

# **MOTEK INCIDENT**

## **TI's RESPONSE**

# Silane Questionnaire

- Developed ESH Compliance Questionnaire

–Based upon revised gas program requirements

- Sent to All TI Sites
- Requested sites' feedback on current state of compliance via completion of the questionnaire
- All sites responded, but many needed follow-up since some answers (and questions) were not clear

#	SILANE SYSTEM REVIEW CHECKLIST	Y	N	N/A	Comments/Process Description	Score
1	Is the silane gas room provided with an exhaust rate of at least 0.020 cubic meters per minute per square meter (one cubic foot per minute per square feet) of floor area?					0%
2	Is there a means of communicating an incident (such as hazardous production material (HPM) pull stations, incident alarm buttons, telephones, etc.) provided outside each room containing silane?					0%
3	Is access to gas rooms limited to authorized personnel only?					0%
4	Do rooms containing silane cylinders have two exit doors equipped with fire-rated panic hardware?					0%
5	Does the site ensure only compatible gases are stored in or dispensed from silane gas rooms?					0%
6	Are gas rooms containing silane provided with fire protection sprinklers?					0%
7	Is access to outdoor silane storage/distribution areas limited to authorized personnel?					0%
8	Are outdoor silane gas sources provided with a remote means for emergency shutdown?					0%
9	Are outdoor silane storage/distributions areas provided with fire protection sprinklers?					0%
10	Do only authorized personnel have access to silane leak detection equipment?					0%
11	Are the leak detection systems equipped with emergency power?					0%
12	Is the leak detection equipment capable of detecting silane gas at one-half (½) the TI occupational exposure limit (TI OEL) of 5 ppm?					0%
12a	If yes, is it capable of detecting silane gas at one-half the TI OEL when the silane is burning?					0%
12b	If 12a is no, does the site have UVIR detection installed in its gas cabinets and exhausted enclosures?					0%
13	Are leak detection points (locations) installed in the exhaust duct (or enclosure) downstream of all potential leak points and up stream of the first damper for all gas cabinets and exhausted enclosures?					0%
14	Does the gas leak detection equipment alarm to a... (Silane Systems) (Response Procedure) ...					0%

# Silane Questionnaire ( Cont.)

- All non-affirmative answers were ranked via a standardized risk assessment tool
- Low risk non-conformances were reviewed for possible elimination as standard requirements (legacy issues)
- Moderate to Very High Risk non-conformances require action and some capital approval

		SEVERITY/CONSEQUENCES					Hierarchy of Risk Controls										
		0	1	2	3	4											
		Insignificant/ No Effect	Moderate/ Reversible	Moderate/ Irreversible	Serious/ Reversible	Serious/ Irreversible	Potentially Catastrophic										
PROBABILITY		Very Low (0)	Moderate (20)	High (40)	High (60)	Very High (80)	Very High (100)										
4	25	Very Low (0)	Moderate (20)	High (40)	High (60)	Very High (80)	Very High (100)	Elimination is a permanent solution and should be attempted at the first instance									
5	20	Very Low (0)	Moderate (20)	High (40)	High (60)	Very High (80)	Very High (100)	Substitution involves replacing the hazard or environmental aspect by one of lower risk									
6	15	Very Low (0)	Low (10)	Moderate (20)	Moderate (30)	High (40)	Very High (80)	Engineering controls involve physical barriers or structural changes to the environment of process									
7	10	Very Low (0)	Low (10)	Moderate (20)	Moderate (30)	High (40)	Moderate (20)	Administrative controls reduce hazards by altering procedures and providing instructions									
8	5	Very Low (0)	Very Low (5)	Very Low (10)	Low (20)	Moderate (30)	Moderate (20)	Personal Protective Equipment is a last resort or temporary control									
9	0	Very Low (0)	Very Low (5)	Very Low (10)	Very Low (15)	Very Low (20)	Very Low (25)										
Probability is equal to Frequency x Control. Risk is equal to Severity x Probability																	
LEGEND																	
Very High/Significant Risk, immediate action required, must be managed by site senior management with a detailed plan.																	
High Risk, senior management attention needed, detailed research and management planning at senior levels																	
Moderate Risk, management responsibility must be specified, manage by specific monitoring or response procedures																	
Low Risk, manage by routine procedures, unlikely to need specific allocation of resources																	
Same as Low																	
CONTROL																	
Hazard not recognized (i.e., doesn't know it is a hazard), hazard recognized but ignored																	
Hazard recognized, formal procedure in place (not documented), some controls in place but not appropriate or not always used																	
Hazard recognized, written procedures in place but lack some components, all required and appropriate controls in place but not always used																	
Hazard recognized, adequate written procedures in place and employees trained on procedures, appropriate controls in place and used																	
Hazard recognized, adequate written procedures in place and employees trained on procedures, appropriate controls in place and used, periodic inspections by suspension to verify																	
Hazard eliminated																	
FREQUENCY																	
Frequent - Likely to occur frequently (e.g., continuous exposure to the hazard)																	
Probable - Will occur several times (e.g., daily)																	
Occasional - Will occur at least once (e.g., weekly/monthly)																	
Remote - Unlikely but possible to occur (e.g., biannual or annual)																	
Improbable - So unlikely, assume it will not happen (e.g., not expected except under emergency situation)																	
Impossible - Can occur only by a deliberate act (e.g., no exposure)																	
SEVERITY																	
Potentially Catastrophic (fatality, enormous environmental impact, repeat or egregious non-conformance with company/god requirements)																	
Serious/Reversible Effect (serious injury with permanent disability, serious environmental impact)																	

# Questionnaire Elements

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- **Storage & Distribution**
  - Gas rooms & external areas
- **Monitoring**
  - Gas leak detection & UV/IR fire detection
- **Distribution Systems**
  - Gas cabinets & exhausted enclosures
  - Cylinders
  - Piping/Tubing
- **Process Exhaust/Vent Lines**
- **Point-of-Use Abatement**
  - TPU's
  - Burn Tubes
- **Vacuum Pumps**
- **Documentation and Procedures**
- **Hazard Assessment**
- **Training**