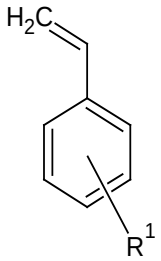
Assessment of regulatory needs

Authority: European Chemicals Agency (ECHA)

Group Name: Vinylbenzene derivatives

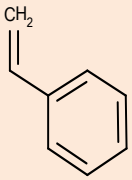
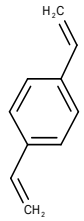
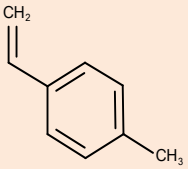
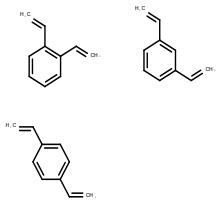
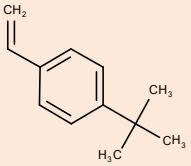
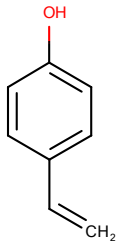
General structure:



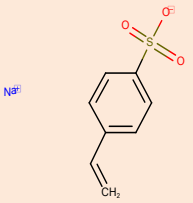
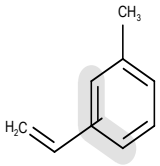
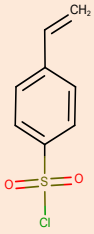
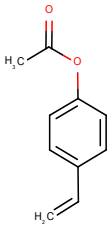
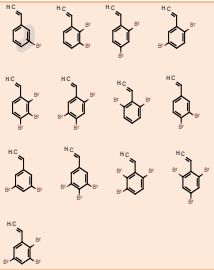
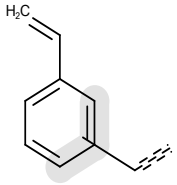
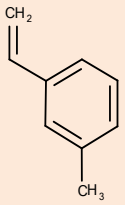
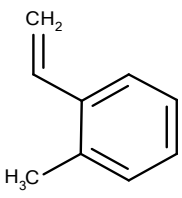
Revision history

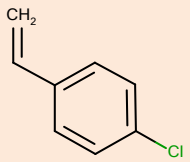
Version	*Date*	*Description*
1.0	15 November 2022	

Substances within this group:

EC / List number	CAS number	Substance name [and / or Substance name acronyms]	Chemical structures	Registration type (full, OSII or TII, NONS), highest tonnage band among all the registrations (t/y) [1]
202-851-5	100-42-5	styrene		Full, >1000
203-266-8	105-06-6	1,4-divinylbenzene		Not (publicly) available
210-762-8	622-97-9	4-methylstyrene		Full, >1000
215-325-5	1321-74-0	divinylbenzene		Not (publicly) available
217-126-9	1746-23-2	p-tert-butylstyrene		Not (publicly) available
220-103-6	2628-17-3	p-vinylphenol		Not (publicly) available

[1] n/a: not publicly available

220-266-3	2695-37-6	sodium 4-vinylbenzenesulphonate		Not (publicly) available
246-562-2	25013-15-4	vinyltoluene		Full, >1000
404-770-2 (801-162-2)		styrene-4-sulfonyl chloride		Not (publicly) available
434-600-2 (607-905-5)	2628-16-2	4-ethenylphenyl acetate		Not (publicly) available
603-094-7	125904-11-2	Benzene, ethenyl-, ar-bromo derivs.		Not (publicly) available
910-757-7		Reaction mass of divinylbenzene and ethylstyrene		Full, >1000
202-889-2	100-80-1	3-methylstyrene		C&L notification
210-256-7	611-15-4	2-methylstyrene		C&L notification

214-028-8	1073-67-2	p-chlorostyrene		C&L notification
248-846-1	28106-30-1	Ethylstyrene	N/A	C&L notification

This table contains also group members that are not registered (yet) but have a C&L notification under the CLP Regulation. However, the list is currently non-exhaustive. Once further regulatory risk management action on one or more registered substances is being considered, ECHA may make an additional search for related C&L notified substances to be included in the group and develop an assessment of regulatory needs for them.

Contents

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The author does not accept any liability with regard to the use that may be made of the information contained in this document. Usage of the information remains under the sole responsibility of the user. Statements made or information contained in the document are without prejudice to any further regulatory work that ECHA, the Member States or other regulatory agencies may initiate at a later stage. Assessment of regulatory needs and their conclusions are compiled on the basis of available information and may change in light of newly available information or further assessment.

Foreword

The purpose of the assessment of regulatory needs of a group of substances is to help authorities conclude on the most appropriate way to address the identified concerns for a group of substances or a single substance, i.e. the combination of the regulatory risk management instruments to be used and any intermediate steps, such as data generation, needed to initiate and introduce these regulatory measures.

An assessment of regulatory needs can conclude that regulatory risk management at EU level is required for a (group of) substance(s) (e.g. harmonised classification and labelling, Candidate List inclusion, restriction, other EU legislation) or that no regulatory action is required at EU level. While the assessment is done for a group of substances, the (no) need for regulatory action can be identified for the whole group, a subgroup or for single substance(s).

The assessment of regulatory needs is an important step under ECHA's Integrated Regulatory Strategy. However, it is not part of the formal processes defined in the legislation but aims to support them.

The assessment of regulatory needs can be applied to any group of substances or single substance, i.e., any type of hazards or uses and regardless of the previous regulatory history or lack of such. It can be done based on different level of information. A Member State or ECHA can carry out this case-by-case analysis. The starting point is available information in the REACH registrations and any other REACH and CLP information. However, more extensive set of information can be available, e.g. assessment done under REACH/CLP or other EU legislation, or can be generated in some cases (e.g. further hazard information under dossier evaluation). Uncertainties associated to the level of information used should be reflected in the documentation. It will be revisited when necessary. For example, after further information is generated and the hazard has been clarified or when new insights on uses are available. It can be revisited by the same or another authority.

The responsibility for the content of this assessment rests with the authority that developed it. It is possible that other authorities do not have the same view and may develop further assessment of regulatory needs. The assessment of regulatory needs does not yet initiate any regulatory process but any authority can consequently do so and should indicate this by appropriate means, such as the Registry of Intentions.

For more information on Assessment of regulatory needs please consult ECHA website[2].

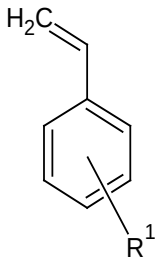
[2] https://echa.europa.eu/understanding-assessment-regulatory-needs

Glossary

ARN	Assessment of Regulatory Needs
CCH	Compliance Check
CLH	Harmonised classification and labelling
CMR	Carcinogenic, mutagenic and/or toxic to reproduction
Dev	Dossier evaluation
ED	Endocrine disruptor
NONS	Notified new substances
OEL	Occupational exposure limit
OSII or TII	On-site isolated intermediate or transported isolated intermediate
PBT/vPvB	Persistent, bioaccumulative and toxic/very persistent and very bioaccumulative
RMOA	Regulatory management options analysis
RRM	Regulatory risk management
SEv	Substance evaluation
STOT RE	Specific target organ toxicity, repeated exposure
SVHC	Substance of very high concern

1 Overview of the group

ECHA has grouped together structurally similar substances based on the presence of the vinylbenzene moiety shown in the figure below.



The substances may include more than one functional group attached to the phenyl ring in addition to the common vinyl-group.

The present group includes 18 substances of which 12 are registered, 5 are intermediates, and 2 are unclaimed NONS. 6 substances have not been registered under REACH. Out of the 12 registered substances, 9 substances are registered as mono constituent substances and 3 as multi-constituents.

Based on information reported in the REACH registration dossiers, all registered substances (except for EC 603-094-7, which is registered as a monomer in imported polymer) are used at industrial sites, in polymer preparations and compounds. Other industrial uses are typically those reported below for professional and consumer uses. In addition, industrial uses such as water softeners, water treatment chemicals and solvent in manufacturing of semiconductors are reported. For the latter the relevant substances are used as monomers in specific polymers, such as ion exchange resins. Styrene (EC 202-851-5) has the widest range of uses, being used e.g. in production of polystyrene and styrene butadiene rubber.

Five substances are used by professionals: ECs 202-851-5, 210-762-8, 215-325-5, 246-562-2, 910-757-7 of which ECs 210-762-8 and 246-562-2 are also used by consumers, with a potential for exposure to humans and release to the environment. The professionals and/or consumers are using these substances as fillers, putties, plasters, modelling clay; ink and toners; coatings and paints, thinners, paint removers; adhesives, sealants. Additional professional uses are e.g. the uses in paper and board treatment products and in metal surface treatment products.

Even though article service life is not reported in the registrations, it can be assumed that styrene (EC 202-851-5), and ECs 246-562-2 and 210-762-8 (two latter ones due to their use in sealants) may have a potential to be released during the article service life. However, this potential is likely to be low for ECs 246-562-2 and 210-762-8.

As regards regulatory history only styrene EC 202-851-5 has harmonised classification (Flam. Liq. 3, Skin Irrit. 2, Eye Irrit. 2, Acute Tox. 4, STOT RE 1 and Repr. 2). It is to be noted that the Netherlands has submitted the intention in November 2021 to include Carc. 2 in the harmonised classification and labelling[3]

[3] https://echa.europa.eu/registry-of-clh-intentions-until-outcome/-/dislist/details/0b0236e186f854a5

and has completed an RMOA on styrene[4] An EU Risk Assessment Report (EU RAR) was prepared by United Kingdom under the Council Regulation (EEC) No 793/93[5]/transitional dossier[6]. EFSA's Panel on Food Contact Materials, Enzymes and Processing Aids (CEP) has given to styrene high priority for review (among the substances for which a Specific Migration Limit (SML) is not assigned in Regulation (EU) No 10/2011)[7].

Note on the scope of ECHA's assessment of regulatory needs

Regarding hazards, the focus of ECHA's assessment is on CMR (carcinogenic, mutagenic and/or toxic to reproduction), sensitiser, ED (endocrine disruptor), PBT/vPvB or equivalent (e.g. substances being persistent, mobile and toxic), aquatic toxicity hazard endpoints and therefore only those are reflected in the table in section 3. This does not mean that the substances do not have other known or potential hazards. In some specific cases, where ECHA identifies a need for regulatory risk management action at EU level for other hazards (e.g. neurotoxicity, STOT RE), such additional hazards may be addressed in the assessment. An overview of classification is presented in Annex 1.

On the exposure side, ECHA is mainly using the information on uses reported in the registration dossiers (IUCLID) as a proxy for assessing the potential for exposure to humans and releases to the environment. The potential for release / exposure is generally considered high for "widespread" uses, i.e. professional and consumer uses and uses in articles. For these uses, normally happening at many places, the expected level of control is *à priori* considered limited. The chemical safety reports are not necessarily consulted and no quantitative exposure assessment is performed at this stage.

2 Justification for the need for regulatory risk management action at EU level

Based on currently available information, it is not possible to assess the need for regulatory risk management as information on hazard is not sufficient to conclude on carcinogenicity, mutagenicity for all substances in the group.

Due to ongoing regulatory activities on styrene (CLH ongoing) and implication on the regulatory strategy depending on whether the substance will be classified as Carc. 2 or Carc. 1B and whether it meets the classification criteria for mutagenicity, it is not possible to assess at this stage the need for regulatory risk management.

In analogy, taking into account: the structural similarity of styrene with other group members, their potential to create similar metabolite (epoxide) that might be carcinogenic and mutagenic, equivocal results on some of the mutagenicity studies

[4] NL RMOA 2022: https://echa.europa.eu/documents/10162/f78b5201-6e3b-b22e-449f-e1c06e6f9a1b

[5] https://echa.europa.eu/information-on-chemicals/information-from-existing-substances-regulation/-/substance-rev/3991/term

[6] https://echa.europa.eu/information-on-chemicals/transitional-measures/annex-xv-transitional-reports

[7] https://www.efsa.europa.eu/en/efsajournal/pub/6124

available and the need for further assessment under CCH and/or data generation, the needs for risk management for the whole group will be assessed upon the completion of the CLH for styrene and CCHs to clarify the hazard of other group members.

Furthermore, at that stage, additional substances will be considered for inclusion in the current group; these substances would be the potential metabolites (if registered) similar to styrene-7,8-oxide EC 202-476-7 which is a metabolite of styrene likely linked to its carcinogenic and mutagenic potential.

The RMOA for styrene (2022 by NL CA[8]) also concludes that the future RRM needs depend on the CLH process outcome (sub-categorisation of carcinogenicity, mutagenicity and STOT RE)

All group members are considered inconclusive for mutagenicity; there are indications of potential somatic cell adduct formation, however there are both positive and negative studies for styrene and some other group members. The NL RMOA 2022 notes the pending CLH process for styrene should consider mutagenicity in context of carcinogenicity hazard class. There is also an IARC assessment on styrene and styrene-7,8-oxide regarding mutagenicity and carcinogenicity potential[9].

Styrene has a harmonised classification for Repr. 2 whereas EC 217-126-9, 220-103-6 and 910-757-7 are self-classified as Repr. 2. This hazard is extrapolated to all group members based on structural similarity. No ED potential is identified for any of the group members, based on available systemic toxicity studies and on the information available on styrene. Other human health endpoints such as skin sensitisation and repeated-dose toxicity will be assessed under CCH for selected group members.

For ECs 210-762-8 and EC 246-562-2, based on the biodegradation screening both substances are potentially persistent or very persistent (P/vP), however the available data indicate low B potential for EC 210-762-8 and for EC 246-562-2 it does not formally screen for B/vB neither for aquatic nor for air-breathing organisms. Therefore, these substances are unlikely PBT.

ECs 203-266-8, 215-325-5 and 910-757-7 also show aquatic toxicity and except for EC 910-757-7 are potentially P/vP. In addition, EC 203-266-8 formally screens for B/vB properties for aquatic and air-breathing organisms, while EC 215-325-5 and EC 910-757-7 only for air-breathing organisms. Based on the available bioaccumulation studies the BCF values are however below 500, i.e., an indicative potential to bioconcentrate for classification purposes.

For ECs 202-889-2, 210-256-7, 214-028-8, 217-126-9, 220-103-6, 220-266-3, 248-846-1, 404-770-2, 434-600-2, 603-094-7, 607-905-5 and 801-162-2, the available information indicates known or potential aquatic toxicity and self-classification for aquatic toxicity is available several of these substances. In addition, EC 217-126-9 and EC 434-600-2 are potentially P/vP substances.

[8] NL RMOA 2022: https://echa.europa.eu/documents/10162/f78b5201-6e3b-b22e-449f-e1c06e6f9a1b

[9] https://publications.iarc.fr/_publications/media/download/6060/5894fec08d186b0eb1a24cfa93db2cd97dc2eb2c.pdf

Compliance check/data generation will be performed for EC 203-266-8, 210-762-8, 215-325-5, 220-103-6, 220-266-3 and 246-562-2, 603-094-7, 910-757-7.

Based on currently available information, there is no need for (further) EU regulatory risk management for EC 202-889-2, 210-256-7, 214-028-8, 248-846-1, 404-770-2, 607-905-5, 801-162-2

These substances are either not registered or unclaimed NONS. Therefore although they have the same hazards as the registered group members, no exposure potential exists.

3 Conclusions and actions

The conclusions and actions proposed in the table below are based on the REACH and CLP information available at the time of the assessment by ECHA. The main source of information is the registration dossiers. Relevant public assessments may also be considered. When new information (e.g. on hazards through evaluation processes, or on uses) will become available, the document will be updated and conclusions and actions revisited

Subgroup name, EC number, substance name	Human Health Hazard	Environmental Hazard	Relevant use(s) & exposure potential	Last foreseen action	Action
EC 202-851-5 EC 210-762-8 EC 246-562-2 EC 203-266-8 EC 215-325-5 EC 910-757-7 EC 217-126-9 EC 220-103-6 EC 220-266-3 EC 434-600-2 EC 603-094-7	Inconclusive hazard for carcinogenicity and mutagenicity Known or potential hazard for reproductive toxicity	Known or potential hazard for aquatic toxicity	Industrial uses , Professional workers and/or consumers with exposure potential	**No hypothesis yet** <u>Justification:</u> Awaiting outcome of CLH for styrene for carcinogenicity and mutagenicity as well as further CCH for other group members for these hazards to develop a hypothesis	**First step:** Await outcome of CLH CCH for: EC 203-266-8, 210-762-8, 215-325-5, 220-103-6, 220-266-3, 246-562-2, 603-094-7, 910-757-7
C&L notified, unclaimed NONs	Inconclusive hazard	Known or potential hazard		**Currently no need for EU RRM**	No action

and not registered substances: EC 202-889-2 EC 210-256-7 EC 214-028-8 EC 248-846-1 EC 404-770-2 EC 607-905-5 EC 801-162-2	for carcinogenicity and mutagenicity Known or potential hazard for reproductive toxicity	for aquatic toxicity: No hazard or unlikely hazard for PBT/vPvB for C&L notified, unclaimed NONs and not registered substances.		These are substances with only C&L notifications, unclaimed NONs (EC 404-770-2), and not registered (EC 607-905-5), no information on uses is available and no data for PBT/vPvB can be generated to clarify the hazards.	

Annex 1: Harmonised classifications and self-classifications reported by registrants

Data extracted on 7 February 2022.

EC/ List No	CAS No	Substance name	Harmonised classification	Classification in registrations
202-851-5	100-42-5	styrene	*Flam. Liq. 3* *Skin Irrit. 2* *Eye Irrit. 2* *Acute Tox. 4* *STOT RE 1* *Repr. 2*	*Repr. 2 H361, specific effect: Suspected of damaging the unborn child* *Flam. Liquid 3 H226* *Acute Tox. 4 H332* *Skin Irrit. 2 H315* *Eye Irrit. 2 H319* *Asp. Tox. 1 H304* *STOT Rep. Exp. 1 H372, affected organs: ear* *STOT Single Exp. 3 H335, affected organs: Nose* *Aquatic Chronic 3 H412* *STOT Rep. Exp. 1 H372, affected organs: hearing organs [intermediate (active)]* *STOT Rep. Exp. 2 H373, affected organs: olfactory system, respiratory system [Article 10 (inactive)]* *STOT Single Exp. 3 H335, affected organs: respiratory system [Article 10 (inactive)]* *Repr. 2 H361 [intermediate (active)]*
203-266-8	105-06-6	1,4-divinylbenzene		*Aquatic Chronic 2 H411;*
210-762-8	622-97-9	4-methylstyrene		*Flam. Liquid 3 H226* *Acute Tox. 4 H332* *Skin Irrit. 2 H315* *Eye Irrit. 2 H319* *Asp. Tox. 1 H304* *Aquatic Chronic 3 H412*
215-325-5	1321-74-0	divinylbenzene		*Skin Irrit. 2 H315* *Eye Irrit. 2 H319* *Aquatic Chronic 2 H411*
217-126-9	1746-23-2	p-tert-butylstyrene		*Repr. 2 H361, specific effect:Fertility: Testicular atrophy and degeneration, male infertility* *Acute Tox. 4 H332* *Skin Irrit. 2 H315* *Eye Irrit. 2 H319*

				Aquatic Acute 1 H400; Aquatic Chronic 1 H410, M = 1;
220-103-6	2628-17-3	p-vinylphenol		*Muta. 2 H341* *Repr. 2 H361* *Acute Tox. 4 H302* *STOT Rep. Exp. 1 H372, affected organs: Osephagus, stomach, intestine, duodenum, ilieum, jejunem, kidneys, ureter, uethra, bladder.*
220-266-3	2695-37-6	sodium 4-vinylbenzenesulphonate		*Skin Irrit. 2 H315* *Eye Irrit. 2A H319*
246-562-2	25013-15-4	vinyltoluene		*Flam. Liquid 3 H226* *Acute Tox. 4 H332* *Skin Irrit. 2 H315* *Eye Irrit. 2 H319* *Asp. Tox. 1 H304* *Aquatic Acute 1 H400* *Aquatic Chronic 3 H412* *Aquatic Chronic 2 H411*
404-770-2		styrene-4-sulfonyl chloride		
434-600-2	2628-16-2	4-ethenylphenyl acetate		*Acute Tox. 4 H302* *Acute Tox. 2 H310* *Acute Tox. 1 H330* *Skin Irrit. 2 H315* *Eye Irrit. 2A H319* *Skin Sens. 1 H317* *STOT Rep. Exp. 2 H373, affected organs: respiratory tract* *STOT Single Exp. 3 H335, affected organs:* *Aquatic Chronic 3 H412*
603-094-7	125904-11-2	Benzene, ethenyl-, ar-bromo derivs.		*Skin Irrit. 2 H315* *Eye Irrit. 2 H319* *STOT Single Exp. 3 H335, affected organs: respiratory tract* *Aquatic Chronic 2 H411*
910-757-7		Reaction mass of divinylbenzene and		*Repr. 2 H361, specific effect:fetal toxicity; decreased pup survival* *Skin Irrit. 2 H315* *Eye Irrit. 2 H319* *Skin Sens. 1B H317*

		ethylstyrene		*STOT Single Exp. 3 H335, affected organs: respiratory tract* *Aquatic Chronic 1 H410* *Aquatic Chronic 2 H411*
202-889-2	100-80-1	3-methylstyrene		
210-256-7	611-15-4	2-methylstyrene	*Aquatic Chronic 2 H411;*	
214-028-8	1073-67-2	p-chlorostyrene		
248-846-1	28106-30-1	Ethylstyrene		
607-905-5	2628-16-2	4-Acetoxystyrene		
801-162-2	2633-67-2	4-Ethenylbenzene-1-sulfonyl chloride		

(*) the number in brackets indicates the number of notifications received. Each notification can represent a group of notifiers, therefore the number may differ from the C&L inventory which displays number of notifiers.

Annex 2: Overview of uses based on information available in registration dossiers

Data extracted on 26 October 2021.

Main types of applications structured by product types	EC/ List 203-266-8	EC/ List 434-600-2	EC/ List 246-562-2	EC/ List 910-757-7	EC/ List 220-103-6	EC/ List 202-851-5	EC/ List 215-325-5	EC/ List 220-266-3	EC/ List 210-762-8	EC/ List 217-126-9	EC/ List 603-094-7
I Overarching group											
PC 32: Polymer preparations and compounds	I	I, F	I, F, P	I, F, P	F	I, F, P, A	I, F, P	I	I, P	I	
II PCs under which uses of free substances are involved											
PC 19: Intermediate				I, F, P		I, F, P		I		I	
PC 21: Laboratory chemicals						I, F					
PC 30: Photo-chemicals		I									
PC 33: Semiconductors		I, F									
III Oligomers with the release potential											
PC 1: Adhesives, sealants			I, C		F	I, F, A			I, C		
PC 9a: Coatings and paints, thinners, paint removes			I, C			I, F, P, C			C		
PC 9b: Fillers, putties, plasters, modelling clay			P, C			I, F, P, C			P, C		
PC 14: Metal surface treatment products						P					
PC 15: Non-metal-surface treatment products						I, F, P					
PC 18: Ink and toners				I		I, F, P, C					
PC 26: Paper and board						I, F, P					

treatment products											
IV Substances in polymer matrices											
PC 35: Washing and cleaning products						I, F, P					
PC 36: Water softeners	I			I, P							
PC 37: Water treatment chemicals				I		I, F	I, F, P				

F: formulation, I: industrial use, P: professional use, C: consumer use, A: article service life; P, C and A are highlighted in red to indicate widespread use with potential for exposure/release

Annex 3: Overview of completed or ongoing regulatory risk management activities

Data extracted on 4 November 2021.

EC / List number	RMOA	Authorisation		Restriction*	CLH	Actions not under REACH / CLP
		Candidate list	Annex XIV	Annex XVII	Annex VI (CLP)	
202-851-5	YES				YES	

* Some of the broad restriction entries in the Annex XVII of REACH are not represented in the overview, e.g. when the scope of the restriction is defined by its classification or the substance identification is broad (e.g. entries 3, 28-30 and 40).

There are no relevant completed or ongoing regulatory risk management activities for the other substances.