



State of Utah

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Lieutenant Governor

Department of  
Environmental Quality

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Executive Director

DIVISION OF AIR QUALITY  
Bryce C. Bird  
Director

DAQ-088-13

**MEMORANDUM**

**TO:** Air Quality Board

**THROUGH:** Bryce C. Bird, Executive Secretary

**FROM:** Joel Karmazyn, Environmental Scientist

**DATE:** October 23, 2013

**SUBJECT:** PROPOSE FOR PUBLIC COMMENT: Amend R307-335. Degreasing and Solvent Cleaning Operations.

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On July 3, 2013, the Board proposed for public comment amendments to R307-335. A public comment period was held from August 1 to September 3, 2013. The proposed amendments were to:

1. Clarify that the requirements of R307-335-7(2) apply to operators of industrial solvent cleaning that emit 15 pounds of volatile organic compounds (VOCs) or more per day from the cleaning process;
2. Exempt industrial solvent cleaning of electronic parts in R307-335-7(1); and
3. Exempt military technical data orders in R307-335-7(1).

**Public Comments on Proposed Amendments**

Proposed Amendment 1: The public did not comment on this proposal. No further action is necessary on this item prior to adoption by the Board.

Proposed Amendment 2: The public did not comment on this proposal, but comments were received from the Specialty Graphic Imaging Association (SGIA) and the American Coating Association (ACA) regarding the VOC content limit in R307-335-7(3). The SGIA and ACA noted that they failed to comment on the VOC content limit during the initial rulemaking and at this juncture are contending that the limit constrains their use of solvents to acetone. The use of acetone increases fire risk due to its low flash point. The ACA is particularly concerned that the use of acetone in ink manufacturing will result in workplace fires.

Upon further analysis, staff has determined that if the VOC content limit is raised to address safety concerns raised by the SGIA and ACA, there will no longer be a reason to exempt electronic parts from the rule because the higher VOC content level would eliminate the need to use aqueous based solvent in the electronics industry.

We can also maintain the state implementation plan (SIP) VOC credit used in the attainment modeling demonstration even with a higher VOC content limit by expanding the rule applicability to the broad electronic industrial sector. The following is a list of types of businesses within the electronic industrial sector operating in the nonattainment area and the number of sources within each category:

- Semiconductor – 43
- Business to Business Electronics Market – 69 (mix of manufacturers, supplier, and brokers)
- Electronic Coils, Transformer, and Inductor – 5
- Electronic Computer Manufacturing – 6
- Electronic Connector Manufacturing – 2
- Motor Vehicle Electrical and Electronic Equipment Manufacturing – 1
- Other Electronic Component Manufacturing – 14
- Small Electrical Appliance Manufacturing – 1

There are a number of sizable sources in this business sector mix. For example, the small electrical appliance manufacturer located in Orem has between 250 and 499 employees (based on Workforce Services data).

Consequently, staff is now recommending including the electronics industry within the rule applicability based on the proposal to increase the VOC content limit discussed below.

Proposed Amendment 3: L-3 Communications pointed out that military contractors must also meet military technical data orders. Therefore, they requested that the military exception be extended to include contractors. A recommendation was made to exclude operations conducted off military installations as well. Staff concurs and has modified the exemption to include contractors performing work on or off site military installations.

### **General Public Comments**

The SGIA and ACA submitted similar comments regarding the solvent cleaning limit of 0.42 lb/gal VOC. They contend that the limit constrains their use of solvents to acetone. The use of acetone increases fire risk due to its low flash point.

R307-335-7, Industrial Solvent Cleaning, rulemaking followed the EPA Control Technology Guideline recommendation to apply a general solvent cleaning limit of 0.42 lb/gal VOC, with the option to modify rulemaking specific to state industrial processes. No commenters offered industry specific information during the initial comment period to support an industry specific VOC content limit. In the interest in maximizing VOC reduction for the PM<sub>2.5</sub> SIP and in the absence of industry specific information, staff supported the general solvent cleaning limit. The SGIA and ACA have now raised our awareness of the safety issue with acetone use; therefore, we have worked closely with both organizations to identify a workable solution. We have researched this issue by contacting other regulators that have adopted industrial solvent cleaning rules and contacted solvent suppliers to evaluate alternate options.

An analysis of other state regulations shows that mid-western states that are classified as moderate nonattainment (i.e., Ohio and Wisconsin) have adopted higher limits (1.67-7 lb/gal for varied industries), while severe nonattainment air districts, like San Joaquin Valley and South Coast, have adopted more stringent levels overall, but have also exempted certain industries that are included in our rule. For example, the San Joaquin Rule 4663 exempts coating and ink manufacturers.

**Commercially Available Low-VOC Solvents**

The South Coast Rule 1171 has a VOC content limit of 0.83 lb/gal. We contacted Mike Morris, the industrial solvent cleaning contact at South Coast, to find out if sources have had difficulty finding cleaning products that meet their low limit. Mr. Morris provided us with a list of manufacturers that supply the California market that can meet that limit. Mr. Morris stated that sources in the graphics arts industry can choose between aqueous cleaners, vegetable oils, a low content acetone mixture and parachlorobenzotrifluoride (PCBTF), an exempt VOC compound. PCBTF is considered to have negligible VOCs and is increasingly used as a xylene replacement in cleaners, thinners, and other aromatic hydrocarbon blends. However, PCBTF costs two to three times the amount of traditional hydrocarbons.

Several of the suppliers referenced by Mr. Morris and a few additional suppliers found by staff were asked about their product lines and ability to meet the 0.83 lb/gal VOC content limit. Most suppliers confirmed that they offered at least one product that met the limit, but were quick to point out limitations and challenges in a number of industrial settings. Specific problems were cited for the circuit board, plastic printing and any other industry that uses impregnated printing. These industries require a higher VOC content solvent or must use acetone. Supplier representatives who spoke knowledgably about the California marketplace and industrial practices, recommended a general VOC content limit of between 2.49 and 4.2 lb/gal.

**Industry-Specific Response to Commenters**

Digital Printing

The digital printing cleanup process is conducted using small absorptive swabs and is not expected to attain the 15 lb/day VOC threshold within R307-335-7(2). Therefore, no further action is deemed necessary for this industry.

Coating and Ink Manufacturing

The ACA’s position is that the coating and ink manufacturing industry should be exempt from a VOC limit and rely solely on best management practices to reduce VOC emissions. Some states have exempted this industry in their general degreasing rule but then have a separate industry specific rule. R307-335-7 already requires sources to reduce VOC emissions from the use, handling, storage, and disposal of cleaning solvents and shop towels. Work practice requirements are part of all our coating rules.

According to Workforce Services records, there are only five ink manufacturers in Utah; this precludes development of an industry specific rule to regulate coating and ink manufacturing.

Company Name	City	County Name	Emp Range	NAICS
Advanced Color Systems Inc	Salt Lake City	Salt Lake	1-4	325910
Gans Ink & Supply Co Inc	Salt Lake City	Salt Lake	10-19	325910
Graphic Ink Company	Salt Lake City	Salt Lake	10-19	325910
Inx International Ink Co	Salt Lake City	Salt Lake	0	325910
Sawgrass Technologies Inc	Highland	Utah	1-4	325910

Consequently, we believe it is reasonable to include this industry within R307-335-7 as a means to reduce VOC emissions as part of the PM<sub>2.5</sub> SIP.

### Screen Printing

In screen printing, ink passes through a porous screen of fine silk, Nylon, Dacron, polyester, or stainless steel mesh to which a stencil has been applied. Printing is accomplished by applying ink to the screen and then forcing the ink through the stencil with a rubber or synthetic blade. Inks are usually cured by applying heat, infrared or ultraviolet to the printed products. After the job is finished, the screens are cleaned of ink and stencil then re-used. Ink solvents can be xylols, toluene, ketones, and mineral spirits.

According to Workforce Services records, there are 61 screen printing sources in the PM<sub>2.5</sub> nonattainment area. Some of these sources participated in the graphic arts survey that led to the national adoption of the revised emission factor for graphic arts (201 lb VOC/employee). The VOC emissions from these sources are estimated to be 74 tons/yr. Therefore, we believe that we should derive the lowest general VOC content limit that will accommodate this and other industries in order to maintain SIP credit. South Coast has the lowest limit at 0.83 lb/gal while a number of states like Ohio are at 4.2 lb/gal. The difference in values again reflects air district attainment status. The SGIA has stated that it will not support a limit lower than 4.2 lb/gal. We have confirmed that, while limited, there are available options at the South Coast VOC limit, as described above. However, in the interest in establishing one low VOC limit for all uses, we are proposing a limit between the noted ranges, as described below.

### **Proposed General VOC Content Limit**

In the interest of attaining maximum SIP VOC reductions, addressing industrial safety concerns and widely available commercial products, we are recommending a general VOC solvent content limit of 2.49 lb/gal. Based on our research, it is our understanding that this limit will offer industry greater options. Increasing the limit allows us to include a broader range of industrial sectors thereby maintain the same SIP credit applied in our attainment modeling.

Staff Recommendation: In order to provide industry sufficient time to determine their ability to comply with the newly proposed general VOC content limit, staff recommends that the Board propose for public comment R307-335 as amended.

1 **R307. Environmental Quality, Air Quality.**

2 **R307-335. Degreasing and Solvent Cleaning Operations.**

3 **R307-335-1. Purpose.**

4 The purpose of this rule is to limit volatile organic compound  
5 (VOC) emission from degreasing and solvent cleaning operations.  
6

7 **R307-335-2. Applicability.**

8 R307-335 applies to all degreasing or solvent cleaning operations  
9 that use VOCs and that are located in PM10 and PM2.5 nonattainment  
10 and maintenance plan areas as defined in 40 CFR 81.345 (July 1, 2011).  
11

12 **R307-335-3. Definitions.**

13 The following additional definitions apply to R307-335:

14 "Batch open top vapor degreasing" means the batch process of  
15 cleaning and removing grease and soils from metal surfaces by  
16 condensing hot solvent vapor on the colder metal parts.

17 "Cold cleaning" means the batch process of cleaning and removing  
18 soils from metal surfaces by spraying, brushing, flushing or immersing  
19 while maintaining the solvent below its boiling point.

20 "Conveyorized degreasing" means the continuous process of  
21 cleaning and removing greases and soils from metal surfaces by using  
22 either cold or vaporized solvents.

23 "Department of Defense military technical data" means a  
24 specification that specifies design requirements, such as materials  
25 to be used, how a requirement is to be achieved, or how an item is  
26 to be fabricated or constructed.

27 "Freeboard ratio" means the freeboard height (distance between  
28 solvent line and top of container) divided by the width of the degreaser.

29 "Industrial solvent cleaning" means operations performed using  
30 a liquid that contains any VOC, or combination of VOCs, which is used  
31 to clean parts, tools, machinery, equipment and work areas. Cleaning  
32 operations include, but are not limited to, spraying, wiping, flushing,  
33 and purging.

34 "Open top vapor degreaser" means the batch process of cleaning  
35 and removing soils from metal surfaces by condensing low solvent vapor  
36 on the colder metal parts.

37 "Separation operation" means any process that separates a mixture  
38 of compounds and solvents into two or more components. Specific  
39 mechanisms include extraction, centrifugation, filtration, and  
40 crystallization.

41 "Solvent metal cleaning" means the process of cleaning soils from  
42 metal surfaces by cold cleaning, open top vapor degreasers, or  
43 conveyorized degreasing.  
44

45 **R307-335-4. Cold Cleaning Facilities.**

46 No owner or operator shall operate a degreasing or solvent  
47 cleaning operation unless conditions in R307-335-4(1) through (7) are  
48 met.

49 (1) A cover shall be installed which shall remain closed except  
50 during actual loading, unloading or handling of parts in cleaner.  
51 The cover shall be designed so that it can be easily operated with  
52 one hand if:

1 (a) The volatility of the solvent is greater than 2 kPa (15 mm  
2 Hg or 0.3 psi) measured at 38 degrees C (100 degrees F),

3 (b) The solvent is agitated, or

4 (c) The solvent is heated.

5 (2) An internal draining rack for cleaned parts shall be  
6 installed on which parts shall be drained until all dripping ceases.  
7 If the volatility of the solvent is greater than 4.3 kPa (32 mm Hg  
8 at 38 degrees C (100 degrees F)), the drainage facility must be  
9 internal, so that parts are enclosed under the cover while draining.  
10 The drainage facility may be external for applications where an  
11 internal type cannot fit into the cleaning system.

12 (3) Waste or used solvent shall be stored in covered containers.

13 (4) Tanks, containers and all associated equipment shall be  
14 maintained in good operating condition, and leaks shall be repaired  
15 immediately or the degreaser shall be shutdown.

16 (5) Written procedures for the operation and maintenance of the  
17 degreasing or solvent cleaning equipment shall be permanently posted  
18 in an accessible and conspicuous location near the equipment.

19 (6) If the solvent volatility is greater than 4.3 kPa (33 mm  
20 Hg or 0.6 psi) measured at 38 degrees C (100 degrees F), or if solvent  
21 is heated above 50 degrees C (120 degrees F), then one of the following  
22 control devices shall be used:

23 (a) Freeboard that gives a freeboard ratio greater than 0.7;

24 (b) Water cover if the solvent is insoluble in and heavier than  
25 water); or

26 (c) Other systems of equivalent control, such as a refrigerated  
27 chiller or carbon adsorption.

28 (7) If used, the solvent spray shall be a solid fluid stream  
29 at a pressure that does not cause excessive splashing and may not be  
30 a fine, atomized or shower type spray.

### 31 32 **R307-335-5. Open Top Vapor Degreasers.**

33 Owners or operators of open top vapor degreasers shall, in  
34 addition to meeting the requirements of R307-335-4(3), (4) and (5),

35 (1) Equip the vapor degreaser with a cover that can be opened  
36 and closed without disturbing the vapor zone. The cover shall be closed  
37 except when processing work loads through the degreaser;

38 (2) Install one of the following control devices:

39 (a) Equipment necessary to sustain:

40 (i) A freeboard ratio greater than or equal to 0.75, and

41 (ii) A powered cover if the degreaser opening is greater than  
42 1 square meter (10.8 square feet),

43 (b) Refrigerated chiller,

44 (c) Enclosed design (cover or door opens only when the dry part  
45 is actually entering or exiting the degreaser),

46 (d) Carbon adsorption system, with ventilation greater than or  
47 equal to 15 cubic meters per minute per square meter (50 cubic feet  
48 per minute per square foot) of air/vapor area when cover is open and  
49 exhausting less than 25 parts per million of solvent averaged over  
50 one complete adsorption cycle;

51 (3) Minimize solvent carryout by:

52 (a) Racking parts to allow complete drainage,

1 (b) Moving parts in and out of the degreaser at less than 3.3  
2 meters per minute (11 feet per minute),

3 (c) Holding the parts in the vapor zone at least 30 seconds or  
4 until condensation ceases,

5 (d) Tipping out any pool of solvent on the cleaned parts before  
6 removal, and

7 (e) Allowing the parts to dry within the degreaser for at least  
8 15 seconds or until visibly dry.

9 (4) Spray parts only in or below the vapor level;

10 (5) Not use ventilation fans near the degreaser opening, nor  
11 provide exhaust ventilation exceeding 20 cubic meters per minute per  
12 square meter (65 cubic feet per minute per square foot) in degreaser  
13 open area, unless necessary to meet state and federal occupational,  
14 health, and safety requirements.

15 (6) Not degrease porous or absorbent materials, such as cloth,  
16 leather, wood or rope;

17 (7) Not allow work loads to occupy more than half of the  
18 degreaser's open top area;

19 (8) Ensure that solvent is not visually detectable in water  
20 exiting the water separator;

21 (9) Install safety switches on the following:

22 (a) Condenser flow switch and thermostat (shuts off sump heat  
23 if condenser coolant is either not circulating or too warm); and

24 (b) Spray switch (shuts off spray pump if the vapor level drops  
25 excessively, i.e., greater than 10 cm (4 inches)).

26 (10) Open top vapor degreasers with an open area smaller than  
27 one square meter (10.8 square feet) are exempt from R307-335-5(2) (b)  
28 and (d).

29  
30 **R307-335-6. ConveyORIZED Degreasers.**

31 Owners and operators of conveyORIZED degreasers shall, in  
32 addition to meeting the requirements of R307-335-4(3), (4) and (5)  
33 and R307-335-5(5):

34 (1) Install one of the following control devices for conveyORIZED  
35 degreasers with an air/vapor interface equal to or greater than two  
36 square meters (21.5 square feet):

37 (a) Refrigerated chiller; or

38 (b) Carbon adsorption system, with ventilation greater than or  
39 equal to 15 cubic meters per minute per square meter (50 cubic feet  
40 per minute per square foot) of air/vapor area when downtime covers  
41 are open, and exhausting less than 25 parts per million of solvent,  
42 by volume, averaged over a complete adsorption cycle.

43 (2) Equip the cleaner with equipment, such as a drying tunnel  
44 or rotating (tumbling) basket, sufficient to prevent cleaned parts  
45 from carrying out solvent liquid or vapor.

46 (3) Provide downtime covers for closing off the entrance and  
47 exit during shutdown hours. Ensure that down-time cover is placed over  
48 entrances and exits of conveyORIZED degreasers immediately after the  
49 conveyor and exhaust are shut down and is removed just before they  
50 are started up.

51 (4) Minimize carryout emissions by racking parts for best  
52 drainage and maintaining the vertical conveyor speed at less than 3.3

1 meters per minute (11 feet per minute).

2 (5) Minimize openings: Entrances and exits should silhouette  
3 work loads so that the average clearance (between parts and the edge  
4 of the degreaser opening) is either less than 10 cm (4 inches) or less  
5 than 10% of the width of the opening.

6 (6) Install safety switches on the following:

7 (a) Condenser flow switch and thermostat - shuts off sump heat  
8 if coolant is either not circulating or too warm;

9 (b) Spray switch - shuts off spray pump or conveyor if the vapor  
10 level drops excessively, i.e., greater than 10 cm or (4 inches); and

11 (c) Vapor level control thermostat - shuts off sump level if  
12 vapor level rises too high.

13 (7) Ensure that solvent is not visibly detectable in the water  
14 exiting the water separator.

15

#### 16 **R307-335-7. Industrial Solvent Cleaning.**

17 (1) Exemptions. The requirements of R307-335-7 do not apply to  
18 aerospace, wood furniture, shipbuilding and repair, flat wood  
19 paneling, large appliance, metal furniture, paper film and foil,  
20 plastic parts, miscellaneous metal parts coatings and light autobody  
21 and truck assembly coatings, flexible packaging, lithographic and  
22 letterpress printing materials, fiberglass boat manufacturing  
23 materials, [~~electrical and electronic components~~] and operations that  
24 are exclusively covered by Department of Defense military technical  
25 data and performed by a Department of Defense contractor and/or on  
26 site at installations owned and/or operated by the United States Armed  
27 Forces.

28 (2) Operators of industrial solvent cleaning that emit 15 pounds  
29 of VOCs or more per day from industrial solvent cleaning operations,  
30 shall reduce VOC emissions from the use, handling, storage, and  
31 disposal of cleaning solvents and shop towels by implementing the  
32 following work practices:

33 (a) Covering open containers; and

34 (b) Storing used applicators and shop towels in closed fire proof  
35 containers.

36 (3) Owners or operators of industrial solvent cleaning operations  
37 shall limit VOC emissions by either:

38 (a) Using cleaning solutions with vapor pressure less than or  
39 equal to eight millimeters of mercury (mm Hg) at 20 degrees C;

40 (b) Using solvents with a VOC content [~~0.42~~]2.49 pounds per  
41 gallon or less; or

42 (c) Installing an emission control system designed to have an  
43 overall control efficiency of at least 85%.

44

#### 45 **R307-335-8. Emission Control Systems.**

46 (1) The owner or operator of a control device shall maintain  
47 certification from the manufacturer that the emission control system  
48 will attain at least 85% overall efficiency performance and make the  
49 certification available to the director upon request.

50 (2) Emission control systems shall be operated and maintained  
51 in accordance with the manufacturer recommendations to maintain at  
52 least 85% overall efficiency performance. The owner or operator shall

1 maintain for a minimum of two years records of operating and maintenance  
2 sufficient to demonstrate that the equipment is being operated and  
3 maintained in accordance with the manufacturer recommendations.

4  
5 **R307-335-9. Recordkeeping.**

6 The owner or operator shall maintain, for a minimum of two years,  
7 records of the solvent VOC content applied and the physical  
8 characteristics that demonstrate compliance with R307-335.

9  
10 **R307-335-10. Compliance Schedule.**

11 (1) All sources [~~defined~~] shall be in compliance with  
12 R307-335- [2]7 [~~shall be in compliance with R307-335~~] by  
13 [~~September~~] June 1, 201 [3]4.  
14

15 **KEY: air pollution, degreasing, solvent cleaning**

16 **Date of Enactment or Last Substantive Amendment: [January 1,] 2013**

17 **Notice of Continuation: February 1, 2012**

18 **Authorizing, and Implemented or Interpreted Law: 19-2-104(1)(a)**