

CHEMICAL SAFETY REPORT

Update 3: Submitted September 2021

(Replaces 2nd Update (April 2016), 1st Update May 2013 and original version submitted 2010)

Substance Name: diammonium dimolybdate

EC Number: 248-517-2

CAS Number: 27546-07-2

Registrant's Identity: Joint CSR submitted by the Lead Registrant (Climax Molybdenum B.V.) on behalf of all members of the joint submission MOCONJS-ADM. Document prepared by the IMO A REACH Molybdenum Consortium (MoCon)

See also the [2014 OECD Highly Soluble Molybdenum Salts Mutual Acceptance of Data \(MAD\) dataset \(containing primarily sodium molybdate data used for read-across in many instances in this CSR\)](#), which is attached in IUCLID Section 13. The afore-mentioned MAD status data is:

- 1) likewise contained in the relevant individual sections within this CSR.
- 2) also downloadable from the OECD website at:

http://webnet.oecd.org/HPV/UI/SIDS_Details.aspx?id=5c88d62f-4401-4cad-b521-521a4bd710f3

Several supporting documents/reports are to be considered together with the CSR. They are referenced in the CSR, and are attached in the technical registration dossier in IUCLID section 13.2:

- MoCon read-across concept/justification for human health hazards
 - MoCon read-across concept/justification for environmental hazards
 - Speciation of molybdenum compounds in water: UV spectra (in support of the above)
 - DNEL derivation report
 - Background document – Environmental Effects Assessments (*updated July 2021*)
 - Background document – Environmental Fate properties (*updated May 2021*)
 - Background document – Regional / ambient monitoring data (water, soil, sediment)
 - OECD SIDS Initial Assessment Profile (SIAP), containing the dataset with MAD status
 - List of assessors (list of professionals that contributed to the registration dossier).
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2. MANUFACTURE AND USES

Table 5. Quantities (in tonnes/year)

Year	Tonnages (tonnes per year)
-	For confidentiality reasons the data on manufactured or imported quantities per registrant are not provided in this joint CSR , but are instead provided by each individual registrant of this substance in their technical registration dossier (section 3.2 in IUCLID).

2.1. Manufacture

Table 6. Manufacture

	Manufacture
M-1	<p>Manufacture of ammonium dimolybdate <u>Further description of manufacturing process:</u></p> <p>Process Summary: Diammonium dimolybdate (ADM) is prepared by dissolving molybdenum trioxide (MoO₃) also known as molybdic oxide in aqueous-ammonia followed by filtration to remove gangue elements. After filtration, ADM is crystallized out of the filtrate, dried and then packaged.</p> <p>Feed Stock Selection: ADM feed stocks can be any grade of molybdic oxide, such as roasted molybdic oxide (EINEC 289-178-0), or pure oxide calcined or sublimed (EINECS 215-204-7). The desired quality of the ADM will dictate feed stock selection.</p> <p>Process Description: ADM is produced in a batch process. Depending on the desired purity of the ADM and the feed stock, the molybdic oxide feed stock may be leached typically in hot water at 70°C and filtered to remove water-insoluble impurities. The filter cake containing the molybdic oxide is leached in an aqueous-ammonia solution to put the molybdenum trioxide into solution as a molybdate. The chemical reaction is shown below:</p> $\text{MoO}_3 + \text{H}_2\text{O} + 2\text{NH}_3 \rightarrow (\text{NH}_4)_2\text{MoO}_4$ <p>The ammoniated slurry is filtered to recover the ammoniated molybdate solution, i.e. the filtrate. The filter cake is reprocessed for molybdenum recovery. The molybdate solution is then crystallized by evaporating ammonia and water thus creating a saturated solution. When the solution becomes super-saturated, i.e. molybdate can no longer stay in solution, ADM crystals will precipitate. The chemical reaction is shown below:</p> $2(\text{NH}_4)_2\text{MoO}_4 \rightarrow (\text{NH}_4)_2\text{Mo}_2\text{O}_7 + \text{H}_2\text{O} + 2\text{NH}_3$ <p>The ADM is recovered by centrifuging. Depending on solution impurities, the liquid centrifuged out of the crystals may be put back into the crystallizer or removed from the crystallization circuit. The ADM crystals from the centrifuge are dried in a dryer and stored. From the storage bin, ADM is packed into fibre board drums, steel drums and/or bulk bags as per sales requirements.</p> <p>Contributing activity/technique for the environment : - ERC1: Manufacture of the substance</p> <p>Contributing activity/technique for the workers : - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery</p>

	Tonnage of substance for that use: tonnes/year Related assessment: use not assessed
M-2	<p>Manufacture of ammonium dimolybdate in the catalyst industry</p> <p><u>Further description of manufacturing process:</u> Contributing activity/technique for the environment : - ERC1: Manufacture of the substance</p> <p>Contributing activity/technique for the workers : - PROC 1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions - PROC 4: Chemical production where opportunity for exposure arises - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 14: Tableting, compression, extrusion, pelletisation, granulation - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery</p> <p>Tonnage of substance for that use: tonnes/year Related assessment: use not assessed <u>Remarks:</u> Information provided by European Catalyst Manufacturing Assn.</p>

2.2. Identified uses

Table 7. Formulation

	Formulation
F-1	<p>Formulation of ammonium dimolybdate into fertilizers as micronutrient</p> <p><u>Further description of the use:</u> Contributing activity/technique for the environment : - ERC2: Formulation into mixture</p> <p>Contributing activity/technique for the workers : - PROC 5: Mixing or blending in batch processes - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery</p> <p>Product Category formulated: PC 12: Fertilisers Technical function of the substance: fertilisers (soil amendments)</p> <p>Tonnage of substance for that use: tonnes/year Substance supplied to that use: as such <u>Remarks:</u> Molybdenum is an essential trace nutrient for plants, animals, humans and most microbes. Related assessment: use not assessed</p>

F-2	<p>Formulation of ammonium dimolybdate in the production of (activated) carbon by impregnation</p> <p><u>Further description of the use:</u></p> <p>Contributing activity/technique for the environment :</p> <ul style="list-style-type: none"> - ERC3: Formulation into solid matrix <p>Contributing activity/technique for the workers :</p> <ul style="list-style-type: none"> - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - PROC 4: Chemical production where opportunity for exposure arises - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery <p>Product Category formulated: PC 2: Adsorbents</p> <p>Technical function of the substance: adsorbent; adsorbent; impregnation agent</p> <p>Tonnage of substance for that use: tonnes/year</p> <p>Substance supplied to that use: as such</p> <p>Related assessment: use not assessed</p>
F-3	<p>Formulation of lubricants and greases containing ammonium dimolybdate</p> <p><u>Further description of the use:</u></p> <p>Contributing activity/technique for the environment :</p> <ul style="list-style-type: none"> - ERC2: Formulation into mixture <p>Contributing activity/technique for the workers :</p> <ul style="list-style-type: none"> - PROC 1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions - PROC 4: Chemical production where opportunity for exposure arises - PROC 5: Mixing or blending in batch processes - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 15: Use as laboratory reagent - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery <p>Product Category formulated: PC 24: Lubricants, greases, release products</p> <p>Technical function of the substance: lubricating agent; wear reduction in rotary equipment</p> <p>Tonnage of substance for that use: tonnes/year</p> <p>Substance supplied to that use: as such</p> <p>Related assessment: use not assessed</p>
F-4	<p>Formulation of ammonium dimolybdate in the catalyst industry</p> <p><u>Further description of the use:</u></p> <p>Contributing activity/technique for the environment :</p> <ul style="list-style-type: none"> - ERC2: Formulation into mixture - ERC3: Formulation into solid matrix <p>Contributing activity/technique for the workers :</p> <ul style="list-style-type: none"> - PROC 1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions - PROC 4: Chemical production where opportunity for exposure arises - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH]

	<ul style="list-style-type: none"> - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 14: Tableting, compression, extrusion, pelletisation, granulation - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery <p>Product Category formulated: PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents; PC 0: Other: UCN Code P15500 Catalysts</p> <p>Technical function of the substance: catalyst</p> <p>Tonnage of substance for that use: tonnes/year</p> <p>Substance supplied to that use: as such</p> <p>Remarks:</p> <p>Information provided by European Catalyst Manufacturers Assn.</p> <p>Related assessment: use not assessed</p>
F-5	<p>Formulation of ammonium dimolybdate in the production of frits and enamels</p> <p><u>Further description of the use:</u></p> <p>Contributing activity/technique for the environment :</p> <ul style="list-style-type: none"> - ERC2: Formulation into mixture <p>Contributing activity/technique for the workers :</p> <ul style="list-style-type: none"> - PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 15: Use as laboratory reagent - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery <p>Product Category formulated: PC 9a: Coatings and paints, thinners, paint removes; PC 9b: Fillers, putties, plasters, modelling clay</p> <p>Technical function of the substance: pigment</p> <p>Tonnage of substance for that use: tonnes/year</p> <p>Substance supplied to that use: as such</p> <p>Related assessment: use not assessed</p>
F-6	<p>Formulation of ammonium dimolybdate into metal surface treatment products</p> <p><u>Further description of the use:</u></p> <p>Contributing activity/technique for the environment :</p> <ul style="list-style-type: none"> - ERC2: Formulation into mixture <p>Contributing activity/technique for the workers :</p> <ul style="list-style-type: none"> - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - PROC 5: Mixing or blending in batch processes - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 15: Use as laboratory reagent - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery <p>Product Category formulated: PC 14: Metal surface treatment products; PC 15: Non-metal-surface treatment products; PC 21: Laboratory chemicals; PC 38: Welding and soldering products, flux products</p> <p>Technical function of the substance: antiscaling agent; corrosion inhibitor; plating agent</p> <p>Tonnage of substance for that use: tonnes/year</p> <p>Substance supplied to that use: as such</p> <p>Related assessment: use not assessed</p>

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Table 8. Uses at industrial sites

	Uses at industrial sites
IW-1	<p>Industrial use of ammonium dimolybdate in catalysts</p> <p><u>Further description of the use:</u></p> <p>Contributing activity/technique for the environment :</p> <ul style="list-style-type: none"> - ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) - ERC6b: Use of reactive processing aid at industrial site (no inclusion into or onto article) <p>Contributing activity/technique for the workers :</p> <ul style="list-style-type: none"> - PROC 1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions - PROC 4: Chemical production where opportunity for exposure arises - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 14: Tableting, compression, extrusion, pelletisation, granulation - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery <p>Product Category used: PC 2: Adsorbents; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents; PC 0: Other: UCN Code P15500 Catalysts</p> <p>Sector of end use: SU 8: Manufacture of bulk, large scale chemicals (including petroleum products)</p> <p>Technical function of the substance: catalyst</p> <p>Tonnage of substance for that use: tonnes/year</p> <p>Substance supplied to that use: in a mixture</p> <p>Subsequent service life relevant for that use: no</p> <p>Remarks:</p> <p>Information provided by European Catalyst Manufacturers Assn.</p> <p>Related assessment: use not assessed</p>
IW-2	<p>Intermediate use of ammonium dimolybdate as catalyst precursor</p> <p><u>Further description of the use:</u></p> <p>Contributing activity/technique for the environment :</p> <ul style="list-style-type: none"> - ERC6a: Use of intermediate <p>Contributing activity/technique for the workers :</p> <ul style="list-style-type: none"> - PROC 1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions - PROC 4: Chemical production where opportunity for exposure arises - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 14: Tableting, compression, extrusion, pelletisation, granulation - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery

	<p>Product Category used: PC 2: Adsorbents; PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents; PC 0: Other: UCN Code P15500 Catalysts Sector of end use: SU 8: Manufacture of bulk, large scale chemicals (including petroleum products) Technical function of the substance: intermediate (precursor) Tonnage of substance for that use: tonnes/year Substance supplied to that use: in a mixture Subsequent service life relevant for that use: no Remarks: Information provided by European Catalyst Manufacturers Assn. Related assessment: use not assessed</p>
IW-3	<p>Industrial use of ammonium dimolybdate in metal surface treatment products <u>Further description of the use:</u> Contributing activity/technique for the environment : - ERC5: Use at industrial site leading to inclusion into/onto article Contributing activity/technique for the workers : - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - PROC 5: Mixing or blending in batch processes - PROC 7: Industrial spraying - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 13: Treatment of articles by dipping and pouring - PROC 15: Use as laboratory reagent - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery Product Category used: PC 14: Metal surface treatment products; PC 15: Non-metal-surface treatment products; PC 21: Laboratory chemicals; PC 38: Welding and soldering products, flux products Technical function of the substance: antiscaling agent; corrosion inhibitor; plating agent Tonnage of substance for that use: tonnes/year Substance supplied to that use: as such; in a mixture Subsequent service life relevant for that use: yes Link to the subsequent service life: Service life of surface treated articles by consumers; Service life of surface treated articles in industrial settings; Service life of surface treated articles in professional settings Related assessment: use not assessed</p>
IW-4	<p>Industrial use of ammonium dimolybdate in lubricants and greases <u>Further description of the use:</u> Contributing activity/technique for the environment : - ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) Contributing activity/technique for the workers : - PROC 1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions - PROC 4: Chemical production where opportunity for exposure arises - PROC 5: Mixing or blending in batch processes - PROC 7: Industrial spraying - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated</p>

	<p>facilities [EU REACH]</p> <ul style="list-style-type: none"> - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 10: Roller application or brushing - PROC 13: Treatment of articles by dipping and pouring - PROC 15: Use as laboratory reagent - PROC 17: Lubrication at high energy conditions in metal working operations - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery <p>Product Category used: PC 24: Lubricants, greases, release products Technical function of the substance: lubricating agent; wear reduction in rotary equipment Tonnage of substance for that use: tonnes/year Substance supplied to that use: as such; in a mixture Subsequent service life relevant for that use: no Related assessment: use not assessed</p>
IW-5	<p>Intermediate use of ammonium dimolybdate in the manufacture of molybdenum metal (by reduction)</p> <p><u>Further description of the use:</u> Contributing activity/technique for the environment : - ERC6a: Use of intermediate</p> <p>Contributing activity/technique for the workers : - PROC 1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions - PROC 4: Chemical production where opportunity for exposure arises - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery</p> <p>Product Category used: PC 7: Base metals and alloys Sector of end use: SU 14: Manufacture of basic metals, including alloys; SU 23: Electricity, steam, gas water supply and sewage treatment Technical function of the substance: intermediate (precursor) Tonnage of substance for that use: tonnes/year Substance supplied to that use: as such Subsequent service life relevant for that use: no Related assessment: use not assessed</p>
IW-6	<p>Intermediate use of ammonium dimolybdate in the manufacture of other molybdenum substances</p> <p><u>Further description of the use:</u> Contributing activity/technique for the environment : - ERC6a: Use of intermediate</p> <p>Contributing activity/technique for the workers : - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions - PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery</p> <p>Sector of end use: SU 9: Manufacture of fine chemicals Technical function of the substance: intermediate (precursor) Tonnage of substance for that use: tonnes/year Substance supplied to that use: as such Subsequent service life relevant for that use: no Related assessment: use not assessed</p>

<p>IW-7</p>	<p>Industrial use of ammonium dimolybdate in the production of activated carbon by impregnation <u>Further description of the use:</u> Contributing activity/technique for the environment : - ERC4: Use of non-reactive processing aid at industrial site (no inclusion into or onto article) Contributing activity/technique for the workers : - PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions - PROC 5: Mixing or blending in batch processes - PROC 13: Treatment of articles by dipping and pouring - PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery Product Category used: PC 2: Adsorbents Technical function of the substance: adsorbent; adsorbent; impregnation agent Tonnage of substance for that use: tonnes/year Substance supplied to that use: Subsequent service life relevant for that use: no Related assessment: use not assessed</p>
<p>IW-8</p>	<p>Intermediate use of ammonium dimolybdate in the manufacture of frits and enamels <u>Further description of the use:</u> Contributing activity/technique for the environment : - ERC6a: Use of intermediate Contributing activity/technique for the workers : - PROC 3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment conditions - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 15: Use as laboratory reagent - PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery Product Category used: PC 9a: Coatings and paints, thinners, paint removes; PC 9b: Fillers, putties, plasters, modelling clay Technical function of the substance: intermediate (precursor) Tonnage of substance for that use: tonnes/year Substance supplied to that use: as such; in a mixture Subsequent service life relevant for that use: no Related assessment: use not assessed</p>

Table 9. Uses by professional workers

<p>Uses by professional workers</p>	
<p>PW-1</p>	<p>Professional use of ammonium dimolybdate in lubricants and greases <u>Further description of the use:</u> Contributing activity/technique for the environment : - ERC8a: Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor) - ERC8d: Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor) Contributing activity/technique for the workers : - PROC 1: Chemical production or refinery in closed process without likelihood of</p>

	<p>exposure or processes with equivalent containment conditions</p> <ul style="list-style-type: none"> - PROC 8a: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 10: Roller application or brushing - PROC 11: Non industrial spraying - PROC 13: Treatment of articles by dipping and pouring - PROC 17: Lubrication at high energy conditions in metal working operations - PROC 20: Use of functional fluids in small devices <p>Product Category used: PC 24: Lubricants, greases, release products Technical function of the substance: lubricating agent; wear reduction in rotary equipment Tonnage of substance for that use: tonnes/year Subsequent service life relevant for that use: no Related assessment: use not assessed</p>
<p>PW-2</p>	<p>Professional use of ammonium dimolybdate in metal surface treatment products <u>Further description of the use:</u> Contributing activity/technique for the environment : <ul style="list-style-type: none"> - ERC8c: Widespread use leading to inclusion into/onto article (indoor) - ERC8f: Widespread use leading to inclusion into/onto article (outdoor) Contributing activity/technique for the workers : <ul style="list-style-type: none"> - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 10: Roller application or brushing - PROC 11: Non industrial spraying - PROC 14: Tableting, compression, extrusion, pelletisation, granulation - PROC 15: Use as laboratory reagent Product Category used: PC 14: Metal surface treatment products; PC 15: Non-metal-surface treatment products; PC 21: Laboratory chemicals; PC 38: Welding and soldering products, flux products Technical function of the substance: antiscaling agent; corrosion inhibitor Tonnage of substance for that use: tonnes/year Subsequent service life relevant for that use: yes Link to the subsequent service life: Service life of surface treated articles by consumers; Service life of surface treated articles in professional settings Related assessment: use not assessed</p>
<p>PW-3</p>	<p>Professional use of ammonium dimolybdate as micronutrient in fertilizers <u>Further description of the use:</u> During this use the following activities are considered: Mixing, dilution, (un)loading and application of solid and liquid fertilizers onto/into, soil, onto crop foliage or seeds in out/indoor conditions. Contributing activity/technique for the environment : <ul style="list-style-type: none"> - ERC8b: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) - ERC8e: Widespread use of reactive processing aid (no inclusion into or onto article, outdoor) Contributing activity/technique for the workers : <ul style="list-style-type: none"> - PROC 1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions - PROC 2: Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions </p>

	<ul style="list-style-type: none"> - PROC 5: Mixing or blending in batch processes - PROC 8a: Transfer of substance or mixture (charging and discharging) at non-dedicated facilities - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 9: Transfer of substance or mixture into small containers (dedicated filling line, including weighing) - PROC 11: Non industrial spraying - PROC 13: Treatment of articles by dipping and pouring - PROC 15: Use as laboratory reagent - PROC 19: Hand-mixing with intimate contact and only PPE available. - PROC 26: Handling of solid inorganic substances at ambient temperature <p>Product Category used: PC 12: Fertilisers Sector of end use: SU 1: Agriculture, forestry and fishing Technical function of the substance: fertilisers (soil amendments) Tonnage of substance for that use: tonnes/year Subsequent service life relevant for that use: no Remarks:</p> <p>Molybdenum is an essential trace nutrient for plants, animals, humans and most microbes.</p> <p>Related assessment: use not assessed</p>
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Table 10. Consumer uses

Consumer uses	
C-1	<p>Consumer use of ammonium dimolybdate as micronutrient in fertilizers <u>Further description of the use:</u> Contributing activity/technique for the environment:</p> <ul style="list-style-type: none"> - ERC8b: Widespread use of reactive processing aid (no inclusion into or onto article, indoor) - ERC8e: Widespread use of reactive processing aid (no inclusion into or onto article, outdoor) <p>Contributing activity/technique for consumers:</p> <ul style="list-style-type: none"> - PC 12: Fertilisers <p>Technical function of the substance: fertilisers (soil amendments) Tonnage of substance for that use: tonnes/year Subsequent service life relevant for that use: no Remarks:</p> <p>The best estimate of maximum concentration within consumer product is 0.2%. Molybdenum is an essential trace nutrient for plants, animals, humans and most microbes.</p> <p>Related assessment: use not assessed</p>

Table 11. Article service life

Article service life	
SL-1	<p>Service life of surface treated articles in industrial settings <u>Further description of the use:</u> Article used by: workers Substance intended to be released from article: Article category related to subsequent service life (AC): AC 7: Metal articles Contributing activity/technique for the environment:</p> <ul style="list-style-type: none"> - ERC12a: Processing of articles at industrial sites with low release <p>Contributing activity/technique for consumers:</p>

	<p>Contributing activity/technique for the workers: - PROC 21: Low energy manipulation of substances bound in materials and/or articles Technical function of the substance: antiscaling agent; corrosion inhibitor Tonnage of substance for that use: tonnes/year Related assessment: use not assessed</p>
SL-2	<p>Service life of surface treated articles in professional settings <u>Further description of the use:</u> Article used by: workers Substance intended to be released from article: Article category related to subsequent service life (AC): AC 7: Metal articles Contributing activity/technique for the environment: - ERC10a: Widespread use of articles with low release (outdoor) - ERC11a: Widespread use of articles with low release (indoor) Contributing activity/technique for consumers: Contributing activity/technique for the workers: - PROC 21: Low energy manipulation of substances bound in materials and/or articles Technical function of the substance: antiscaling agent; corrosion inhibitor Tonnage of substance for that use: tonnes/year Related assessment: use not assessed</p>
SL-3	<p>Service life of surface treated articles by consumers <u>Further description of the use:</u> Article used by: consumers Substance intended to be released from article: Article category related to subsequent service life (AC): Contributing activity/technique for the environment: - ERC10a: Widespread use of articles with low release (outdoor) - ERC11a: Widespread use of articles with low release (indoor) Contributing activity/technique for consumers: - AC 7: Metal articles Contributing activity/technique for the workers: Technical function of the substance: antiscaling agent; corrosion inhibitor Tonnage of substance for that use: tonnes/year Related assessment: use not assessed</p>

2.3. Uses advised against

Table 12. Uses at industrial sites advised against

Uses at industrial sites advised against	
IW-1	<p>REACH Restriction limiting the use of inorganic ammonium salts in cellulose insulation <u>Further description of the use:</u> Annex XVII to Regulation (EC) No 1907/2006 (REACH), entry 65 restricts the use of inorganic ammonium salts in cellulose insulation. The use is permitted only if certain conditions are met, as follows (cited from REACH Annex XVII): Inorganic ammonium salts... “1. Shall not be placed on the market, or used, in cellulose insulation mixtures or cellulose insulation articles after 14 July 2018 unless the emission of ammonia from those mixtures or</p>

<p>articles results in a concentration of less than 3 ppm by volume (2,12 mg/m³) under the test conditions specified in paragraph 4.</p> <p>A supplier of a cellulose insulation mixture containing inorganic ammonium salts shall inform the recipient or consumer of the maximum permissible loading rate of the cellulose insulation mixture, expressed in thickness and density.</p> <p>A downstream user of a cellulose insulation mixture containing inorganic ammonium salts shall ensure that the maximum permissible loading rate communicated by the supplier is not exceeded.</p> <p>2. By way of derogation, paragraph 1 shall not apply to placing on the market of cellulose insulation mixtures intended to be used solely for the production of cellulose insulation articles, or to the use of those mixtures in the production of cellulose insulation articles.</p> <p>3. In the case of a Member State that, on 14 July 2016, has national provisional measures in place that have been authorised by the Commission pursuant to Article 129(2)(a), the provisions of paragraphs 1 and 2 shall apply from that date.</p> <p>4. Compliance with the emission limit specified in the first subparagraph of paragraph 1 shall be demonstrated in accordance with Technical Specification CEN/TS 16516, adapted as follows:</p> <p>(a) the duration of the test shall be at least 14 days instead of 28 days;</p> <p>(b) the ammonia gas emission shall be measured at least once per day throughout the test;</p> <p>(c) the emission limit shall not be reached or exceeded in any measurement taken during the test;</p> <p>(d) the relative humidity shall be 90 % instead of 50 %;</p> <p>(e) an appropriate method to measure the ammonia gas emission shall be used;</p> <p>(f) the loading rate, expressed in thickness and density, shall be recorded during the sampling of the cellulose insulation mixtures or articles to be tested.”</p>
