

Memorandum

CAL/OSHA REPORT

Marc Lappe, Ph.D., Director
HALTS
Department of Health Services
Berkeley

Date : April 14, 1980

Subject Plastic Pipe Joining Study

Telephone: ATSS ()
()

AN=318

m : Department of Industrial Relations
Milt Mason, Head
Health Targeting Unit
Division of Occupational
Safety and Health
Berkeley

Milt

Transmitted herewith is a report and related information of subject study in accordance with Assembly Concurrent Resolution 98, as follows:

- Memo: Lappe to Mason, February 27, 1980 describing scope and timing.
- Study Outline: Beck, February 8, 1980.
- Field assignment (B1798-005-80): typical.
- Memo: Phund, March 13, 1980.
- Memo: Fynboh to Mason, April 11, 1980.

The latter memo summarizes the locations, field monitoring data, conclusions and recommendations of nine field studies conducted according to your suggested scope. Due to Cal/OSHA protocol and limited time, we had to locate and sample conditions as we found them. Most of the study was conducted during a prolonged wet period and precluded observation of conditions that may be representative of warmer temperatures or different working environments.

/ai
att

cc Richard Wade
Roxanne Fynboh

BFG06515

20787001

Memorandum

To : Milt Mason
Occupational Safety

Date : February 27, 1980

Subject: Plastic Pipe

From : Marc Lappe', Ph.D. *M*
Director, HALTS

This is to confirm our conversation today about the minimum components of a complete testing of worker exposure to plastic pipe products and their solvent cements and primers.

We agreed that with the passage of ACR 98 (Pappan) this testing has become of highest Departmental priority. We further agreed that at a minimum work conditions at eight sites would be studied systematically; that vinyl chloride monomer residues and worker exposures would be measured; that PVC dust samples would be measured (full eight hour shift); and that the full spectrum of solvents identified in ACR 98 would be measured.

I agreed to identify one or more lead persons from the pipefitters' union who would work with Lou Beck to get a better information flow on sites and times of maximum activity. I also understand that you will take under consideration Lou's suggestion to involve more staff. I would strongly urge you to do so in light of the importance of this study and the difficulties encountered over the last two months in acquiring the needed data.

Finally, we agreed that April 1 was the last possible date for sample collection and that you would coordinate and obtain the highest possible priority for lab sample processing.

Thank you again for your cooperation and enthusiasm for this project.

cc: Bill Clark, M.D.
Donald Lyman, M.D.
Richard Wade, Ph.D.

ml:vk

cc Lou Beck

BFG06516

20787002

Plastic Pipe Joining Study

Outline

I Assignment of project

II Research basic information on plastic pipe industry

- a. First limitation: look at primarily PVC and ABS piping
- b. Types of glues and constituent solvents
 - 1. Tetrahydrofuran
 - 2. Dimethylformamide
 - 3. Cyclohexanone
 - 4. Methyl Ethyl Ketone
- c. Other chemicals
 - 1. PVC
 - 2. VC
 - 3. Acrylonitrile
 - 4. Butadiene-Styrene
- d. Various industries
 - 1. Performed by HALTS
- e. Analytical capabilities
 - 1. Sampling method
 - 2. Lab analysis

III Field research

- a. Field locations specified by HALTS
- b. Job site visitation with sampling of operation
- c. Repeat visits to job site
- d. Submission of lab samples
- e. Calculation of lab results

IV Submission of results to HALTS

I and II have been completed

III is ongoing and can last as long as time allows

III a is incomplete

III b, c, d, all vary in time requirements. Lab turnaround varies from 1 week to several months

Lou Beck February 8, 1980

BFG06517

20787003

OHB INITIATED FIELD INVESTIGATION

DHF-02

1. Location of DIS Office That Has Jurisdiction Over Company Investigated: Region: 1 District: 2

2. SIC No.

1711 ☒ S
L

3. Investigation Identification For This Assignment:

LD. No. B1798 Rpt. No. 005 Year 90 Type 6

4. Type of Investigation:

6 Self Initiated
8. Carcinogen

5. Location:

a. Name of Company

La Noe Plumbing Co

b. Address

2980 S. Winchester Blvd, Campbell 95008

c. Location In Plant

Fabrication shop 3-12 people

d. Contact Persons (If Any)

Name

Title/Affiliation

Phone No.

408-378-6921

e. Other Information

Lloyd Williams, Pipefitters Local, San Jose
408-225-3030 Contact man

6. Reason For This Assignment - Check One

Target Health Industry ☒ 11Target Health Substances ☐ 12O.D. Report ☐ 13Local Health Department Referral ☐ 14Carcinogen Reported ☐ 15Carcinogen Suspected ☐ 16Follow-up, To Previous Investigation ☐ 17LD. No. ☐ ☐ ☐ ☐ Rpt. No. ☐ ☐ Year ☐ ☐ Type ☐7. Priority Rating For This Assignment: (1 is high; 2-5 low) 3

8. Problems To Be Evaluated Should Include:

a. Fumes

d. Solvents

g. Heat

j. Medical

b. Vapors/Gases

e. Skin Irritants

h. Radiation

k. Carcinogen

c. Dust

f. Noise

i. Other Chemicals

1 OtherABS pipe

Comments:

This is a self initiated study in the
Plastic pipe joining project.

Assigned To:

Lou Beck

Assigned By:

Milt Mason

Date of Request:

2-14-80

Memorandum

Roxanne Fynboh, Cal/OSHA
Milt Mason, Cal/OSHA
Marc Lappe, HALTS

Date : March 13, 1980

Subject: Plastic Pipe Monitoring

from : Nancy Pfund, HALTS

Here is some of the latest information I have on plastic pipe sites. I hope we can get together next week to coordinate our efforts.

1. In order to measure some levels at sites where PVC, not ABS, pipe is being installed, I am currently contacting pipefitters business agents in the valley and in Southern California to see if such work is going on. Bill Coss (of the Martinez Pipefitters Union) said it was more likely that PVC work would be going on down south because of warmer temperatures. It is important that we measure both PVC and ABS pipe, both because of their different components and the different primer and solvent compositions which they require. As soon as I get some sites, I will give them to you.
2. There is one PVC site in the Bay Area which can be monitored: Harding Park, at Lake Merced (it's the San Francisco golfcourse). The person to contact in order to get a union business agent to go out with you is Larry Mazola, 626-2000. Because we are interested in the effect of temperature on exposure patterns, we will need the temperatures of sites like this, for comparison purposes. (Lou Beck knows about this.)
3. I have talked with Bill Coss about our apprentice-shop simulation and we agreed to shoot for the end of March or early April for this test. Fridays are the easiest days to get people there, so that should be the first-choice. At this point, we are intending to do 3 separate measurements at 10° intervals, but details have not yet been worked out. In addition to measuring air levels, we will most likely send our staff physician, Jon Rosenberg, to measure pulse and breathing rates, skin absorption, etc.
4. In the near future, I plan to meet with a few more of the pipefitters and to go look at the apprentice shop. If you are interested in doing this with me, please let me know. Also, I would appreciate knowing what the scope and status of your activities are, so please call me at 2790 when you have a chance. Thanks.

BFG06519

20787005

Memorandum

To : Milt Mason, Head
Health Targeting Unit
DOSH, Berkeley

Date : April 11, 1980

Subject: PVC & ABS Pipe Health
Hazard Study

Telephone: ATSS (8) 571-2673
(415) 540-2673

From : Department of Industrial Relations
Roxanne Fynboh *R.F.*
Industrial Hygienist
DOSH, Berkeley

The following information and occupational exposure data was obtained as requested for Hazard Alert Systems (HALTS) pursuant to Assembly Concurrent Resolution 98. ACR 98 mandates that state agencies investigate and submit data pertaining to the health hazards associated with current installation methods and the use of Poly-Vinyl Chloride (PVC) and Acrylonitrilebutadienestyrene (ABS) plastic pipe.

HALTS specifically requested industrial hygiene monitoring data which would represent plumbers' exposures to:

- 1) The solvents present in the glues used to "weld" the pipe pieces together. These solvents are usually methyl ethyl ketone, dimethylformamide, cyclo hexanone and tetrahydrofuran singularly or in some combination;
- 2) Vinyl chloride and acrylonitrile monomer liberated during gluing operations; and
- 3) PVC and ABS dust concentrations present during pipe cutting.

I found that the pipe installation consists of four phases. These are prefabrication, "roughing", "topping off" and "finishing work".

Prefabrication can be described as a mass production of certain pipe configurations when a large number of the same type will be needed for a particular building site. This is normally done indoors and involves the cutting and gluing of the pipe to specifications. These configurations are often referred to as "trees" and are taken to the construction site for installation during the "topping off" phase.

The "roughing" phase consists of the installation of the pipes leading from the main city sewer and water lines to and throughout the crawl space or basement of the structure. This is usually done in the open at the point when the building construction consists of the foundation and floor studs.

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Following the "roughing" phase, floor boards are laid and walls are constructed, although not covered. The next phase, "topping off" is the installation of the pipes branching off from the floorboard pipes, up through the walls and ceiling of the structure to the points where fixtures will be installed.

Finally, the "finishing work" is the plumbing connected after the fixtures and cabinets, vanities or wet bars have been installed. This involves the attachment of the fixture to the pipes in the wall usually inside cabinets under the sinks. Pages 7-11 show photographs of each phase.

The majority of the exposure data was collected during the "finishing work" phase. The main reason for this is the wet ground conditions at this time of year which limits the number of new installations. Also, PVC pipe is not used as frequently as the ABS, as its use is limited to non-potable water conveyance. Therefore, its major uses are in irrigation and in the "roughing" phase. Only one study contains PVC related exposure data.

The table on page 5 presents employee exposure data from inspections of a total of nine different plumbing contractors and the monitoring of 17 employee exposures. Proceeding the table is an explanation sheet clarifying each column. The time weighted average and excursion values are based on sampling results from the monitoring of employee breathing zones using current Cal/OSHA methods (page 6 has further details). Vinyl Chloride and acrylonitrile monomer were monitored to determine concentrations in employee breathing zones and in bulk samples of the glue. These results are not reported as they were found to be below the limit which can be detected accurately by the laboratory. Samples were obtained to determine PVC & ABS dust concentrations during pipe cutting operations. These also are not reported as levels were found to be very low ($\leq 1 \text{ mg/m}^3$).

The monitoring results show employee exposure data to be within current limits as established by Cal/OSHA. Excursion exposures are below short term exposure limits recommended by the American Conference of Governmental Industrial Hygienists, (refer to page 4).

The limited number of data and the unavailability of exposure data for certain operations (such as repair work, and additional "roughing" and "topping off" data), and for exposures during hotter summer months (all primarily due to a restricted time frame for the study) made the data inconclusive. However, it does appear that the "finishing work" has the potential for showing the highest exposure levels due to the enclosed work space.

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Milt Mason, Head HTU
April 11, 1980
Page 3

I observed that nearly all of the plumbers did not wear hand protection while gluing. When questioned, the usual reply was that they preferred not to as they felt gloves limited dexterity and were uncomfortably warm in summer months. The glues get on the hands and forearms during the course of their work and harden quickly (see photographs on page 12). Some skin is often peeled off in its removal. The use of hand protection should be strongly recommended. Also, particularly during the finishing operation, there is the potential for face and eye contact with the glues. Goggles or a face shield could decrease this potential.

Many plumbers complained of a "drunken" feeling which they have experienced proceeding a good "whiff" of the glue when working in enclosed spaces, particularly during the summer months. This effect was not observed during these particular inspection studies.

This is a brief overview of the inspections conducted. Additional and detailed information can be obtained from the individual inspection files.

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LIST OF CURRENT ESTABLISHED OCCUPATIONAL EXPOSURE LIMITS

<u>Substance</u>	<u>Current Cal/OSHA</u>	<u>Current ACGIH</u>	<u>Current Recommended</u>
	<u>PEL (ppm)</u>	<u>TLV (ppm)</u>	<u>ACGIH STEL* (ppm)</u>
2-Butanone (methyl ethyl ketone)	200	200	300
Cyclohexanone	50	25	100
Dimethylformamide (skin)	10	10	20
Tetrahydrofuran	200	200	250
PVC and ABS dust**	10mg/m ³	10mg/m ³	-
Acrylonitrile	2ppm	none	-
Vinyl Chloride monomer	1ppm	5ppm	-

*Short term exposure limit is defined by A.C.G.I.H. to be the maximal concentration to which workers can be exposed for a period up to 15 minutes without suffering irritation, narcosis or chronic effects.

**As nuisance dusts.

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BFG06523

CUPATIONAL EXPOSURE DATA FOR PLASTIC PIPE STUDY

(1) Study No.	(2) Type of Operation (or Plumbing phase)	(3) Plumber	(4) Glue Type	(5) Components of Glue (Volatile)	(6) Sample Type	(7) Temperature Approx, F.	TWA (ppm)		(9) Highest Excursion THF CYCL. ppm MEX
							(8)	(8)	
F6399 033	Finishing	A	eld on BS 773	Essentially 100 % MEX	Charcoal Tube	55 - 60	7.1	*	127.0 (27)
"	"	B	"	"	"	55 - 60	0.1		2.8 (22)
F6399 032	"	C	"	"	"	55 - 60	12.0		146.0 (33)
"	"	D	"	"	"	55 - 60	1.8		42.3 (20)
F6399 026	"	E	"	"	"	55 - 60	151.9 **		Not Avail.
F6399 031	"	F	"	"	"	Not Avail.	2.5		32.4 (30)
F6399 030	"	G	"	"	"	Not Avail.	0.8		14.5 (25)
"	"	G	"	"	"	Not Avail.	3.4		101.0 (16)
F6399 028	"	H	torseal	"	"	Not Avail.	2.7		30.9 (24)
"	"	H	"	"	"	64 - 70	0.1		Not Avail.
"	"	I	"	"	"	64 - 70	0.1		Not Avail.
"	"	H	"	"	"	64 - 70	0.8		Not Avail.
"	"	I	"	"	"	64 - 70	0.4		Not Avail.
F6399 027	Pre Fab	J	BS 773	"	"	55 - 60	4.9		3.1 (33)
F6399 025	"	K	ey Special ent for ABS	"	"	58 - 61	12.7		5.7 (43)
"	"	L	stic Pipe	"	"	58 - 61	5.0		Not Avail.
(FVC PIPE INSTALLATION STUDY)									
F6399 034	Roughing	M	d on P-470 mer anese PVC v. Cement	THF, DMF	Charcoal Tube & Silica Gel Tube	61 - 63	6.4	5.5 3.1	
"	"	N	"	THF, DMF, CYCL	"	61 - 63	1.5	7.2	2.6 15.2 0.02 0.0 (18)

* Levels found were negligible or none
 ** This particular TWA is believed to be highly questionable, as it does not reflect conditions observed, nor is it similar to results obtained from near identical situations. A possibility is that the charcoal tube may have come into close contact with the glue applicator or container.

20787013

Explanation of Columns in Table

- Column 1: A different study number is assigned to every Cal/OSHA inspection. In this case, each study number represents a plumbing subcontractor.
- Column 2: This column reports the time of operation or plumbing phase in progress when the sampling results were obtained. A description of each phase can be found on page 1. (See also photographs on pages 7-11.)
- Column 3: Letters were assigned to represent the individual plumbers monitored.
- Column 4: This is the manufacturer's trade name for the particular glue in use during the inspection.
- Column 5: This column lists the volatile components of the glue listed in Column 4. These components were verified by the Air and Industrial Hygiene Laboratory.
- Column 6: Lists the type of sampling collection media. Monitoring was conducted using a personal sampling pump at a rate of approximately 1 liter per minute. The charcoal or silica gel tube was placed on the employee's lapel as close to the employee's breathing zone as possible.
- Column 7: Ambient temperatures during sampling.
- Column 8: Time-weighted average values were calculated for each employee exposure. In most cases these values were calculated based on long-term sampling data. Where the employee completed the gluing work for the day, the remainder of the shift was not monitored and assumed to be zero exposure.
- Column 9: Excursion values are given when available. These values represent an effort to determine maximum concentrations employees may be exposed to during a short-time period. The sampling period, in minutes, is in parentheses next to the exposure level.

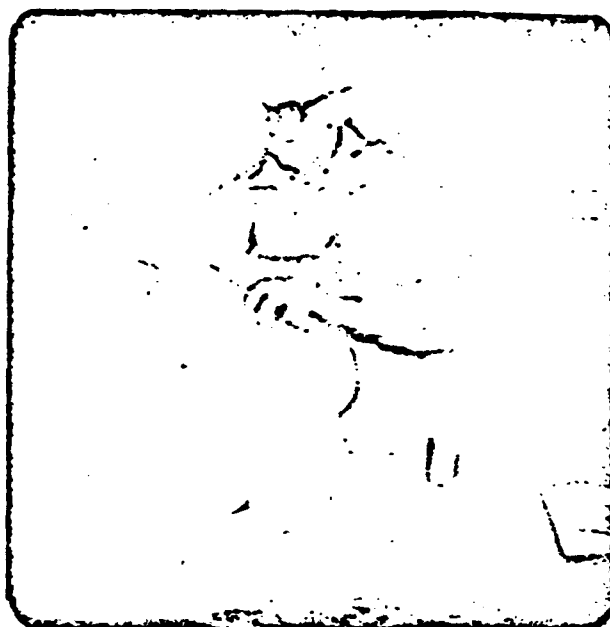
20787011

BFG06525

I. PREFABRICATION

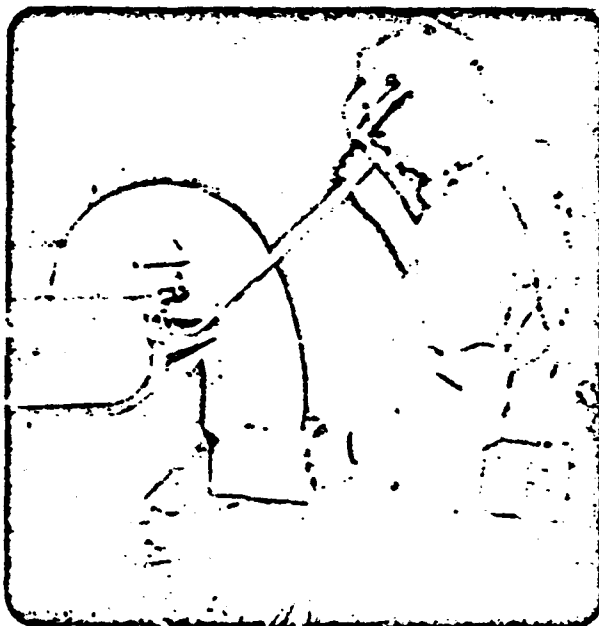


1.



2.

Photographs 1 and 2 : Gluing of plastic pipe during prefabrication.



3.

Photograph 3 : Cutting of plastic pipe during prefabrication using an abrasive saw.

20787012

BFG06526

1. INSPECTION IDENTIFICATION

IDENT NUMBER: **F6399** REPORT NO: **026** FISCAL YEAR: **80** TYPE: **6**

DATE INSPECTION WAS STARTED: MO **03** DAY **12** YR **80** REGION: **1** DISTRICT: **3**

2. PRIMARY SIC S-STATE **1522** L-LOCAL **X** E-PRV INDUSTRY: ESTABLISHMENT CODE: **000000**

3. ESTABLISHMENT NAME
SUPERB MECHANICAL

4. STREET NUMBER
1111

5. STREET NAME
ST. LOUIS RD.

6. CITY
PLEASANT HILL

7. COUNTY CODE
06

8. ZIP CODE
949

9. TELEPHONE NUMBER
(415) 758-2610

10. TYPE OF LEGAL ENTITY
Partnership

11. TYPE OF BUSINESS
Plumbing (sub-contractor)

12. ADDRESS OF PRINCIPAL OFFICE (Mailing Address)
949 3rd Ave.

(City) (State) (Zip Code)
Pinole CA 949

13. ADVANCE NOTICE GIVEN ☒ Y/N

14. FOLLOW-UP INSPECTION

IDENT NUMBER: **0000** REPORT NO: **000** FISCAL YEAR: **00**

15. NUMBER OF EMPLOYEES

EMPLOYED IN COMPANY (ALL BRANCHES)	35
EMPLOYED IN ESTABLISHMENT (OR SITE)	3
AFFECTED BY INSPECTION	3

16. ENGINEER SIGNATURE *Baranne Furbush* **DATE** **5/1/80**

16. REASON FOR INSPECTION (Check one)

ACCIDENT INITIATED ☐ COMPLAINT INITIATED ☐ FOLLOW-UP ☐

A ☐ B ☐ C ☒ D ☐ F ☐

SUB PERMIT OTHER SCHEDULED COMPLAINT LOG NO

17. DIS REQUESTED TECHNICAL ASSISTANCE FROM OR ENFORCEMENT ASSISTANCE WAS REQUESTED BY HEALTH

(For DIS use only) TECHNICAL ASSISTANCE REQUESTED BY DIS ☐ Y/N

(For OHS use only) ENFORCEMENT ASSISTANCE REQUESTED BY HEALTH ☐ Y/N

18. EMPLOYER EVALUATION

GOOD FAITH: G ☒ 30% F ☐ 15% P ☐ 0%

SIZE: 1-10 ☐ 40% 11-25 ☐ 30% 26-60 ☒ 20% 61-100 ☐ 10% 100+ ☐ 0%

HISTORY: G ☒ 10% F ☐ 5% P ☐ 0%

19. EMPLOYEE REPRESENTATIVE EXERCISED WALKAROUND PRIVILEGES DURING THIS INSPECTION ☒ Y/N/X

20. EMPLOYEE(S) INTERVIEWED ONLY ☒ Y/N/X

21. RECORDKEEPING INJURIES/ILLNESSES

Log (Form 200) ☒ Y/N/X

SUPPLEMENT (5020-101-ins.) ☒ Y/N/X

22. REQUIRED POSTING

POSTER ☒ Y/N

CITATION ☒ Y/N/X

INJURY ILLNESS SUMMARY (Form 200) ☒ Y/N/X

23. INSPECTION

WALL-TO-WALL ☐ C

PARTIAL ☒ P

NO INSPECTION ☐ N

24. EMPLOYER FOUND TO BE IN COMPLIANCE

DIS ☐ Y/N/X For DIS use only

OHS ☒ Y/N/X For OHS use only

25. DATE INSPECTION WAS COMPLETED

MO **05** DAY **20** YR **80**

26. CAL OSHA 4 ☒ Y/N

27. DISTRICT MANAGER SIGNATURE *Miller* **DATE** **5-20-80**

20787018

BFG06532

Jamie Jones

Foreman - 3020 Garrow Dr
Antioch

Pete Alonzo

Superintendent 759-1691
General Cont.

☒ ☒ ☒
☒ ☐ ☒
☐ ☐ ☐

28. EMPLOYEES CONTACTED

NAME	ORGANIZATION AND TITLE	HOME ADDRESS	REP	WALK AROUND	CONFIDEN- TIALITY	TELEPHONE
Bill Coss	Business Rep	1308 Roman Way, Martinez 94553	Y	Y	-	229-0900
John Darke	Local 159	↓	Y	Y	-	229-0900

29. OPENING AND CLOSING CONFERENCE SUMMARY AND ADDITIONAL COMMENTS

30	CHECK LIST
☒	CAL/OSHA Program
☒	Employee Rights
☒	Variances
☒	Inspection Procedure
☒	Security Clearance
☒	Violations
☒	Citation Procedure
☒	Penalty Calculation
☒	Right to Appeal
☒	Right to Informal Conference
☒	Follow up Procedure
☒	Invite Questions
☒	Offer Help Summarize
☒	Employee Conference

3/12/80 - Opening conference held by Lou Beck, CAL/OSHA & N. with Jamie Jones, foreman at this site. All items covered as in P+P. Note - Union business representative notified foreman at site that we would be coming.

closing conf - A form letter was mailed (to employers involved in the plastic pipe study) containing closing conference information. A copy is contained in this report. Union Bus. Reps. were contacted.

31. IN YOUR OPINION IS A FOLLOW UP NECL. SARY? ☐ YES ☐ NO

32. EVALUATION OF SAFETY AND HEALTH PROGRAM

	EFFECTIVE	AVERAGE	INEFFECTIVE	PROTECTIVE EQUIPMENT	EFFECTIVE	AVERAGE	INEFFECTIVE
SAFETY RESPONSIBILITY	☐	☒	☐	no gloves	☐	☐	☒
EMPLOYEE PARTICIPATION	☐	☒	☐	HOUSEKEEPING	☐	☒	☐
TRAINING	☐	☒	☐	FIRST AID	☐	☒	☐

33. Region 1 District 3 Ident. E10399 CAL/OSHA 1 Rep. No. 26 Fiscal Yr. 80 CAL/OSHA Rev. June 15:

BFG06533



ESTABLISHMENT NAME: Superb Mechanical

2. PAGE: 1 of 17

3. SURVEY SUMMARY

The company is engaged in: plumbing installation
using the following operation(s): finishing work in
bathrooms and kitchens (as witnessed on day of inspection)
- company also installs pipes during "roughing" and "tapping off" phases

1. Description of equipment, processes and raw materials used in the operation(s): as weather permits

ABS pipes, weld on 773 glue (essentially 100% methyl ethyl ketone)

2. Production rates are: variable

Work Hours 8:00-4:30

3. The company's buildings or worksite consist of: Construction sites

4. Ambient weather conditions were: clear, moderate

Windows and/or doors were: (OPEN) CLOSED

Heating system: ON (OFF) Type: NOT APPL.

Air Conditioning: YES (NO) ON OFF

5. Hazards evaluated:

Exposures to solvents in glue used to "weld" pieces of
ABS pipe together during finishing work under sinks.

Time weighted averages were found to be within
current CAL/OSHA PEL

see report for further detail

6. Flow diagram: (YES) NO Page 4+5. Sketch or map: YES (NO) Page

7. I.H. SIGNATURE: Rebecca Lynbach

8. DATE: 5/1/77

9. REGION 1 DISTRICT 3 IDENT. NO. FL 379 REPORT NO. 126 FISCAL YR. 77

(Optional) CAL/OSHA 1B
MAY 1979

BFG06534

20787020

AL RELATIONS
OCCUPATIONAL
HEALTH

WAY, FIFTH FLOOR
SAC 704

ADDRESS REPLY TO
2171 BAYVIEW AVE 5TH FLOOR
BERKELEY, CA 94704

May 13, 1980

Mr. Pete Alonzo
Huffman Road
6379 Clark Avenue
P.O. Box 2755
Dublin, CA 94566

Dear Mr. Alonzo:

This letter is to inform you of the results of the recent CAL/OSHA industrial hygiene inspection at your site conducted on 3/12/80.

As you will recall, air samples were collected near employee breathing zones to determine glue solvent concentrations during the cementing of plastic pipe. Laboratory analysis of these samples indicated that for the observed conditions (i.e., such as the outside air temperature and amount of gluing on this particular day), employee exposures were below the current CAL/OSHA permissible exposure levels. Therefore, no citations will be issued based on these samples.

However, it was noted during the inspection that plumbers do not use hand protection while working with the glues. As a result, glue that gets on the hands and forearms during the course of their work hardens and is difficult to remove. Some skin is often peeled off in its removal. Solvents should never be used to remove the glue from the skin. Flexible, impermeable gloves are available from safety supply stores. The correct glove can be selected by consulting with the manufacturers and the supply store. I strongly suggest that this be done and under California Administrative Law, it is the employers responsibility to provide personal protective equipment and insure that it is worn when necessary.

Also, some glues (particularly those used in cementing PVC pipe) contain the chemical Dimethylformamide. This chemical is absorbed through intact skin and therefore contributes to an employees exposure via this route. Gloves impermeable to this substance should always be worn while working with these glues. These glues were not observed in use during the time of the inspection and this information is provided for your own future reference. Failure to provide and insure the use of gloves when employees are working with substances which can be absorbed through the skin can result in a citation.

20787021

BFG06535

Page 2

This letter substituted for a formal closing conference. I would like to thank you for your cooperation and information. If you have any further questions about this or any other occupational safety and health matter, please feel free to contact me.

Sincerely,

Roxanne Fynboh

Roxanne Fynboh
Industrial Hygienist

RF/rmf

BFG06536

20787022

memorandum

12 p. 2 of 12

File

Date April 11, 1980

Subject:

Telephone: ATSS ()
()

From : Department of Industrial Relations
Roxanne Fynboh *R.F.*
Industrial Hygienist

This inspection was conducted pursuant to Assembly Concurrent Resolution 98 (ACR 98). ACR 98 mandates that state agencies collect and submit data concerning the health hazards associated with plastic pipes and the current methods used in their installation. The evaluation of these hazards was originally assigned to the Hazard Alert System (HALTS). HALTS requested assistance from the DOSH industrial hygiene section.

Specifically requested was industrial hygiene monitoring data which would represent plumbers' exposures to:

- 1) The solvents present in the glues used to "weld" the pipe pieces together. These solvents are usually methyl ethyl ketone, dimethylformamide, cyclohexanone and tetrahydrofuran singularly or in some combination;
- 2) Vinyl Chloride and acrylonitrile monomer liberated during gluing operations; and
- 3) PVC and ABS dust concentrations present during pipe cutting.

This project was assigned to me when Lou Beck, the field industrial hygienist who was initially assigned the study, left state service in mid-March. Lou had opened several studies and had conducted opening conferences and some exposure monitoring. Therefore, some of the inspection files contain two Cal/OSHA 1 forms. The one identified by Lou's study number contains information he gathered, while the other one identified by my study number contains any additional notes.

Briefly, the scope of the inspections was limited per instructions. Only the hazards specified by HALTS were evaluated. The reason for this was the very optimistic time limit set forth by the Assembly. Representatives of the subcontractor or general contractor were, however, in each case shown identification and informed of the possibility of citations. (This per Lou Beck and myself.) Opening conference, particularly at construction sites, were often abbreviated and held with whomever was available. No attempt was made to contact or go to the main office of the subcontractor to obtain information such as injury/illness records, and safety program details when it was not available at the site. (These items are, however, necessarily checked off on all Cal/OSHA 1's for processing purposes). The main purpose of these inspections was to collect as much exposure data as possible within the limited time frame.

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URNAME
A 5-1001 (1-80)

Generally, there are four stages to the plastic pipe installation:

1. "Prefabrication"
2. "Roughing"
3. "Topping off"
4. "Finishing Work"

A description of each stage can be found in the files. Most of the work monitored was finishing work (ABS pipe) as the other stages are limited by the wet ground conditions at this time of the year.

All samples collected were given top priority by the AIHL. All were found to represent TWA's within the current Cal/OSHA PEL's.

Methyl Ethyl Ketone was the most common solvent found in the ABS glues (essentially 100% of the volatile components in the glues observed in use). Skin exposure appears to be the most serious health hazard. I observed that nearly all of the plumbers did not wear hand protection while gluing. When questioned, the usual reply was that they preferred not to, due to the limited dexterity and that the gloves were uncomfortably warm particularly in the summer months. The glues get onto the hands and forearms during the course of their work and hardens quickly. Some skin is often peeled off in its removal. The use of hand protection will be strongly recommended. Also, particularly during the finishing operation, there is the potential for face and eye contact with the glues. Goggles or a face shield could decrease this potential and will be recommended. Many plumbers complained of a "drunken" feeling proceeding a good "whiff" of the glue when working in enclosed spaces, particularly in summer months. However, this effect was not observed during these particular inspections.

It must be noted that the plumbers' exposures are highly variable. Most of the plumbers are involved in all stages of the pipe installation, which varies with the time of year and daily weather conditions.

Union Business Representatives for different counties were contacted by HALTS to supply us with information concerning job locations.

See the final report submitted to HALTS for more detail. A copy of this report can be found in file # F6399 028 80. The other files pertaining to this study are: F6399 025 80, F6399 026 80, F6399 027 80, F6399 028 80, F6399 030 80, F6399 031 80, F6399 032 80, F6399 033 80, F6399 034 80.

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F 6399

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Page 4 of 12 Pages

Additional Sampling Notes

Employee sampled is doing "leak-testing" work. This involves installing the "P-trap" and "flap arm" under the sink.

Using Weld-on 773 for ABS pipe, Black, medium bodied (our lab has analyzed this & found the volatile portion to be essentially 100% MEX)

Procedure for installation -

each sink takes approx 7-8 min.

1st Step - moves equip (glue, cutter, etc.) to sink area, lays down cardboard under sink, etc - this prep time takes ~ 3-4 min.

2nd - measures & cuts pipe - this takes approx 1-2 min

3rd - applies glue to both ends of pipe to be fitted together (he takes ~ 10 sec. to apply glue to pipe for ea. weld) - actual use of glue is less than a min. for ea. pc.

4th - fits pieces together

F6349

426

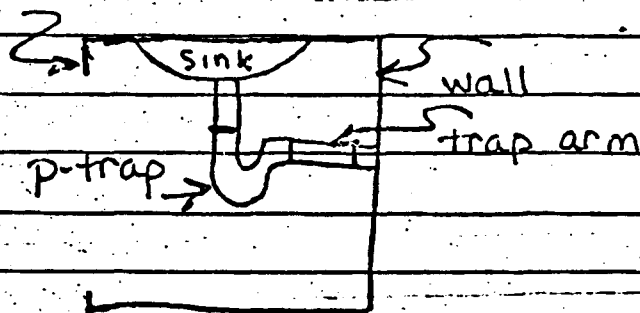
80

6

Richard was his torso under the sink when he is installing pieces.

Avg cabinet under sink - 36" ht, 24" depth
48" width

Cabinet



per Tarnie:

Depending on the job, employee may spend all day doing finishing work & do it for months.

However, normally they do the finishing work when it rains.

May last yista few minutes to all day.

* Also - Richard set up to do these sinks for us - normally they work in teams of 3 & must first do the prep work which involves putting a metal tail pc. in - this was all done ahead of time so we could sample a whole day of gluing?! actually can not do this many?!

163-1-4

424

84

C

3/12/80

Page 11 of 12 Pages

Jean - Mgr.

LOS MEDANOS PLUMBING CO.

Take Locality Rd off of 4, left at 4 way stop

2025 E. Leland Rd

No 200's at site
POSTER

3-6 CCS

Safety meetings
Safety Insp. by OHS
Canner

Union Hdqts - LOCAL 159

PIPEFITTERS

Take Morello ave exit off 4

Business
Rep.

John Darke

1308 Roman Way

Bill Coss

TUES MORNING - 8:00

20787027

100 99

126

N/A

C

Partnership

Superb Mechanical

Superb Mechanical

9119 2nd Ave

1101 Mechanical

Pine, CA

Superb

7587610

K&B Homes - Contractor

Diablo Valley Estates

St. Louis Rd.

Jamie Jones

Foreman

3020 Garrow Dr.

Superb

Antich

35 company
3 at site

754-1641

20787028



STABLISHMENT Diablo Valley Estates, P.H.
HAZARD Solvent Vapors CODE
3. A. LOCATION, WORKSTATION, OR OPERATION Finishing work - installing plumbing under sinks B. JOB CODE
4. NAME OF WORKER Richard Betti - 914 Kilkenny Way
5. INSTRUMENT/ID No. FLB1 FLB4
SM-1 SM-2
6. CALIBRATION METHOD DOSH X OTHER (Attach calib. report)
10. SAMPLING METHOD DOSH C-tube 11. SAMPLE TYPE PERSONAL 12. SAMPLING DATE 3 12 80
Mo. Day Yr.
☐ OTHER ☐ MATERIAL ☐ OTHER
(Explain on reverse side)

7. CITATION Page 1 of 1
8. YES NO
☐ ☒ A. More than one worker sampled at this location? See page
☒ ☐ B. Worker sampled for more than one hazard? See page Same page
☒ ☐ C. Photograph taken of this worker at this location?
☐ ☒ D. Medical participation?
9. A. No. of workers affected 35
B. No. of lab. samples 6
C. No. of direct readings 0
DATE SUBMITTED 3 14 80 DATE RETURNED 3 21 80
Mo. Day Yr. Mo. Day Yr.
INITIALS: See Lab Analysis
Chemist Supervisor

14. LAB No. A.	FIELD No. B.	SAMPLING TIMES C.	INSTRUMENT Reading/Flowrate, etc. D.	Ave. Flowrt. E. Elapsed time	VOLUME (Liters) F.	Exposure time represented by sample G.	15. LABORATORY RESULTS (ppm)
00476	SM 1	10:27 12:00	53 (1 LPM) 1.16 LPM	1.08 LPM 93 MIN	100.4	10:27-12:00	351 MEK <u>X</u> .0005 AN
00476	SM 2	10:30 12:00	53 (1 LPM) 1.05 LPM	1.06 90	95.4	10:30-12:00	.0005 AN
00476	SM 3	12:45 15:17	(62551) 1.0 LPM .91 LPM	.95 152	144.4	12:45-15:17	265 MEK <u>X</u>
00476	SM 4	12:45 15:17	(62565) 1.0 LPM .87 LPM	.93 152	141.4	12:45-15:17	.0006 AN

16. CALCULATIONS: ☒ TWA ☐ PEAK CONCENTRATION ☐ CEILING
00476 (Blank SM 5)
00476 (Blank SM 6)
$$\text{MEK} = \frac{(93 \times 351) + (152 \times 265)}{480} = 151.92$$

$$\text{AN} = \frac{(90 \times .0005) + (152 \times .0006)}{480} = .0003$$

AN = <.0003 ppm
MEK = 152 ppm
18. RESULTS: VALUE DETERMINED MEK=152 ppm 19. DOSE .76 MEK
20. CSE/IH. SIGNATURE Rafael Fyrbich PHONE 42697 OFFICE Berkeley
* Note: Levels are highly doubtful. They do not correlate with levels from similar operations or from conditions actually observed. C-tube may have come into contact with glue.

REGION 1 DISTRICT F6399 IDENT. NO. 026 REPORT NO. 80 FISCAL YR. 5/20
CAL/OSHA 1C MARCH 1979

BFG06543

20787029



1. ESTABLISHMENT Diablo Valley Estates, P.H.

2. HAZARD Solvent vapors

3. A. LOCATION, WORKSTATION, OR OPERATION Finishing work -
installing plumbing under sinks

4. NAME OF WORKER Richard Bell - 919 Kilkenny Way
Flora 255-1475

5. INSTRUMENT/ID NO. FLB1
FLB9

6. CALIBRATION METHOD DOSH
SM-1
SM-2
(Attach calib. report)

10. SAMPLING METHOD ☒ DOSH C-tube ☐ PERSONAL ☐ MATERIAL ☐ OTHER
No. 3 Day 12 Yr. 80
(Explain on reverse side)

11. SAMPLE TYPE ☐ ROUTINE ☒ URGENT

13. LABORATORY SAMPLE ANALYSIS REQUEST: ☐ ROUTINE ☒ URGENT

ANALYSIS REQUESTED MEK - Samples 1, 3 + 5
AN - Samples 2, 4 + 6

INITIALS: See Lab Analysts
Supervisor

DATE SUBMITTED 3/14/80 DATE RETURNED 3/21/80
Mo. Day Yr. Mo. Day Yr.

A. LAB NO.	B. FIELD NO.	C. TIMES	D. INSTRUMENT	E. AVERAGE	F. VOLUME	G. EXPOSURE
00476	SM 1	10:27	53 (1 LPM)	1.08 LPM	100.4	10:27-12:00
00476	SM 2	10:30	53 (1 LPM)	1.06	95.4	10:30-12:00
00476	SM 3	12:45	62 (1 LPM)	1.01 LPM	144.9	12:45-15:17
00476	SM 4	12:45	62 (1 LPM)	1.02 LPM	144.9	12:45-15:17
00476	Blank SM 5					
00476	Blank SM 6					

15. LABORATORY RESULTS (ppm)

MEK = $(93 \times 351) + (152 \times 265) = 480$
AN = $(90 \times 0.005) + (152 \times 0.006) = 151.92$

* Note: Levels are highly doubtful. They do not correlate with levels from similar operations or from AN. Observed C-tube MEK into contact with glue

16. CALCULATIONS: ☒ TWA ☐ PEAK CONCENTRATION ☐ CEILING

17. GRAVITY FOR VIOLATION ☐ L ☐ E ☐ S

20. CSE/IN SIGNATURE Robert J. Smith PHONE 226-97 OFFICE 226-97

REPORT NO. 26 FISCAL YR. 80

Page 1 of 1

BFG06544

Page 1 of 1

2. Region ☐

District **3**

3. Date Submitted 3/14/80

Submitter Roxanne Fynboh

S. Phone No. X2697

Inspection/I.H. Investigation Identification:

I.D. No.					Ret. No			Yr	
F	6	3	9	9	0	2	6	8	00

Date Laboratory Results Desired: urgent

Sample Information:

Name of Establishment Superb Mechanical Plumbing

Address St. Louis Rd., Pleasant Hill

[illegible]

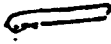
* Material = M; Bag = B; Settled Dust = S; Grab Sample = G; Impinger = I; Bubbler = Bu; ESP = E; Filter Paper = F; Other - Write In.

Comments:

20787031

CAL/OCHA II-10

BFG06545

TO			ROOM/STA. NO.		
 Roxanne Fyfe DOSH					
FROM			ROOM/STA. NO.		
R. GREN					
REPRESENTING					
DATE	TIME	PHONE			
Division of Occupational Safety and Health					
☐ Telephoned	☐ Please Call	☐ Yes, I want to see you			
☐ Returned Call	☐ Will Call Again	RECEIVED			
☐ Information	Note and	MAR 26 1980			
☐ Comment	☐ Re-visit	Department of Industrial Relations			
☐ Investigate	☐ Return	Berkeley Office			
☐ Contact Me	☐ File	☐ Forwarded			
☐ Per Request					
MESSAGE/REMARKS					
Samples run in duplicate - 4 vials 10X The standard used in the analysis. Results verified.					
BY					

STD 7 (REV. 10-79)

STATE OF CALIFORNIA
COMBINATION OF STD 7 AND 116 (ROUTE SLIP) ANNUAL SAVINGS \$8,200.

MESSAGE

7802-730 10-79 C27 34000

20787032

BFG06546

Name R. FYNBOH

Chemical H. Investigation Identification:

F	6	3	9	9	0	2	6	2	0	6
---	---	---	---	---	---	---	---	---	---	---

of Establishment SUPERB MECHANICAL PLUMBING

Address ST. LOUIS RD, PLEASANT HILL

3. Date This Report:

Mo.	Day	Yr
03	21	80

Laboratory Results

Lab. No. Lab. Use Only	Field No.	Laboratory Results
---------------------------	--------------	--------------------

ACRYLONITRILE

	PPM	MG/M3
496 SM-2	.000479	.0005 .00104
SM-4	.000590	.0006 .00123
SM-6	BLANK	

Signatures of Chemists Involved

Mervin L. ... 3-20-80

6. Signature of Supervising Chemist

Paula Piene 3/21/80
LBP

20787034

DIS ☐ Dist. ☒ 3
Name R. FYNDOH

Investigation Identification: AG377026806

of Establishment SUPERB MECHANICAL PUMPING

ST. LOUIS RD, PLEASANT HILL

3. Date This Report:

Mo. Day Yr.
03-21-80

Laboratory Results

Lab. No. Lab. Use Only	Field No.	Laboratory Results
---------------------------	--------------	--------------------

MEK

PPM

MG/M3

0476

SM-1

351

1040

SM-3

265

733

SM-5

BLANK

00476 The presence of Methyl Ethyl Ketone in the CS₂ extracts of SM-1 and SM-3 were confirmed by Glass Capillary GC/MS/DS analysis.

Signatures of Chemists Involved:

Theodore Belsky, Ph.D. 3-17-80
Theodore Belsky, Ph.D. 3-18-80

6. Signature of Supervising Chemist

Louis Piere 3/21/80
LDP

State of California - Department of Health
Health Protection System - Occupational Health Section

BFG06549

2078735

prelim. Report

#'s for ea. operation (field)

TABLE (SUMMARY)

type of
operation

values

Add'l comments

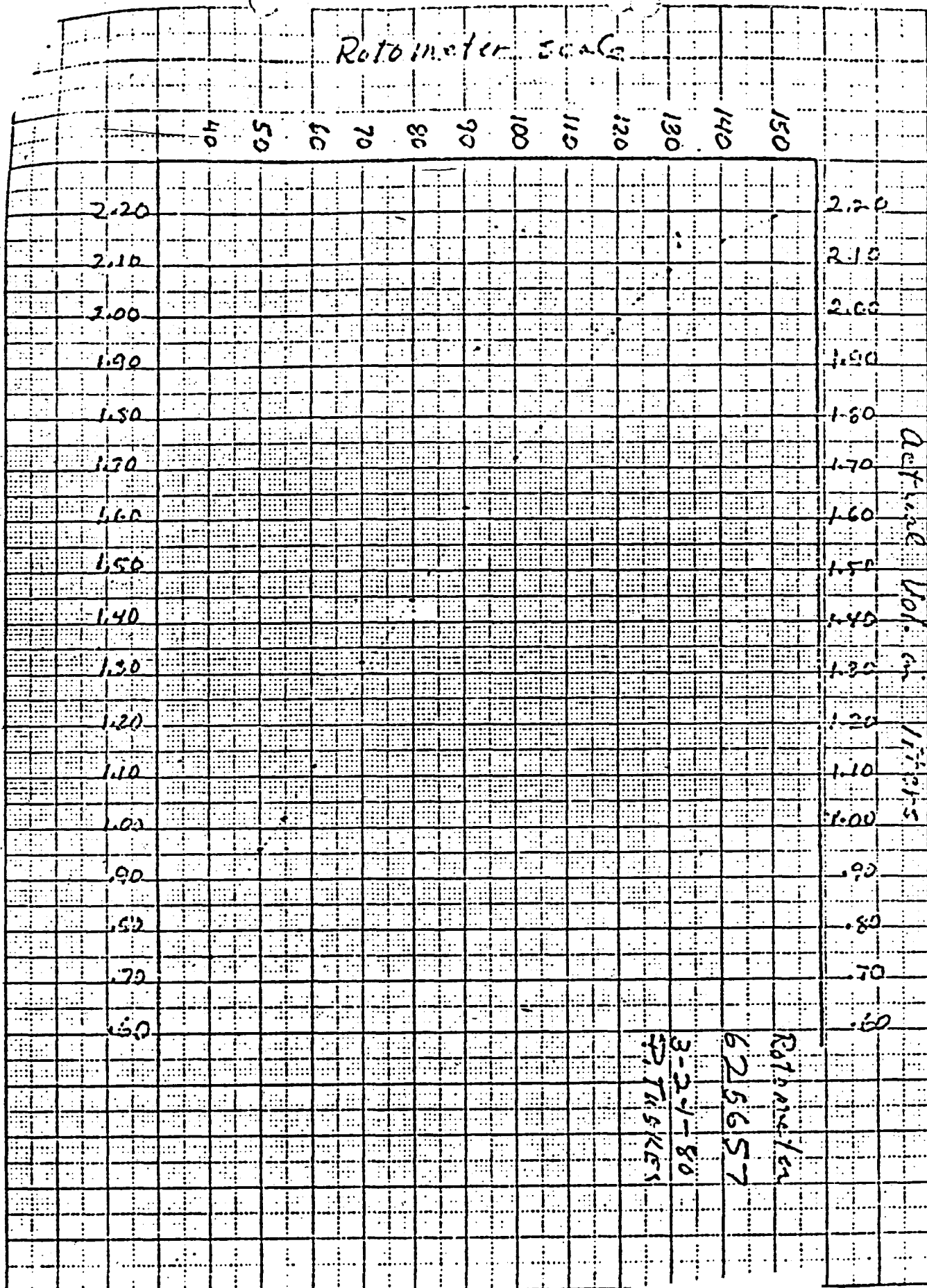
Description
any other info

recommendations + limitations

20787037

BFG06551

Rotometer scale



Rotometer
625657
3-2-1-80
77145/65

BFG06552

20787038

EQUIPMENT CALIBRATION SHEET

Description of Equipment Rotometer

Equipment I.D. No. 625657

Calibration Procedures Used: Established Procedure No. _____

or Other ☐ (describe on back of this sheet)

Calibration Medium Used: Air ☒ Contaminant (specify) _____

Other (specify) _____

Calibration Check Points

Reading (equipment)			Actual (calibration standard)		
		Sec.			
1.	<u>150</u>	<u>45.5</u>	<u>2.19</u>	11.	<u>50</u> <u>104</u> <u>.96</u>
2.	<u>140</u>	<u>46.5</u>	<u>2.14</u>	12.	<u>40</u> <u>132</u> <u>.75</u>
3.	<u>130</u>	<u>47.5</u>	<u>2.09</u>	13.	_____
4.	<u>120</u>	<u>50.2</u>	<u>1.99</u>	14.	_____
5.	<u>100</u>	<u>58.0</u>	<u>1.72</u>	15.	_____
6.	<u>90</u>	<u>61.5</u>	<u>1.62</u>	16.	_____
7.	<u>80</u>	<u>65</u>	<u>1.45</u>	17.	_____
8.	<u>70</u>	<u>75.5</u>	<u>1.32</u>	18.	_____
9.	<u>60</u>	<u>55.7</u>	<u>1.12</u>	19.	_____
10.	<u>55</u>	<u>45</u>	<u>1.02</u>	20.	_____

Date of Previous Calibration Involving Same Calibration Medium _____ None ☐

Is There Any Significant Change In Calibration (more than 5% variation from previous calibration) Yes ☐

No ☒

N.A. ☐

Calibrated By Paul Tuske Date 3-24-80

Put Original In Equipment Files; Put Copy In Investigation Files.

Attach Any Other Pertinent Calibration Information With Original (e.g., graphs, raw data, intermediate data, etc.)

BFG06553

DHC-9 (10-74)

20787039