

Assessment of regulatory needs

Authority: ECHA

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Group Name: Simple Vanadium compounds

General structure: -

Revision history

<i>Version</i>	<i>Date</i>	<i>Description</i>
1.0	19 May 2021	

Substances within this group:**Subgroup 1 (substances known or likely to release vanadium ions)**

EC/List number	CAS number	Substance name	Registration type (full, OSII or TII, NONS), highest tonnage band among all the registrations (t/y) ¹
215-230-9	1314-34-7	divanadium trioxide	Full, 100-1000
215-239-8	1314-62-1	divanadium pentaoxide	Full, > 1000 OSII or TII, not (publicly) available
231-561-1	7632-51-1	vanadium tetrachloride	Full, not (publicly) available
231-744-6	7718-98-1	vanadium trichloride	Full, not (publicly) available
231-780-2	7727-18-6	vanadium trichloride oxide	Full, not (publicly) available
232-261-3	7803-55-6	ammonium trioxovanadate	Full, 100-1000
234-176-7	10580-52-6	vanadium dichloride	C&L notifications
234-841-1	12036-21-4	vanadium dioxide	Cease manufacture
235-384-0	12207-63-5	ammonium trivanadium octaoxide	Full, not (publicly) available
237-226-6	13701-70-7	divanadium tris(sulphate)	Full, not (publicly) available
237-272-7	13718-26-8	sodium metavanadate	Full, OSII or TII, not (publicly) available
237-287-9	13721-39-6	trisodium tetraoxovanadate	C&L notifications
237-388-8	13769-43-2	potassium vanadium trioxide	Full, 100-1000 OSII or TII
248-652-7	27774-13-6	vanadium oxide sulphate	Full, 1-10
254-463-0	39455-80-6	Ammonium sodium vanadium oxide	OSII or TII
406-260-5	58834-75-6	vanadyl pyrophosphate	Full, NONS, not (publicly) available
407-130-0	65232-89-5	divanadyl pyrophosphate	Full, OSII or TII, NONS, not (publicly) available
424-390-0	93280-40-1	Vanadate(1-), oxo[phosphato(3-)-.kappa.O]-, hydrogen, hydrate (2:2:1)	NONS, not (publicly) available
618-920-1	93280-40-1	Vanadate(1-), oxo[phosphato(3-)-.kappa.O]-, hydrogen, hydrate (2:1)	Full, OSII or TII
635-023-0	12439-96-2	Vanadium, oxosulfato-, pentahydrate	C&L notifications
677-940-9	123334-20-3	Vanadium oxide sulphate hydrate	C&L notifications
-	-	Vanadium (n) oxysulphate	Full, not (publicly) available

¹ N/A: not publically available

Subgroup 2 (substances with low or uncertain ability to release vanadium ions)

EC/List number	CAS number	Substance name	Registration type (full, OSII or TII, NONS), highest tonnage band among all the registrations (t/y) ¹
231-171-1	7440-62-2	vanadium	Full, > 1000
235-122-5	12070-10-9	vanadium carbide	Full, 1-10
237-001-2	13573-13-2	magnesium divanadium hexaoxide	Full, not (publicly) available
237-758-9	13977-56-5	iron vanadium tetraoxide	Full, not (publicly) available
237-952-3	14100-64-2	calcium divanadium hexaoxide	Full, not (publicly) available
601-732-9	12069-91-9	Vanadium carbide nitride	Full, not (publicly) available
239-052-6	14974-48-2	Oxalic acid, vanadium salt	C&L notifications
308-876-9	98903-75-4	Vanadium, oxalate complexes	Full, 100-1000 OSII or TII
945-749-2	-	Vanadium diascorbate	Full, not (publicly) available
947-007-3	-	[(2-hydroxyacetyl)oxy](oxo) vanadium 2-hydroxyacetate	Full, not (publicly) available

This table contains also group members that are only notified under the CLP Regulation. However, the list is currently non-exhaustive. Should further regulatory risk management action on one or more substances in the group be considered, ECHA will 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.

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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 voluntary, i.e., it is not part of the 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 website².

² <https://echa.europa.eu/understanding-assessment-regulatory-needs>

Glossary

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
OSH	Occupational safety and health
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
STOT RE	Specific target organ toxicity, repeated exposure
SEv	Substance evaluation
SVHC	Substance of very high concern

1 Overview of the group

ECHA has grouped together structurally similar vanadium compounds.

This group consists of 32 simple vanadium compounds in different oxidation states (0, +2, +3, +4 and +5) with both inorganic (oxides, chlorides, sulfates, phosphates, carbides etc.) and organic (ascorbate, 2-hydroxy acetate and oxalate) counterparts. There are active registrations for 26 substances of which one is registered only as intermediate (OSII or TII).

The substances have been sub-grouped according to their ability to release vanadium ions resulting in (potential) bioavailability of vanadium IV and V cationic species, which are determining the (eco)toxicological effects observed:

- Subgroup 1: substances known or likely to release vanadium ions
- Subgroup 2: substances with low or uncertain ability to release vanadium ions

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.

Based on information reported in the REACH registration dossiers, the main uses of the substances are as catalysts, electrolytes for (non-consumer) batteries, pigments or UV absorbent (for paints, glass or ceramics) as well as in alloys, welding and metal surface treatment mainly in industrial settings where the potential for exposure and release seems to be limited but still possible. Three substances have professional uses in welding, lubricants or fertilisers. The latter use is also reported for consumers for one substance.

For divanadium pentaoxide (EC 215-239-8) a process to establish a harmonised classification and labelling is ongoing³. The Committee for Risk Assessment (RAC), in its opinion, concluded that the substance warrants amongst others a classification as carcinogen in category 1B.

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

Based on currently available information, there is a need for (further) EU regulatory risk management – namely EU-wide exposure limit for workers under OSH legislation or REACH for all substances in this group.

For divanadium pentaoxide (EC 215-239-8) a process to establish a harmonised classification and labelling (CLH) is ongoing. RAC, in its opinion³, concluded that the substance warrants harmonised classification as Carc. 1B (carcinogenic properties causing lung cancer), as well as Muta. 2, Repr. 2, Lact., STOT RE 1, Acute Tox. 3 and Acute Tox. 2. The existing harmonised classification as germ cell mutagenicity cat. 2 suggests it may be a non-threshold carcinogen. As the lung cancer hazard relates to the release of vanadium IV and V cationic species, these properties can (potentially) be read-across to all other substances in the group (both from subgroup 1 and 2, including non-registered substances). The bioavailability of vanadium IV and V cationic species is uncertain for poorly soluble vanadium compounds, but cannot be excluded for any of the substances in this group.

An EU-wide exposure limit for workers is proposed as the substances have mainly industrial uses. The substances also require harmonised classification and labelling (CLH). For a number of substances the proposed regulatory risk management actions could already be initiated. For other substances, compliance checks and generation of data or waiting for the data to be generated are proposed as next steps.

Justifications

The main uses of the substances are in catalysts, electrolytes for (non-consumer) batteries, base metals and alloys as well as uses as intermediate, which take place mainly in industrial settings. For those uses, regulatory risk management may not primarily aim for substitution and therefore authorisation or a restriction banning those uses was not considered appropriate for this group of substances.

The proposed EU-wide exposure limit for workers can be implemented either by setting a binding occupation exposure limit (OEL) under occupational safety and health (OSH) legislation or by a restriction under REACH.

Setting an **EU OEL under OSH** legislation mainly addresses exposure via inhalation which seems to be possible via dust (like catalyst powders or from use of steel tools), spray application of coatings and paints or welding fumes as well as fertiliser or lubricant uses and battery production or maintenance. The advantage of an OEL is that it also covers the manufacture of the substances, the waste stage,

³ According to the Committee for Risk Assessment (RAC) opinion from Sept. 2020 the harmonised classification should be: Carc. 1B (H350), Muta. 2 (H341), Repr. 2 (H361fd), Lact. (H362), STOT RE 1 (H372, respiratory tract, inhalation), Acute Tox. 3 (H301) and Acute Tox. 2 (H330). More information on the CLH proposal: <https://www.echa.europa.eu/web/guest/registry-of-clh-intentions-until-outcome/-/dislist/details/0b0236e1814e26d1>.

intermediate uses as well as dust or welding fumes generated at the workplace, which cannot (or only partly) be addressed by a restriction. Drawbacks are that an OEL under OSH does not cover self-employed professionals, but an EU-wide exposure limit for workers in a restriction, which would lead to specified risk management measures in a safety data sheet, could be appropriate and effective for self-employed professionals. A complementary restriction of minor professional uses could address these concerns for self-employed professionals.

The only consumer use in fertilisers reported for vanadium diascorbate (945-749-2) falls under the restriction via entry 28 of Annex XVII once harmonised classification as Carc 1B is applicable. Although the release of a number of substances from articles (like metal, glass or ceramic articles) is considered to be low, there is uncertainty whether dust from consumer handling or processing of paper, textile or coated or painted articles could cause a concern.

Furthermore, uses in paints or coatings as well as uses as catalyst or battery electrolyte or minor uses in lubricants and fertilisers (including professional uses) can also lead to dermal exposure. The available data for the inhalation route suggests a local nature of the observed lung cancer. From the current assessment there is no evidence whether or not dermal exposure may lead to increased risk of skin cancer. However, an EU-wide exposure limit for workers would also need to consider the reproductive toxicity properties (cat. 2) and thus adding a skin notation to the OEL may be considered. As a result of the proposed CLH (repro 2 and carc 1B) it is expected that exposure via the dermal route will be reduced by measures under the OSH legislation.

For divanadium pentoxide (EC 215-239-8) several national exposure limit values have been set (which also apply more widely to vanadium IV and V compounds), with the value set by Germany (0.005 g/m³ for respirable fraction) being the lowest. The Scientific Committee for Occupational Exposure Limits adopted an opinion on that substance in 2004⁴. In addition, national exposure values for vanadium metal (EC 231-171-1), divanadium trioxide (EC 215-230-9) and vanadium carbide (EC 235-122-5) have been set at 0.5 g/m³ by Austria and Latvia.

Alternatively, a restriction can define EU-wide exposure limits for workers. Such a restriction proposal may consider the approach taken in the restriction proposal for five cobalt substances⁵.

As part of a possible restriction activity it may also be assessed whether, as mentioned above, concerns caused by carcinogenicity or toxicity to reproduction from minor professional uses or uses in articles need to be addressed (e.g. by targeted ban of specific uses to complement an exposure limit for workers). Furthermore, we may aim for consistency with regulatory risk management activities proposed for other groups of metal compounds like cobalt compounds, silver and silver compounds or lanthanum and its simple compounds.

In general, a restriction can cover uses as transported isolated intermediate, whereas uses as on-site isolated intermediate are exempted from restrictions under REACH. However, for such uses under strictly controlled conditions the proposed harmonised classification as Carc. 1B may trigger sufficient risk management measures under occupational safety and health legislation.

⁴ The SCOEL opinion on vanadium pentoxide from 2004 is available at: <http://ec.europa.eu/social/BlobServlet?docId=6817&langId=en>

⁵ More information on the restriction proposal: <https://echa.europa.eu/registry-of-restriction-intentions/-/dislist/details/0b0236e181d575c8>

In parallel to setting the exposure limit for workers, or as a first step, also a group CLH proposal for these substances is proposed mainly based on the Carc 1B hazard (but also considering Repr, Muta, Lact, STOT RE and aquatic toxicity hazards) read across from divanadium pentaoxide to the other substances in the group. The CLH process on divanadium pentaoxide (EC 215-230-9) is already advanced³.

Currently none of the substances in the group are classified for carcinogenicity. A harmonised classification as Carc 1B would trigger more stringent risk management measures under occupational safety and health legislation for uses not covered by the proposed restriction (e.g. OSII) or OEL (self-employed professionals) and would restrict uses in certain articles (e.g. medical devices or toys) as well as the consumer use in fertilisers reported for vanadium diascorbate (945-749-2) via entry 28 of REACH Annex XVII.

The proposed regulatory risk management activities and the measures under OSH legislation triggered by the CLH also address concerns caused by mutagenicity, toxicity for reproduction, repeated dose toxicity and skin sensitisation hazards.

For divanadium pentaoxide (EC 215-239-8) and another 12 registered and four non-registered substances (all from subgroup 1) ECHA proposes to directly initiate the proposed regulatory risk management processes as available data indicate similar bioavailability of vanadium IV and V cationic species and based on that the read-across seems to be justified. For three of those substances – vanadium tetrachloride (EC 231-561-1), vanadium trichloride (EC 231-744-6) and vanadium trichloride oxide (EC 231-780-2) – no data on human health hazards are available. However, as they are hydrolytically unstable, they are proposed for direct regulatory actions based on their hydrolysis products, mainly divanadium pentaoxide (EC 215-239-8) or vanadium dioxide (EC 234-841-1). For the non-registered substances data found in literature indicate water solubility and based on that bioavailability of vanadium IV and V cationic species can be assumed.

Available studies on toxicity for reproduction show deficiencies. If adequate studies become available classification as Repr 1B cannot be excluded. However, as Carc 1B classification together with Muta 2 classification seems to be already warranted for vanadium substances that have similar bioavailability as divanadium pentaoxide (EC 215-239-8) indicating a genotoxic carcinogen with no threshold, generating further data on toxicity for reproduction does not seem to be necessary for these substances as their benefit for risk management would be limited.

For 15 substances (all subgroup 2 substances and only few from subgroup 1), including oxalic acid, vanadium salt, EC 239-052-6 which is not registered, the read-across may not be justified or is at least insufficiently substantiated based on currently available data. They include moderately or poorly water-soluble substances as well as vanadium compounds with organic acids, for which there is uncertainty about the bioavailability of vanadium IV and V cationic species. However, at this stage, similar hazards observed as with well soluble vanadium compounds cannot be excluded. Therefore, **compliance check and data generation** are needed for several of them to confirm potential hazards (e.g. Repr, Muta, STOT RE) and to provide information supporting the read-across. Generated data could also be useful for the assessment of carcinogenicity. On the basis of the newly generated data the substances will be proposed for the same regulatory actions as the other substances in the group.

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
divanadium pentaoxide (215-239-8)	Known or potential hazard for carcinogenicity, mutagenicity, reproductive toxicity, STOT RE and effects via lactation	Known or potential hazard for aquatic toxicity	Industrial uses as catalyst, electrolyte for batteries, pigment, intermediate and in alloys, incl. article service life	Need for EU RRM: EU-wide exposure limit for workers under OSH or REACH Justification: RAC opinion for 215-239-8 that CLH for Carc. 1B is warranted and	CLH process ongoing Next step: EU-wide exposure limit for workers via EU OEL under OSH legislation or via a restriction under REACH
ammonium trioxovanadate (232-261-3) ammonium sodium vanadium oxide (254-463-0) divanadyl pyrophosphate (407-130-0)	Known or potential hazard for carcinogenicity, mutagenicity, reproductive toxicity, STOT RE and effects via lactation	Known or potential hazard for aquatic toxicity, with the exception of 601-732-9 for which there is no or unlikely hazard	Industrial uses as catalyst, electrolyte for batteries, pigment, intermediate and in alloys, incl. article service life; minor industrial use as corrosion inhibitor in the production of fertilisers for 237-	potential read across to all other substances, potential for exposure from industrial uses (incl. powders, spraying, dusts, welding fumes) and articles, substitution may not be primary aim of EU RRM, several OELs	First step: CLH (group approach) Next steps (if hazard confirmed): EU-wide exposure limit for workers via EU OEL under OSH legislation or via a

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Subgroup name, EC number, substance name	Human Health Hazard	Environmental Hazard	Relevant use(s) & exposure potential	Last foreseen action	Action
<p>potassium vanadium trioxide (237-388-8)</p> <p>vanadate(1-), oxo[phosphato(3-)-.kappa.O]-, hydrogen, hydrate (2:1) (618-920-1)</p> <p>sodium metavanadate (237-272-7)</p> <p>vanadium oxide sulphate (248-652-7)</p> <p>Vanadium (n) oxysulphate</p> <p>divanadium tris(sulphate) (237-226-6)</p> <p>vanadium tetrachloride (231-561-1)</p> <p>vanadium trichloride (231-744-6)</p> <p>vanadium trichloride oxide (231-780-2)</p>			<p>388-8, professional use of 248-652-7 in lubricants and of vanadium metal (231-171-1) in welding, professional and consumer uses of 945-749-2 in fertilisers</p>	<p>already set at national level</p>	<p>restriction under REACH</p>

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Subgroup name, EC number, substance name	Human Health Hazard	Environmental Hazard	Relevant use(s) & exposure potential	Last foreseen action	Action
<p>Not registered:</p> <p>vanadium dichloride (234-176-7)</p> <p>trisodium tetraoxovanadate (237-287-9)</p> <p>vanadium, oxosulfato-, pentahydrate (635-023-0)</p> <p>vanadium oxide sulphate hydrate (677-940-9)</p>					
<p>From subgroup 1:</p> <p>divanadium trioxide (215-230-9)</p> <p>ammonium trivanadium octaoxide (235-384-0)</p> <p>From subgroup 2:</p> <p>vanadium (231-171-1)</p> <p>vanadium carbide (235-122-5)</p> <p>vanadium carbide nitride (601-732-9)</p>					<p>First step: CCH</p> <p>Next steps (if hazard confirmed): CLH</p> <p>EU-wide exposure limit for workers via EU OEL under OSH legislation or via a restriction under REACH</p>

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Subgroup name, EC number, substance name	Human Health Hazard	Environmental Hazard	Relevant use(s) & exposure potential	Last foreseen action	Action
Vanadium, oxalate complexes (308-876-9)					
<p>From subgroup 1:</p> <p>vanadyl pyrophosphate (406-260-5)</p> <p>Vanadate(1-), oxo[phosphato(3-)-.kappa.O]-, hydrogen, hydrate (2:2:1) (424-390-0)</p> <p>vanadium dioxide (234-841-1, <i>cease manufacture</i>)</p> <p>From subgroup 2:</p> <p>magnesium divanadium hexaoxide (237-001-2)</p> <p>iron vanadium tetraoxide (237-758-9)</p> <p>calcium divanadium hexaoxide (237-952-3)</p> <p>vanadium diascorbate (945-749-2)</p> <p>[(2-hydroxyacetyl)oxy](oxo)</p>					<p>First step: Await CCH outcome for other substances</p> <p>Next steps (if hazard confirmed): CLH</p> <p>EU-wide exposure limit for workers via EU OEL under OSH legislation or via a restriction under REACH</p>

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Subgroup name, EC number, substance name	Human Health Hazard	Environmental Hazard	Relevant use(s) & exposure potential	Last foreseen action	Action
vanadium 2-hydroxyacetate (947-007-3) oxalic acid, vanadium salt (239-052-6, <i>not registered</i>)					

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

Data extracted on 29 September 2020.

EC/ List No	Substance name	Harmonised classification	Classification in registrations	Classification in C&L notifications
215-230-9	divanadium trioxide		Eye Irrit. 2 - H319	Skin Irrit. 2 - H315 Acute Tox. 4 - H332 STOT SE 3 - H335 Aquatic Chronic 2 - H411
215-239-8	divanadium pentaoxide	Acute Tox. 4 - H302 Acute Tox. 4 - H332 STOT SE 3 - H335 Muta. 2 - H341 STOT RE 1 - H372 Aquatic Chronic 2 - H411 Repr. 2 - H361d CLH process to amend this classification (e.g by adding Carc. 1B (H350)) is ongoing ³	Acute Tox. 4 - H302 Acute Tox. 4 - H332 STOT SE 3 - H335 Muta. 2 - H341 STOT RE 1 - H372 Aquatic Chronic 2 - H411 Repr. 2 - H361d Eye Dam. 1 - H318	Acute Tox. 2 - H300
231-171-1	vanadium		Not classified	Aquatic Chronic 4 - H413
231-561-1	vanadium tetrachloride		Skin Corr. 1A - H314 Aquatic Chronic 3 - H412	Acute Tox. 3 - H301 Acute Tox. 3 - H311 Acute Tox. 3 - H331 Skin Corr. 1B - H314 Eye Dam. 1 - H318 Flam. Liq. 3 - H226
231-744-6	vanadium trichloride		Skin Corr. 1C - H314 Aquatic Chronic 3 - H412	Acute Tox. 4 - H302 Skin Corr. 1B - H314 Aquatic Chronic 2 - H411
231-780-2	vanadium trichloride oxide		Skin Corr. 1C - H314 Aquatic Chronic 3 - H412	Acute Tox. 3 - H301 Acute Tox. 3 - H311 Acute Tox. 4 - H332 STOT SE 1 - H370 STOT SE 2 - H371 Skin Corr. 1B - H314 Eye Dam. 1 - H318 Aquatic Chronic 2 - H411 Aquatic Chronic 3 - H412 Met. Corr. 1 - H290
232-261-3	ammonium trioxovanadate		Acute Tox. 3 - H301 Acute Tox. 4 - H332 Eye Irrit. 2 - H319 Repr. 2 - H361d STOT RE 1 - H372 Aquatic Chronic 2 - H411	Acute Tox. 1 - H300 Acute Tox. 4 - H302 Acute Tox. 1 - H330 Acute Tox. 2 - H330 Acute Tox. 3 - H331 STOT SE 3 - H335 Skin Irrit. 2 - H315

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EC/ List No	Substance name	Harmonised classification	Classification in registrations	Classification in C&L notifications
				Eye Dam. 1 - H318 Muta. 2 - H341 Carc. 2 - H351 Aquatic Chronic 3 - H412
234- 176-7	vanadium dichloride		Not registered	Acute Tox. 4 - H302 Skin Corr. 1A - H314
234- 841-1	vanadium dioxide		Cease manufacture	STOT SE 3 - H335 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Acute Tox. 4 - H332 Aquatic Chronic 4 - H413
235- 122-5	vanadium carbide		Not self-classified	Acute Tox. 4 - H302 Acute Tox. 4 - H312 Acute Tox. 4 - H332 STOT SE 3 - H335 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Flam. Sol. 2 - H228
235- 384-0	ammonium trivanadiu m octaoxide		Acute Tox. 3 - H301 Acute Tox. 3 - H331 STOT SE 3 - H335 STOT RE 1 - H372 Repr. 2 - H361d Eye Dam. 1 - H318 Aquatic Chronic 2 - H411	
237- 001-2	magnesium divanadium hexaoxide		Acute Tox. 4 - H302 Acute Tox. 4 - H332 STOT SE 3 - H335 Muta. 2 - H341 STOT RE 1 - H372 Repr. 2 - H361 Eye Dam. 1 - H318 Aquatic Chronic 2 - H411	Acute Tox. 2 - H300 Carc. 1B - H350 Eye Irrit. 2 - H319
237- 226-6	divanadium tris(sulphat e)		Met. Corr. 1 - H290 Skin Corr. 1C - H314 Eye Dam. 1 - H318 Repr. 2 - H361 Aquatic Chronic 3 - H412	Acute Tox. 4 - H302 STOT RE 1 - H372 Aquatic Chronic 2 - H411
237- 272-7	sodium metavanad ate		Acute Tox. 3 - H301 Acute Tox. 4 - H332 Eye Irrit. 2 - H319 Repr. 2 - H361 STOT RE 1 - H372 Aquatic Chronic 2 - H411	Acute Tox. 3 - H331 Skin Irrit. 2 - H315 STOT SE 3 - H335 Skin Sens. 1 - H317 Resp. Sens. 1 - H334 Muta. 1B - H340 Carc. 1B - H350 Repr. 1B - H360 Aquatic Chronic 3 - H412
237- 287-9	trisodium tetraoxova nadate		Not registered	Acute Tox. 4 - H302 Acute Tox. 4 - H312 Acute Tox. 4 - H332 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 STOT SE 3 - H335

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EC/ List No	Substance name	Harmonised classification	Classification in registrations	Classification in C&L notifications
237-388-8	potassium vanadium trioxide		Acute Tox. 4 - H302 Acute Tox. 4 - H332 Eye Irrit. 2 - H319 Repr. 2 - H361 STOT RE 1 - H372 Aquatic Chronic 2 - H411	Acute Tox. 2 - H300 Acute Tox. 3 - H301 Acute Tox. 2 - H310 Acute Tox. 2 - H330 STOT SE 3 - H335 Muta. 2 - H341 Carc. 2 - H351 Skin Irrit. 2 - H315 Eye Dam. 1 - H318 Aquatic Acute 1 - H400
237-758-9	iron vanadium tetraoxide		Aquatic Chronic 2 - H411	
237-952-3	calcium divanadium hexaoxide		Acute Tox. 4 - H302 Acute Tox. 4 - H332 Skin Irrit. 2 - H315 Eye Dam. 1 - H318 STOT SE 3 - H335 Muta. 2 - H341 Repr. 2 - H361 STOT RE 1 - H372 Aquatic Chronic 2 - H411	Acute Tox. 3 - H301 Acute Tox. 3 - H331 Eye Irrit. 2 - H319
239-052-6	Oxalic acid, vanadium salt		Not registered	Acute Tox. 4 - H302 Acute Tox. 4 - H312 Acute Tox. 4 - H332 STOT SE 3 - H335 Eye Irrit. 2 - H319 Eye Dam. 1 - H318 Aquatic Chronic 3 - H412 Met. Corr. 1 - H290
248-652-7	vanadium oxide sulphate		Met. Corr. 1 - H290 Aquatic Chronic 2 - H411 Acute Tox. 3 - H301 Acute Tox. 2 - H330 Eye Irrit. 2 - H319 Skin Irrit. 2 - H315 STOT RE 1 - H372 Repr. 2 - H361	Acute Tox. 4 - H332 STOT SE 3 - H335
254-463-0	Ammonium sodium vanadium oxide		Acute Tox. 3 - H301 Repr. 2 - H361 STOT RE 1 - H372 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Met. Corr. 1 - H290 Aquatic Chronic 2 - H411	Acute Tox. 4 - H302 Acute Tox. 2 - H330 Acute Tox. 3 - H331 Acute Tox. 4 - H332 STOT SE 3 - H335 Aquatic Chronic 3 - H412
308-876-9	Vanadium, oxalate complexes		Acute Tox. 3 - H301 Repr. 2 - H361 STOT RE 1 - H372 Skin Irrit. 2 - H315 Eye Dam. 1 - H318 Aquatic Chronic 2 - H411 Met. Corr. 1 - H290	Acute Tox. 4 - H302 Skin Corr. 1B - H314 Skin Corr. 1C - H314

ASSESSMENT OF REGULATORY NEEDS

EC/ List No	Substance name	Harmonised classification	Classification in registrations	Classification in C&L notifications
406- 260-5	vanadyl pyrophosph ate	Eye Irrit. 2 - H319 Skin Sens. 1 - H317 Aquatic Chronic 3 - H412	Eye Irrit. 2 - H319 Skin Sens. 1 - H317 Repr. 2 - H361 Aquatic Chronic 3 - H412	Acute Tox. 4 - H302 Eye Dam. 1 - H318 Aquatic Chronic 2 - H411
407- 130-0	divanadyl pyrophosph ate	Acute Tox. 4 - H302 Eye Dam. 1 - H318 Skin Sens. 1 - H317 Aquatic Chronic 2 - H411	Acute Tox. 4 - H302 Eye Dam. 1 - H318 Skin Sens. 1B - H317 Aquatic Chronic 2 - H411 Acute Tox. 4 - H332 STOT SE 3 - H335 Muta. 2 - H341 Repr. 2 - H361 STOT RE 1 - H372	
424- 390-0	Vanadate(1 -), oxo[phosp hato(3-)- .kappa.O]-, hydrogen, hydrate (2:2:1)		Acute Tox. 3 - H301 Acute Tox. 4 - H332 STOT SE 3 - H335 Eye Dam. 1 - H318 Skin Sens. 1B - H317 Muta. 2 - H341 Repr. 2 - H361 STOT RE 1 - H372 Aquatic Chronic 2 - H411	
601- 732-9	Vanadium carbide nitride		Not self-classified	
618- 920-1	Vanadate(1 -), oxo[phosp hato(3-)- .kappa.O]-, hydrogen, hydrate (2:1)		Acute Tox. 3 - H301 Acute Tox. 4 - H332 STOT SE 3 - H335 Eye Dam. 1 - H318 Skin Sens. 1B - H317 Muta. 2 - H341 Repr. 2 - H361 STOT RE 1 - H372 Aquatic Chronic 2 - H411	
635- 023-0	Vanadium, oxosulfato - pentahydra te		Not registered	Acute Tox. 4 - H302
677- 940-9	Vanadium oxide sulphate hydrate		Not registered	Acute Tox. 4 - H302 Acute Tox. 2 - H300 Acute Tox. 2 - H310 Acute Tox. 2 - H330 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Muta. 1B - H340 STOT SE 3 - H335
945- 749-2	Vanadium diascorbate		Skin Corr. 1A - H314 Eye Dam. 1 - H318 STOT SE 3 - H335	
947- 007-3	[(2- hydroxyace tyl)oxy](ox o) vanadium		Acute Tox. 3 - H301 Skin Irrit. 2 - H315 Eye Dam. 1 - H318 Skin Sens. 1 - H317	

ASSESSMENT OF REGULATORY NEEDS

EC/ List No	Substance name	Harmonised classification	Classification in registrations	Classification in C&L notifications
	2- hydroxyace tate		Aquatic Chronic 2 - H411	
-	Vanadium (n) oxysulphat e		Skin Corr. 1 - H314 Eye Dam. 1 - H318 Skin Sens. 1 - H317	

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

Data extracted on 29 September 2020.

Main types of applications structured by product or article types	Substance Name	Intermediate use	Catalyst	Electrolytes for (non-consumer) batteries	Base metals, Alloys	Production of pigments, frits, enamels and glass	Pigments for frits, enamels, glass, ceramics	Pigments in coatings, paints	Welding, soldering	Fertilisers	Lubricants	Metal Surface Treatment	Laboratory uses
231-171-1	vanadium				I, P, A				I, P, A				
215-230-9	divanadium trioxide	I	I	I, A									
215-239-8	divanadium pentaoxide	I	I, A	I, A	I, A	I, A	I, A	I, A					I
231-561-1	vanadium tetrachloride	I	I										
231-744-6	vanadium trichloride		I										
231-780-2	vanadium trichloride oxide		F, I										
232-261-3	ammonium trioxovanadate	I		I, A			I, A						
235-122-5	vanadium carbide				I, P, A								
235-384-0	ammonium trivanadium octaoxide	F, I	F, I	I, A			I, A			I			
237-001-2	magnesium divanadium hexaoxide		I										
237-226-6	divanadium tris(sulphate)			I, A									
237-272-7	sodium metavanadate	I	I		I		I, A	I, A					
237-388-8	potassium vanadium trioxide	F, I	I			I				I			
237-758-9	iron vanadium tetraoxide		I					I, A					

ASSESSMENT OF REGULATORY NEEDS

Main types of applications structured by product or article types	Substance Name	Intermediate use	Catalyst	Electrolytes for (non-consumer) batteries	Base metals, Alloys	Production of pigments, frits, enamels and glass	Pigments for frits, enamels, glass, ceramics	Pigments in coatings, paints	Welding, soldering	Fertilisers	Lubricants	Metal Surface Treatment	Laboratory uses
237-952-3	calcium divanadium hexaoxide		I										
248-652-7	vanadium oxide sulphate	F, I	I	I, A							I, P	I	
254-463-0 (interm. reg.)	Ammonium sodium vanadium oxide	I											
308-876-9	Vanadium, oxalate complexes	I	I, A	I, A									
406-260-5	vanadyl pyrophosphate		I										
407-130-0	divanadyl pyrophosphate		I										
424-390-0	Vanadate(1-), oxo[phosphato(3-)-kappa.O]-, hydrogen, hydrate (2:2:1)		I										
601-732-9	Vanadium carbide nitride				I, A								
618-920-1	Vanadate(1-), oxo[phosphato(3-)-kappa.O]-, hydrogen, hydrate		I										
945-749-2	Vanadium diascorbate									P, C			
947-007-3	[(2-hydroxy acetyl)oxy](oxo) vanadium 2-hydroxyacetate						I, A						
-	Vanadium (n) oxysulphate	I	I		F, I, A							F, I	

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 21 September 2020.

EC/List number	RMOA	Authorisation		Restriction*		CLH	Actions not under REACH/CLP
		Candidate list	Annex XIV	Annex XVII	Annex VI (CLP)		
215-239-8						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).

No completed or ongoing regulatory risk management activities for the other substances.