CHEMICAL SAFETY REPORT

Update 3: September 2021

(replaces Update 2 submitted May 2016, Update 1 submitted January 2014 and Original version submitted 2010)

Substance Name: iron (III) molybdate

EC Number: 237-389-3
CAS Number: 13769-81-8
Registrant's Identity: Joint CSR submitted by the Lead Registrant Clariant Prodotti (Italia) S.p.A. on behalf of all members of the joint submission MOCONJS-IRONMO. Document prepared by the IMOA REACH Molybdenum Consortium (MoCon)

Introductory remarks:

This dossier addresses the substance "iron molybdate" and is one of several dossiers prepared by the Molybdenum Consortium for REACH. To avoid unnecessary (animal) testing, a comprehensive grouping and read-across concept has been developed. This grouping/category approach is described in detail in a separate report, in accordance with the ECHA's "Read-Across Assessment Framework" (RAAF). This document is attached to section 13 in the technical dosser and to the CSR. Based on the chemical composition, structure and its properties, "iron(III)molybdate" is included in this grouping concept. **In brief, the molybdate ion $[MoO_4]^{2-}$ is the only molybdenum species relevant for the assessment of systemic toxicity in humans and of the ecotoxicity of this inorganic molybdenum substance.** The iron moiety in the substance iron molybdate is not considered to be of any relevance for systemic toxicity in humans and organisms assessed in the various environmental compartments, based on the essential role of iron in human physiology and all living organisms and the ubiquitous occurrence of iron in nature, including in humans.
Furthermore, iron molybdate has been shown to be only slightly soluble in water, when using a worst-case fine powder as the test item. In practice, most iron molybdate is marketed not as a substance as such, but as a constituent of catalysts (special preparation). These catalysts are usually produced in the form of pressed and sintered tablets, i.e. a physical form which further reduces the potential for any relevant human or environmental exposure.
Nevertheless, for precautionary and compliance reasons, comprehensive read-across from other (more soluble) molybdenum substances to iron molybdate is applied in this CSR. Large parts of this report are thus generic to a group of molybdenum substances and have not been not been adapted on a substance specific basis for iron molybdate.
In view of the properties and forms of use of iron molybdate this is considered an utmost conservative approach.

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 to this CSR. 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).

2. MANUFACTURE AND USES

2.1. Manufacture

Table 5. Manufacture

	Manufacture
M-1	**Manufacture of iron molybdate during catalyst manufacture** Further description of manufacturing process: Molybdenum substance(s) react with iron salts to form substances based on iron-molybdenum in a water slurry phase. The slurry is then subjected to filtration, washing and drying. The dry powder is pressed to form pellets that are then calcined (formation of iron molybdate) and packed in drums. Contributing activity/technique for the environment : **- ERC1: Manufacture of the substance** 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: Tabletting, compression, extrusion, pelletisation, granulation** **- 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** Tonnage of substance for that use: tonnes/year Related assessment: use not assessed Remarks: The substance is formed when molybdenum substance(s) react with iron salts to form substances based on iron-molybdenum in a water slurry phase that is part of the process of catalyst manufacture.

2.2. Identified uses

Table 6. Formulation

	Formulation
F-1	**Formulation of iron molybdate at manufacturing site** Further description of the use: Contributing activity/technique for the environment : **- ERC2: Formulation into mixture** **- ERC3: Formulation into solid matrix** 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** **Technical function of the substance:** no technical function Tonnage of substance for that use: tonnes/year Substance supplied to that use: as such Related assessment: use not assessed
F-2	**Formulation of iron molybdate in the catalyst industry by mixing fresh catalysts with a ceramic ring** Further description of the use: Contributing activity/technique for the environment : **- ERC3: Formulation into solid matrix** 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 21: Low energy manipulation of substances bound in materials and/or articles** **- PROC28: Manual maintenance (cleaning and repair) of machinery** **Product Category formulated:** PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents **Technical function of the substance:** catalyst Tonnage of substance for that use: tonnes/year Substance supplied to that use: in a mixture Remarks: Iron molybdate formed in the catalytic mixture is mixed with inert ceramic rings, which are articles. Related assessment: use not assessed

Table 7. Uses at industrial sites

	Uses at industrial sites
IW-1	**Industrial use of iron molybdate containing-catalyst (oxidation catalyst)** Further description of the use: Contributing activity/technique for the environment : **- 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)** 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 21: Low energy manipulation of substances bound in materials and/or articles** **- PROC28: Manual maintenance (cleaning and repair) of machinery** **Product Category used:** PC 20: Products such as ph-regulators, flocculants, precipitants,

	neutralisation agents; PC 21: Laboratory chemicals **Sector of end use:** SU 8: Manufacture of bulk, large scale chemicals (including petroleum products); SU 9: Manufacture of fine chemicals **Technical function of the substance:** catalyst 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: Iron molybdate containing catalysts are used in the oxidation of methanol to formaldehyde. Related assessment: use not assessed
IW-2	**Industrial use of iron molybdate in catalyst regeneration and recycling** Further description of the use: Contributing activity/technique for the environment : **- ERC6a: Use of intermediate** 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 22: Potentially closed processing operations with minerals/metals at elevated temperature. Industrial setting** **- PROC 21: Low energy manipulation of substances bound in materials and/or articles** **- PROC28: Manual maintenance (cleaning and repair) of machinery** **Product Category used:** PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents **Sector of end use:** SU 8: Manufacture of bulk, large scale chemicals (including petroleum products); 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: in a mixture Subsequent service life relevant for that use: no Related assessment: use not assessed
IW-3	**Intermediate use of iron molybdate containing-catalyst** Further description of the use: Contributing activity/technique for the environment : **- ERC6a: Use of intermediate** 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 21: Low energy manipulation of substances bound in materials and/or articles **- PROC28: Manual maintenance (cleaning and repair) of machinery** **Product Category used:** PC 20: Products such as ph-regulators, flocculants, precipitants, neutralisation agents; PC 21: Laboratory chemicals **Sector of end use:** SU 8: Manufacture of bulk, large scale chemicals (including petroleum products); 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: in a mixture Subsequent service life relevant for that use: no Related assessment: use not assessed