

Succinct summary of representative risk management measures (RMMs) and operational conditions (OCs)

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Substance: *2,2'-Dichloro-4,4'-methylenedianiline*
(MOCA, MbOCA) [CAS 101-14-4; EC 202-918-9]

Use title: *Use 1: Industrial use of 2,2'-Dichloro-4,4'-methylenedianiline (MOCA) in the manufacture of high-performance polyurethanes specifically for custom-made rollers with high reliability requirements for steel and aluminium sectors*
Use 2: Industrial use of 2,2'-Dichloro-4,4'-methylenedianiline (MOCA) in the manufacture of high-performance polyurethanes specifically for heavy-duty rollers, tensioner pads and spring blocks with high reliability requirements for offshore energy and renewables sectors

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Exposure scenario 1: Industrial use of MOCA in the manufacture of polyurethanes

ECS and WCS	Task (ERC/spERC or PROC)	Annual amount per site (tonnes/year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
ECS 1	ERC 6a Industrial use of MOCA in the manufacture of hot cast polyurethanes	3.8 t/y	<p>MOCA pellets are solely handled in a glovebox. Melting and dosing are automated and [65-100 %] of production is fully automated.</p> <p>LEV points in place for the glovebox, machines, casting points and curing ovens.</p> <p>All MOCA waste streams are collected for disposal as hazardous waste by licenced waste contractors.</p>	<p>Environment, health and safety (EHS) responsibilities defined and assigned in writing.</p> <p>Emergency action plans.</p> <p>All activities are undertaken with appropriate and well-maintained equipment by trained personnel operating under supervision; Ensure regular inspection, cleaning and maintenance of equipment and machines; Clean spills immediately and dispose of waste safely; Ensure daily cleaning of the equipment</p>	-	<p>Releases to soil and water at the site are prevented by prohibiting the washing of empty containers, glassware, reaction vessels, etc. and applying spill protocols to ensure that MOCA does not enter the drains.</p> <p>Air releases of MOCA are expected to be very low because of the very low vapour pressure of molten MOCA and low dustiness of the MOCA pellets.</p>	-	<p>Water: 0 Air: 0.005 Soil: 0</p>	9.2.1

WCS 1	Delivery and storage of MOCA PROC 1	-	MOCA is stored in separate warehouses that is only accessible to authorized personnel. Drums are sealed – no contact during task Containment: closed drums in dedicated storage area.	Duration: < 15 mins 2 to 3 times per year Occupational Health and Safety Management System: Advanced Biomonitoring program in place	Cut resistant gloves Work clothing Safety shoes Safety glasses	Concentration of MOCA in drums;: 100 % Place of use: Separate storage room Process temperature: Room temperature			9.2.2
WCS 2	Transfer of MOCA to MOCA Feeding Unit (glovebox & melter) PROC 8b		Inlay bag containing the MOCA pellets solely opened inside the glovebox. MOCA pellets transfers to the melter via an enclosed system. LEV point above the glovebox Containment: MOCA handling is contained in the glovebox and casting machine	Duration: < 1 min every 2 weeks Occupational Health and Safety Management System: Advanced Biomonitoring program in place	Chemical resistant gloves Cut resistant gloves (some tasks) Glovebox gloves Work clothes Disposable apron Disposable sleeves Safety shoes Safety glasses RPE: Half face mask with P3 filter	Transfer of MOCA pellets via a glovebox to feeding unit Concentration of MOCA: 100 % Place of use: indoors Process temperature: room temperature			9.2.3
WCS 3	Automated process PROC 1		All reaction steps are done in an enclosed system	no manual tasks	Not applicable	Melting, dosing and reaction of liquid MOCA with other reactions in an enclosed system to yield liquid polyurethane			9.2.4
WCS 4	Semi-automated process		Liquid MOCA is transferred to a vessel that is then sealed.	Duration: < 14 mins per week Occupational Health and Safety	Chemical resistant gloves	a. Transfer of liquid MOCA to smaller containers			9.2.5

	PROC 5		<p>Transfer of liquid MOCA to a reaction vessel and mixing of liquid MOCA with other reactants under LEV.</p> <p>Transfer and mixing done under LEV</p> <p>Containment: Handling that reduces contact between product and adjacent air</p>	<p>Management System: Advanced</p> <p>Biomonitoring program in place</p>	<p>Heat resistant gloves</p> <p>Work clothes</p> <p>Disposable apron</p> <p>Disposable sleeves</p> <p>Safety shoes</p> <p>Safety glasses</p> <p>RPE: Half face mask with P3 filter</p>	<p>b. Mixing of liquid MOCA with other reactants in a reaction vessel where MOCA is rapidly consumed in the reaction</p> <p>Place of use: indoors</p> <p>Process temperature: hot</p>			
WCS 5	<p>Transferring liquid polyurethane to moulds</p> <p>PROC 4</p>		<p>Transfer of liquid polyurethane to moulds</p> <p>MOCA content of polyurethane is very low</p> <p>Transfer done under LEV</p> <p>Containment: partially open</p>	<p>Duration: < 20 mins per day</p> <p>Occupational Health and Safety Management System: Advanced</p> <p>Biomonitoring program in place</p>	<p>Chemical resistant gloves</p> <p>Heat resistant gloves</p> <p>Work clothes</p> <p>Disposable apron</p> <p>Disposable sleeves</p> <p>Safety shoes</p> <p>Safety glasses</p> <p>RPE: Half face mask with P3 filter</p>	<p>Transfer of hot liquid</p> <p>MOCA content < 0.1 % (w/w)</p> <p>Place of use: indoors</p> <p>Process temperature: hot</p>			9.2.6
WCS 6	<p>Maintenance & cleaning</p> <p>PROC 28</p>		<p>Maintenance and cleaning of equipment and surfaces with (a) (visible surface contamination) and (b) slight surface contamination</p> <p>Vacuum cleaners equipped with HEPA filters.</p>	<p>Duration: < 7 mins per day</p> <p>Occupational Health and Safety Management System: Advanced</p> <p>Biomonitoring program in place</p>	<p>Chemical resistant gloves</p> <p>Cut resistant gloves (some tasks)</p> <p>Work clothes</p> <p>Protective coveralls (some tasks)</p>	<p>Handling contaminated objects</p> <p>a. visible contamination (object covered with fugitive dust from surrounding dusty activities)</p> <p>b. slightly contaminated</p>			9.2.7

					Disposable apron Disposable sleeves Safety shoes Safety glasses RPE: Half face mask with P3 filter; full face mask with P3 filter (some tasks)	(layers of less than few grams) objects Place of use: indoors Process temperature: room temperature			
WCS 7	Waste management PROC 8b		MOCA containing waste streams collected and stored in closed containers Containment: open	Duration: < 2 mins per day Occupational Health and Safety Management System: Advanced Biomonitoring program in place	Chemical resistant gloves Cut resistant gloves(some tasks) Work clothes Safety shoes Safety glasses RPE: Half face mask with P3 filter	Handling contaminated objects Slightly contaminated with MOCA Place of use: indoors Process temperature: room temperature			9.2.8

Abbreviations: WCS=Worker contributing scenario, ECS=Environmental Contributing Scenario,* ERC=Environmental Release Category (or spERC if available) , PROC= Process category, LEV=Local Exhaust Ventilation, PPE=Personal Protective Equipment