Texas Commission on Environmental Quality ODOR COMPLAINT INVESTIGATION PROCEDURES

This document was prepared by the TCEQ for trained investigators who perform odor complaint investigations on behalf of the TCEQ. It is intended to be used only after qualified training has been provided. Members of the public who would like to submit information related to an odor complaint should use the Odor Log located on the TCEQ webpage. For additional information, please contact the TCEQ Office of Compliance and Enforcement. The following document updates and supersedes the previous version of this document dated September 18, 2007.

DEFINITIONS

Odor:

Odor is defined in Title 5, Subtitle C, Texas Health and Safety Code (THSC), Chapter 382.003(2) as an air contaminant. "Air contaminant" means particulate matter, radioactive material, dust, fumes, gas, mist, smoke, vapor, or odor, including any combination of those items, produced by processes other than natural.

Nuisance:

Nuisance is defined in Title 30 of the Texas Administrative Code (TAC), Chapter 101.4, which states that a discharge from any source whatsoever of one or more air contaminants or combinations thereof, in such concentration and of such duration as are or may tend to be injurious to or to adversely affect human health or welfare, animal life, vegetation, or property, or as to interfere with the normal use and enjoyment of animal life, vegetation, or property.

DETECTION OF ODOR AND INITIAL RESPONSE

Detection

An odor may be detected by a citizen and reported to a Texas Commission on Environmental Quality (TCEQ) regional office as a citizen complaint, or detected by an investigator without a citizen complaint as the initiating factor. In either case, the regional office should promptly make a determination regarding the appropriate action based on the guidelines below. If an investigation is appropriate, the investigation should be conducted according to the procedures specified in this document.

Initial Response

If an odor is detected, and health effects are alleged by a complainant or suspected by the investigator, the complaint should be prioritized for immediate response and an investigation should be conducted as soon as possible, regardless of the manner of detection. The definition of alleged or suspected health effects should remain very broad in this situation to ensure that appropriate actions are taken any time there is a potential imminent threat to public health and safety.

If an odor is detected by either a complainant or an investigator and health effects are not alleged or suspected, an investigation should be conducted to determine the cause of the odor (or alleged odor) according to the incident prioritization procedures established by the Office of Compliance and Enforcement.

Complaint Information

The following information should be gathered by the regional office at the time that a complaint is received or prior to conducting an onsite investigation.

- Name(s) and address(es) of complainant(s).
- Driving directions to the site of the complaint and source as necessary.
- Where on their property was the complainant when they experienced the odor?
- Description of odor.
- Dates, times, frequency, and duration when the complainant(s) experienced the odor.
- Is the odor on-going, past or intermittent at the complainant's residence or business at this time?
- Nature of any allegation of effects on the complainant's health, property, animals, or vegetation.
- Nature of any allegation of interference with the normal use and enjoyment of the complainant's property, animals, or vegetation.
- Alleged source of the odor.
- Meteorological conditions (temp, wind direction, wind speed, etc.)
- Does the complainant want an investigator to come to their residence or business? If we go to their residence or business, they may lose their confidentiality because state vehicles are marked. Explain to the complainant that their confidentiality may be lost during an investigation to confirm nuisance. We cannot substantiate a nuisance if we don't go to the complainant's residence or business, but we can look for issues at the alleged source.

INVESTIGATION/DATA GATHERING

The purpose of all odor investigations is to determine the source of the odors and to work with that source to stop or lessen the generation of any nuisance odors, if present.

The following is a brief discussion that is not intended to restrict the collection of any information which the investigator considers appropriate or necessary to evaluate the citizen concerns during an odor investigation. For additional investigation guidance reference Field Operations Standard Operating Procedures (FOSOP) Investigation Guidance on the internal Field Operations Documents Website (FODWeb).

There are two steps TCEQ investigators perform during odor complaint investigations.

The first step is to conduct a nuisance odor investigation at the complainant's residence or business. In order to successfully pursue a nuisance violation, there must be a potentially impacted party (complainant). If the complainant does not want an onsite investigation conducted at their location, then nuisance cannot be confirmed. The second step is to determine the source of the odor and conduct an onsite investigation of the alleged source to determine compliance with applicable rules and regulations. Investigators may refer members of the public to the TCEQ webpage titled "What if Your Complaint is About an Odor" for additional information.

Additionally, if a nuisance violation is to be pursued and objective evidence is not otherwise available, the complainant must submit a written, signed statement describing the impact and nuisance condition. The complainant must also be advised that if formal enforcement proceedings (such as a State Office of Administrative Hearings) result from a nuisance violation issued under these circumstances, the complainant will be required to formalize this statement in the form of a sworn, notarized affidavit. The affidavit may be provided in lieu of the written statement initially, if preferred by the complainant. Templates for a statement and affidavit are both available on FODWeb. The complainant must also be informed that they must be willing to testify in a related enforcement action regarding the contents of their statement. Additional information concerning nuisance violations can be found in the Nuisance Violations Memo on FODWeb.

If during the investigation the investigator experiences health effects, or complainant health effects are confirmed, refer to the procedures outlined within the Implementation of Revised Approval Process for Using THSC Citation 382.085(a) available on FODWeb.

If the investigation is initiated as the result of detection of an odor by an investigator (no complainant) the purpose of the investigation would be to determine the cause of the odor and require corrective actions. With regards to anonymous complaints, the investigator would not be able to confirm a nuisance condition but could investigate the source of the odor. If a potentially impacted party is identified during the course of an investigation that was initiated by the investigator, the investigator should proceed with the following investigation protocol to document the presence or absence of nuisance odor.

Safety

Prior to conducting an investigation at any site, the staff shall be familiar with all applicable agency investigation and safety protocols including but not limited to:

- FOSOP Guidance Document for Field Operations Investigation of Complaints;
- TCEQ Safety Manual;
- TCEQ OPP Chapter 6, General Operations Section 6.06; and
- Hydrogen Sulfide Investigation Guidance at Natural Gas and Other Sites.

If unknown or if the nature of the odor described and knowledge of the alleged source indicates the potential presence of a toxic gas (H2S, chlorine, etc.) or a gas that could pose a potential inhalation or explosive hazard, the investigator must approach the location from the upwind direction and use the appropriate handheld monitoring equipment and/or personal monitoring equipment as available. Be aware that there may be toxic gases present that may not be detected with available monitoring equipment.

Investigations at isolated locations, unauthorized disposal sites, or investigations in confrontational situations pose particular investigator safety concerns. When investigating these situations, having additional field staff, law enforcement, or personnel from other agencies accompany the investigator may be prudent and appropriate.

The investigator should only continue the investigation as long as they feel confident with site conditions and have no health and/or safety concerns.

Equipment

The investigator should properly prepare and take any equipment necessary to address safety concerns and any sampling equipment that could provide relevant information concerning the odor and its source.

Prior to the use of TCEQ sampling/monitoring equipment, the investigator must have demonstrated a level of proficiency with that piece of equipment. This level of proficiency is checked through the Initial Demonstration of Capability (IDC) Procedure. There are several documents associated with IDC, all of which can be found on the FODWeb OCE Quality Program page.

In all sampling cases, ensure that all necessary paperwork, such as chain of custody forms, sample record sheets, field observation notebooks, calibration logs, etc. are accurately maintained. It is important to collect and record legally defensible data.
For samples that need to be analyzed by a certified laboratory, complete a TCEQ Request for Analysis Form available on FODWeb.

Frequency, Intensity, Duration, and Offensiveness (FIDO) Chart

The FIDO chart is a method used to provide consistent nuisance determinations and assist in description of odors.

Each of the four tables on the FIDO Chart represents a level of offensiveness (Highly Offensive, Offensive, Unpleasant, and Not Unpleasant). Offensiveness is the character of the odor which can be distinguished even in very light concentrations.

The intensity of the detected odor is documented using the legend on the right side of the chart, with "VS" representing Very Strong odors, "S" for Strong odors, "M" for Moderate odors, "L" for Light odors, and "VL" for Very Light odors. Intensity is the relative measure of the perceived concentration. If the odor intensity is variable throughout the duration period, the investigator should record the changes and determine the duration using a weighted average at the conclusion of the period. Investigators learn to determine relative intensity through experience and/or butanol training. The Butanol Reference Method was developed by Texas A&M University in the 1990s. It is a method of rating intensity without regard to specific compounds or odor type. The method consists of the comparison by an objective observer of the level of intensity of a subject odor to several known concentrations of 1-butanol. These known concentrations relate directly to the intensity levels on the FIDO Chart, as such the use of the Butanol Method is recommended, per regional discretion.

Frequency is the number of times that an odor has been complained about and documented to have occurred (either directly or circumstantially) by the investigator. The regional office files should provide the investigator enough information to determine the frequency of a particular odor from a particular facility. Regional management has the option of specialized handling to adapt to unique situations as they arise. Guidelines for each frequency category are explained below.

- Daily: The odor has been documented during an investigator's odor survey at least three consecutive times in a 14-day rolling period at the complainant's site.
- Weekly: The odor has been documented during an investigator's odor survey at least three times at the complainant's site or equal distance in any 30-day period.
- Monthly: The odor has been documented during an investigator's odor survey at least two times at the complainant's site or equal distance in any 60-day period.
- Quarterly: The odor has been documented during an investigator's odor survey at least two times at the complainant's site or equal distance in any 90-day period.
- Single Occurrence: The odor has been documented during an investigator's odor survey at the complainant's site or equal distance.

Duration is the length of time that an odor which has been complained about and confirmed by the investigator to have occurred. The minimum time that an investigator remains on-site to determine if a nuisance condition exists is based on many factors including how safe the

investigator feels at that location, but the investigator should try to remain on-site for at least 15 minutes.

The frequency and duration are plotted on the horizontal and vertical axes of the appropriate table. If the odor situation is at least as intense as the colored block in which it is plotted, it is considered a nuisance odor. If the plot falls outside the colored area of the table (NA), the odor does not represent a nuisance.

Investigation

All odor complaint investigation activities and results should be documented in the investigation report. The items and discussion below should be included in the investigation, but should not be construed as limiting either the collection or reporting of relevant information.

The investigator should attempt to locate and assess the odor firsthand. It would be ideal if an investigator could be at the complainant's location at the time that the odor is occurring, in order to experience the same conditions that generated the complaint. An effort should be made, possibly including multiple trips to the location and multiple investigations per management discretion, to duplicate the experience of the complainant.

- Complete the attached Investigator FIDO Log and if necessary the Supplemental Investigator's Odor Intensity Time Log.
- Describe any physical effects experienced by the investigator which are indicative of effects upon health.
- Describe the normal use of property affected by the odor, and the manner in which such odor could reasonably be expected to interfere with this use, if possible without compromising complainant confidentiality.
- Determine and document the extent of the odor plume. Document on a map the odor survey route, the time the investigator was at each location, and the odor observations at each location. This survey should include observations upwind and downwind of the alleged source as necessary. If the wind direction has changed from the original complaint, then the investigator should move to a location downwind from the alleged source, equal in distance from the complainant's residence in line with the current wind direction.
- Attempt to locate the source(s) of the odor.
- If a source is identified, attempt to locate the specific cause of the odor (i.e., the specific compound, equipment, or process emitting the odor, and the reason(s), such as a plant upset).
- Gather local meteorological data for the time the complainant(s) alleged the occurrence of the odor, as well as the time when the investigation was conducted. This should

include, at a minimum, estimates of wind speed and direction, temperature, humidity, precipitation, and sky cover.

- Describe the terrain features of the area, including natural and man-made features which could influence the flow of air.
- If an investigator has detected odors at the same location at other times or prior investigations show that odors were documented, the investigator should document a comparison of the current observations with the prior observations.
- Collect information about the frequency and duration of any detected odors. This includes information provided by the complainant or the source relative to these factors.
- If safe to do so, the investigator should remain at the complainant's site for at least 15 minutes, the minimum duration time to reach the nuisance level for the information known at that time, or as directed by regional management.
- The investigator should use their own judgment to determine the length of observation time at each point including:
    - the intensity and offensiveness of the odor observed,
    - any associated health effects incurred by the investigator,
    - any known or perceived changes in the offensiveness or intensity of the odor or odor source, and
    - any measurements using handheld or personal monitoring equipment.
- The investigator may provide the complainant an Odor Log for Public Use available on the TCEQ webpage as directed by regional management.
- The investigator may be approached in the field by a concerned individual to provide information concerning the odor investigation. If this occurs, the investigator should collect and consider the information as part of the investigation. Caution should be taken to ensure that this information-gathering procedure not be construed as soliciting additional complaints.
- If a member of the media approaches the investigator while they are conducting the investigation, the investigator should follow agency protocol/procedure regarding contact with the media.
- If any health effect or injury is documented, the source should be required to take measures to mitigate the odor immediately and appropriate enforcement action should be initiated against the responsible party as directed by regional management.

INVESTIGATION FOLLOWUP

Upon completion of the investigation, the information collected should be reviewed to determine whether a nuisance condition is confirmed. The FIDO Chart will be used to determine whether the evidence in the case constitutes a nuisance violation.

Injurious Impacts

If the preponderance of the evidence collected during the course of the investigation (including discussions with the complainant and observations by the investigator) confirms the presence of odors in such concentration and duration as to be injurious to or affect human health, welfare, animal life, vegetation, or property, remedial action should be immediately required to mitigate the odors, and appropriate enforcement action should be initiated according to agency enforcement procedures. In this situation, these actions should be taken regardless of whether the incident was complaint-generated or detected by the investigator. If documented health effects have occurred during the investigation the investigator shall use the Implementation of Revised Approval Process for Using THSC Citation 382.085(a) available on FODWeb.

Interference with Normal Use and Enjoyment of Animal Life, Vegetation, or Property

If the preponderance of the evidence does not confirm the presence of odors in such concentration and duration as to be injurious to or affect human health, welfare, animal life, vegetation, or property, the investigator should evaluate all the evidence collected during the course of the investigation using the FIDO Chart. This chart is used to determine whether a nuisance odor violation should be issued based on whether the frequency, intensity, duration, and offensiveness of detected and documented odors combined cause interference with the normal use and enjoyment of animal life, vegetation, or property.

If application of the FIDO Chart confirms a nuisance odor, the regional office should issue a nuisance odor violation, initiate appropriate enforcement action based on agency enforcement procedures, and require the responsible party to correct the problem. This should be conducted at the regional office after discussion with management.

Concentrated Animal Feeding Operation (CAFO) Nuisance

If the investigation of a CAFO facility results in documentation of nuisance conditions please refer to the following procedures outlined in the CAFO Violations Review Committee Document available on FODWeb.

FIDO CHART

ODORS CHARACTERIZED AS HIGHLY OFFENSIVE

DURATION	FREQUENCY				
	Single Occurrence	Quarterly	Monthly	Weekly	Daily
1 minute	NA	NA	VS	S	M
10 minutes	NA	VS	S	M	L
1 hour	VS	S	M	L	VL
4 hours	S	M	L	VL	VL
12 hours+	M	L	VL	VL	VL

ODORS CHARACTERIZED AS OFFENSIVE

DURATION	FREQUENCY				
	Single Occurrence	Quarterly	Monthly	Weekly	Daily
1 minute	NA	NA	NA	VS	S
10 minutes	NA	NA	VS	S	M
1 hour	NA	VS	S	M	L
4 hours	VS	S	M	L	VL
12 hours+	S	M	L	VL	VL

ODORS CHARACTERIZED AS UNPLEASANT

DURATION	FREQUENCY				
	Single Occurrence	Quarterly	Monthly	Weekly	Daily
1 minute	NA	NA	NA	NA	VS
10 minutes	NA	NA	NA	VS	S
1 hour	NA	NA	VS	S	M
4 hours	NA	VS	S	M	L
12 hours+	VS	S	M	L	VL

ODORS CHARACTERIZED AS NOT UNPLEASANT

DURATION	FREQUENCY				
	Single Occurrence	Quarterly	Monthly	Weekly	Daily
1 minute	NA	NA	NA	NA	NA
10 minutes	NA	NA	NA	NA	NA
1 hour	NA	NA	NA	NA	VS
4 hours	NA	NA	NA	VS	S
12 hours+	NA	NA	VS	S	M

Intensity Legend
VS
Very Strong
S
Strong
M
Moderate
L
Light
VL
Very Light

TCEQ

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ODOR CHARACTERIZATION EXAMPLES

The character of an odor is a unique, innate quality of an odor that does not vary with intensity. Under normal circumstances the following types/sources/processes may be characterized as indicated below, however, these examples should only be used as a guide; characterization should be based on the investigator's experience and training.

Highly Offensive
- Blood drying operations
- Sewage treatment primary sludge
- Putrefying animals/fish
- Hide processing
- Rancid grease
- Landfill gas, leachate, sour gas, paper mill black liquor, etc.-H_2S (smells like rotten eggs)
- Mercaptans (natural gas odorant)

Offensive
- Landfill garbage/waste
- Cattle lagoon cleanout
- Confined hog/poultry operations under bmp
- Decaying silage/composting
- Unprocessed rendering plant material and wastewater
- Typical grease trap odor
- Waste burning (rubber, plastic, tires, or other non-wood materials)
- Failing or improperly operated septic systems
- Organic products like auto body paint & styrene[1]

Unpleasant
- Well digested or chemically-treated sludge
- Cattle operation under best management practices
- Waste-activated sludge processes
- Water-based painting
- Gasoline, diesel fuel
- Combustion exhaust
- Asphalt odors
- Burned coffee/food
- Brush/wood burning
- Petroleum products
- Ammonia
- Chlorine

Not Unpleasant
- Ketones, esters, alcohols
- Fresh-cut grass or hay
- Normal coffee roasting
- Normal food preparation
- Bakery
- Perfume
- Spice packaging
- Winery

[1]At low concentrations, organic products such as auto body paint and styrene used in fiberglass and cultured marble operations would not normally be considered to have offensive odors. However, because of a person's potential physical response to these products at higher concentrations (where most complaints concerning these products occur), we generally consider them to have offensive characteristics.

DETERMINING FREQUENCY/DURATION

You are attempting to determine the frequency and duration that the complainant experiences over time. The frequency and duration observed during a single investigation may not accurately represent what the complainant is experiencing. You may have to use information gathered from multiple investigations (investigator observations as well as any information gathered on plant processes, weather, terrain, or complainant information) to make this determination. Consider the following:

- Daily: The odor has been documented during an investigator's odor survey at least three consecutive times in a 14-day rolling period at the complainant's site.
- Weekly: The odor has been documented during an investigator's odor survey at least three times at the complainant's site or equal distance in any 30-day period.
- Monthly: The odor has been documented during an investigator's odor survey at least two times at the complainant's site or equal distance in any 60-day period.
- Quarterly: The odor has been documented during an investigator's odor survey at least two times at the complainant's site or equal distance in any 90-day period.
- Single Occurrence: The odor has been documented during an investigator's odor survey at the complainant's site or equal distance.

Plant Processes
- Constant, seasonal, intermittent processes/activities (e.g., reactor top opened)
- Upset conditions, maintenance, startup & shutdown, etc.
- Plant records, sampling data, CEM data, etc.

Complainant Information
- Statements as to frequency and duration
- Odor Logs
- Knowledge of source operations - times, processes
- Other information as provided

Weather
- Wind rose from source to receptor
- Temperature or other meteorological data that could affect intensity or duration.
- Wind speed, day, night, summer, winter
- CAMS Station/NWS/ personal weather meter data

HOW TO USE THE FIDO CHART

Each of the four tables on this FIDO Chart represents a different level of offensiveness (Highly Offensive, Offensive, Unpleasant, and Not Unpleasant). The intensity of the observed odor is documented using the legend on the right side of the chart--with "VS" for Very Strong odors, "S" for Strong, "M" for Moderate, "L" for Light, and "VL" for Very Light. Once the overall frequency and duration have been determined (based on one or more investigations), they are then plotted on the horizontal and vertical axes of the appropriate table. If the odor situation is at least as intense as the colored block in which it is plotted for the corresponding duration and frequency, it is considered a nuisance odor. If the plot falls outside the colored area of the table (NA), the odor does not represent a nuisance.

Investigator FIDO Log

1. Characterize the odor to determine which Offensiveness table to use (Not Unpleasant to Highly Offensive)
2. Assess the Intensity of odor (Very Light to Very Strong), for variable intensities use Supplemental Investigator's Odor Intensity Time Log.
3. Determine the total Duration of the odor(s) (1 minute to 24 hours)
4. Evaluate the Frequency of odor occurrence (Single Occurrence to Daily)
5. Identify the block on the chart that corresponds to the information from Steps 1-4 and determine if a nuisance condition exists.

Date	Time(s)	How long did the odor occur?	Was the odor intermittent? (Y/N)	Weather Conditions			Odor Characteristic				Odor Intensity					Effects/Comments/Concerns
				Wind direction	Rain (Y/N)	Temperature (°F)	Not Unpleasant	Unpleasant	Offensive	Highly Offensive	Very Light	Light	Moderate	Strong	Very Strong	

Supplemental Investigator's Odor Intensity Time Log

Date of Investigation: _____ Start Time: _____

Minutes	Odor Intensity VL, L, M, S,VS
1 min	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	

Minutes	Odor Intensity VL, L, M, S, VS
31 min	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	
43	
44	
45	
46	
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49	
50	
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52	
53	
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55	
56	
57	
58	
59	
60	

Offensiveness: Highly_____ Offensive _____ Unpleasant _____ Not Unpleasant _____

Weighted Average Intensity:

	VS	S	M	L	VL	No Odor
1 Min						
10 Min						
1 Hour						

Chemical Odor Description Examples

These descriptions should only be used as a guide, based on the investigator's experience and training.

Chemical	Description	Chemical	Description
Acetaldehyde	Green, sweet, oxidized, alcohol	**Formaldehyde**	hay/straw-like, sweet, pungent
Acetic Acid	sour, vinegar	**Hydrochloric Acid Gas**	pungent, burnt
Acetone	chemical, sweet, pungent	**Hydrogen Sulfide**	boiled eggs, rotten eggs
Acrolein	burnt, pungent, sweet	**Methanol**	sweet, fruity
Acrylonitrile	onion/garlic-pungency, sweet, acrylic plastic	**Methyl Ethyl Ketone**	sweet
Allyl Chloride	garlic-onion pungency, sweet, green	**Methyl Isobutyl Ketone**	sweet, floral, fruity
Amine, Dimethyl	fishy, dirty clothes	**Methyl Mercaptan**	cabbage, sulfidy, pungent, natural gas
Amine, Monomethyl	fishy, pungent	**Methyl Methacrylate**	pungent, sulfidy, plastic
Amine, Trimethyl	fishy, pungent	**Monochlorobenzene**	chlorinated, moth balls, benzene-like
Ammonia	barn-like, pungent, cat litter-box	**Nitrobenzene**	sweet, shoe polish, pungent
Aniline	sweet, oily, solvent, pungent	**p-Cresol**	antiseptic, tar-like, pungent
Benzene	sweet, solvent	**p-Xylene**	sweet, oily, anethol, moth balls
Benzyl Chloride	sweet, solvent	**Perchloroethylene**	sweet, chlorinated
Benzyl Sulfide	sweet, cedary, sulfidy	**Phenol**	medicinal, sweet
Bromine	sweet, bleach	**Phosgene**	sweet, hay-like
Butyric Acid	cheesy, sour	**Phosphine**	oniony, mustard
Carbon Disulfide	vegetable sulfide, leaves a taste	**Pyridine**	burnt, gauze-like, pungent, diamine
Carbon Tetrachloride	sweet, pungent, feeling factor	**Styrene (Inhibited)**	solventy, rubbery
Chloral	sweet(powdered sugar), fruity	**Styrene(Uninhibited)**	solventy, rubbery, sweet, plasticy
Chlorine	pungent, sweet, bleach	**Sulfur Dichloride**	sulfidy, putrid (leaves a metallic taste)
Dimethylacetamide	amine, burnt, oily, organic decay	**Sulfur Dioxide**	Heavy, oppressive (more taste and feel than odor)
Dimethylformamide	fishy, sweet, floral, pungent, solvent	**Toluene (From Petroleum)**	moth balls, sweet, rubbery, anethol
Dimethyl Sulfide	cooked vegetable	**Toluene (From Coke)**	heavy, sweet, floral, pungent, solventy
Ethanol	sweet, floral	**Toluene diisocyanate**	medicated bandage, sweet, fruity, pungent
Ethyl Acrylate	sweet, hot plastic, earthy	**Trichloroethylene**	sweet, solventy
Ethyl Mercaptan	earthy, sulfidy		