Background Report Reference

AP-42 Section Number: 12.20

Background Chapter: 4

Reference Number: 69

Title: Report to Snap-On Tools Corporation, Kenosha, Wisconsin for Stack Emission Tests

1990

Snap-On Tools SM
Kenosha, WI
Electropolishing
July 20, 1990

AP-42 Section 12.20
Reference
Report Sect. 4
Reference 69

Report to

SNAP-ON TOOLS CORPORATION
Kenosha, Wisconsin

for

STACK EMISSION TESTS
MEDICAL PRODUCTS SCRUBBER

July 20, 1990

Process rate not provided
CANNOT USE

Received: 10/31/91

by

ENVIRONMENTAL TECHNOLOGY & ENGINEERING CORPORATION
13020 West Bluemound Road
Elm Grove, Wisconsin 53122
414-784-2434

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

Date: October 31, 1991

File Ref: 4530

To: Files

Received: 10/31/91

From: Denese Helgeland - SED DH

Subject: Review of Stack Test Performed at Snap-On Tools Medical Division

I. Source

Snap-On Tools, Medical Division
1100 91st Street
Kenosha, Wisconsin 53140
FID# 999828940 Stack #S01 Process #P01
Permit #89-GDB-255 Issued: April 17, 1990
Test Date: July 20, 1990
Test Firm: Environmental Technology & Engineering
13020 West Bluemound Road
Elm Grove, Wisconsin 53122
Crew Chief: Mr. William Dick (414) 784-2434

II. Source Description

The source tested was Snap-On Tools, Medical Division in Kenosha. This facility was permitted to construct and operate a passivation line. Stainless steel medical devices are electropolished and cleaned by processing the material through tanks of phosphoric, sulfuric and nitric acid.

Emissions from the passivation line are controlled by a Dual packed wet scrubber, rated at 2000 cfm. The scrubber sprays a caustic (sodium hydroxide) solution over the plastic saddles to help control the acid emissions. The pH of the solution is approximately 8.0. The first stack test was conducted without the use of make-up water to the scrubber. During the second test, the scrubber spray shut off due to the lack of make-up water. The test was completed as a worse case situation. The make-up water pump was wired to run continually during the remaining two tests. There were no other problems during the stack testing.

II. Discussion of Results

The test results are shown below. The average phosphoric acid emissions, after the scrubber, was 0.0033 pounds per hour. The average sulfuric acid emissions, after the scrubber, was 0.0017 pounds per hour. And, the average nitric acid emissions, after the scrubber, was 0.0015 pounds per hour. This is well below the permit limits of 0.159 pounds per hour of phosphoric acid, 0.144 pounds per hour of sulfuric acid, and 0.079 pounds per hour of nitric acid.

	RUN #1	RUN #2	RUN #3	RUN #4	AVG
Phosphoric Acid	0.0028	0.0036	0.0037	0.0031	0.0033
Sulfuric Acid	0.0017	0.0017	0.0018	0.0015	0.0017
Nitric Acid	0.0012	0.0016	0.0016	0.0014	0.0015

Environmental Technology & Engineering (ET&E) used midget impingers with deionized water to collect samples and ion chromatography to analyze the samples. A review of the stack test report and results was made. Minor numerical corrections were made in the results.

ET&E reported the emissions rate of sulfuric acid in the first and fourth test at a slightly lower concentration. ET&E had the sufuric acid emissions rate, from the scrubber, of 0.001 lb/hr for both tests. My calculations have the concentrations as 0.0017 and 0.0015 lb/hr, respectively.

c: Bureau of Air Management - AM\10
U.S. EPA, Region V

SUMMARY

On July 20, 1990, Environmental Technology & Engineering Corporation personnel performed stack emission tests on the Duall scrubber installed to control the potential acid vapor emissions from the electopolishing and passivation process at the Snap-On Tools Medical Products Division plant in Kenosha, Wisconsin. The following table summarizes the tests results for phosphoric acid (H_3PO_4), sulfuric acid (H_2SO_4)8 and nitric acid (HNO_3):7

TEST	POLLUTANT	INLET LOAD LB/HR	EMISSIONS LB/HR
1	H_3PO_4	<0.004	<0.003
	H_2SO_4	<0.002	0.001
	HNO_3	<0.002	<0.001
2	H_3PO_4	<0.004	<0.004
	H_2SO_4	<0.002	<0.002
	HNO_3	<0.002	<0.002
3	H_3PO_4	<0.004	<0.004
	H_2SO_4	<0.002	<0.002
	HNO_3	<0.002	<0.002
4	H_3PO_4	<0.004	<0.003
	H_2SO_4	<0.002	<0.001
	HNO_3	<0.002	<0.001

The results indicate that all emissions from the scrubber, as well as the loading to the scrubber, are well below the permit limits set by the State of Wisconsin DNR in an Air Pollution Control Permit.

AIR PERMIT REVIEW CALCULATION SHEET
FORM 4500-89 1-82

DEPARTMENT OF NATURAL RESOURCES

MADE BY: DATE:

DISCUSSED WITH & CHECKED BY:

DATE:

APPROVED: DATE:

DATE:

E: Snap-On Tools - Medical Div
Stack Test Review

AR#

Run #1 $LB/HR = 60 * DSCFM * (lb/DSCF)$

$= 60 * DSCFM * (6.243 * 10^{-8} (mg/DSCM))$

H_3PO_4 lb/HR (out) $= 60 * (1993.85) * (6.243 * 10^{-8}) * (0.37)$

$= 0.0028$ lb/HR H_3PO_4

H_2SO_4 lb/HR (out) $= 60 * 1993.85 * 6.243 * 10^{-8} * 0.23$

$= 0.0017$ lb/HR H_2SO_4

HNO_3 lb/HR (out) $= 60 * 1993.85 * 6.243 * 10^{-8} * 0.16$

$= 0.0012$ lb/HR HNO_3

Run #2 H_3PO_4 lb/HR (out) $= 60 * 1945.72 * 6.243 * 10^{-8} * 0.50$

$= 0.0036$ lb/HR H_3PO_4

H_2SO_4 lb/HR (out) $= 60 * 1945.72 * 6.243 * 10^{-8} * 0.24$

$= 0.0017$ lb/HR H_2SO_4

HNO_3 lb/HR (out) $= 60 * 1945.72 * 6.243 * 10^{-8} \times 0.22$

$= 0.0016$ lb/HR HNO_3

FOOTNOTES/REFERENCES:

AIR PERMIT REVIEW CALCULATION SHEET
FORM 4500-89 1-82

DEPARTMENT OF NATURAL RESOURCES

PAGE 2 OF

MADE BY: DATE:

DISCUSSED WITH & CHECKED BY:

DATE:

APPROVED: DATE:

DATE:

E: Snap-On Tools - Medical Div
Stack Test review

AR#

Run #3 H_3PO_4 lb/HR (OUT) = 60 * 2000.83 * 6.243 * 10^{-8} x 0.50
= 0.0037 lb/HR H_3PO_4

H_2SO_4 lb/HR (OUT) = 60 * 2000.83 * 6.243 * 10^{-8} * 0.24
= 0.0018 lb/HR H_2SO_4

HNO_3 lb/HR (OUT) = 60 * 2000.83 * 6.243 * 10^{-8} * 0.22
= 0.0016 lb/HR HNO_3

Run #4 H_3PO_4 lb/HR (OUT) = 60 * 1992.93 * 6.243 * 10^{-8} * 0.42
= 0.0031 lb/HR H_3PO_4

H_2SO_4 lb/HR (OUT) = 60 * 1992.93 * 6.243 * 10^{-8} * 0.20
= 0.0015 lb/HR H_2SO_4

HNO_3 lb/HR (OUT) = 60 * 1992.93 * 6.243 * 10^{-8} * 0.19
= 0.0014

AVG OUTLET VALUES, FOR THE 4 RUNS ARE

H_3PO_4 = 0.0033 lb/HR AVG
H_2SO_4 = 0.0017 lb/HR AVG
HNO_3 = 0.0015 lb/HR AVG

PERMIT LIMITS
H_3PO_4 - 0.159 lb/HR
H_2SO_4 = 0.144 lb/HR
HNO_3 = 0.079 lb/HR

FOOTNOTES/REFERENCES:

SUMMARY

On July 20, 1990, Environmental Technology & Engineering Corporation personnel performed stack emission tests on the Duall scrubber installed to control the potential acid vapor emissions from the electopolishing and passivation process at the Snap-On Tools Medical Products Division plant in Kenosha, Wisconsin. The following table summarizes the tests results for phosphoric acid (H_3PO_4), sulfuric acid (H_2SO_4), and nitric acid (HNO_3):

TEST	POLLUTANT	INLET LOAD LB/HR	EMISSIONS LB/HR
1	H_3PO_4	<0.004	<0.003
	H_2SO_4	<0.002	0.001
	HNO_3	<0.002	<0.001
2	H_3PO_4	<0.004	<0.004
	H_2SO_4	<0.002	<0.002
	HNO_3	<0.002	<0.002
3	H_3PO_4	<0.004	<0.004
	H_2SO_4	<0.002	<0.002
	HNO_3	<0.002	<0.002
4	H_3PO_4	<0.004	<0.003
	H_2SO_4	<0.002	<0.001
	HNO_3	<0.002	<0.001

The results indicate that all emissions from the scrubber, as well as the loading to the scrubber, are well below the permit limits set by the State of Wisconsin DNR in an Air Pollution Control Permit.

1.0 GENERAL

On Friday, July 20, 1990, Environmental Technology and Engineering Corporation personnel performed a stack emission test on a Duall scrubber installed to control the potential acid vapor emissions on the electropolishing and passivation process at the Snap-On Tools Medical Products Division plant located in Kenosha, Wisconsin. The purpose of the test was to determine the inlet loading and emission rate of phosphoric acid (H_3PO_4), sulfuric acid (H_2SO_4), and nitric acid (HNO_3) and the efficiency of the scrubber in removing the acid vapors.

The scrubber was installed to control the potential emissions from the process in this facility. The scrubber uses caustic to control the potential emissions. During the second test of the scheduled three-test sequence, it was discovered that the caustic spray was off due to an error in the design of the system. The situation was quickly remedied and a fourth test was performed. The process operation and test procedures were witnessed by Joe Perez of the State of Wisconsin Department of Natural Resources. The process and scrubber operation were monitored by Guy Bradshaw of Snap-On Tools. Mr. Hiram Buffington of Snap-On Tools was also in attendance. The field tests and corresponding laboratory analysis and report preparation were performed by Bill Dick and Mike Huenink.

The following sections of this report document the activities and results of the test program. The report presents all of the relevant data collected and discussions on the interpretation of the data are provided where appropriate. The report, therefore, includes much necessary detail. The results, however, have been summarized in the SUMMARY section at the beginning of this report for those readers not wishing to be burdened by the details.

2.0 RESULTS

Four (4) tests each of one hour in duration were performed on this scrubber during a period of normal process operation. The scrubber vented the electropolish and passivation tanks associated with the process. The scrubber is a DuAll Model FW303 rated at 2000 cfm. Caustic (sodium hydroxide) was added to the scrubber at a pH of approximately 8.0. The stack flow parameters recorded during testing and the weights of phosphoric acid (H3PO4), sulfuric acid (H2SO4), and nitric acid (HNO3) collected were used to compute the emissions for each test of the four-test sequence. The following table summarizes the numerical test results:

TEST	POLLUTANT	INLET LOAD LB/HR	EMISSIONS LB/HR
1	H3PO4	<0.004	<0.003
	H2SO4	<0.002	0.001
	HNO3	<0.002	<0.001
2	H3PO4	<0.004	<0.004
	H2SO4	<0.002	<0.002
	HNO3	<0.002	<0.002
3	H3PO4	<0.004	<0.004
	H2SO4	<0.002	<0.002
	HNO3	<0.002	<0.002
4	H3PO4	<0.004	<0.003
	H2SO4	<0.002	<0.001
	HNO3	<0.002	<0.001

AVG: H3PO4 = .0035
H2SO4 = .0015
HNO3 = .0015

The results indicate that all emissions from the scrubber, as well as the loading to the scrubber, are well below the permit limits set by the State of Wisconsin DNR in an Air Pollution Control Permit.

3.0 COMMENTS

The DNR established emission limits as follows for the test pollutants:

Phosphoric Acid	0.159 lb/hr
Sulfuric Acid	0.144 lb/hr
Nitric Acid	0.079 lb/hr.

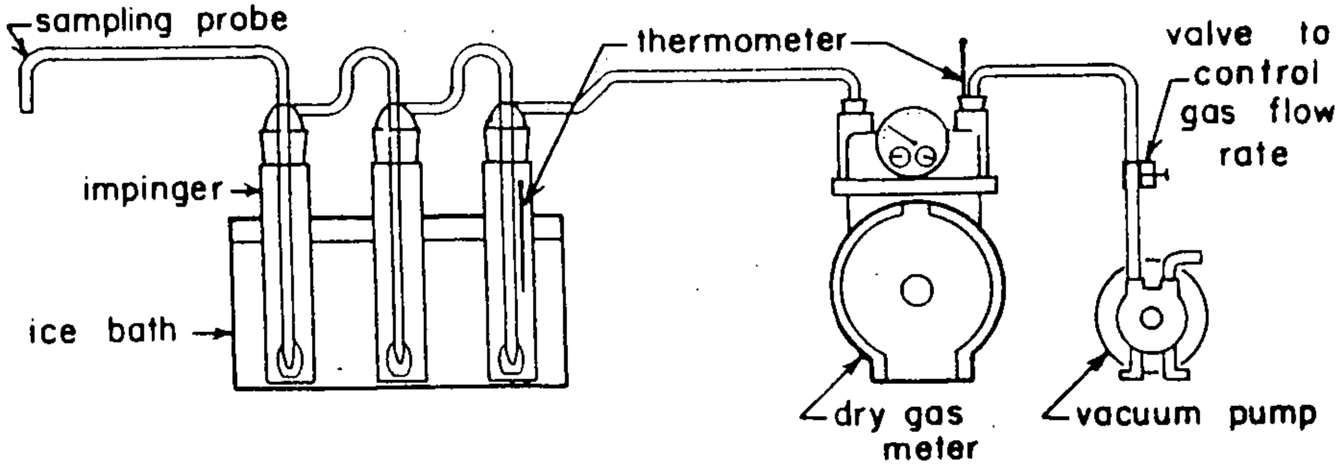
Since the emissions from the process to the scrubber were well below these limits, it is possible that a permit might not be required at all of this process.

4.0 METHODS

The equipment used to sample was a modification of the equipment used to sample in-plant to determine occupational exposures to these parameters. The sampling trains consisted of a teflon probe inserted into the duct and connected directly to three midget impingers in series through tygon tubing. The first two impingers were filled with 15 cc of distilled and deionized water. The samples then passed through a sampling pump and then a dry gas meter to precisely measure the sample volumes. A diagram of the sampling train is enclosed. The pumps were set at a nominal sampling rate to insure 99+ % absorption of the pollutants in the impingers. The sampling trains were tested for leaks prior to and immediately following each test period.

At the completion of each test, the probe and connecting tygon tubing were rinsed with water and combined with the impinger contents. The samples were then transported to the laboratory where they were analyzed for phosphoric acid, sulfuric acid, and nitric acid using standard ion chromatography techniques. These weights were combined with the sample volumes to determine the concentrations (milligrams per cubic meter -mg/m3).

The velocity, temperature, and flow rate in the stack were measured using the standard procedure promulgated by the EPA as Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate. Velocity and temperature was measured at 18 prescribed points in the stack and the data, along with the moisture content of the exhaust (assumed saturated), was used to calculate the flow rate (cubic meters per hour). The combination of concentrations and flow rates was used to determine the emission rates (pounds per hour - lb/hr). Copies of all field and laboratory records are included in the Appendix to this report.



IMPINGER SAMPLING TRAIN

SAMPLE CALCULATIONS
for
Single Point (non-isokinetic) Sampling

1. **DRY GAS SAMPLE VOLUME** (**Vm m3, std**), std cubic meters

   Vm m3, std = GAMA*(Vm)*(Pb)/29.92*528/Tmavg*0.02832

   where: GAMA = dry gas meter calibration factor
   Vm = volume of dry gas metered, cubic feet
   Tmavg = average meter temperature, deg R (460+F)
   528 = std temperature, deg R
   0.02832 = cubic meters per cubic foot factor

2. **EMISSION CONCENTRATION** (**EC**), milligrams per std cubic meter

   EC = (mg-mgb)/(Vm m3, std)

   where: mg = milligrams of compound found in sample, determined from comparison to a generated standard curve
   mgb = milligrams of compound found in "blank" sampling media

3. **EMISSION RATE** (**ER**), pounds per hour

   ER = EC*(Qs)*0.02832*60*(1/453600)

   where: Qs = stack gas flow rate, std cubic feet per minute
   60 = minutes per hour factor
   1/453600 = pound per milligrams factor

APPENDIX

Field & Laboratory Data

```
IST 5000
000 DATA  .40,.44,.41,.38,.42,.48,.49,.49,.20,.26,.25,.24,.46,.48,.48,.47
UN
      SNAP ON TOOLS  SCRUBBER INLET  TEST 1  JULY 20, 1990

       CALCULATE FLOW

       ENTER NO OF POINTS:16
       ENTER GAS CONSTITUENTS, % CO2,O2,CO,N2 - %:0,20.7,0,79.3
       ENTER % WATER - %:0.5
       ENTER STACK TEMP - F:76
       ENTER BAROMETRIC PRESSURE - in Hg:29.30
       ENTER STATIC PRESSURE - in H2O:-3.5
       ENTER  PITOT COEFFICIENT:.99
       ENTER STACK DIAMETER - in:12
       ENTER STACK LENGTH & WIDTH - in, in:0,0

          AVG RT OF DEL P  =  0.62437
          VELOCITY, afps  =   42.120
          ACTUAL FLOW WET, acfm  =     1,984.85
          STANDARD FLOW DRY, scfm    =     1,888.40
          STANDARD FLOW DRY, cu. meters per hour  =     3,208.77
k


IST 5000
000 DATA  .39,.43,.44,.34,.40,.45,.47,.48,.24,.26,.25,.27,.42,.46,.47,.46
UN
      SNAP ON TOOLS  SCRUBBER INLET  TEST 2  JULY 20, 1990

       CALCULATE FLOW

       ENTER NO OF POINTS:16
       ENTER GAS CONSTITUENTS, % CO2,O2,CO,N2 - %:0,20.7,0,79.3
       ENTER % WATER - %:0.5
       ENTER STACK TEMP - F:78
       ENTER BAROMETRIC PRESSURE - in Hg:29.30
       ENTER STATIC PRESSURE - in H2O:-3.5
       ENTER  PITOT COEFFICIENT:.99
       ENTER STACK DIAMETER - in:12
       ENTER STACK LENGTH & WIDTH - in, in:0,0

          AVG RT OF DEL P  =  0.61987
          VELOCITY, afps  =   41.894
          ACTUAL FLOW WET, acfm  =     1,974.21
          STANDARD FLOW DRY, scfm    =     1,871.30
          STANDARD FLOW DRY, cu. meters per hour  =     3,179.70
k
```

```
5000 DATA  .95,.98,1.00,.99,1.00,1.01,.89,.87,.76,.71,.71,.87,.69,.67,.56,.54,.6
3,.80
RUN
      SNAP ON TOOLS  SCRUBBER OUTLET  TEST 1  JULY 20, 1990

       CALCULATE FLOW

       ENTER NO OF POINTS:18
       ENTER GAS CONSTITUENTS, % CO2,O2,CO,N2 - %:0,20.7,0,79.3
       ENTER % WATER - %:2.7
       ENTER STACK TEMP - F:73
       ENTER BAROMETRIC PRESSURE - in Hg:29.30
       ENTER STATIC PRESSURE - in H2O:.05
       ENTER  PITOT COEFFICIENT:.99
       ENTER STACK DIAMETER - in:0
       ENTER STACK LENGTH & WIDTH - in, in:7,12

          AVG RT OF DEL P  =  0.89728
          VELOCITY, afps  =   60.346
          ACTUAL FLOW WET, acfm  =     2,112.09
          STANDARD FLOW DRY, scfm   =     1,993.85
          STANDARD FLOW DRY, cu. meters per hour  =    3,387.96
)k




i000 DATA  .95,.96,.97,.92,.88,.98,.92,.80,.72,.66,.68,.82,.80,.67,.50,.50,.61,.
'0
?UN
      SNAP ON TOOLS  SCRUBBER OUTLET  TEST 2  JULY 20, 1990

       CALCULATE FLOW

       ENTER NO OF POINTS:18
       ENTER GAS CONSTITUENTS, % CO2,O2,CO,N2 - %:0,20.7,0,79.3
       ENTER % WATER - %:2.9
       ENTER STACK TEMP - F:75
       ENTER BAROMETRIC PRESSURE - in Hg:29.30
       ENTER STATIC PRESSURE - in H2O:.10
       ENTER  PITOT COEFFICIENT:.99
       ENTER STACK DIAMETER - in:0
       ENTER STACK LENGTH & WIDTH - in, in:7,12

          AVG RT OF DEL P  =  0.87967
          VELOCITY, afps  =   59.224
          ACTUAL FLOW WET, acfm  =     2,072.84
          STANDARD FLOW DRY, scfm   =     1,945.72
          STANDARD FLOW DRY, cu. meters per hour  =    3,306.17
 k
```

```
ST 5000
0 DATA  .40,.44,.41,.38,.42,.48,.49,.49,.20,.26,.25,.24,.46,.48,.48,.47

   SNAP ON TOOLS  SCRUBBER INLET  TEST 1  JULY 20, 1990

    CALCULATE FLOW

    ENTER NO OF POINTS:16
    ENTER GAS CONSTITUENTS, % CO2,O2,CO,N2 - %:0,20.7,0,79.3
    ENTER % WATER - %:0.5
    ENTER STACK TEMP - F:76
    ENTER BAROMETRIC PRESSURE - in Hg:29.30
    ENTER STATIC PRESSURE - in H2O:-3.5
    ENTER  PITOT COEFFICIENT:.99
    ENTER STACK DIAMETER - in:12
    ENTER STACK LENGTH & WIDTH - in, in:0,0

       AVG RT OF DEL P  =  0.62437
       VELOCITY, afps  =   42.120
       ACTUAL FLOW WET, acfm  =    1,984.85
       STANDARD FLOW DRY, scfm   =    1,888.40
       STANDARD FLOW DRY, cu. meters per hour  =    3,208.77
```



```
ST 5000
00 DATA  .39,.43,.44,.34,.40,.45,.47,.48,.24,.26,.25,.27,.42,.46,.47,.46
IN
   SNAP ON TOOLS  SCRUBBER INLET  TEST 2  JULY 20, 1990

    CALCULATE FLOW

    ENTER NO OF POINTS:16
    ENTER GAS CONSTITUENTS, % CO2,O2,CO,N2 - %:0,20.7,0,79.3
    ENTER % WATER - %:0.5
    ENTER STACK TEMP - F:78
    ENTER BAROMETRIC PRESSURE - in Hg:29.30
    ENTER STATIC PRESSURE - in H2O:-3.5
    ENTER  PITOT COEFFICIENT:.99
    ENTER STACK DIAMETER - in:12
    ENTER STACK LENGTH & WIDTH - in, in:0,0

       AVG RT OF DEL P  =  0.61987
       VELOCITY, afps  =   41.894
       ACTUAL FLOW WET, acfm  =    1,974.21
       STANDARD FLOW DRY, scfm   =    1,871.30
       STANDARD FLOW DRY, cu. meters per hour  =    3,179.70
```

```
000 DATA  .86,.98,.94,.94,.92,.98,.96,.90,.84,.76,.75,.86,.84,.70,.55,.55,.64,.
8
UN
     SNAP ON TOOLS  SCRUBBER OUTLET  TEST 3  JULY 20, 1990

      CALCULATE FLOW

      ENTER NO OF POINTS:18
      ENTER GAS CONSTITUENTS, % CO2,O2,CO,N2 - %:0,20.7,0,79.3
      ENTER % WATER - %:2.8
      ENTER STACK TEMP - F:74
      ENTER BAROMETRIC PRESSURE - in Hg:29.30
      ENTER STATIC PRESSURE - in H2O:.10
      ENTER  PITOT COEFFICIENT:.99
      ENTER STACK DIAMETER - in:0
      ENTER STACK LENGTH & WIDTH - in, in:7,12

         AVG RT OF DEL P  =  0.90196
         VELOCITY, afps  =   60.725
         ACTUAL FLOW WET, acfm  =    2,125.38
         STANDARD FLOW DRY, scfm   =    2,000.83
         STANDARD FLOW DRY, cu. meters per hour  =    3,399.81
)k


5000 DATA  .84,.95,.94,.94,.92,.96,.95,.90,.84,.75,.75,.85,.84,.70,.54,.55,.66,.
75
RUN
     SNAP ON TOOLS  SCRUBBER OUTLET  TEST 4  JULY 20, 1990

      CALCULATE FLOW

      ENTER NO OF POINTS:18
      ENTER GAS CONSTITUENTS, % CO2,O2,CO,N2 - %:0,20.7,0,79.3
      ENTER % WATER - %:2.8
      ENTER STACK TEMP - F:74
      ENTER BAROMETRIC PRESSURE - in Hg:29.30
      ENTER STATIC PRESSURE - in H2O:.10
      ENTER  PITOT COEFFICIENT:.99
      ENTER STACK DIAMETER - in:0
      ENTER STACK LENGTH & WIDTH - in, in:7,12

         AVG RT OF DEL P  =  0.89840
         VELOCITY, afps  =   60.485
         ACTUAL FLOW WET, acfm  =    2,116.99
         STANDARD FLOW DRY, scfm   =    1,992.93
         STANDARD FLOW DRY, cu. meters per hour  =    3,386.39
Ok
```

FIELD SAMPLING DATA

GENERAL

Facility *Snap on Tools* — Contact *Guy Bradshaw*

Address ______ — Test Date *7-20-90*

Kenosha — Witnesses *Joe Perez*

Process Description ______

Stack Number *OUTLET*

SAMPLING DATA

A. Sample ID *Out* Analyte *[illegible]* Pump # *MSA 6* *Y 1.019*

	Time	Meter Rdg/ Rotameter	Flow Rate	Minutes	Volume
Start ①	0807	698.00/72			
	0907	701.25/74	----	-------	3.25
②	0915	701.30/71	----	-------	------
	1015	704.13/74	----	-------	------
					2.88

B. Sample ID ______ Analyte ______ Pump # ______

	Time	Meter Rdg/ Rotameter	Flow Rate	Minutes	Volume
Start ③	1125	704.30/73			
	1225	706.99/74	----	-------	2.69
④	1229	707.00/74	----	-------	------
	1329	710.10/74	----	-------	3.10

FLOW DATA

Diam = -

L x W = *7 x 12 in*

Cp = *.99*

Ps = *+0.05*

T = *73F*

Point	Run 1 Del P	Run 1 Del P	Run 2 Del P	Run 2 Del P	Run 3 Del P	Run 3 Del P	Run 4
1	.95	.69	.95	.80	.86	.88	.84
2	.98	.67	.96	.67	.98	.70	.95
3	1.00	.56	.97	.50	.99	.55	.94
4	.99	.54	.92	.50	.99	.55	[illegible]
5	1.00	.63	.88	.61	.92	.64	[illegible]
6	1.01	.80	.98	.70	.98	.78	.96
7	.89	-----	.93	-----	.96	-----	.95
8	.87	-----	.85	-----	.90	-----	.90
9	.76	-----	.72	-----	.84	-----	.84
10	.72	-----	.66	-----	.76	-----	.75
11	.72	-----	.68	-----	.75	-----	.75
12	.87	-----	.82	-----	.86	-----	.85
T	73	29.29" Hg	75	29.29" Hg	74	29.29" Hg	70
Ps	+.05		+.10		+.10		.10

COMMENTS ______

ENVIRONMENTAL TECHNOLOGY & ENGINEERING CORP.

13020 West Bluemound Road

Elm Grove, Wisconsin 53122

414-784-2434

FIELD SAMPLING DATA

GENERAL

Facility: Snap on Tools
Address: 1100 91st St.
Kenosha

Contact: Guy Bradshaw
Test Date: 7-20-90
Witnesses: Buffington - Snap On
Joe [illegible] DNR

Process Description:

Stack Number: INLET

SAMPLING DATA

A. Sample ID: 1-IN Analyte: H_3PO_4 / H_2SO_4 / HNO_3 Pump #: MSA 3
Y: 1.014

	Time	Meter Rdg/ ~~Rotameter~~	Flow Rate	Minutes	Volume
Start (1)	0807	152.00/72			
	0907	154.15/73			2.15
(2)	0915	154.20/73			
	1015	156.78/73			2.58

B. Sample ID: ______ Analyte: ______ Pump #: ______

	Time	Meter Rdg/ Rotameter	Flow Rate	Minutes	Volume
Start (3)	1125	156.90/73			
	1225	159.40/73			2.50
(4)	1229	159.41/73			
	1329	161.76/74			2.35

FLOW DATA

Diam = 12"
L x W =
Cp = .99
Ps = -3.5
T = 76

	Point	Run 1 Del P	Run 1 Del P	Run 2 Del P	Run 2 Del P	Run 3 Del P	Run 3 Del P	Run 4	
1.0	1	.40	.20	.39	.25	.45	.24	.46	.2
1.2	2	.44	.26	.43	.26	.47	.26	.42	[illegible]
2.3	3	.41	.25	.44	.25	.45	.25	.41	[illegible]
3.9	4	.38	.24	.34	.27	.38	.22	.37	[illegible]
8.1	5	.42	.46	.40	.42	.38	.45	.38	[illegible]
9.7	6	.48	.48	.45	.46	.44	.43	.43	[illegible]
10.7	7	.49	.48	.47	.47	.47	.47	.47	[illegible]
11.0	8	.49	.47	.43	.46	.4[illegible]	.46	.47	[illegible]
	9								
T	10	76		78		77		77	
Ps	11	-3.5		-3.5		-3.6		-3.6	
	12								

COMMENTS
(1) Caustic water to scrubber off during second test ~0915-1015
(2) Pump "jumped" to on position [illegible] test 3

ENVIRONMENTAL TECHNOLOGY & ENGINEERING CORP.
13020 West Bluemound Road
Elm Grove, Wisconsin 53122
414-784-2434

ELECTROPOLISH 195°F ±10

50% H_3PO_4

45% H_2SO_4

5% H_2O

PASSIVATE

30% HNO_3 136°F ±10

70% H_2O

DI WATER RINSE 130°F ±10

SCRUBBER CAUSTIC

pH 6.0 – 9.0 RANGE

TYPICAL 8.1

SNAP-ON TOOLS

MOD. PRODUCTS DIV.

7.20.90

TEST 1 — SPRAYS ON
NO MAKE UP H_2O

TEST 2 — SPRAYS OFF
MAKE UP H_2O

TEST 3 — SPRAYS ON
MAKE UP H_2O ~ 30 GPM

TEST 4 — SAME AS TEST 3

SNAP ON TOOL
MED PRODUCTS DIVISION
SCRUBBER CONDITIONS
7-[illegible]-[illegible]

Po: 29.30

FIELD SAMPLING DATA

GENERAL

Facility Sunroof Tool [illegible] — Contact [illegible]

Address [illegible] — Test Date [illegible]

[illegible] — Witnesses [illegible]

Process Description ________

Stack Number INLET

SAMPLING DATA

A. Sample ID 1-IN — Analyte [illegible] — Pump # MSA 3

Time	Meter Rdg/ ~~Rotameter~~	Flow Rate	Minutes	Volume	
Start (2) 1301	152.[illegible] / 73				
1222	[illegible] / 73			2.15	2.16 SCF 61.0 liter
(2) 0913	[illegible] 73				
1013	[illegible] 73			2.59	2.59 SCF 73.24 liter

B. Sample ID ________ Analyte ________ Pump # ________

Time	Meter Rdg/ Rotameter	Flow Rate	Minutes	Volume	
Start (1) 1121	13[illegible].90 / 73				
1221	[illegible] 73			2.50	2.51 SCF 70.97 liter
(1) 1229	[illegible] / 73				
1329	[illegible] 73			2.35	2.36 SCF 66.71 liter

FLOW DATA

Diam = 12"
L x W = ______
Cp = .99
Ps = -3.5
T = 76

Point	Run 1 Del P	Run 1 Del P	Run 2 Del P	Run 2 Del P	Run 3 Del P	Run 3 Del P
1.0 1	.40	.20	.39	.22	.41	.24
1.2 12 2	.44	.26	.43	.26	.47	.24
2.3 3	.41	.23	.41	[illegible]	.43	.25
3.9 4	.32	.27	[illegible]	[illegible]	.35	.22
8 1 5	.42	.16	.15	.17	.32	.05
9.76 6	.42	.17	.15	[illegible]	.44	.17
10.717 7	.41	.17	.31	[illegible]	.42	.47
11.3 8	.40	.17	[illegible]	[illegible]	.40	.40
9						
10 T	75		73		77	
11 Ps	[illegible]		[illegible]		[illegible]	
12						

COMMENTS (1) Caustic Water → [illegible]
(2) Pump [illegible]

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Elm Grove, Wisconsin 53122
414-784-2434

FIELD SAMPLING DATA

GENERAL

Facility: Snap on Tools
Address:
Kenosha

Contact: [illegible]
Test Date: [illegible]
Witnesses: [illegible]

Process Description:

Stack Number: OUTLET

SAMPLING DATA

A. Sample ID: Out   Analyte: [illegible]   Pump #: MSA 6
γ 1.09

	Time	Meter Rdg/ Rotameter	Flow Rate	Minutes	Volume	
Start ①	0807	698.03/72				3.28 SCF
	0907	701.25/74			3.25	92.89 liters
②	0915	701.[illegible]/71				2.91 SCF
	1015	[illegible]			2.88	82.31 liters

B. Sample ID: ______   Analyte: ______   Pump #: ______

	Time	Meter Rdg/ Rotameter	Flow Rate	Minutes	Volume	
Start ③	1125	704.30/[illegible]				2.71 SCF
	1225	[illegible]			2.7[illegible]	76.88 liters
④	1232	[illegible]				3.13 SCF
	1332	[illegible]			[illegible]	88.60 liters

FLOW DATA

Diam = -
L x W = 7 x 12 in
Cp = .99
Ps = -0.05
T = 73°

Point	Run 1 Del P	Run 1 Del P	Run 2 Del P	Run 2 Del P	Run 3 Del P	Run 3 Del P
1	.95	.67	.45	.35	.33	.38
2	.79	.67	[illegible]	[illegible]	[illegible]	.30
3	[illegible]	.66	.39	[illegible]	[illegible]	.35
4	.91	.57	.32	.3	.37	.47
5	1.02	.67	.33	.31	.32	.40
6	[illegible]	.62	[illegible]	.3	[illegible]	.10
7	.71		[illegible]		.46	
8	.77		[illegible]		[illegible]	
9	[illegible]		.32		[illegible]	
10	.71		.34		[illegible]	
11	.71		.32		[illegible]	
12	.77		[illegible]		[illegible]	
T	[illegible]		[illegible]		74	
Ps	[illegible]		[illegible]		+ .10	

COMMENTS

ENVIRONMENTAL TECHNOLOGY & ENGINEERING CORP.
13020 West Bluemound Road
Elm Grove, Wisconsin 53122
414 784-2434

NATLSCO

National Loss Control Service Corporation
Long Grove, Illinois 60049-0075
(708) 540-2488 • Fax (708) 540-4331
ENVIRONMENTAL SCIENCES LABORATORY, K-2

LABORATORY ANALYSIS REPORT

REPORT DATE JUL. 26, 1990
SAMPLES REC'D JUL. 23, 1990
REQUEST NUMBER 132420
PAGE NUMBER 1 OF REQUEST.

TO:

WILLIAM J. DICK
ENVIRONMENTAL TECH & ENG. CORP.
13020 W. BLUEMOUND RD.
ELM GROVE, WI 53122

SAMPLE NUMBER	ANALYSIS REQUESTED	Q m3/hr	RESULTS Micrograms	mg/m3	EL LB/HR
1-IN	PHOSPHORIC ACID	3208.77	<38	<0.62	<.004
	SULFURIC ACID		<18	<0.30	<.002
	NITRIC ACID		<17	<0.27	<.002
2-IN	PHOSPHORIC ACID	3179.70	<38	<0.52	<.004
	SULFURIC ACID		<19	<0.26	<.002
	NITRIC ACID		<17	<0.23	<.002
3-IN	PHOSPHORIC ACID	3208.01	<35	<0.50	<.004
	SULFURIC ACID		<17	<0.24	<.002
	NITRIC ACID		<16	<0.22	<.002
4-IN	PHOSPHORIC ACID	3202.96	<36	<0.54	<.004
	SULFURIC ACID		<18	<0.26	<.002
	NITRIC ACID		<16	<0.24	<.002
1-OUT	PHOSPHORIC ACID	3387.96	<35	<0.37	<.003
	SULFURIC ACID		21	0.23	.001
	NITRIC ACID		<15	<0.16	<.001
2-OUT	PHOSPHORIC ACID	3306.17	<41	<0.50	<.004
	SULFURIC ACID		<20	<0.24	<.002
	NITRIC ACID		<18	<0.22	<.002
3-OUT	PHOSPHORIC ACID	3399.81	<38	<0.50	<.004
	SULFURIC ACID		<19	<0.24	<.002
	NITRIC ACID		<17	<0.22	<.002
4-OUT	PHOSPHORIC ACID	3386.39	<37	<0.42	<.003
4-OUT	SULFURIC ACID		<18	<0.20	<.001
	NITRIC ACID		<16	<0.19	<.001
BLANK	BLANK.... PHOSPHORIC ACID			SUBTRACTED	
	BLANK.... SULFURIC ACID			SUBTRACTED	
	BLANK.... NITRIC ACID			SUBTRACTED	

	ANALYSIS REQUESTED	METHODOLOGY
	NITRIC ACID	OSHA METHOD ID-127 EQUIVALENT
	PHOSPHORIC ACID	OSHA METHOD ID-111 EQUIVALENT
	SULFURIC ACID	OSHA METHOD ID-113 EQUIVALENT