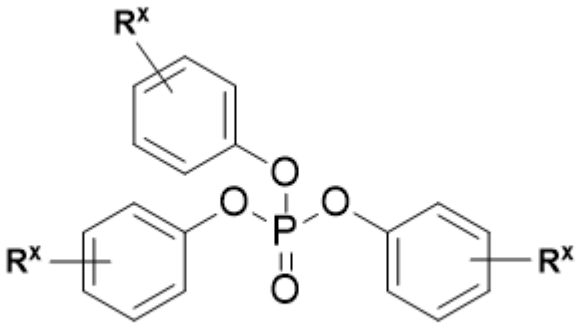
August 2017
Office of Chemical Safety and
Pollution Prevention
U.S. EPA

Preliminary Information on Manufacturing, Processing, Distribution, Use, and Disposal:

Phenol, isopropylated, phosphate (3:1)



Where R^X = H or $CH(CH_3)_2$ and all three rings have at least one -$CH(CH_3)_2$ group.

August 2017

Support document
for Docket EPA-HQ-OPPT-2016-0730

This document provides a preliminary public summary of available information collected by EPA's Office of Pollution Prevention and Toxics (OPPT) in the Office of Chemical Safety and Pollution Prevention (OCSPP) on the manufacturing (including importing), processing, distribution in commerce, use, and disposal of this chemical. This is based on existing data available to EPA, including information collected under the Chemical Data Reporting rule, Toxics Release Inventory (if available), information from other Agency databases, other U.S. Government agencies, publicly available information from states, and a review of published literature. In addition, the document includes information reported to EPA by producers and users of the chemical in the United States and in other countries.

This preliminary use information and any additional use information received in the docket by December 9, 2017, will inform efforts to identify, under section 6(h)(1)(B) of the Toxic Substances Control Act (TSCA), whether exposure to phenol, isopropylated, phosphate (3:1) is likely, under the conditions of use, either to the environment, the general population, or to a potentially exposed or susceptible subpopulation identified by EPA. The information will also inform any risk management efforts following the exposure and use assessment under TSCA section 6(h)(1)(B).

The chemical structure for phenol, isopropylated, phosphate (3:1) shown on the cover constitutes a family of structures in which each of the three aryl groups have at least one isopropyl group. Examples of chemicals covered by this document that meet this general structure include:

- Tris(3-isopropylphenyl) phosphate
- Tri(isopropylphenyl) phosphate
- Tri(4-isopropylphenyl) phosphate

Mention of trade names in this document does not constitute endorsement by EPA. To verify products or articles containing this chemical currently in commerce, EPA has identified several examples. Any lists are provided for informational purposes only. EPA and its employees do not endorse any of the products or companies.

This document does not contain confidential business information (CBI).

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CONTACT

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Docket: EPA-HQ-OPPT-2016-0730

MANUFACTURING, PROCESSING, DISTRIBUTION, USE AND DISPOSAL

1. Manufacturing (Including Importing)

For the 2016 Chemical Data Reporting (CDR) period, 9 sites reported manufacturing (including importing) phenol, isopropylated, phosphate (3:1) in the United States[1],[2]. The total amount (lbs) of phenol, isopropylated, phosphate (3:1) manufactured or imported annually in the United States was 12,362,683 in 2010; 14,932,040 in 2011; 3,191,017 in 2012; 2,968,861 in 2013; 5,632,272 in 2014; and 5,951,318 in 2015.

Phenol, isopropylated, phosphate (3:1) is not reported to the Toxics Release Inventory.

Manufacturing Process

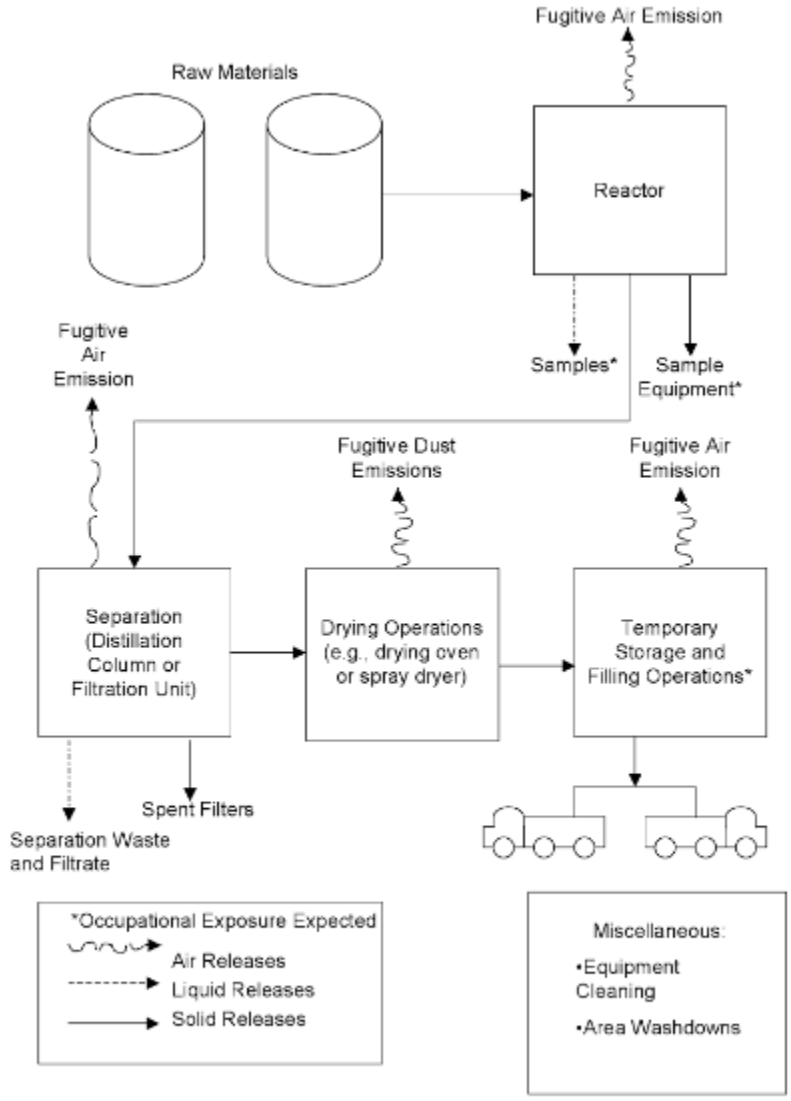
Phenol, isopropylated, phosphate (3:1) is made by reaction of phenol with propylene. The resulting product is a mixture of mainly ortho- and para-isomers with varying degrees of alkylation. The product of this reaction is then mixed with phenol and reacted with phosphorus oxychloride to produce the phosphate ester. The relative amounts of phenol and isopropylated phenol can be varied to give a range of products with a corresponding range of properties.
Source: https://pubchem.ncbi.nlm.nih.gov/compound/75628#section=Methods-of-Manufacturing

Triaryl phosphates isopropylated are manufactured from phosphorous oxychloride and phenol. The manufacturing process is carried out in closed reactors and the hydrogen chloride gas generated during the reaction absorbed in water.
Source: https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/f?./temp/~M6hbNs:1

The figure below provides a generic depiction of a process for manufacturing phenol, isopropylated, phosphate (3:1).
Source: https://www.epa.gov/sites/production/files/2015-04/documents/ffr_foam_alternatives_vol1.pdf

[1] Manufacturers (including importers) are required to report under CDR if they meet certain production volume thresholds, generally 25,000 lb or more of a chemical substance at any single site. Reporting is triggered if the annual reporting threshold is met during any of the calendar years since the last principal reporting year. In general, the reporting threshold remains 25,000 lb per site. However, a reduced reporting threshold (2,500 lbs) now applies to chemical substances subject to certain TSCA actions. https://www.epa.gov/chemical-data-reporting/how-report-under-chemical-data-reporting

[2] Manufacture in the context of CDR means to manufacture, produce, or import for commercial purposes. Manufacture includes the extraction, for commercial purposes, of a component chemical substance from a previously existing chemical substance or complex combination of chemical substances. (40 CFR 711.3)
https://www.epa.gov/sites/production/files/2015-12/documents/cdr_fact_sheet_importers_final_dec2015_0.pdf



Generic Chemical Manufacturing Process Flow Diagram

2. Processing

Based on publicly available information reported to the 2016 CDR, processing of phenol, isopropylated, phosphate (3:1) includes:

Table 1. NAICS codes of industries processing phenol, isopropylated, phosphate (3:1).

NAICS	NAICS Title
42, 44, 45, 48, 49	Wholesale and Retail Trade
336	Transportation Equipment Manufacturing
3261	Plastics Product Manufacturing
32551	Paint and Coating Manufacturing
32552	Adhesive Manufacturing
324191	Petroleum Lubricating Oil and Grease Manufacturing
325211	Plastic Material and Resin Manufacturing
325212	Synthetic Rubber Manufacturing
325992	Photographic Film Paper, Plate, and Chemical Manufacturing

As reported to the 2016 CDR, the types of processes using phenol, isopropylated, phosphate (3:1) include incorporation into articles, use as a chemical processing or manufacturing aid, and incorporation into a formulation, mixture or reaction product.

Phenol, isopropylated, phosphate (3:1) is widely used for both its flame retardant and lubricating properties.

A number of applications to which flame retardants such as phenol, isopropylated, phosphate (3:1) are added include the use in textiles, rubber, polyurethane foam, antistatic agent, cellulose, cotton, cutting oils, electronic equipment such as video display units cables, casting resins, glues, engineering thermoplastics, epoxy resins, and phenolic resins.
Source: **van der Veen, I.; de Boer, J. Phosphorus Flame Retardants: Properties, Production, Environmental Occurrence, Toxicity and Analysis. Chemosphere 2012, 88 (10), 1119–1153.**

Because phenol, isopropylated, phosphate (3:1) is a liquid, processing into lubricant products and liquid flame retardants involves adding it into formulated mixtures. Data was not available to the EPA regarding the equipment commonly used for this process.

3. Products and Articles

EPA identified the following types of products [and articles] based on a search of available sources for products containing phenol, isopropylated, phosphate (3:1). This list is provided for informational purposes only. EPA and its employees do not endorse any of the products or companies. Due to lack of available data on which articles contain specific flame retardants, only products have been included in this section.

Table 2. List of Products containing Phenol, isopropylated, phosphate (3:1)

Trade name	Use of the product/article as described in the SDS or the company website	% by weight of chemical	Link to references, SDS or industry information
HI-TAC adhesive	Adhesive	1 – 5%	http://us.henry.com/fileadmin%2Fpdf%2Fcurrent%2Fmsds%2FBK103_msds.pdf
HYJET IV-A PLUS	Aviation hydraulic fluid	10 – 20%	http://www.sfm.state.or.us/cr2k_subdb/MSDS/SYNTHETIC_AVIATION_HYDRAULIC_FLUID.PDF
HYJET V		10 – 20%	http://site.skygeek.com/MSDS/exxon-mobil-hyjetv5gl-hydraulic-fluid-jet-v-5-gallon.pdf
FSC3, Joint Fire Protective Coating	Elastomeric Firestop, Intumescent	1 – 10%	http://www.emersonindustrial.com/en-US/documentcenter/EGSElectricalGroup/products_documents/fitting/haz_loc_fitting/haz_loc_cable_cord_fitting/firestop-coatings-compounds/nelson_firestop_fsc3_nsds_05-2006.pdf
ES2207	Epoxy resin	10 – 30%	http://hybris.cms.henkel.com/henkel/msdspdf?matnr=922147&country=US&language=ES
Reolube HYD 46	Fire-resistant hydraulic fluid	N/A	
FR-46-PE	Fire-resistant phosphate ester hydraulic fluid	60 – 100%	
SpecSeal Fast Tack	Firestop and Sound Transmission	10 – 15%	http://files.systems.stifirestop.com/5.%20Safety%20Data%20Sheet/1.%20English/SDS_Fast%20Tack%20Firestop%20Spray.pdf
Reofos 50	Flame Retardant	90 – 100%	Chemtura Reofos 50 SDS
Firemaster 550		50 – 70%	Chemtura Firemaster 550 SDS
Pyroclad X1		2.5 – 10%	msds.carboline.com/servlet/FeedFile/11/prod/8690/98/Pyroclad+X1.pdf
Durad 150		≤100%	Chemtura Durad 150 SDS
Reofos 35	Flame Retardant; Lubricant	62 – 68%	Chemtura Reofos 35 SDS
Durad 310M		90 – 100%	Chemtura Durad 310M SDS
Durad 220		90 – 100%	Chemtura Durad 220 SDS
Reofos 95		90 – 100%	Chemtura Reofos 95 SDS
Syn-O-Ad 9578		81 - 87%	Manufacturers MSDS
Phosguard 8100	Flame retardant; plasticizer	8.10%	http://www.thecarycompany.com/media/pdf/specs/TDS_PhosGard8100_Jun2014.pdf
Reofos 65		90 – 100%	Chemtura Reofos 65 SDS
Phosflex 31L		64 – 72%	Manufacturers MSDS
Phosflex 41L		81 – 87%	http://www.tri-iso.com/documents/ICL_Phosflex_41L_MSDS.pdf

Trade name	Use of the product/article as described in the SDS or the company website	% by weight of chemical	Link to references, SDS or industry information
PANCRETE PART B	HVAC metal pan resurfacer and related coating.	5 – 15%	http://www.novatech-usa.com/core/media/media.nl/id.4469/c.ACCT119126/.f?h=f85a6c5d13397ee243e6
Braycote 3214	Industrial grease; aircraft applications	2.90%	http://msdspds.bp.com/ussds/amersdsf.nsf/0/C1D4D449457689B180257ED80052CCFC/$file/BP%20GHS%20SDS%20-%20South%20Korea%20KR-ILS-Castrol463729-US17en-GB.pdf
Boss 816	Intumescent Firestop Sealant	1 – 10%	http://accumetricllc.org/uplimg/boss/MSDS/816.pdf
FlameSafe FS 1900 Series Firestop Sealant	Intumescent Firestop Sealant	5 – 10%	http://csiconcrete.com/msds/flamesafefirestopsealant.pdf
727	Laminating Adhesive	10 – 15%	http://www.vimasco.com/pdf/727_Laminating_Adhesive_SDS.pdf
Serpiflex Shield	Lead/Asbestos Abatement	1 – 10%	http://www.constructionmidwest.com/msds/Serpiflex.pdf
IP3	Lubricant Additive	64 – 72%	http://www.palmerholland.com/Assets/User/Documents/Product/43024/5601/MITM04664.pdf
Tribol 1300/460	Lubricating oils	1 – 1.1%	http://msdspds.bp.com/ussds/amersdsf.nsf/0/C82A9743D849D48F80257F0600581015/$file/BP%20GHS%20SDS%20-%20China%20%20CN%20(Shanghai%20Branch)-ILS-Castrol461558-DE03en-GB.pdf
Castrol AN157, 9cSt. Helicopter Gear Oil		1 – 5%	http://msdspds.castrol.com/ussds/amersdsf.nsf/0/10F0DF30F427D71A862578700067ACE8/$file/233663Castrol%20AN157,%209cSt.%20Helicopter%20Gear%20Oil.pdf
Eastman HALO 157		1 - <3%	http://ws.eastman.com/ProductCatalogApps/PageControllers/MSDS_PC.aspx?Product=71097894
Shell Morlina S2 BL 10		0.1 – 1%	https://prodepc.blob.core.windows.net/epcblobstorage/GSAP_msds_00422402.PDF
EXCELENE 316		1 – 2.5%	http://www.flywheeldistribution.com/content/EXCELENE-316-SDS.PDF
3M air tool lubricant		Trade Secret	http://site.skygeek.com/MSDS/3m-051141-20451-air-tool-lubricant-4-oz.pdf
NYCOLUBE 127		0 – 2.5%	http://objects.eanixter.com/PD365857.PDF
Interspeed 5640	Paint	1 – 10%	http://www.kellysolutions.com/erenewals/documentsubmit/KellyData%5COK%5Cpesticide%5CMSDS%5C2693%5C2693-220%5C2693-220_Interspeed_5640_Red_BZA645_5_5_13_2009_12_16_47_PM.pdf
Micron Antifouling		1 – 10%	https://www.jamestowndistributors.com/userportal/pdfs/MSDS/Interlux/MicronExtra/micron_extra_blue.pdf

Trade name	Use of the product/article as described in the SDS or the company website	% by weight of chemical	Link to references, SDS or industry information
Incoat (all colors)		1 – 5%	http://www.sealproweb.com/msds/polyval/polyvalmsds.pdf
KP53	Penetrating oil	5%	http://www.skf.com/binary/81-137146/MSDS_KA54004-4_KA54020_KP53penetrant.pdf
P-521	Plasticizer	85%	http://www.hbchemical.com/wp-content/uploads/2014/04/P-521-SDS.pdf
749 VaporBlok Coating	Water-based Vapor Barrier Coating	1 – 2%	http://www.vimasco.com/pdf/749_Vapor-Blok_Water_Based_Elastomeric_SDS.pdf

4. Distribution (Includes Retailers)

Based on data reported to the 2016 CDR, eight sites manufacture or import phenol, isopropylated, phosphate (3:1) for wholesale and retail trade in 2015. Phenol, isopropylated, phosphate (3:1) is available for purchase online from chemical suppliers.

5. Use

In addition to the applications and products described above, flame retardants—some of which contain phenol, isopropylated, phosphate (3:1)—are used predominantly in four major areas: electronics and electrical devices, building and construction materials, furnishings, and transportation. They are also used in adhesives, lubricants, oils, paints, epoxy resins, and plasticizers.

Commonly treated electronics are TVs, computers/computer accessories, phones, washers and dryers, circuit boards, electrical cables, and other various household appliances. For building and construction materials, treated products include insulation materials, paints and coatings, wood products, roofing components, composite panels, and fixtures. Home/Office furnishing such as foam upholstery, curtains, carpets, and any fabrics that house them may also contain phenol, isopropylated, phosphate (3:1). Fabrics, foams, carpets, electrical equipment, and bumpers in airplanes, trains, and automobiles also contain flame retardants.

6. Disposal of Waste and Recycling/Recovery

Data was not available to the EPA regarding the disposal or recycling of phenol, isopropylated, phosphate (3:1).

USEFUL TYPES OF INFORMATION

This document presents a summary of information currently available to EPA on phenol, isopropylated, phosphate (3:1). EPA is interested in obtaining information to more fully characterize the manufacturing, processing, distribution, disposal, and use of chemicals that fall within the structure described earlier, to inform the development of the exposure and use of these chemicals, and to inform any subsequent risk management efforts. For example, EPA is interested in obtaining information on:

- the functional uses for this chemical;
- what types of products contain this chemical;
- which industry sectors use this chemical;
- what volume of the chemical is used;
- which uses have been discontinued or phased out;
- exposure scenarios for this chemical; and
- articles in which this chemical is found.

APPENDIX: SOURCES CONSULTED

- U.S. EPA *Chemical Inventory*
  https://www.epa.gov/tsca-inventory
- U.S. EPA *ChemView*
  https://java.epa.gov/chemview
- TRI P2 information
  https://www.epa.gov/toxics-release-inventory-tri-program/pollution-prevention-p2-and-tri
- U.S. EPA *HPV HC* (access through Chemical Data Access Tool – CDAT)
  https://java.epa.gov/oppt_chemical_search/
- U.S. EPA *HPVIS* and *HPV HC* (access through Chemical Data Access Tool – CDAT)
  https://java.epa.gov/oppt_chemical_search/
- DfE Alternatives Assessments
  https://www.epa.gov/saferchoice/design-environment-alternatives-assessments
- Safer Chemical Ingredients List
  https://www.epa.gov/saferchoice/safer-ingredients
- Green Chemistry awards
  https://www.epa.gov/greenchemistry/presidential-green-chemistry-challenge-winners
- Greener products and services
  https://www.epa.gov/greenerproducts/identify-greener-products-and-services
- Pollution Prevention
  https://www.epa.gov/p2/pollution-prevention-case-studies
  https://www.epa.gov/p2/grant-programs-pollution-prevention#sra
  https://www.epa.gov/p2/pollution-prevention-tools-and-calculators
- U.S. EPA *InertFinder*
  https://iaspub.epa.gov/apex/pesticides/f?p=101:1:
- U.S. EPA *Pesticide Chemical Search*
  https://iaspub.epa.gov/apex/pesticides/f?p=CHEMICALSEARCH:1:0::NO:1::
- U.S. EPA *Endocrine Disruptor Screening Program*
  https://www.epa.gov/ingredients-used-pesticide-products/endocrine-disruptor-screening-program-tier-1-assessments
- U.S. EPA *Hazardous Waste*
  https://www.epa.gov/hw/learn-basics-hazardous-waste#regulations
- U.S. EPA *Superfund chemical data matrix*
  https://www.epa.gov/superfund/superfund-chemical-data-matrix-scdm-query
- U.S. EPA *Hazardous Air Pollutants*
  https://www.epa.gov/haps/initial-list-hazardous-air-pollutants-modifications
- U.S. EPA *Significant New Alternatives Policy (SNAP)*
  https://www.epa.gov/snap
- U.S. EPA *Volatile Organic Compounds*
  https://www.epa.gov/indoor-air-quality-iaq/technical-overview-volatile-organic-compounds#definition

- U.S. EPA *Toxic and priority pollutants under the Clean Water Act*
  https://www.epa.gov/eg/toxic-and-priority-pollutants-under-clean-water-act#toxic
- U.S. EPA *Contaminant Candidate list under the Safe Drinking Water Act*
  https://www.epa.gov/ccl/contaminant-candidate-list-3-ccl-3#chemical-list
- U.S. EPA *IRIS Assessment*
  https://cfpub.epa.gov/ncea/iris2/atoz.cfm
- U.S. EPA *SRS*
  https://iaspub.epa.gov/sor_internet/registry/substreg/searchandretrieve/substancesearch/search.do
- U.S. EPA *Chemical and Product Categories (CPCat) Database*
  https://actor.epa.gov/cpcat/faces/home.xhtml
- U.S. National Library of Medicine *ChemIDplus*
  https://chem.sis.nlm.nih.gov/chemidplus/
- U.S. National Library of Medicine *Hazardous Substance Data Bank (HSBD)*
  https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm
- U.S. Department of Health & Human Services *Household Products Database*
  https://hpd.nlm.nih.gov/index.htm
- OSHA *Chemical Hazards and Toxic Substances*
  https://www.osha.gov/SLTC/hazardoustoxicsubstances/index.html
- NIOSH Workplace Safety and Health Topics *Chemicals*
  http://www.cdc.gov/niosh/topics/chemical.html
- NIOSH *Pocket Guide to Chemical Hazards*
  http://www.cdc.gov/niosh/npg/npgdcas.html
- CPSC *Chemicals*
  http://www.cpsc.gov/en/Research--Statistics/Chemicals/
- CPSC *FHSA*
  https://www.cpsc.gov/Business--Manufacturing/Business-Education/Business-Guidance/FHSA-Requirements/
- Food and Drug Administration *List of Databases*
  http://www.fda.gov/ForIndustry/FDABasicsforIndustry/ucm234631.htm
- NTP (National Toxicology Program) *Substances studied by NTP*
  http://ntpsearch.niehs.nih.gov/?e=True&ContentType=Testing+Status
- Department of Energy *Protective Action Criteria Database*
  http://energy.gov/ehss/protective-action-criteria-pac-aegls-erpgs-teels-rev-29-chemicals-concern-may-2016
- California Department of Toxic Substances Control *Toxics in Products*
  http://www.dtsc.ca.gov/PollutionPrevention/ToxicsInProducts/index.cfm
  http://www.dtsc.ca.gov/SCP/CandidateChemicalsList.cfm
  http://www.dtsc.ca.gov/SCP/WhatIsAPriorityProduct.cfm
- California Office of Environmental Health Hazard Assessment *Proposition 65*
  http://oehha.ca.gov/proposition-65/chemicals
  http://oehha.ca.gov/proposition-65/proposition-65-list
- California Office of Environmental Health Hazard Assessment *Biomonitoring*

http://biomonitoring.ca.gov/chemicals

- California *permissible exposure limits for chemical contaminants*
  https://www.dir.ca.gov/title8/5155table_ac1.html
- California *hazardous substance list*
  https://www.dir.ca.gov/title8/339.html
- California *Safe Cosmetics Program – list of chemical agents known or suspected to cause cancer or developmental or other reproductive harm.*
  http://www.cdph.ca.gov/programs/cosmetics/Pages/default.aspx
  https://safecosmetics.cdph.ca.gov/search/Default.aspx
- Maine *chemicals of high concern*
  http://www.maine.gov/dep/safechem/highconcern/
- Massachusetts *Toxics Use Reduction Act (TURA) (link includes a link to Higher hazard substances list)*
  http://www.mass.gov/eea/waste-mgnt-recycling/toxics/toxic-use-reduction/toxics-use-reduction-act/
- Massachusetts *Complete list of TURA chemicals*
  http://www.mass.gov/eea/agencies/massdep/toxics/tur/toxics-use-reduction-act-tura-reporting-and-fees.html
- Lowell Center for Sustainable Production *Chemical, Policy and Science Initiative*
  http://www.chemicalspolicy.org/chemicalspolicy.us.state.database.php
- Minnesota Department of Health *Toxic Free Kids Act Chemicals of High Concern*
  http://www.health.state.mn.us/divs/eh/hazardous/topics/toxfreekids/highconcern.html
- Michigan *Environmental Health Topics*
  http://www.michigan.gov/mdhhs/0,5885,7-339-71548_54783_54784_74881-13050--,00.html
- New Hampshire *Regulated Toxic Air Pollutants*
  http://des.nh.gov/organization/commissioner/legal/rules/documents/env-a1400.pdf
- New Jersey *Right to Know Hazardous Substances*
  http://web.doh.state.nj.us/rtkhsfs/rtkhsl.aspx
- Oregon *Priority Persistent Pollutants (in water)*
  http://www.deq.state.or.us/wq/SB737/
- Oregon *Pollutant Profiles*
  http://www.deq.state.or.us/wq/SB737/docs/LegRpAtt420100601.pdf
- Oregon *Reducing Toxics in Oregon*
  http://www.oregon.gov/deq/Pages/ToxicsReduction.aspx
- Oregon *Chemicals of Concern for Children's Health*
  http://public.health.oregon.gov/HealthyEnvironments/HealthyNeighborhoods/ToxicSubstances/Pages/childrens-chemicals-of-concern.aspx
- Pennsylvania Department of Labor and Industry *Hazardous Substance List*
  http://www.pacode.com/secure/data/034/chapter323/chap323toc.html
- Rhode Island *Air Resources – Air Toxics*
  http://www.dem.ri.gov/pubs/regs/regs/air/air22_08.pdf
- Vermont *Chemical Disclosure Program for Children's Products*

http://www.healthvermont.gov/enviro/chemical/cdp.aspx

- Washington *Chemicals of High Concern to Children*
  http://www.ecy.wa.gov/programs/hwtr/rtt/cspa/chcc.html
- Washington *Children's Safe Products Act*
  http://apps.leg.wa.gov/RCW/default.aspx?cite=70.240
- Washington Department of Labor & Industries *SHARP Publications*
  http://www.lni.wa.gov/Safety/Research/Pubs/default.asp
- National Conference of State Legislatures
  http://www.ncsl.org/research/environment-and-natural-resources/state-chemical-statutes.aspx
- Canada *Chemicals Portal*
  http://chemicalsubstanceschimiques.gc.ca/index-eng.php
- EU *ECHA website*
  https://echa.europa.eu/
- Australia *NICNAS Chemical Information*
  https://www.nicnas.gov.au/chemical-information
- Japan *Chemical Risk Information Platform (CHIRP)*
  http://www.nite.go.jp/en/chem/chrip/chrip_search/systemTop
- OECD *eChemPortal*
  http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en
- Stockholm Convention on Persistent Organic Pollutants
  http://chm.pops.int/TheConvention/ThePOPs/ListingofPOPs/tabid/2509/Default.aspx
  http://chm.pops.int/TheConvention/ThePOPs/ChemicalsProposedforListing/tabid/2510/Default.aspx
- WHO IPCS (UN)
  http://www.who.int/ipcs/en/
- Other – worker protection information
  http://www.dguv.de/ifa/gestis/gestis-internationale-grenzwerte-fuer-chemische-substanzen-limit-values-for-chemical-agents/index-2.jsp
- DeLima Associates *Consumer Product Information Database (CPID)*
  https://www.whatsinproducts.com/chemicals/index/1
- SRC *FatePointers Search Module PHYSPROP*
  http://esc.syrres.com/fatepointer/search.asp
- Product and company websites