

REACTOR SAFETY QUESTIONNAIRE

Dear VCSA Member,

Reactor safety and prevention of vinyl chloride releases to the atmosphere from polymerization vessels are topics of utmost concern to us in the PVC industry. Environmental agencies, particularly in the U.S., have adopted harsh stances and levied stiff fines on relatively small vinyl chloride releases in recent years. The purpose of this questionnaire is to provide an update to procedures, equipment, and precautions taken to prevent VCM releases from reactors. Results will be presented and discussed at the October general meeting later this year.

NOTE: Multi-plant companies may wish to copy the survey and list separate answers from each plant if procedures/equipment vary greatly, or you may give a "composite/majority" response on one questionnaire.

Please send replies by 31 August 1986 to:

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CTL020038

REACTOR SAFETY QUESTIONNAIRE

I. HYDROSTAT PREVENTION DURING BATCH CHARGE - please complete the following table and answer the questions.

Batch Ingredient	PRIMARY MEASUREMENT			BACK-UP MEASUREMENT		
	Measuring Device	Calibration Frequency	Reliability	Measuring Device	Calibration Frequency	Reliability
Water	We have no process water					
VCM	M	A	E	Meter	A	E
Others:						

Example:

Water	M (turbine)	A	G	L (DP), VI	N	E
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Key:

Device	Calibration Frequency	Reliability
M = meter (type)	W = weekly	E = excellent
L = level transmitter (type)	M = monthly	G = good
W = weight	Q = quarterly	A = average
VI = visual inspection in reactor	S = semi-annually	F = fair
O = other (type)	A = annually	P = poor
	N = as needed (maintenance)	

NOTES:

QUESTIONS

1a. Is a visual inspection made after charging is complete, before heat-up?

YES _____ NO X

1b. After heating to reaction temperature?

YES _____ NO X

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2. Are high level alarms employed on reactors? YES _____ NO X

Type of Device _____ Reliability _____

Problems or Comments: _____

3. Are reactor charge valve(s) MANUAL _____ or AUTOMATIC X (check one)?

Computer controlled? YES X NO _____

Problems or Comments: _____

4. How do you ensure that reactor is empty prior to charging?

The reactor is checked that it be empty before charging.

5. What is your typical batch fillage (batch charge volume/actual reactor volume)?

40 %

II. CONTROLLING RUNAWAY REACTIONS

1. What process measurements are used to indicate a "problem" batch, a "first alert" as opposed to an uncontrollable situation? (Check where appropriate.)

a. Pressure _____ How many PSI above reaction pressure? _____

b. Temperature _____ How many °F above reaction temperature? _____

c. Other Water flow to the main cooling devices is monitored
and an alarm is set to preact to a problem batch
occurring.

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2. What is done at this time? (Check where appropriate.)

- a. Rate of reaction moderated with retardant/shortstop _____
- b. Batch partially dropped to another vessel _____
- c. Batch killed with shortstop _____
- d. Other Extra cooling is started and emergency
degassing is begun.

3. What process measurements are used to indicate an emergency situation leading to an eminent release? (Check where appropriate.)

- a. Pressure 25 How many PSI above reaction pressure? _____
- b. Temperature _____ How many °F above reaction temperature? _____
- c. Agitation
 - low amps _____
 - low RPM _____
 - high amps _____
- d. Power Failure X
- e. Other _____

- g. Combinations (e.g., T & P) _____

4. Please indicate the actions taken at this point to prevent an uncontrolled release to the atmosphere. Number them sequentially in the order in which they are performed.

- 3 add shortstop (manually or automatically)
- _____ drop part of batch to another vessel
- 1 extra cooling (e.g., water on dome)
- 2 vent to recovery system
- _____ controlled vent to atmosphere
- _____
- _____
- _____

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5. For each type/size reactor you have, please provide the following data:

Reactor Volume (U.S. Gal)	Reactor Pressure Rating (PSIG)	Rupture Disc Rating (PSIG)	Safety Relief Valve Set-pressure (PSIG)	Maximum Normal Reaction Pressure (PSIG)
14,000 gal.	225 psig	217 psig	None	135
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

6. Please describe your shortstop addition system: (Check where appropriate.)

- _____ a. FULLY AUTOMATIC - when certain conditions are reached, shortstop is mechanically injected; no action needed by operator.
- _____ b. SEMI-AUTOMATIC - when certain conditions are reached, shortstop is mechanically injected, but operator must somehow activate the system (as by pushing a button).
- X c. MANUAL - addition is totally manual by operator. (For example, shortstop is added to a pot, a valve is opened and shortstop drains into reactor.)
- _____ d. No shortstop system exists or none is used.
- _____ e. Other (please describe) _____
- _____
- _____
- _____

7. If system is fully automatic, can operator activate system manually before it is activated by the process?

YES _____

NO _____

N/A X

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8. Shortstop is added by (check where appropriate):

- a. Pump _____
- b. Nitrogen Pressure _____
- c. Gravity X
- d. Rupture Disc _____
- e. Other (please describe _____

9. Is your shortstop system independent for each reactor or a common system for several reactors? (Check appropriate response.)

- a. Independent X
- b. Common _____
- c. Both _____

10. Please offer any general comments about your shortstop system concerning reliability, effectiveness, non-emergency batch kills, etc.

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III. MISCELLANEOUS

1. How often do you inspect reactor nozzles for PVC build-up or pluggage?
(Check one.)

Safety Valve Nozzle(s)	Pressure Transmitter Nozzle(s)
------------------------------	--------------------------------------

- | | | |
|--------------------------|--|-------|
| a. Never | _____ | _____ |
| b. Every cleaning | _____ | _____ |
| c. Every ___ batches | _____ | _____ |
| d. Every batch | _____ | _____ |
| e. Every reactor opening | _____ | _____ |
| f. Other (describe) | Safety valve nozzles are checked each batch
pressure transmitter nozzles are checked annually. | |

2. Do you have dual (redundant) pressure transmitters on your reactors?

- a. Yes X
b. No _____

3. Please indicate what form(s) of back-up electrical power you have. (Check where appropriate.)

- a. Emergency generator _____
b. Second source X
c. Other _____

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