<td>Tubing</td>
</tr>
<tr>
<td>Cr₆⁺ total ug</td>
<td>0.02</td>
<td>0.22</td>
<td>0.06</td>
</tr>
</tbody>
</table>

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

Reviewed By:  
Joan Niertit, Principal A.Q. Chemist  
Laboratory Services

Date Reviewed: 04/28/17

Approved By:  
Aaron Katzstein, Ph.D.  
Senior Manager  
Laboratory Services  
(909) 396-2219

Date Approved: 5/6/17
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Dr., Diamond Bar, CA 91765-4182
Page 2 of 2

MONITORING & ANALYSIS
REPORT OF LABORATORY ANALYSIS

LABORATORY NO 1710807
REQUESTED BY Wayne Stredwick

ANALYTICAL WORK PERFORMED, METHOD OF ANALYSIS AND RESULTS
Moisture and Hexavalent Chromium by CARB 425 (Sodium Bicarbonate(NaHCO3) solution)

QUALITY CONTROL

<table>
<thead>
<tr>
<th>Lab No.</th>
<th>Result (g)</th>
<th>Limit (g)</th>
<th>Check Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>B17D149-CCV1</td>
<td>99.9997</td>
<td>±0.0005</td>
<td>Pass</td>
</tr>
<tr>
<td>B17D149-CCV2</td>
<td>500.0</td>
<td>±0.2</td>
<td>Pass</td>
</tr>
</tbody>
</table>

CCV RECOVERIES

<table>
<thead>
<tr>
<th>Lab No.</th>
<th>Results (ppt)</th>
<th>Limit (%)</th>
<th>% Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>S17D063-CCV1</td>
<td>99</td>
<td>90-110</td>
<td>99</td>
</tr>
<tr>
<td>S17D063-CCV2</td>
<td>97</td>
<td>90-110</td>
<td>97</td>
</tr>
<tr>
<td>S17D063-CCV3</td>
<td>94</td>
<td>90-110</td>
<td>94</td>
</tr>
<tr>
<td>S17D063-CCV4</td>
<td>96</td>
<td>90-110</td>
<td>96</td>
</tr>
<tr>
<td>S17D063-CCV5</td>
<td>99</td>
<td>90-110</td>
<td>99</td>
</tr>
</tbody>
</table>

REF B17D149
S17D063
Test No. 17-336

Date(s): 4/20/2017 and 5/3/2017

---

**SOURCE TEST REQUEST FOR EQUIPMENT/ANALYSIS**

<table>
<thead>
<tr>
<th>Company</th>
<th>Press Forge Co.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>7700 Jackson Street</td>
</tr>
<tr>
<td>Basic Equipment</td>
<td>Heat Treat Furnaces &amp; Metal Grinding</td>
</tr>
<tr>
<td>Analysis/Equipment Requested By</td>
<td>W. Stredwick</td>
</tr>
<tr>
<td>For Compliance, Rule(s)</td>
<td>Rule Development/ AB2588</td>
</tr>
<tr>
<td>Dry Ice Needed</td>
<td>Yes</td>
</tr>
<tr>
<td>Facility ID No.</td>
<td>136</td>
</tr>
<tr>
<td>Laboratory No.</td>
<td>1410507</td>
</tr>
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</table>

**SAMPLE EQUIPMENT ANALYSIS REQUEST**

<table>
<thead>
<tr>
<th>Equipment Requested/ID #</th>
<th>Analysis Requested</th>
<th>Set ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- CARB Method 425 Trains</td>
<td>Hexavalent and Total Chromium, % moisture</td>
<td></td>
</tr>
<tr>
<td>with sodium bicarbonate solution</td>
<td>Trains No.: 5, 27, 31</td>
<td></td>
</tr>
<tr>
<td>and filter in the back of train</td>
<td>Reference: Blue Book 41 Page 130 131</td>
<td></td>
</tr>
<tr>
<td>Probes, tubing and tube fittings</td>
<td>Acid washed and sodium bicarbonate rinsed</td>
<td></td>
</tr>
<tr>
<td>4 probes</td>
<td>Train 31: Blank, quartz</td>
<td></td>
</tr>
<tr>
<td>2 x glass</td>
<td>Train 27: Probe + tubing (expected to be high)</td>
<td></td>
</tr>
<tr>
<td>2 x quartz</td>
<td>Train 5: Tubing (expected to be low)</td>
<td></td>
</tr>
<tr>
<td>Trains #5, 27, 31</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**SAMPLE EQUIPMENT CHAIN OF CUSTODY**

<table>
<thead>
<tr>
<th>Sample Equipment</th>
<th>From</th>
<th>To</th>
<th>For (S/T, Analysis, Cleanup, Not Used)</th>
<th>Date Received</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trains 5, 27, 31</td>
<td>C. Simpler</td>
<td>C. Simpler</td>
<td>S/T</td>
<td>4-20-17</td>
<td>8:36 am</td>
</tr>
<tr>
<td>Trains 5, 27, 31</td>
<td>C. Simpler</td>
<td>C. Simpler</td>
<td>Analysis, Not Used</td>
<td>4-21-17</td>
<td>07:40</td>
</tr>
</tbody>
</table>
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT  
21865 Copley Drive, Diamond Bar, California  91765 

Test No. 17-336  
-27-  

Date(s): 4/20/2017 and 5/3/2017

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT  
21865 Copley Dr., Diamond Bar, CA 91765-4182  
Page 1 of 2

REPORT OF LABORATORY ANALYSIS

TO  Mike Garibay  
Supervising A.Q. Engineer  
Source Test & Engineering

LABORATORY NO  1711830

SOURCE TEST NO  17-338

DATE RECEIVED  05/03/17

RULE NO  NA

REQUESTED BY  Wayne Stredwick

DATE ANALYZED  5/4/2017

DATE REPORTED  5/12/2017

ANALYTICAL WORK PERFORMED, METHOD OF ANALYSIS AND RESULTS

Moisture and Hexavalent Chromium by CARB 425 (Sodium Bicarbonate(NaHCO3) solution)

<table>
<thead>
<tr>
<th></th>
<th>Train 6</th>
<th>Train 19</th>
<th>Train 36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture gain, g</td>
<td>30.0</td>
<td>38.4</td>
<td>41.8</td>
</tr>
<tr>
<td>Silica gel% expended</td>
<td>80</td>
<td>90</td>
<td>85</td>
</tr>
<tr>
<td>Filter gain, g</td>
<td>0.002</td>
<td>0.009</td>
<td>-0.0004</td>
</tr>
<tr>
<td>Impinger 1 pH</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Impinger 2 pH</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Cr⁶⁺ total ug</td>
<td>0.02</td>
<td>0.14</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Recovery Notes:  
Tubing  
Probe and tubing  
Probe and tubing

NOTE: Additional significant figures provided for calculation purposes.

Reviewed By:  
Joan Nietert, Principal A.Q. Chemist  
Laboratory Services

Date Reviewed:  05/12/17

Approved By:  
Aaron Katzenstein, Ph.D.  
Senior Manager  
Laboratory Services  
(909) 396-2219

Date Approved:  05/12/17
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Dr., Diamond Bar, CA 91765-4182

MONITORING & ANALYSIS
REPORT OF LABORATORY ANALYSIS

LABORATORY NO. 171830
REQUESTED BY Wayne Stedwick

ANALYTICAL WORK PERFORMED, METHOD OF ANALYSIS AND RESULTS
Moisture and Hexavalent Chromium by CARB 425 (Sodium Bicarbonate(NaHCO3) solution)

QUALITY CONTROL

BALANCE CHECK

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<th>Result (g)</th>
<th>Limit (g)</th>
<th>Check Status</th>
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<tbody>
<tr>
<td>B17E025-CCV1</td>
<td>100.0002</td>
<td>±0.0005</td>
<td>Pass</td>
</tr>
<tr>
<td>B17E025-CCV2</td>
<td>500.0</td>
<td>±0.2</td>
<td>Pass</td>
</tr>
</tbody>
</table>

CCV RECOVERIES

<table>
<thead>
<tr>
<th>Lab No.</th>
<th>Results (ppt)</th>
<th>Limit (%)</th>
<th>% Recovery</th>
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<tbody>
<tr>
<td>S17E021-CCV1</td>
<td>94</td>
<td>90-110</td>
<td>94</td>
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<tr>
<td>S17E021-CCV2</td>
<td>102</td>
<td>90-110</td>
<td>102</td>
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<tr>
<td>S17E021-CCV3</td>
<td>105</td>
<td>90-110</td>
<td>105</td>
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<tr>
<td>S17E021-CCV4</td>
<td>96</td>
<td>90-110</td>
<td>96</td>
</tr>
<tr>
<td>S17E021-CCV5</td>
<td>94</td>
<td>90-110</td>
<td>94</td>
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REF  B17E025
     S17E021
Test No. 17-336 -29- Date(s): 4/20/2017 and 5/3/2017

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

SOURCE TEST REQUEST FOR EQUIPMENT/ANALYSIS

<table>
<thead>
<tr>
<th>Company</th>
<th>Press Forge Co.</th>
<th>Source Test No.</th>
<th>17-338</th>
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<td>7700 Jackson St.</td>
<td>Request Date</td>
<td>April 28, 2017</td>
</tr>
<tr>
<td>Basic Equipment</td>
<td>Heat Treat Furnaces &amp; Metal Grinding</td>
<td>Control Device</td>
<td>Un-controlled</td>
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<tr>
<td>Analysis/Equipment Requested By</td>
<td>W. Stredwick</td>
<td>Date Equipment Needed</td>
<td>May 2, 2017</td>
</tr>
<tr>
<td>For Compliance, Rule(s)</td>
<td>Rule Development/ AB2588</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td>Facility ID No.</td>
<td>136</td>
</tr>
<tr>
<td>Dry Ice Needed</td>
<td>Yes</td>
<td>Laboratory No.</td>
<td>1711830</td>
</tr>
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</table>

SAMPLE EQUIPMENT ANALYSIS REQUEST

<table>
<thead>
<tr>
<th>Equipment Requested/ID #</th>
<th>Analysis Requested</th>
<th>Set ID</th>
</tr>
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<tbody>
<tr>
<td>3. CARB Method 425 Trains</td>
<td>Hexavalent and Total Chromium, % moisture</td>
<td>-</td>
</tr>
<tr>
<td>with sodium bicarbonate solution</td>
<td>Trains: Nos: 6, 19, 36</td>
<td>-</td>
</tr>
<tr>
<td>and filter in the back of train</td>
<td>Reference: Blue Book 41 Pages 132, 133</td>
<td>-</td>
</tr>
<tr>
<td>1 - Quartz Probe, tubing and tube fittings</td>
<td>Acid washed and sodium bicarbonate rinsed</td>
<td>-</td>
</tr>
<tr>
<td>2 lengths tubing 2x8 1x10</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>acid cleaned fittings</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Return

Train 6: tubing, probe
Train 19: tubing, probe

2. probes
1ft, 4 inch quartz

Recovery Samples
Train 6: J-02, -03, -04
Train 19: -06, -07, -08
Train 36: -10, -11, -12
Trip Blank: -13

SAMPLE EQUIPMENT CHAIN OF CUSTODY

<table>
<thead>
<tr>
<th>Sample Equipment</th>
<th>Set ID</th>
<th>From</th>
<th>To</th>
<th>For (S/T, Analysis, Cleanup, Not Used)</th>
<th>Date Received</th>
<th>Time</th>
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</thead>
<tbody>
<tr>
<td>Reactions written down</td>
<td>17-338 04/20/17</td>
<td>-</td>
<td>-</td>
<td>Analysis</td>
<td>5/4/17</td>
<td>15:00</td>
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<tr>
<td>Recovered Sample</td>
<td>17-338 04/20/17</td>
<td>-</td>
<td>-</td>
<td>Analysis</td>
<td>5/4/17</td>
<td>15:00</td>
</tr>
<tr>
<td>Trains 6, 19, 36</td>
<td>17-338 04/20/17</td>
<td>-</td>
<td>-</td>
<td>Analysis</td>
<td>5/3/17</td>
<td>16:17</td>
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Test No. 17-336  -30-  Date(s): 4/20/2017 and 5/3/2017

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

### SAMPLE ANALYSIS REQUEST

<table>
<thead>
<tr>
<th>TO: SCAQMD Lab:</th>
<th>OTHER:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOURCE NAME:</td>
<td>Press Forge Co</td>
</tr>
<tr>
<td>I.D. No.</td>
<td>136</td>
</tr>
<tr>
<td>Source Address:</td>
<td>7700 Jackson St</td>
</tr>
<tr>
<td>City:</td>
<td>Paramount</td>
</tr>
<tr>
<td>Mailing Address:</td>
<td>7700 Jackson St</td>
</tr>
<tr>
<td>City:</td>
<td>Paramount</td>
</tr>
<tr>
<td>Zip:</td>
<td>90723</td>
</tr>
<tr>
<td>Contact Person:</td>
<td>Kyle Nelson</td>
</tr>
<tr>
<td>Title:</td>
<td>EHS Manager</td>
</tr>
<tr>
<td>Tel:</td>
<td>562-531-4962</td>
</tr>
</tbody>
</table>

**Analysis Requested by:**
Areio Soltani  
Date: 05/05/2017

**Approved by:**
Office: Toxics/Waste Mgmt  
Budget #: 60511

**REASON REQUESTED:**
- Court Hearing Board
- Permit Pending
- Hazardous/Toxic Spill
- Suspected Violation  
  - Rule(s): 1401/1404 (hexavalent chromium)
- Other

**Sample Collected by:** A. Soltani  
Date: 05/05/2017  
Time: 0955-1055 hrs

Specify the description and location where the sample was collected:

- Sample #1: Refractory brick debris from inside furnace #5
- Sample #2: "Kaowool" refractory ceramic fiber debris from inside furnace #5

**Analysis Requested:**
- detection of the PPM and percent weight of: (1) Chromium VI; (2) Total Chromium; (3) Nickel; (4) Cadmium; (5) Arsenic; (6) Lead; (7) Aluminum; & (8) Titanium the 8 or container.

<table>
<thead>
<tr>
<th>Relinquished by</th>
<th>Received by</th>
<th>Firm/Agency</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Soltani</td>
<td>A. Huillet</td>
<td>SCAQMD Lab</td>
<td>5/3/17</td>
<td>1304</td>
</tr>
</tbody>
</table>

**Remarks:** Please send results to Scott Caso, Sr. Enforcement Manager, Toxics & Waste Management Unit
Laboratory No. 1712518-01

Metals in Bulk Samples by Bruker S1 Titan Handheld X-Ray

QUALITY CONTROL SUMMARY

Note: Metals QC available upon request
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Drive, Diamond Bar, California 91765

Test No. 17-336
Date(s): 4/20/2017 and 5/3/2017

MONITORING AND ANALYSIS
REPORT OF LABORATORY ANALYSIS
(Page 1 of 2)

To: Scott Caso
Sr. Enforcement Manager
Science & Technology Advancement

Laboratory No. 1712518-01
Requested By Areio Soltani
Submitted On 05/05/2017
Analyzed On 05/23/2017
Report Created 07/06/2017

Sample Source:
Press Forge Co.
7700 Jackson St.
Paramount, CA 90723

ANALYTICAL WORK PERFORMED, METHOD OF ANALYSIS AND RESULTS
Metals in Bulk by Bruker S1 Titan Handheld X-Ray

See attached results and sample description

Note: Analysis for Hexavalent chromium was not performed due to sample matrix.

Reviewed By: Laura Saucedo, Acting Principal A.Q. Chemist Laboratory Services
Reviewed Date: 07/10/2017

Approved By: Aaron Katzenstein, Ph.D., Senior Manager Laboratory Services
Approved Date: 07/10/2017
<table>
<thead>
<tr>
<th>Analyte</th>
<th>Unit</th>
<th>Result</th>
<th>LOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al, %</td>
<td></td>
<td>22.69</td>
<td>0.398</td>
</tr>
<tr>
<td>As, %</td>
<td></td>
<td>&lt; LOD</td>
<td>0.0004</td>
</tr>
<tr>
<td>Cd, %</td>
<td></td>
<td>&lt; LOD</td>
<td>0.004</td>
</tr>
<tr>
<td>Cr, %</td>
<td></td>
<td>0.04</td>
<td>0.002</td>
</tr>
<tr>
<td>Ni, %</td>
<td></td>
<td>0.02</td>
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Sample: Refractory brick debris from inside furnace #5
Sample Date: 05/05/2017
Received Date: 05/05/2017
Analyzed Date: 05/23/2017
# SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Dr. Diamond Bar, CA 91765-4182

## REPORT OF LABORATORY ANALYSIS

### (Page 1 of 5)

**To:** Scott Caso  
Sr. Enforcement Manager  
Compliance & Enforcement

**Laboratory No.:** 1712518-02  
**Requested By:** Areio Soltani  
**Rule No.:** R1401

**Facility ID 136**  
Press Forge, Co.  
7700 Jackson St.  
Paramount, CA 90723

**ST No.:** NA  
**Report Created:** 07/06/2017

## ANALYTICAL WORK PERFORMED, METHOD OF ANALYSIS, AND RESULTS

**Metals in Bulk Samples by Inductively Coupled Plasma - Mass Spectrometry**

See attached results and sample information.

### Reviewed By:

Signed:  
Laurel Saucedo  
Acting Principal A.Q. Chemist  
Laboratory Services

**Date Reviewed:** 07/06/2017

### Approved By:

Signed:  
Aaron Katzenstein, Ph.D.  
Senior Manager  
Laboratory Services  
(909) 396-2219

**Date Approved:** 07/12/2017

Form 2.0
<table>
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<th>Analyte, Unit</th>
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**Sample Description:** Plastic Jar - Kaowool refractory ceramic fiber debris from inside furnace #5

**Sample Date:** 05/05/2017

**Received Date:** 05/05/2017

**Analyzed Date:** 06/14/2017

**Date(s):** 4/20/2017 and 5/3/2017
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 Copley Drive, Diamond Bar, California 91765

Test No. 17-336 -36- Date(s): 4/20/2017 and 5/3/2017

Laboratory No. 1712518-02

Metals in Bulk Samples by Inductively Coupled Plasma - Mass Spectrometry

QUALITY CONTROL SUMMARY

Note: Metals QC available upon request.
Appendix C
Equipment Calibrations

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* All temperatures are in degrees F.
** Percent (%) difference should not exceed ± 1.5%.
### Test No. 17-336

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Date(s): 4/2/2017 and 5/3/2017
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<tr>
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**N/A**

**Date(s):** 4/20/2017 and 5/3/2017
Appendix D
Material Safety Data Sheets
SAFETY DATA SHEET
(For Regulations (EC) No 1907/2006 & (EC) No 1272/2008)

SDS Number: 210 Date of first issue: 01 May 1987 Date of last revision: 22 October 2014

1 - Identification of product


Product Group
REFRACTORY CERAMIC FIBER PRODUCT

Chemical Name
Vitreous Aluminoosilicate Fiber

Intended Release
Use of the product is restricted to professional users for application as thermal insulation, heat shields, heat containment, gaskets and expansion joints at temperatures up to 1400°C in industrial furnaces, ovens, kilns, boilers and other process equipment and in the aerospace and automotive industries. Products are not intended for direct sale to the general public.

- Primary Use: Manufacture of fiber (this use refers to the initial production of the fiber and is therefore not relevant to the downstream user).
- Secondary Use: Conversion into wet and dry mixtures and articles.
- Tertiary Use: Installation, removal (industrial and professional) / Maintenance and service life (industrial and professional).

Uses Advised Against
Spraying of the product

Synonyms
RCF, ceramic fiber, synthetic vitreous fiber (SVF), man-made vitreous fiber (MMVF), man-made mineral fiber (MIMF).

Trade Names
Ka Wooll® Cement A, Cement B, Moldable, Mouldable SV, Pumpable TP, XTP, XTP-HT.
Ka Wooll® Pumpable, Pumpable HT, Pumpable HS, Mouldable AR, Sealcoat HT.
Ka Wooll® Mouldable, HT Pumpable, XTP Pumpable.
Car-Wool® Cement, Pumpable, Moldable, Seal-CoatTM.

Company
Morgan Advanced Materials
Thermal Ceramics Inc.
P. O. Box 923, Dept. 300
Augusta, GA 30903-0923

For Product Stewardship and Emergency Information:
Hotline - 1-800-722-5681
Fax - 706-560-4054

For additional SDSs and to confirm this is the most current SDS for the product, visit our web page www.morganthermalceramics.com or send a request to MTNorthAmerica@morganplc.com.
2 - Hazard Identification

Emergency Overview

POSSIBLE CANCER HAZARD BY INHALATION.

(See Section 11 for more information)

Chronic Effects

There has been no increased incidence of respiratory disease in studies examining occupationally exposed workers. In animal studies, long term laboratory exposure to doses hundreds of times higher than normal occupational exposures has produced fibrosis, lung cancer and mesotheliosis in rats or hamsters. The fibers used in those studies were especially sized to maximize rodent respirability.

Possible Health Effects

Target Organs: Respiratory tract (nose and throat), Eyes, Skin

Respiratory Tract Irritation: If inhaled in sufficient quantity, may cause temporary, mild mechanical irritation to respiratory tract. Symptoms may include scratchiness of the nose or throat, cough or chest discomfort.

Eye Irritation: May cause temporary, mild mechanical irritation. Fibers may be abrasive, prolonged contact may cause damage to the outer surface of the eye.

Skin Irritation: May cause temporary, mild mechanical irritation. Exposure may also result in inflammation, rash or itching.

Gastrointestinal Irritation: Unlike route of exposure.

Medical Conditions Aggravated by Exposure: Pre-existing medical conditions, including dermatitis, asthma or chronic lung disease may be aggravated by exposure. Individuals who have a history of allergies may experience greater amounts of skin and respiratory irritation.

Hazard Classification Info

Although studies, involving occupationally exposed workers, have not identified any increased incidence of respiratory disease, results from animal testing have been used as the basis for hazard classification. In each of the following cases, the conclusions are qualitative only and do not rest upon any quantitative analysis suggesting that the hazard actually may occur at current occupational exposure levels.

The International Agency for Research on Cancer (IARC) confirmed in October 2001 that Group 2B (possible human carcinogen based on sufficient evidence of carcinogenicity in animals but inadequate evidence in humans) continues to be the appropriate classification for refractory ceramic fiber.

The Seventh Annual Report on Carcinogens (1994), prepared by the National Toxicology Program (NTP), classified refractory RCF and dassowd as substances reasonably anticipated to be carcinogens.

The American Conference of Governmental Industrial Hygienists (ACGIH) has classified RCF as "A2-Suspected Human Carcinogen."

The Commission of The European Communities (DG XI) has classified RCF as a substance "that should be regarded as if it is carcinogenic to man."

The State of California, pursuant to Proposition 65, The Safe Drinking Water and Toxic Enforcement Act of 1986, has listed "ceramic fibers (airborne fibers of respirable size)" as a chemical known to the State of California to cause cancer.

The Canadian Environmental Protection Agency (CEPA) has classified RCF as "probably carcinogenic" (Group 2).

The Canadian Workplace Hazardous Materials Information System (WHMIS) – RCF is classified as Class D2A - Materials Causing Other Toxic Effects.

The Hazardous Materials Identification System (HMIS) –

- Health 1
- Flammability 0
- Reactivity 0
- Personal Protection Index X (Employer Determined)

(“ denotes potential for chronic effects)

3 - Composition / Information On Ingredients

<table>
<thead>
<tr>
<th>COMPONENTS</th>
<th>CAS NUMBER</th>
<th>% BY WEIGHT</th>
</tr>
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<tbody>
<tr>
<td>Refractories, Fibers, Aluminosilicate</td>
<td>14284-00-6</td>
<td>Up to 55</td>
</tr>
<tr>
<td>Silica, Amorphous</td>
<td>7631-86-9</td>
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<tr>
<td>Propylene Glycol</td>
<td>57-55-4</td>
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<td>Water</td>
<td>7732-18-5</td>
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(See Section 8 "Exposure Controls / Personal Protection" for exposure guidelines)
4 - First-Aid measures

4.1 - Eyes
If eyes become irritated, flush immediately with large amounts of lukewarm water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Do not rub eyes.

4.2 - Skin
If skin becomes irritated, remove soiled clothing. Do not rub or scratch exposed skin. Wash area of contact thoroughly with soap and water. Using a skin cream or lotion after washing may be helpful.

4.3 - Respiratory Tract
If respiratory tract irritation develops, move the person to a dust free location. See Section 8 for additional measures to reduce or eliminate exposure.

4.4 - Gastrointestinal
If gastrointestinal tract irritation develops, move the person to a dust free environment.

"If the above symptoms persist, seek medical attention."

NOTES TO PHYSICIANS:
Skin and respiratory effects are the result of temporary, mild mechanical irritation; fiber exposure does not result in allergic manifestations.

5 - Fire-fighting measures

5.1 - NFPA Codes
Flammability: 0 Health: 1 Reactivity: 0 Special: 0

5.2 - NFPA Unusual Hazards
None

5.3 - Flammable Properties
None

5.4 - Flash Point
None

5.5 - Hazardous decomposition products
None

5.6 - Unusual Fire and explosion hazard
None

5.7 - Extinguishing media
Use extinguishing media suitable for type of surrounding fire

6 - Accidental Release Measures

Avoid creating airborne dust. Dust suppressing cleaning methods such as wet sweeping or vacuuming should be used to clean the work area. Avoid vacuuming, the vacuum should be equipped with a HEPA filter. Compressed air or dry sweeping should not be used for cleaning.

7 - Handling and storage

7.1 - Handling
Handle ceramic fiber carefully. Limit use of power tools unless in conjunction with local exhaust. Use hand tools whenever possible. Frequently clean the work area with HEPA filtered vacuum or wet sweeping to minimize the accumulation of debris. Do not use compressed air for clean-up.

7.2 - Storage
Store in original container in a dry area. Keep container closed when not in use. Product packaging may contain residue. Do not reuse.
Safety Data Sheet
acc. to OSHA HCS (29 CFR 1910.1200)

1 Identification
- Product identifier
- Trade name: Stainless Steel
- Other Product identifiers: 3XX Series, 4XX Series
- Recommended use and restriction on use
- Recommended use: Raw materials.
- Restrictions on use: Contact manufacturer.
- Details of the supplier of the Safety Data Sheet
  Manufacturer/Supplier:
  Castle Metals
  1420 Kensington Road Suite 220
  Oak Brook IL 60523
  (847) 349-3000
- Emergency telephone number: (847)-349-3000

2 Hazard(s) identification
- Classification of the substance or mixture
  The product is not classified as hazardous according to the Globally Harmonized System (GHS).
- Additional information:
  There are no other hazards not otherwise classified that have been identified.
  0 percent of the mixture consists of ingredient(s) of unknown toxicity.
  Not hazardous as delivered. Long term inhalation of product dusts formed during use is harmful
- Label elements
  - GHS label elements
    The product is not classified as hazardous according to OSHA GHS regulations within the United States.
  - Hazard pictograms Not Regulated
  - Signal word Not Regulated
  - Hazard-determining components of labeling: None.
  - Hazard statements Not Regulated
  - Precautionary statements Not Regulated
  - Hazard description: Not hazardous under WHMIS.
  - Classification system:
    - NFPA ratings (scale 0 - 4)
      Health = 0
      Fire = 0
      Reactivity = 0
    - HMIS-ratings (scale 0 - 4)
      Health = 0
      Fire = 0
      Reactivity = 0
  - Other hazards
  - Results of PBT and vPvB assessment
    - PBT: Not applicable.

(Contd. on page 2)
Safety Data Sheet
acc. to OSHA HCS (29 CFR 1910.1200)

Trade name: Stainless Steel

3 Composition/information on ingredients
   - Chemical characterization: Mixtures
   - Description: Mixture of the substances listed below with nonhazardous additions.

Dangerous components:
7439-85-8 iron 60-88%
7440-47-3 chromium 10-30%
7440-02-0 nickel ⚫ Carc. 2, H351; STOT RE 1, H372 ⚫ Skin Sens. 1, H317
   0-27%
7439-95-5 manganese, powdered ⚫ Flam. Sol. 1, H228
   <5%
7440-50-8 copper ⚫ Flam. Liq. 2, H225; Flam. Sol. 1, H228
   <5%
7439-98-7 molybdenum <5%
7440-32-6 titanium <5%
7723-14-0 phosphorus ⚫ Flam. Liq. 2, H225; Flam. Sol. 1, H228
   <2%
7704-34-9 sulfur ⚫ Skin Irrit. 2, H315
   <2%
7440-21-5 silicon ⚫ Flam. Sol. 2, H228
   <2%
7440-48-4 cobalt ⚫ Resp. Sens. 1, H334; Carc. 2, H351 ⚫ Skin Sens. 1, H317
   <2%
7440-31-5 tin <2%
7440-03-1 lead <2%
7440-44-0 carbon <2%

Additional information:
For the listed ingredients, the identity and exact percentages are being withheld as a trade secret.

4 First-aid measures
   - Description of first aid measures
   General information: No special measures required.
   After inhalation: Supply fresh air; consult doctor in case of complaints.
   After skin contact: Brush off loose particles from skin.
   Immediately wash with water and soap and rinse thoroughly.
   After eye contact: Remove contact lenses if worn, if possible.
   Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

(Contd. on page 3)
Trade name: Stainless Steel

- After swallowing:
  Rinse mouth and then drink plenty of water.
  Do not induce vomiting; immediately call for medical help.
- Information for doctor:
  Most important symptoms and effects, both acute and delayed
  No further relevant information available.
- Danger No further relevant information available.
- Indication of any immediate medical attention and special treatment needed
  No further relevant information available.

5 Fire-fighting measures

- Extinguishing media
  Suitable extinguishing agents:
  Special powder for metal fires. Do not use water.
  Dry sand
  Graphite powder.
  Dry sodium chloride
- For safety reasons unsuitable extinguishing agents: Water
- Special hazards arising from the substance or mixture
  Formation of toxic gases is possible during heating or in case of fire.
- Advice for firefighters
  Protective equipment:
  Wear self-contained respiratory protective device.
  Wear fully protective suit.
  Additional information No further relevant information available.

6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures
  Ensure adequate ventilation.
  Do not breathe dust.
  Avoid formation of dust.
  Use personal protective equipment as required.
  For large spills, use respiratory protective device against the effects of fumes/dust/aerosol.
- Environmental precautions: Do not allow to enter sewers/ surface or ground water.
- Methods and material for containment and cleaning up:
  Pick up mechanically.
  Dispose of the collected material according to regulations.
  Send for recovery or disposal in suitable receptacles.
- Reference to other sections
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.
### 7 Handling and storage
- **Handling:**
  - Precautions for safe handling: Prevent formation of dust. Any deposit of dust which cannot be avoided must be regularly removed. Use proper precautions around molten material.
  - Information about protection against explosions and fires: Keep respiratory protective device available.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
  - Requirements to be met by storerooms and receptacles: No special requirements.
  - Information about storage in one common storage facility: Store away from foodstuffs. Do not store together with acids. Do not store together with alcohols (caustic solutions).
  - Further information about storage conditions: None.
- **Specific end use(s)**: No further relevant information available.

### 8 Exposure controls/personal protection
- **Additional information about design of technical systems**: No further data; see item 7.
- **Control parameters**

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<td><strong>EL (Canada)</strong></td>
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<td><strong>EV (Canada)</strong></td>
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<td><strong>LMPE (Mexico)</strong></td>
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(Conf. on page 5)
Test No. 17-336  
Date(s): 4/20/2017 and 5/3/2017

---

**Safety Data Sheet**

acc. to OSHA HCS (29 CFR 1910.1200)

Printing date 07/01/2015
Reviewed on 07/01/2015

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**Trade name: Stainless Steel**

| REL (USA) | Long-term value: 0.015 mg/m³  
as Ni; See Pocket Guide App. A |
|---|---|
| TLV (USA) | Long-term value: 1.5* mg/m³  
elemental, *inhalable fraction |
| EL (Canada) | Long-term value: 0.05 mg/m³  
ACGIH A1, IARC 2B |
| EV (Canada) | Long-term value: 1 mg/m³  
Inhalable fraction |
| LMPE (Mexico) | Long-term value: 1.5* mg/m³  
elemental: A5, fracción inhalable |

### 7439-96-6 manganese, powdered

| PEL (USA) | Ceiling limit value: 5 mg/m³  
as Mn |
|---|---|
| REL (USA) | Short-term value: 3 mg/m³  
Long-term value: 1 mg/m³  
fume, as Mn |
| TLV (USA) | Long-term value: 0.02* 0.1* mg/m³  
as Mn; *respirable **inhalable fraction |
| EL (Canada) | Long-term value: 0.2 mg/m³  
as Mn; R |
| EV (Canada) | Long-term value: 0.2 mg/m³  
as manganese |
| LMPE (Mexico) | Long-term value: 0.2 mg/m³  
como Mn |

### 7440-80-8 copper

| PEL (USA) | Long-term value: 1* 0.1*** mg/m³  
as Cu *dusts and mists **fume |
|---|---|
| REL (USA) | Long-term value: 1* 0.1*** mg/m³  
as Cu *dusts and mists **fume |
| TLV (USA) | Long-term value: 1* 0.2** mg/m³  
*dusts and mists; **fume; as Cu |
| EL (Canada) | Long-term value: 1* 0.2** mg/m³  
*dusts and mists; **fume, as Cu |
| EV (Canada) | Long-term value: 0.2* 1** mg/m³  
as copper, *fume,**dust and mists |
| LMPE (Mexico) | Long-term value: 0.2* 1** mg/m³  
*humo (como Cu),**polvo y niebla (como Cu) |

### 7439-98-7 molybdenum

| PEL (USA) | Long-term value: 15* mg/m³  
*Total dust |
|---|---|
| TLV (USA) | Long-term value: 10* 3** mg/m³  
as Mo; *inhalable fraction **respirable fraction |
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<tr>
<th>Substance</th>
<th>Long-term value</th>
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<tr>
<td>EL (Canada)</td>
<td>L-10 mg/m³</td>
<td>*respirable inhalable</td>
</tr>
<tr>
<td>EV (Canada)</td>
<td>L-10 mg/m³</td>
<td>*metal, insol. compd.</td>
</tr>
<tr>
<td>LMPE (Mexico)</td>
<td>L-10 mg/m³</td>
<td>*fracción inhalable</td>
</tr>
<tr>
<td>7723-14-0 phosphorus</td>
<td>L-0.1 mg/m³</td>
<td></td>
</tr>
<tr>
<td>REL (USA)</td>
<td>L-0.3 mg/m³</td>
<td></td>
</tr>
<tr>
<td>LMPE (Mexico)</td>
<td>L-0.1 mg/m³</td>
<td></td>
</tr>
<tr>
<td>7440-21-3 silicon</td>
<td>L-10 mg/m³</td>
<td></td>
</tr>
<tr>
<td>PEL (USA)</td>
<td>L-10 mg/m³</td>
<td>*total dust, resp. f.</td>
</tr>
<tr>
<td>REL (USA)</td>
<td>L-10 mg/m³</td>
<td></td>
</tr>
<tr>
<td>TLV (USA)</td>
<td>TLV withdrawn</td>
<td></td>
</tr>
<tr>
<td>EL (Canada)</td>
<td>L-10 mg/m³</td>
<td>*total dust, resp. f.</td>
</tr>
<tr>
<td>EV (Canada)</td>
<td>L-10 mg/m³</td>
<td></td>
</tr>
<tr>
<td>LMPE (Mexico)</td>
<td>L-20 mg/m³</td>
<td></td>
</tr>
<tr>
<td>7440-48-4 cobalt</td>
<td>L-0.1 mg/m³</td>
<td></td>
</tr>
<tr>
<td>PEL (USA)</td>
<td>L-0.05 mg/m³</td>
<td>as Co, for metal dust &amp; fume</td>
</tr>
<tr>
<td>REL (USA)</td>
<td>L-0.05 mg/m³</td>
<td>as Co, metal dust &amp; fume</td>
</tr>
<tr>
<td>TLV (USA)</td>
<td>L-0.02 mg/m³</td>
<td>BEI, *hard metals, thoracic, Ni, C, W</td>
</tr>
<tr>
<td>EL (Canada)</td>
<td>L-0.02 mg/m³</td>
<td>as Co, IARC 2B</td>
</tr>
<tr>
<td>EV (Canada)</td>
<td>L-0.1 mg/m³</td>
<td></td>
</tr>
<tr>
<td>LMPE (Mexico)</td>
<td>L-0.02 mg/m³</td>
<td></td>
</tr>
<tr>
<td>7440-31-6 tin</td>
<td>L-2 mg/m³</td>
<td></td>
</tr>
<tr>
<td>PEL (USA)</td>
<td>L-2 mg/m³</td>
<td>as metal</td>
</tr>
<tr>
<td>REL (USA)</td>
<td>L-2 mg/m³</td>
<td></td>
</tr>
<tr>
<td>TLV (USA)</td>
<td>L-2 mg/m³</td>
<td></td>
</tr>
<tr>
<td>EL (Canada)</td>
<td>L-2 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>
## Safety Data Sheet

**Trade name:** Stainless Steel

### Ingredients with biological limit values:

- **BEI (USA)**
  - **Concentration:** 15 µg/L
  - **Medium:** urine
  - **Time:** end of shift at end of workweek
  - **Parameter:** Cobalt (background)
- **Cobalt**
  - **Concentration:** 1 µg/L
  - **Medium:** blood
  - **Time:** end of shift at end of workweek
  - **Parameter:** Cobalt (background, semi-quantitative)

### Additional information:
- No further relevant information available.
- **Exposure controls**
- **Personal protective equipment:**
  - **General protective and hygienic measures:**
  - The usual precautionary measures for handling chemicals should be followed.
  - Keep away from foodstuffs, beverages and feed.
  - Store protective clothing separately.
  - Wash hands before breaks and at the end of work.
  - Avoid contact with the eyes.
  - Avoid close or long term contact with the skin.
- **Engineering controls:** No further relevant information available.
- **Breathing equipment:** Particulate mask should filter at least 99% of airborne particles.
- Use respiratory protection when grinding or cutting material.
- **Protection of hands:** Wear gloves for the protection against mechanical hazards according to OSHA and NIOSH rules.
- **Eye protection:** Safety glasses
- **Body protection:** Protective work clothing
- **Limitation and supervision of exposure into the environment:** Avoid release to the environment.
- **Risk management measures** See Section 7 for additional information.

### 9 Physical and chemical properties

- **Information on basic physical and chemical properties**
- **General Information**
- **Appearance:**
  - **Form:** Solid material
  - **Color:** Gray to Black.
Test No. 17-336

Date(s): 4/20/2017 and 5/3/2017

<table>
<thead>
<tr>
<th>Trade name: Stainless Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor: Odorless</td>
</tr>
<tr>
<td>Odor threshold: Not determined.</td>
</tr>
<tr>
<td>pH-value: Not applicable.</td>
</tr>
<tr>
<td>Change in condition</td>
</tr>
<tr>
<td>Melting point/Melting range: 1371 °C (2500 °F)</td>
</tr>
<tr>
<td>Boiling point/Boiling range: Undetermined.</td>
</tr>
<tr>
<td>Flash point: Not applicable.</td>
</tr>
<tr>
<td>Flammability (solid, gaseous): Not determined.</td>
</tr>
<tr>
<td>Auto-ignition temperature: Not determined.</td>
</tr>
<tr>
<td>Decomposition temperature: Not determined.</td>
</tr>
<tr>
<td>Auto igniting: Product is not self-igniting.</td>
</tr>
<tr>
<td>Danger of explosion: Product does not present an explosion hazard.</td>
</tr>
<tr>
<td>Explosion limits: Not determined.</td>
</tr>
<tr>
<td>Lower: Not determined.</td>
</tr>
<tr>
<td>Upper: Not determined.</td>
</tr>
<tr>
<td>Vapor pressure: Not applicable.</td>
</tr>
<tr>
<td>Density at 20 °C (68 °F): 7 g/cm³ (58.415 lb/gal)</td>
</tr>
<tr>
<td>Relative density: Not determined.</td>
</tr>
<tr>
<td>Vapour density: Not applicable.</td>
</tr>
<tr>
<td>Evaporation rate: Not applicable.</td>
</tr>
<tr>
<td>Solubility in / Miscibility with Water: Insoluble.</td>
</tr>
<tr>
<td>Partition coefficient (n-octanol/water): Not determined.</td>
</tr>
<tr>
<td>Viscosity: Not applicable.</td>
</tr>
<tr>
<td>Dynamic: Not applicable.</td>
</tr>
<tr>
<td>Kinematic: Not applicable.</td>
</tr>
<tr>
<td>Other information: No further relevant information available.</td>
</tr>
</tbody>
</table>

**10 Stability and reactivity**

- Reactivity
- Chemical stability
- Thermal decomposition / conditions to be avoided: Heating may cause release of toxic fumes.
- Possibility of hazardous reactions
  - Reacts with strong acids and alkali.
  - Reacts with strong oxidizing agents.
  - Reacts with halogenated compounds.
- As the product is supplied it is not capable of dust explosion; however enrichment with fine dust causes risk of dust explosion.
- Conditions to avoid: Avoid acids.
- Incompatible materials: Oxidizers, strong bases, strong acids

(Contd. on page 9)
<table>
<thead>
<tr>
<th>Trade name: Stainless Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous decomposition products:</td>
</tr>
<tr>
<td>Possible in traces;</td>
</tr>
<tr>
<td>Toxic metal oxides smoke</td>
</tr>
<tr>
<td>Lead oxide vapor</td>
</tr>
</tbody>
</table>

**11 Toxicological information**

- **Acute toxicity:**
  - LD/LC50 values that are relevant for classification:
  - 7439-96-5 manganese, powdered
  - Oral [LD50] 9000 mg/kg (rat)
  - 7440-48-4 cobalt
  - Oral [LD50] 6170 mg/kg (rat)

- **Primary irritant effect:**
  - on the skin: No irritant effect.
  - on the eye: No irritating effect.
  - Sensitization: No sensitizing effects known.

- **Additional toxicological information:**
  The product is not subject to classification according to internally approved calculation methods for preparations.
  When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.

- **Carcinogenic categories**

<table>
<thead>
<tr>
<th>NTP (National Toxicology Program)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-02-0 nickel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OSHA-Ca (Occupational Safety &amp; Health Administration)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the ingredients is listed.</td>
</tr>
</tbody>
</table>

- **Probable Routes of Exposure**
  - Ingestion.
  - Inhalation.
  - Eye contact.
  - Skin contact.

- **Repeated Dose Toxicity:**
  - Repeated or long-term inhalation of product dusts may cause pulmonary disease.
  - May cause metal fume disease.

- **CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction):**
  - Germ cell mutagenicity
  - Based on available data, the classification criteria are not met.
  - Carcinogenicity
  - Based on available data, the classification criteria are not met.
  - Reproductive toxicity
  - Based on available data, the classification criteria are not met.

- **STOT-single exposure**
  - Based on available data, the classification criteria are not met.

- **STOT-repeated exposure**
  - Based on available data, the classification criteria are not met.

- **Aspiration hazard**
  - Based on available data, the classification criteria are not met.
**12 Ecological information**

- **Toxicity**
  - Aquatic toxicity: No further relevant information available.
  - Persistence and degradability: No further relevant information available.
  - Behavior in environmental systems:
    - Bioaccumulative potential: May be accumulated in organisms.
    - Mobility in soil: No further relevant information available.
  - Additional ecological information:
    - General notes:
      - The product contains heavy metals. Avoid transfer into the environment. Specific preliminary treatments are necessary.
    - Other adverse effects: No further relevant information available.

**13 Disposal considerations**

- **Waste treatment methods**
- **Recommendation:**
  - Contact manufacturer for recycling information.
  - The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes.

- **Uncleaned packagings:**
  - **Recommendation:** Disposal must be made according to official regulations.

**14 Transport information**

- **UN-Number**
  - Not Regulated
- **DOT, ADR, ADN, IMDG, IATA**
  - Not Regulated
- **UN proper shipping name**
  - Not Regulated
- **DOT, ADR, ADN, IMDG, IATA**
  - Not Regulated
- **Transport hazard class(es)**
  - Not Regulated
- **DOT, ADR, IMDG, IATA**
  - Not Regulated
- **Class**
  - Not Regulated
- **Label**
  - Not Regulated
- **ADN/R Class:**
  - Not Regulated
- **Packing group**
  - Not Regulated
- **DOT, ADR, IMDG, IATA**
  - Not Regulated
- **Environmental hazards:**
  - No
- **Marine pollutant:**
  - Not applicable.
- **Special precautions for user**
  - Not applicable.
- **Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**
  - Not applicable.
15 Regulatory information

- Safety, health and environmental regulations/legislation specific for the substance or mixture
  - United States (USA)
  - SARA

<table>
<thead>
<tr>
<th>Section 304 (extremely hazardous substances):</th>
</tr>
</thead>
<tbody>
<tr>
<td>7723-14-0 phosphorus</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Section 313 (Specific toxic chemical listings):</th>
</tr>
</thead>
<tbody>
<tr>
<td>7440-47-3 chromium</td>
</tr>
<tr>
<td>7440-02-0 nickel</td>
</tr>
<tr>
<td>7438-96-5 manganese, powdered</td>
</tr>
<tr>
<td>7440-50-8 copper</td>
</tr>
<tr>
<td>7723-14-0 phosphorus</td>
</tr>
<tr>
<td>7440-48-4 cobalt</td>
</tr>
</tbody>
</table>

- TSCA (Toxic Substances Control Act):
  All ingredients are listed.

- Proposition 65 (California)
  Chemicals known to cause cancer:
  - 7440-02-0 nickel
  - 7440-48-4 cobalt

- Chemicals known to cause reproductive toxicity for females:
  None of the ingredients are listed.

- Chemicals known to cause reproductive toxicity for males:
  None of the ingredients is listed.

- Chemicals known to cause developmental toxicity:
  None of the ingredients is listed.

Carcinogenic categories

- EPA (Environmental Protection Agency)
  - 7440-47-3 chromium D
  - 7438-96-5 manganese, powdered D
  - 7440-50-8 copper D
  - 7723-14-0 phosphorus D

- IARC (International Agency for Research on Cancer)
  - 7440-47-3 chromium 3
  - 7440-02-0 nickel 1
  - 7440-48-4 cobalt 2B

- TLV (Threshold Limit Value established by ACGIH)
  - 7440-47-3 chromium A4
**Safety Data Sheet**

acc. to OSHA HCS (29 CFR 1910.1200)

**Trade name:** Stainless Steel

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>NiCl2</td>
<td></td>
</tr>
<tr>
<td>MoO3</td>
<td></td>
</tr>
<tr>
<td>CoCl2</td>
<td></td>
</tr>
</tbody>
</table>

**NIOSH-Ca (National Institute for Occupational Safety and Health)**

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>NiCl2</td>
<td>A3</td>
</tr>
</tbody>
</table>

**State Right to Know Listings**

None of the ingredients is listed.

**Canadian substance listings:**

- **Canadian Domestic Substances List (DSL)**
  All ingredients are listed.

- **Canadian Ingredient Disclosure list (limit 0.1%)**
  - NiCl2
  - MoO3
  - CoCl2

- **Canadian Ingredient Disclosure list (limit 1%)**
  - MnO2
  - Cu
  - MoO3
  - P

**Other regulations, limitations and prohibitive regulations**

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

- **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

**16 Other information**

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- **Date of preparation / last revision:** 07/01/2015

**Abbreviations and acronyms:**

- ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
- IMDG: International Maritime Code for Dangerous Goods
- DOT: US Department of Transportation
- IATA: International Air Transport Association
- ACGIH: American Conference of Governmental Industrial Hygienists
- EUH233: European Inventory of Existing Commercial Chemical Substances
- EULNC: European List of Notified Chemical Substances
- CAS: Chemical Abstracts Service (division of the American Chemical Society)
- NFPA: National Fire Protection Association (USA)
- HMIS: Hazardous Materials Identification System (USA)
- WIMIS: Workplace Hazardous Materials Information System (Canada)
- LC50: Lethal concentration, 50 percent
- LD50: Lethal dose, 50 percent
### Safety Data Sheet

**Trade name:** Stainless Steel

- **Flam. Liqu.:** Flammable liquids, Hazard Category 2
- **Flam. Sol.:** Flammable solids, Hazard Category 1
- **Self-heating:** Self-heating Substances and Mixtures, Hazard Category 1
- **Water-react.:** Substances and Mixtures which, in contact with water, emit flammable gases, Hazard Category 1
- **Reactivity:** Reactive substances, exothermic, Hazard Category 2
- **Respi. Sens.:** Respiratory sensitisation, Hazard Category 1
- **Skin Sens.:** Skin sensitisation - Skin, Hazard Category 1
- **Carc.:** Carcinogenicity, Hazard Category 2

**STOT RE:** Specific target organ toxicity - Repeated exposure, Hazard Category 1

**Sources:**

SDS Prepared by:
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Website: www.chemtellnc.com