

CHEMICAL SAFETY REPORT

Update 3: Submitted July 2021
(Replaces 2nd update submitted June 2016)

Substance Name: Calcium Molybdate

EC Number: 232-192-9

CAS Number: 7789-82-4

Registrant's Identity: Joint CSR submitted by the Lead Registrant (5N Plus Belgium SA) on behalf of all members of the joint submission MOCONJS-CAMO. Document prepared by the IMOA 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 calcium molybdate - Method 1 <u>Further description of manufacturing process:</u></p> <p>Method One (brief, non-confidential summary):</p> <p>Calcium molybdate is manufactured from a molybdate solution by precipitation after extraction of possible impurities. The reaction takes place in chemical reactors with addition of different fluxes. The impurities are removed by filtration in a press filter. The precipitated calcium molybdate finally is separated by filtration in a press filter. The calcium molybdate is then dried as required and packed as required by the end-users.</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 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - 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</p>
M-2	<p>Manufacture of calcium molybdate - Method 2 <u>Further description of manufacturing process:</u></p> <p>Method Two (brief, non-confidential summary):</p> <p>In the manufacturing process of diammonium dimolybdate and molybdenum trioxide from 'molybdenum sulfide (MoS₂) roasted' (EC-number 289-178-0), a molybdate-containing wastewater stream is generated. Before discharge the molybdate can be recovered by adding lime, Ca(OH)₂, which results in the precipitation of calcium molybdate which is subsequently decanted and dried. This on-site isolated intermediate is recycled at the site.</p> <p>Contributing activity/technique for the environment : - ERC1: Manufacture of the substance</p> <p>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 4: Chemical production where opportunity for exposure arises</p>

	<ul style="list-style-type: none"> - PROC 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - 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</p>
M-3	<p>Manufacture of calcium molybdate from spent catalysts - Method 3 <u>Further description of manufacturing process:</u></p> <p>Contributing activity/technique for the environment :</p> <ul style="list-style-type: none"> - ERC1: Manufacture of the substance <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>Tonnage of substance for that use: tonnes/year Related assessment: use not assessed</p>

2.2. Identified uses

Table 7. Formulation

	Formulation
F-1	<p>Formulation of calcium molybdate in the production of steel and alloys <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 1: Chemical production or refinery in closed process without likelihood of 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 5: Mixing or blending in batch processes - PROC 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting - PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery <p>Product Category formulated: PC 7: Base metals and alloys Technical function of the substance: antiscaling agent ; corrosion inhibitor</p> <p>Tonnage of substance for that use: tonnes/year Substance supplied to that use: as such Related assessment: use not assessed</p>

F-2	<p>Formulation of calcium molybdate in the production as corrosion inhibition additive <u>Further description of the use:</u> Contributing activity/technique for the environment : - ERC2: Formulation into mixture 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 8b: Transfer of substance or mixture (charging and discharging) at dedicated facilities [EU REACH] - PROC 26: Handling of solid inorganic substances at ambient temperature - PROC28: Manual maintenance (cleaning and repair) of machinery Product Category formulated: PC 9a: Coatings and paints, thinners, paint removes ; PC 9b: Fillers, putties, plasters, modelling clay Technical function of the substance: antiscaling agent ; corrosion inhibitor Tonnage of substance for that use: tonnes/year Substance supplied to that use: as such Related assessment: use not assessed</p>
F-3	<p>Formulation of calcium molybdate in the production as flame retardant/smoke suppressant additive <u>Further description of the use:</u> Contributing activity/technique for the environment : - ERC3: Formulation into solid matrix 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 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 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 formulated: PC 32: Polymer preparations and compounds Technical function of the substance: flame retardant ; smoke suppressant Tonnage of substance for that use: tonnes/year Substance supplied to that use: as such Related assessment: use not assessed</p>

Table 8. Uses at industrial sites

Uses at industrial sites	
IW-1	<p>Intermediate use of calcium molybdate to blend with roasted molybdenite concentrates <u>Further description of the use:</u> Contributing activity/technique for the environment : - ERC6a: Use of intermediate 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 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 Product Category used: PC 7: Base metals and alloys Sector of end use: SU 14: Manufacture of basic metals, including alloys Technical function of the substance: intermediate (precursor) Tonnage of substance for that use: tonnes/year Substance supplied to that use: as such</p>

	<p>Subsequent service life relevant for that use: no Related assessment: use not assessed</p>
IW-2	<p>Intermediate use of calcium molybdate in steel and alloy production <u>Further description of the use:</u></p> <p>Calcium molybdate is transformed (reduced) to molybdenum metal in the steel/alloy production, so there is no subsequent service life for calcium molybdate.</p> <p>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 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 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting - PROC 23: Open processing and transfer operations with minerals/metals at elevated temperature - 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 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>
IW-3	<p>Intermediate use of calcium molybdate as corrosion inhibition additive <u>Further description of the use:</u></p> <p>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 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 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 Remarks: Corrosion inhibition additive to paint. Related assessment: use not assessed</p>
IW-4	<p>Industrial use of calcium molybdate as smoke suppressant/flame retardant additive <u>Further description of the use:</u></p>

	<p>Contributing activity/technique for the environment :</p> <ul style="list-style-type: none"> - ERC5: Use at industrial site leading to inclusion into/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 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 14: Tableting, compression, extrusion, pelletisation, granulation - 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 used: PC 32: Polymer preparations and compounds Sector of end use: SU 12: Manufacture of plastics products, including compounding and conversion Technical function of the substance: flame retardant ; smoke suppressant 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 articles containing flame retardant additives used by consumers; Service life of articles containing flame retardant additives in industrial settings; Service life of articles containing flame retardant additives in professional settings Related assessment: use not assessed</p>
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Table 9. Article service life

Article service life	
SL-1	<p>Service life of articles containing flame retardant additives 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 1: Vehicles ; AC 2: Machinery, mechanical appliances, electrical/electronic articles ; AC 10: Rubber articles ; AC 13: Plastic articles Contributing activity/technique for the environment: <ul style="list-style-type: none"> - ERC12a: Processing of articles at industrial sites with low release - ERC12c: Use of articles at industrial sites with low release Contributing activity/technique for consumers: Contributing activity/technique for the workers: <ul style="list-style-type: none"> - PROC 21: Low energy manipulation of substances bound in materials and/or articles Technical function of the substance: flame retardant Tonnage of substance for that use: tonnes/year Related assessment: use not assessed</p>
SL-2	<p>Service life of articles containing flame retardant additives 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 1: Vehicles ; AC 2: Machinery, mechanical appliances, electrical/electronic articles ; AC 10: Rubber articles ; AC 13: Plastic articles Contributing activity/technique for the environment: <ul style="list-style-type: none"> - 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: <ul style="list-style-type: none"> - PROC 21: Low energy manipulation of substances bound in materials and/or articles </p>

	<p>Technical function of the substance: flame retardant Tonnage of substance for that use: tonnes/year Related assessment: use not assessed</p>
SL-3	<p>Service life of articles containing flame retardant additives used 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 1: Vehicles ; AC 2: Machinery, mechanical appliances, electrical/electronic articles ; AC 10: Rubber articles ; AC 13: Plastic articles Contributing activity/technique for the workers: Technical function of the substance: flame retardant Tonnage of substance for that use: tonnes/year Related assessment: use not assessed</p>