

## RCloud Tasking Form – Part B: Statement of Requirement (SoR)

<b>Title of Requirement</b>	Environmentally friendly granular adsorbents for respiratory protection
<b>Requisition No.</b>	1000167586
<b>SoR Version</b>	0.1

<b>1.</b>	<b>Statement of Requirements</b>
<b>1.1</b>	<b>Summary and Background Information</b>
	<p>Dstl would like to develop and evaluate granular adsorbent materials for respiratory protection against vapours of chemical warfare agents (CWA) and toxic industrial chemical and materials (TICs and TIMs). The adsorbent granules should be suitable for use in respirator canisters, be environmentally sustainable, particularly with respect to the use of renewable feedstocks and the absence of potentially toxic metals impregnated on the adsorbent and be resistant to ageing.</p> <p>Typically, activated carbons are used in respirator (and collective protection) canisters to remove toxic vapours from contaminated airstreams prior to inhalation. Whilst these materials are highly effective, particularly against traditional CWA, they rely on metal impregnants to achieve their effect against some TICs and TIMs. In addition, the activated carbons are subject to performance loss when exposed to the atmosphere for extended periods of time.</p> <p>Alternative adsorbents that do not rely on metal impregnants for their performance may therefore increase the longevity of the adsorbents in the atmosphere and potentially may also have environmental sustainability advantages. Previous work* has shown that some powdered adsorbents are capable of adsorbing some TICs and TIMs without the inclusion of metal impregnants. However, powders are unsuitable for use in respiratory protection and it is therefore necessary to develop and evaluate granular adsorbents that could be used in canisters.</p> <p>* The role of surface functionality of sustainable mesoporous materials Starbon® on the adsorption of toxic ammonia and sulphur gasses, <i>Roxana A Milescu et al</i>, Sustainable Chemistry and Pharmacy, March 2020, <a href="https://doi.org/10.1016/j.scp.2020.100230">https://doi.org/10.1016/j.scp.2020.100230</a>.</p>
<b>1.2</b>	<b>Requirement</b>
	<p>Proposals should not take the form of literature reviews or computation modelling; all proposals should ultimately deliver samples of granular adsorbents suitable for use in respirator canisters though the delivery of some powders can be included to enable the evaluation of a range of base materials. Proposals that do not meet these Requirements will not be funded. The samples should</p>

	<p>have the potential to be inexpensive, derived from renewable feedstocks and not be impregnated with metals.</p> <p>The work should include the preparation of some or all of the following materials:-</p> <ul style="list-style-type: none"> <li>Granular adsorbents (granule size approx. 1 mm) with both meso and microporosity that are not impregnated with metals. The granular adsorbent could be of a single type, capable of adsorbing chemical warfare agents, a wide range of TICs and TIMs, including NH<sub>3</sub>, SO<sub>2</sub> and H<sub>2</sub>S, and other volatile gases/vapours such as HCN and cyanogen chloride. Alternatively, multiple types of granular adsorbent that are collectively capable of adsorbing the above materials could be delivered. The granules should be delivered in quantities of at least 1 kg to allow canister scale testing (&lt;1 kg each if multiple types are to be delivered).</li> </ul> <p>Other materials, which may be in powder form (but with potential to be manufactured into granules using equivalent processes to those used to produce the granules being delivered), to allow a wider range of materials to be assessed. At least 5 g of each material should be delivered.</p>
<b>1.3</b>	<b>Options or follow on work</b> <i>(if none, write 'Not applicable')</i>
	<p>The final report should include a proposed work programme for follow-on work. This should be directed towards scale-up and commercialisation of the materials.</p>
<b>1.4</b>	<b>Contract Management Activities</b>
<b>1.5</b>	<b>Health &amp; Safety, Environmental, Social, Ethical, Regulatory or Legislative aspects of the requirement</b>
	<b>Must be complied with</b>

1.6	Deliverables & Intellectual Property Rights (IPR)					
Ref.	Title	Due by	Format	Expected classification (subject to change)	What information is required in the deliverable	IPR Condition
D1	Samples	Throughout project	Granules and powders	<i>Official</i>	Samples (type and number will be developed in proposal) for assessment by Dstl	<i>Default RCloud Agreement Terms and Conditions shall apply</i>
D2	Start-up meeting (preferably not virtual but dependent on circumstances)	T0+1 Months	Meeting	<i>Official</i>	Discussion of the project and the plan.  Tour of facilities (if feasible in the circumstances at the time)	<i>Default RCloud Agreement Terms and Conditions shall apply</i>
D3	Mid-point progress meeting (may be virtual)	T0+2 Months	Presentation (.pptx)	<i>Official</i>	Presentation pack to include but not limited to: <ul style="list-style-type: none"> <li>• Update on technical progress</li> <li>• Progress report against project schedule.</li> <li>• Review of deliverables.</li> <li>• Risks/issues.</li> </ul>	<i>Default RCloud Agreement Terms and Conditions shall apply</i>

D4	Final report	T0+4 Months	Electronic PDF or Word doc	<i>Official</i>	Report to include but not limited to: <ul style="list-style-type: none"><li>• Technical progress, including all experimental processes, data and results.</li><li>• Assessment of commercialisation potential (for CB protective clothing).</li><li>• Project plan for further work.</li><li>• Dstl Report Documentation Form</li></ul>	<i>Default RCloud Agreement Terms and Conditions shall apply</i>
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<b>1.7</b>	<b>Deliverable Acceptance Criteria</b>
	<p>Standard framework criteria plus –</p> <p>D1 – Delivery of samples with acceptable quality and in acceptable amounts (to be determined in the proposal) to the Technical Partner at Dstl Porton Down.</p> <p>D3 - Presentation of work (virtually or otherwise) and copy of presentation sent to Technical Partner at Dstl Porton Down.</p>

<b>2</b>	<b>Evaluation Criteria</b>
2.1	Method Explanation
	<p>This Tender will be evaluated on the basis of:</p> <p>Most Economically Advantageous Tender (MEAT) – Highest combined technically and financially scored Tender and meets the Commercial and Technical Criteria as detailed in the attached Evaluation Criteria.</p>
2.2	Technical Evaluation Criteria
	See attached 1000167586 Non-metal Impregnant Adsorbants Evaluation Criteria
2.3	Commercial Evaluation Criteria
	See attached 1000167586 Non-metal Impregnant Adsorbants Evaluation Criteria