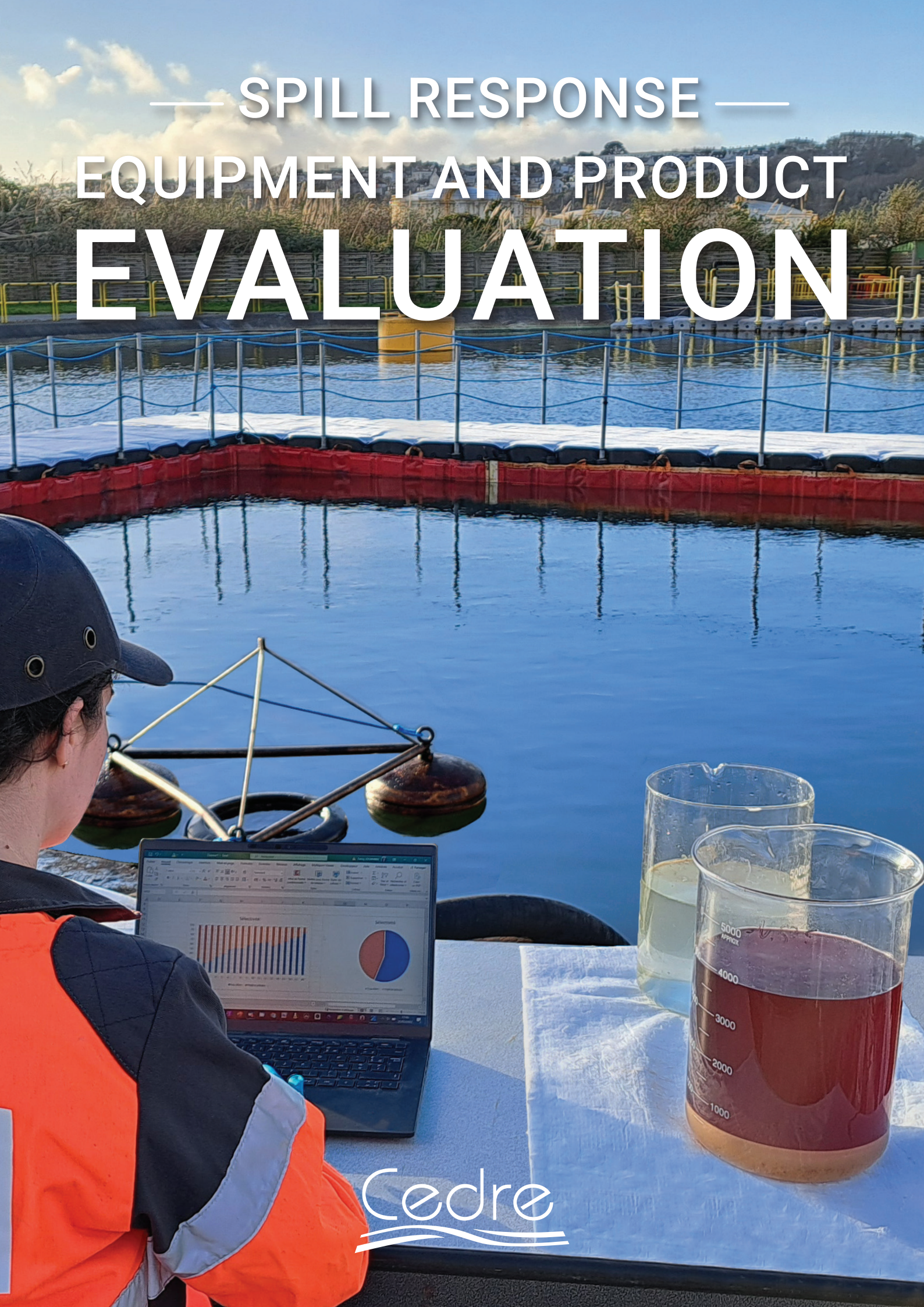
SPILL RESPONSE
EQUIPMENT AND PRODUCT
EVALUATION
5000
4000
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Cedre

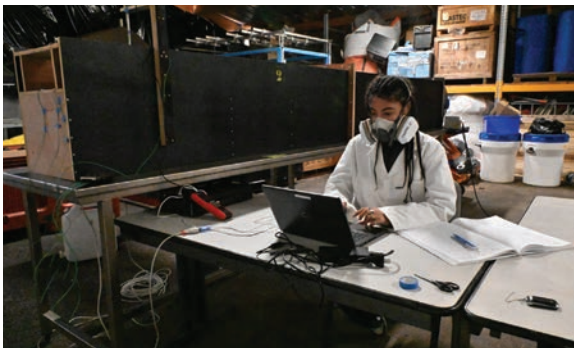
Faced with the constant threat of accidental water pollution, it is essential to have appropriate equipment and products that are capable of responding quickly and effectively to emergency situations. It is therefore crucial to have in-depth knowledge of the capabilities of these tools.

This catalogue presents Cedre's expertise in evaluating spill response equipment and products. Each year, we carry out numerous tests, taking into account the specificities of the pollutants, the environmental conditions and the resources required to deploy the equipment or use the product. Our aim: to test equipment and products available on the market to assess their performance and identify their limitations, so as to define their optimum use in the event of a spill.

Cedre's premises

Tests conducted at Cedre's facilities as part of the European MANIFESTS Genius project

Contents



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Cedre, an organisation dedicated to spill response

As an expert organisation in spill preparedness and response, Cedre has been working across France and worldwide for over 45 years.

With a 50-strong team of technicians, engineers and scientists, its multi-disciplinary team provides advice and knowledge to French and foreign authorities and private organisations in charge of pollution response.

Cedre was created in 1978, in the aftermath of the *Amoco Cadiz* oil spill, in a bid to be more fully prepared for accidental water pollution and to strengthen the national response organisation. It is responsible, on a national level, for research, experimentation and documentation in relation to pollutants (oil, chemicals and aquatic litter), their effects and the response means and tools that can be used to combat them. Its role as an advisory body and its expertise encompass both marine and inland waters. Cedre runs a 24/7 operational assistance service for national authorities and industry.

RESEARCH

AQUATIC LITTER MONITORING

emergency hotline 24

TRAINING

INFORMATION

CONTINGENCY PLANNING

ANALYSIS & TESTING

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

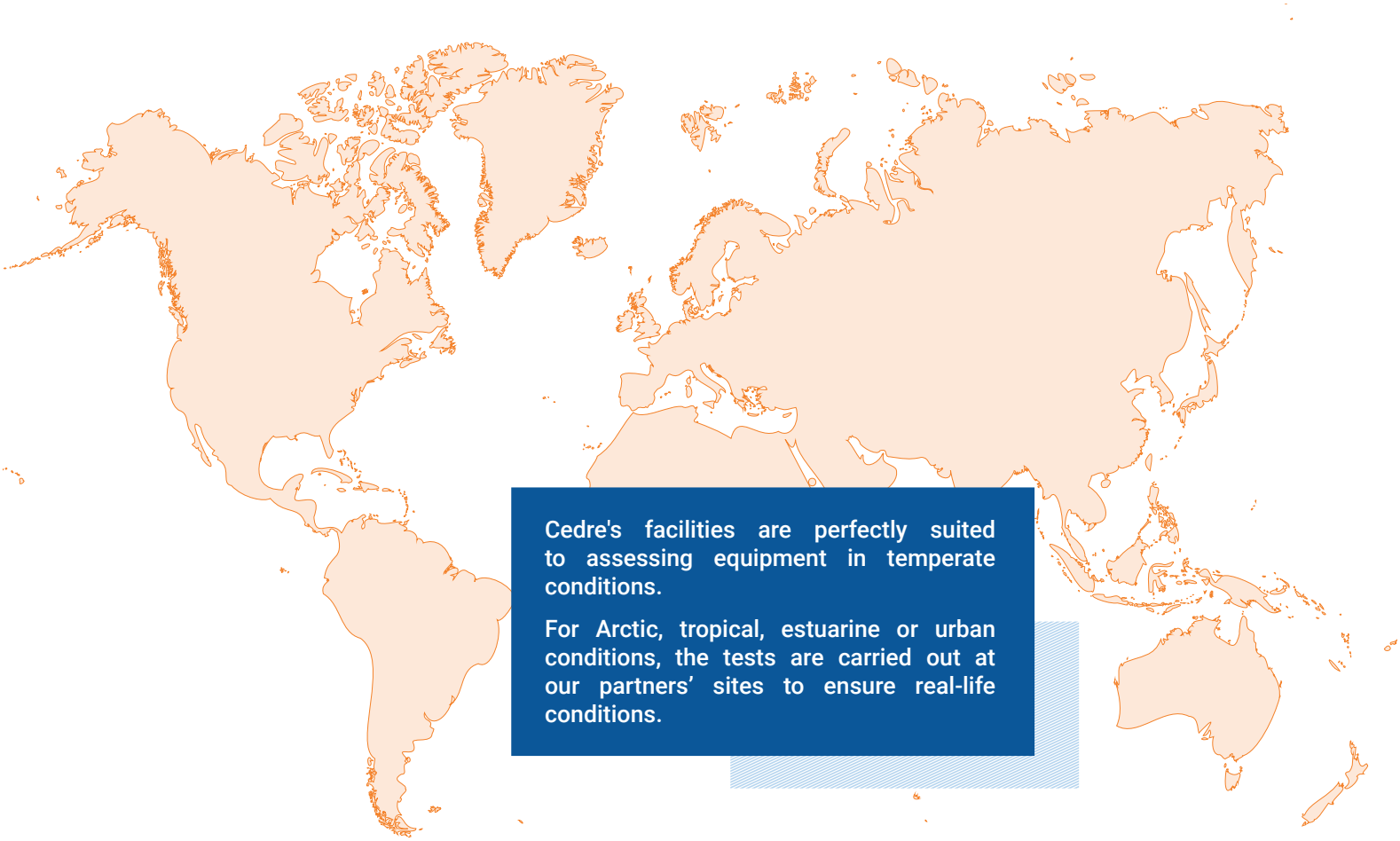
State-approved association with a public service mission

Fields of expertise

- Seas and oceans
- Shoreline
- Inland waters
- Oil
- Chemicals
- Macrolitter, Microplastics including plastic pellets

From the tip of Brittany to around the globe

Located in Brest, France, Cedre boasts one-of-a-kind facilities for experimentation, testing and training in environmentally safe conditions. Cedre's engineers and technicians also travel worldwide for missions relating to accidental water pollution (response operations, tests, studies, training, etc.).



Cedre's facilities are perfectly suited to assessing equipment in temperate conditions.

For Arctic, tropical, estuarine or urban conditions, the tests are carried out at our partners' sites to ensure real-life conditions.

Cedre's commitment to evaluating spill response equipment and products:

Identifying and testing equipment that could contribute to spill response.

Every year, we test products and equipment used to respond to oil spills, chemical spills or aquatic litter, on behalf of our partners or manufacturers. As an independent organisation, we carry out these tests meticulously and objectively, guaranteeing reliable, impartial results with complete confidentiality. These tests provide us with excellent knowledge of the equipment available on the market. We draw on this knowledge during our response missions and training courses.

We can also make our facilities available to our clients to deploy or test equipment.

Cedre's test facilities

1,900 M² AND 3,500 M² SEAWATER TANKS

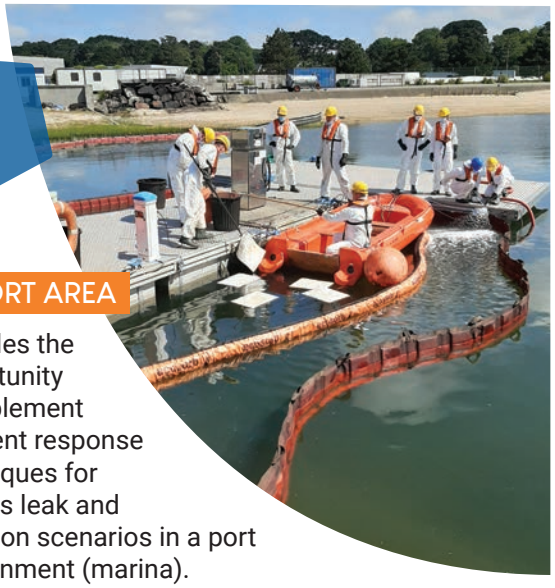
Used to test equipment (booms, vessels, drones, skimmers, sensors, etc.) with various types of pollutants.

2,500 M² ARTIFICIAL BEACH

Designed to test equipment and try out response techniques on different types of substrates (sandy shore, riprap, shingle bed, different types of outfalls, etc.).

10 M-DEEP WELL

To measure the suction and discharge capacities of oil pumping systems.



PORT AREA

Provides the opportunity to implement different response techniques for various leak and pollution scenarios in a port environment (marina).

ZONE DEDICATED TO AQUATIC LITTER

Artificial beach and deep-water test tank for pollution by macro- and micro-plastics, including plastic pellets.

EXPERIMENTATION COLUMN

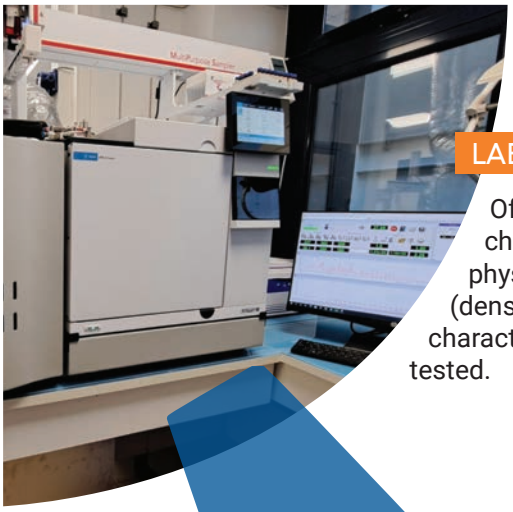
Designed to study the fate of oil, chemicals and solid litter in a water column. It is also used to evaluate sensing equipment for response operations (subsea chemical dispersion).

CLEAN-UP AND SHORELINE TEST BENCH

Designed to study the infiltration of pollutants into different coastal substrates (mud, sand, pebbles, etc.) and thereby to identify the most appropriate clean-up techniques.

POLLUDROME®

Reproduces natural phenomena such as wind, currents, solar radiation and temperature to study pollutant behaviour in conditions close to those found in a given marine or river environment.



LABORATORY

Offers a wide range of chemical analyses and physical measurements (density, viscosity) to characterise the pollutants tested.

CLEAN-UP TEST BENCH

Designed to test and validate washing agents used to treat hard substrates contaminated by pollutants (oil or chemicals).

BURN TEST BENCH

Used to determine the effectiveness of in situ burning of slicks at the water surface. It can also be used to determine the composition of burn residues and identify water column contamination.

RESPONSE EQUIPMENT DATABASE

Provides access, via the Cedre website, to information on response equipment, its manufacturers and suppliers, and its uses (protection, recovery, storage, clean-up, etc.).

www.cedre.fr

Evaluating spill response equipment and products at Cedre

Three types of tests

We evaluate equipment designed to respond to oil spills, chemical spills and aquatic litter via three types of tests:

Standardised tests

To characterise or compare different devices and products, based on standards (AFNOR, ASTM). These tests are carried out at the request of a manufacturer or partner, on different types of products (sorbents, dispersants, etc.) or equipment (pumps, skimmers, etc.).

Custom tests

To demonstrate the equipment's ability to respond to a specific situation. For this, Cedre develops protocols and test benches tailored to the client's requirements. Several devices can be evaluated simultaneously.

Deployment tests

To reproduce the real-life conditions in which the equipment will be used. Cedre simulates a spill response operation in order to identify the advantages and drawbacks of the equipment. This type of test can be carried out in differents environments (river, harbour, area with strong current, marsh, etc.).

What?

Any type of response product or equipment for:
- monitoring and detection
- dispersion
- containment
- recovery
- storage
- shoreline clean-up
- support

With what?

Any type of product:
- solids: containers, aquatic litter, plastic pellets
- liquids: oil, chemicals...
- gases: CO_2, NH_3...

Where?

- at Cedre
- at our partners' sites
- at our clients' sites in France and internationally

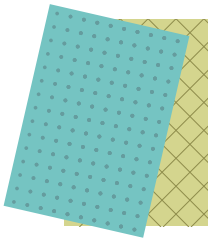
Which environments?

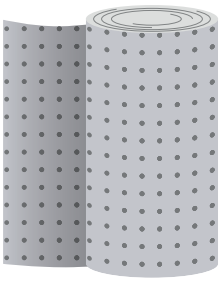
- offshore
- ports and harbours
- rivers
- industrial sites

OUR RANGE OF RESPONSE EQUIPMENT AND PRODUCT TESTS

Sorbents

Hydrophobic floating sorbents or universal sorbents, whether loose or in the form of pads or booms for instance, are solid products capable of trapping liquid pollutants such as oil or chemicals.





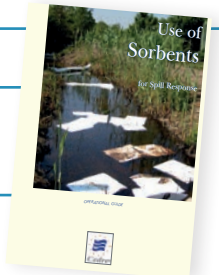
They are used to:

- Contain a spill on water or on land,
- Protect sensitive areas,
- Adsorb a pollutant to facilitate its recovery on the ground or on water,
- Recover pollutant in effluents generated by clean-up operations,
- Filter particulate or dispersed pollutants in a body of water,
- Clean equipment and decontaminate personnel.

	Standardised tests	Custom tests	Deployment tests
	Evaluate universal or floating hydrophobic sorbents under standard conditions to determine their: • Sorption capacity; • Hydrophobic capacity: • Solidity.	Test sorbents based on custom protocols representative of specific conditions of use (product, environment, etc.) in a controlled environment and under reproducible conditions, using test benches and protocols specifically designed to meet the client's needs. Support manufacturers in the design of new sorbent products.	Determine the behaviour of sorbents according to their form and environmental conditions. Test their usage in real-life situations.
	Cedre: • Laboratory	Cedre: • Laboratory • Technical facilities	Cedre: • Laboratory • Technical facilities Natural environment Port environment
	Oil	Oil Chemicals	Oil Chemicals Spill simulant
	Depends on protocol	Depends on protocol	≈ 1 day
	Protocol based on standards: • AFNOR NF T 90-360 • AFNOR NF T 90-361	Custom protocol designed according to client's needs	Deployment based on client's needs

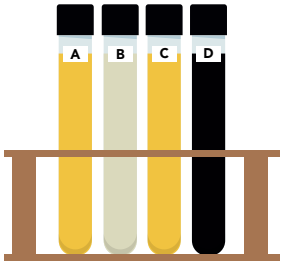
Bonus

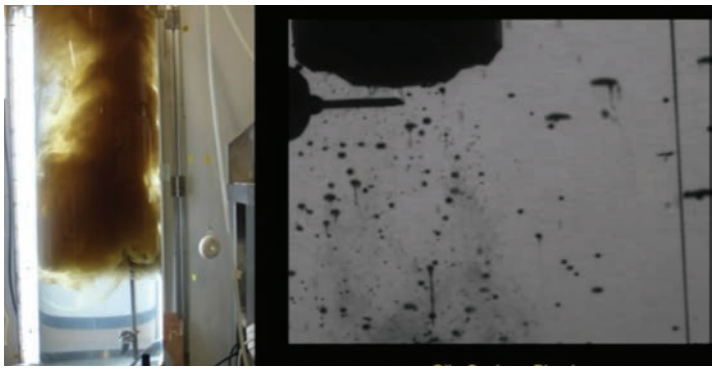
▶ An Operational Guide on the “Use of Sorbents” is available at www.cedre.fr!



Dispersants

By promoting the dispersion of oil in the form of microdroplets in the water column, dispersants increase its “dilution”, stimulate and accelerate its degradation in the natural environment and reduce the chances of large-scale oiling of the shoreline.

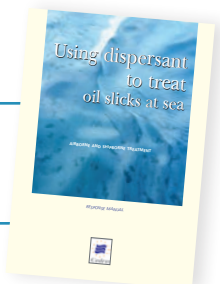




	Standardised tests	Custom tests	Deployment tests
	Evaluate the effectiveness, toxicity and biodegradability of freshwater and marine dispersants under standard conditions. Check dispersant stocks at regular intervals to determine the effect of weathering on their effectiveness and toxicity.	Test, develop and compare bio-based or chemical dispersants in a controlled environment and under reproducible conditions, using test benches and protocols specifically designed to meet the client's needs. Study the impact of dispersants on the environment and optimise their use.	Study the effectiveness of dispersant-oil combinations under realistic conditions, reproducing cold, temperate or hot seawater or freshwater environments, as well as turbid areas. Investigate the possibility of implementing subsurface dispersion. Each test is tailored to the client’s needs.
	Cedre: • Laboratory • Ecotoxicology room	Cedre: • Technical facilities • Laboratory • Ecotoxicology room Natural environment	Cedre: • Laboratory • Technical facilities
	Oil Dispersants	Oil Dispersants	Oil Dispersants
	Depends on protocol	Depends on protocol	Depends on protocol
	Protocols based on standards: • AFNOR NFT 90-345 • AFNOR NFT 90-346 • ISO 10253 • MNS, WSL, SFT methods	Custom protocol designed according to client's needs	Deployment based on client's needs

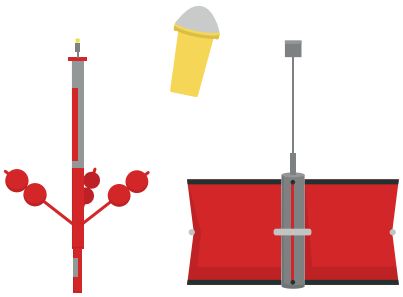
Bonus

▶ An Operational Guide on “Using dispersant to treat oil slicks at sea” is available at www.cedre.fr!



Drifting buoys

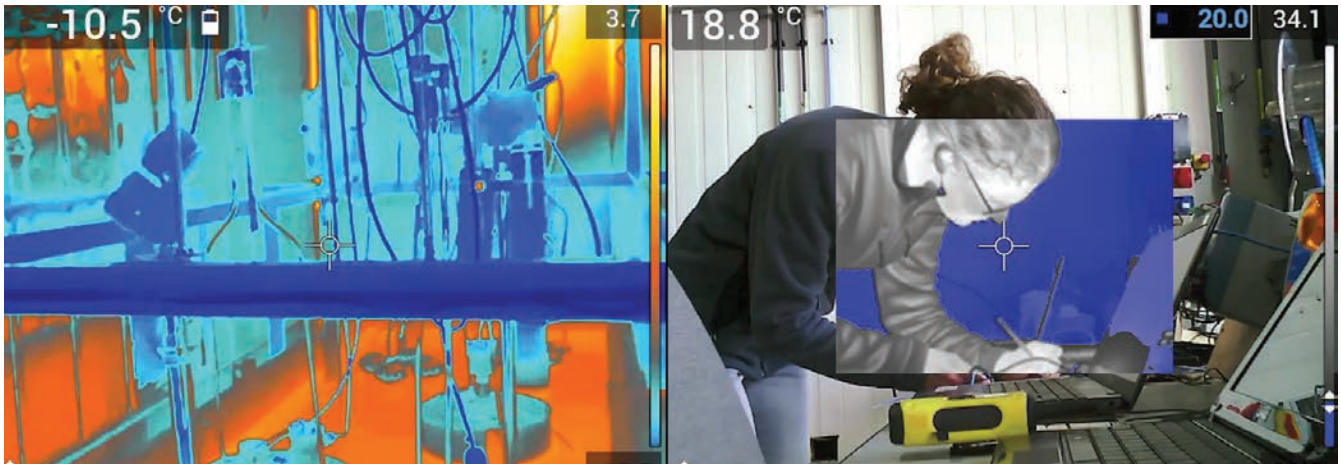
Drifting buoys, or drifters, can be used to predict the trajectory of a slick (oil or chemical) in order to plan spill response actions. Depending on their design, they may be floating or ballasted to drift in the water column.



	Custom tests	Deployment tests
	Design, test and compare drifting buoys in a controlled environment and under reproducible conditions, using specially designed test benches and specific protocols in order to meet the client's needs. Examples of tests: • Assessment of the behaviour of drifting buoys in Cedre's flume tank (Polludrome®) with oil or chemicals; • At sea.	Design and test the deployment of drifting buoys and evaluate their operational performance in field conditions: • Ease of deployment; • Data access; • Data quality (precision, time step…); • Drift prediction reliability; • Lifetime; • Buoy retrieval;
	Cedre: • Technical facilities Natural environment	Natural environment
	Oil Simulant	Simulant
	Depends on protocol	Depends on protocol
	Custom protocol designed according to client's needs	Deployment based on client's needs

Sensors

The purpose of detecting oil and chemical pollution, whatever the environmental compartment (water column, surface sediment or air) or the technology used, is to define a more targeted response, while mitigating the risk of exposure for responders.



	Custom tests	Deployment tests
	Assess and compare oil and chemical sensors, in a controlled environment and under reproducible conditions, using test benches and protocols specifically designed to meet the client's needs.	Appraise the use of sensors and evaluate their operational performance in field conditions: • Ease of use; • Data access; • Data quality (precision, time step…); • Range of products detected; • Lifetime...
	Cedre: • Technical facilities • Laboratory Natural environment Industrial site	Cedre: • Technical facilities Natural environment Industrial site
	Chemicals Oil	Chemicals Oil
	Depends on protocol	≈ 1 to 2 days
	Custom protocol designed according to client's needs	Deployment based on client's needs

Drones

Drones – whether it be unmanned ground vehicles (UGVs), unmanned surface vehicles (USVs), unmanned aerial vehicles (UAVs) or unmanned underwater vehicles (UUVs) – are increasingly being used in spill response operations, for instance to conduct surveys, deploy equipment (booms, skimmers, sensors, etc.), take samples, etc.

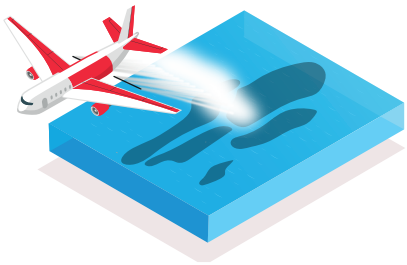
Drones can be used to access areas that are out of reach for human responders and to keep operators at a distance from the pollutant.

© Focale fixe

	Standardised tests	Custom tests	Deployment tests
	Evaluate drone performance under standard conditions. Examples of tests: assess the recovery capabilities of drones according to the thickness and viscosity of the oil: • Recovery rate; • Selectivity; • Tendency to emulsify; • Ability to attract the slick.	Assess and compare the performances of drones in a controlled environment and under reproducible conditions, using test benches and protocols specifically designed to meet the client's needs. Examples of tests: • Agility course; • Pollutant recovery; • Sampling; • Manoeuvrability; • Boom laying; • Tractive force.	Appraise equipment use conditions, taking into account the specific constraints relating to the client and the environment. Examples of use: • Navigation in shallow waters or areas inaccessible to human responders; • Deployment of aerial, underwater and surface sensors in a constrained environment; • Boom deployment in a port or inland waters.
	Cedre: • Technical facilities • Laboratory	Cedre: • Technical facilities • Laboratory Industrial site Natural environment	Cedre: • Technical facilities Natural environment Industrial site
	Oil Chemicals	Oil Chemicals Macrolitter, microplastics including plastic pellets Spill simulant	Spill simulant
	1 pollutant per day	Depends on protocol	≈ 1 to 2 days
	Recovery protocol based on standard: • AFNOR NF T71-500	Custom protocol designed according to client's needs	Deployment based on client's needs

Chemical dispersant spraying systems

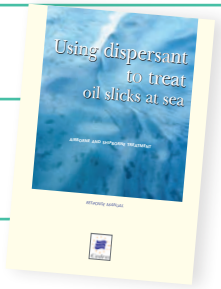
Chemical dispersants can be applied using aircraft-mounted or vessel-mounted spraying systems or by subsea injection to promote the dilution of oil in the natural environment and reduce the chances of large-scale oiling of the shoreline. Chemical dispersion requires spray arms, single-point spray nozzles or subsea injection systems.



	Standardised tests	Custom tests	Deployment tests
	Characterise droplet size in the dispersant plume and evenness of application.	Test and compare dispersant application systems, in a controlled environment and under reproducible conditions, using test benches and protocols specifically designed to meet the client's needs.	Evaluate the use of dispersant application systems in field conditions (operational and environmental constraints):
	Cedre: • Technical facilities • Laboratory	Cedre: • Technical facilities Natural environment Industrial site Cedre's partners	Cedre: • Technical facilities Natural environment Industrial site
	Dispersant Fresh water Seawater	Dispersant Simulant	Fresh water Seawater
	≈ 3 to 4 days	Depends on protocol	≈ 1 to 2 days
	Protocol based on standards: • ASTM F1413/F1413M • ASTM F2465/F2465M	Custom protocol designed according to client's needs	Deployment based on client's needs

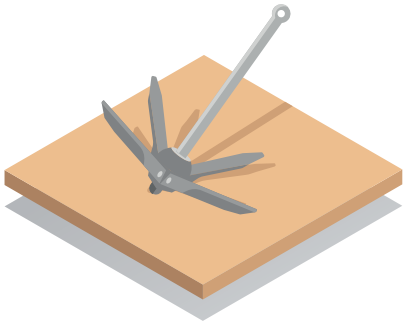
Bonus

▶ An Operational Guide on "Using dispersant to treat oil slicks at sea" is available at www.cedre.fr!



Mooring systems

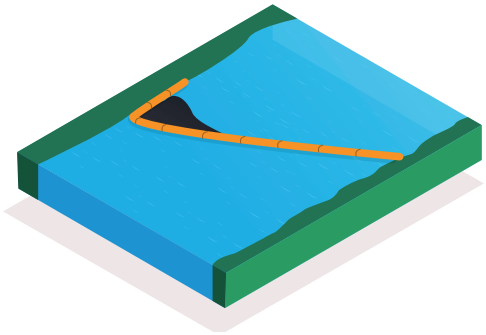
Mooring systems are an essential element in spill response, used to hold booms, nets or other spill response devices in place. Their intrinsic capabilities, their conditions of use and the substrate in which they are installed will affect their tensile strength.



	Custom tests	Deployment tests
	Design, evaluate and compare the tensile strength of mooring systems in different substrates (mud, sand, vegetated shore...), using test benches and protocols specifically designed to meet the client's needs.	Evaluate the use of mooring systems in field conditions (operational and environmental constraints): Installation in a specific environment to meet client's requirements.
	Cedre: • Technical facilities Natural environment	Cedre Natural environment Industrial site
	≈ 1 to 2 days	≈ 1 to 2 days
	Custom protocol designed according to client's needs	Deployment based on client's needs

Manufactured containment booms

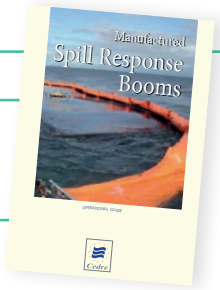
Manufactured spill response booms are devices designed to contain, deflect or absorb spills of pollutants (oil or chemicals) in aquatic environments. They are exposed to physical constraints (tractive forces during towing, strong currents, etc.) and chemical constraints (exposure to pollutants).



	Standardised tests	Custom tests	Deployment tests
	Assess the mechanical properties of spill response booms (tensile strength of the boom structure or fabric).	Assess and compare booms using test benches and protocols specifically designed to meet the client's needs. Examples of tests: • Assessment of the chemical compatibility of boom fabrics • Assessment of the containment capacity in the case of a floating pollutant	Appraisal of the feasibility of boom deployment and storage, as well as their capacity to protect sensitive sites.
	Cedre: • Laboratory Cedre's partners	Cedre: • Laboratory • Technical facilities Natural environment Industrial site	Natural environment Industrial site
		• Oil • Chemicals	Spill simulant
	≈ 1 to 2 days per test	Depends on protocol	≈ 1 to 2 days
	Protocol based on standards: • NF EN ISO 1421 • ASTM F1093	Custom protocol designed according to client's needs	Deployment based on client's needs

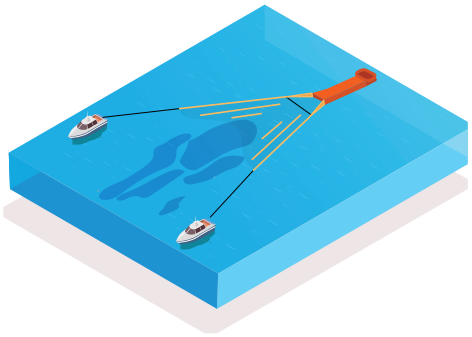
Bonus

▶ An Operational Guide on "Manufactured Spill Response Booms" is available at www.cedre.fr!



Fast current systems

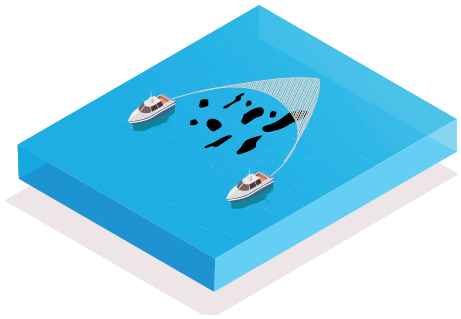
Fast current systems are specially designed to respond to spills (particularly of oil or floating materials) in areas of strong current and powerful waves (current > 0.7 knots). Such systems are suited to harsh environments where recovery is more complex. They can be used in combination with skimmers.

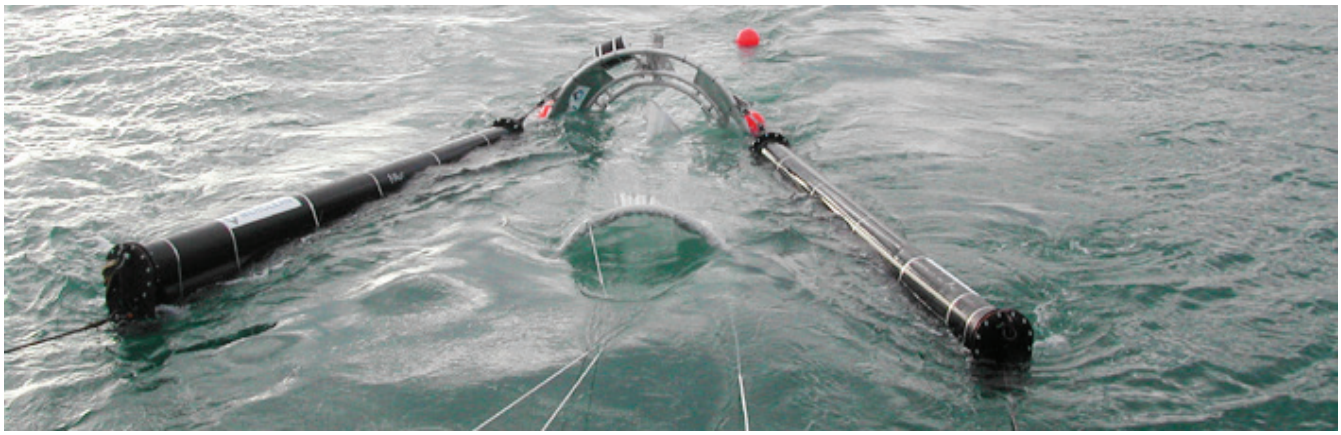


	Standardised tests	Custom tests	Deployment tests
	Assess the mechanical properties of fast current systems (tensile strength).	Assess and compare booms using test benches and protocols specifically designed to meet the client's needs. Assessment of the chemical compatibility of fabrics.	Assess deployment feasibility and operational conditions, as well as the ability to protect areas of strong current by evaluating the system's capacity to contain a floating pollutant (simulant). Use of different deployment systems (boom vane, vessels, etc.) to define optimum conditions of use.
	Cedre: • Technical facilities Cedre's partners	Cedre: • Laboratory Natural environment Industrial and port sites	Natural environment Industrial and port sites
		Oil Chemicals	Simulant
	≈ 1 to 2 days	≈ 1 to 3 days	≈ 1 to 2 days
	Protocol based on standards: • NF EN ISO 1421 • ASTM F1093	Custom protocol designed according to client's needs	Deployment based on client's needs

Nets and trawl nets

Spill response nets and surface trawl nets are specifically designed to recover solid or highly viscous products.



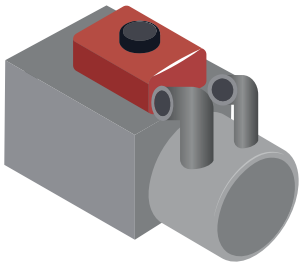


	Custom tests	Deployment tests
	Develop, test or compare nets, using test benches and protocols specifically designed to meet the client's needs.	Assess the deployment, use and repacking of nets and trawl nets, on land, in inland waters or at sea.
	Cedre Natural environment Industrial site	Cedre Natural environment Industrial site
	Oil Solid pollutants	Spill simulant
	Depends on protocol	≈ 1 to 2 days
	Custom protocol designed according to client's needs	Deployment based on client's needs

Pumps

Pumps are used to transfer the pollutant and are one of the key elements in the recovery chain.

Testing is essential to identify the equipment's performance, strengths and limitations, according to the physico-chemical characteristics of the pollutant (viscosity, chemical compatibility, etc.), as well as the environmental conditions and configuration of use.

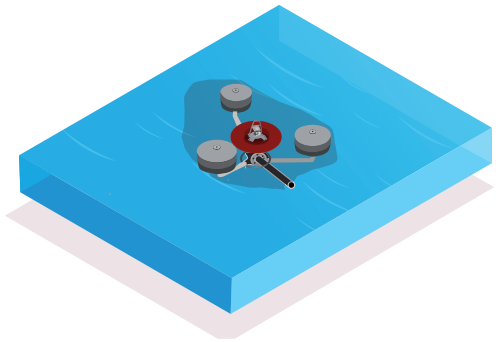


	Standardised tests	Custom tests	Deployment tests
	Evaluate the intrinsic performance of pumps under standard conditions depending on: • the type of fluid pumped; • the suction height; • the discharge pressure.	Assess and compare pump performances with pollutants in configurations of use matching the client's needs, in a controlled environment and under reproducible conditions. Possibility of conducting iterative tests to investigate several options so as to optimise the equipment's design and operating procedures with a view to improving its performance in given conditions (e.g. annular injection). Compatibility tests with oil and chemicals.	Assess the use of the equipment in specific conditions (environment, organisation, logistics, etc.) that take into account the client's specific constraints.
	Cedre: • Technical facilities • Laboratory	Cedre: • Technical facilities • Laboratory Natural environment Industrial site	Cedre: • Technical facilities Natural environment Industrial site
	Oil	Oil Chemicals Microplastics including plastic pellets	Spill simulant
	≈ 2 to 3 days	Depends on protocol	≈ 1 to 2 days
	Test protocol based on standard: • AFNOR NF T-71-401	Custom protocol designed according to client's needs	Deployment based on client's needs

Skimmers

Used in a static or dynamic configuration, from the shore or from vessels, skimmers recover floating pollutants from the water surface. They are one of the key elements in the recovery chain.

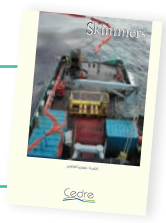
Testing is essential to identify the equipment's performance, strengths and limitations, according to the physico-chemical characteristics of the pollutant (density, viscosity, chemical compatibility, etc.), as well as the environmental conditions and configuration of use.



	Standardised tests	Custom tests	Deployment tests
	Assess the intrinsic performance of the skimmer according to oil thickness and viscosity: • Recovery rate; • Selectivity; • Tendency to emulsify; • Ability to attract the slick.	Evaluate the skimmer's recovery capacity and operational conditions in appropriate conditions. Possibility of conducting iterative tests to investigate several options so as to optimise the equipment's design and operating procedures with a view to improving its performance in given conditions. Compatibility tests of materials with oil and chemicals.	Assess the use of the equipment in specific conditions (environment, organisation, logistics, etc.) that take into account the client's specific constraints.
	Cedre: • Technical facilities • Laboratory	Cedre: • Technical facilities • Laboratory Natural environment Industrial site	Cedre: • Technical facilities Natural environment Industrial site
	Oil	Oil Chemicals Microplastics including plastic pellets	Spill simulant
	≈ 1 week	Depends on protocol	≈ 1 to 2 days
	Protocol based on standard: • AFNOR NF T71-500	Custom protocol designed according to client's needs	Deployment based on client's needs

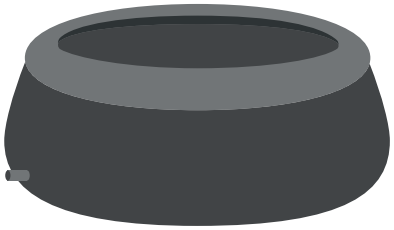
Bonus

▶ An Operational Guide on "Skimmers" is available at www.cedre.fr!



Storage systems

The storage of oil, chemicals, waste or plastic pellets, both on shore and offshore, must take into account operational needs and the type of pollutant.



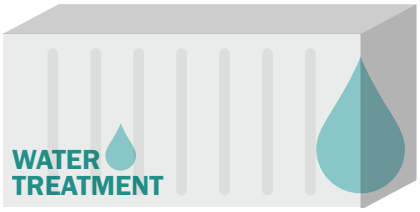
	Standardised tests	Custom tests	Deployment tests
	Assess the tensile strength of the fabrics of which flexible storage tanks and floating storage capacities are made.	Test and compare storage systems based on custom protocols representative of specific conditions of use (product, environment, etc.) in a controlled environment and under reproducible conditions, using test benches and protocols designed to meet the client's needs. Examples of tests: • Assessment of the chemical compatibility of fabrics.	Assessment of the deployment, use and repacking of storage systems under realistic conditions and in field conditions.
	Cedre: • Laboratory Cedre's partners	Cedre: • Laboratory	Cedre: • Technical facilities Natural environment Industrial site
	Oil Chemicals	Oil Chemicals Microplastics including plastic pellets	Spill simulant Oil Chemicals Macrolitter, microplastics including plastic pellets
	≈ 1 to 2 days per test	Depends on protocol	≈ 1 to 2 days
	Protocols based on standard: • NF EN ISO 1421	Custom protocol designed according to client's needs	Deployment based on client's needs

Bonus

▶ An Operational Guide on "Waste Management" is available at www.cedre.fr!

Water treatment units

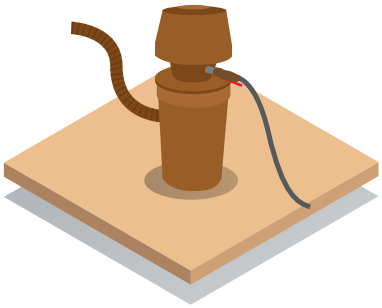
Water treatment units extract pollutants from water before it is released into the environment or reused. These units are essential for protecting water resources and ensuring that any water released into the environment complies with environmental quality standards.

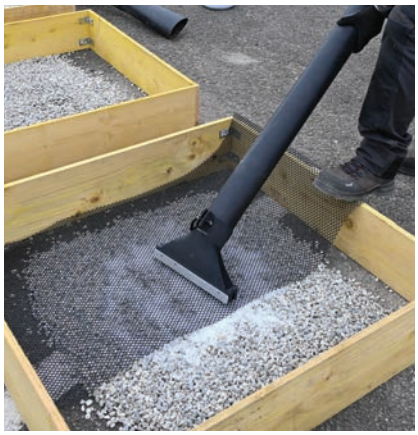


	Custom tests	Deployment tests
	Develop and test water treatment units via custom protocols representative of specific conditions of use, in a controlled environment and under reproducible conditions.	Preventive assessment of water treatment units by reproducing real conditions of use (water/oil separation): • Ease of deployment; • System effectiveness; • Equipment reliability; • Lifetime...
	Cedre: • Technical facilities • Laboratory	Cedre: • Technical facilities • Laboratory Natural environment Industrial site
	Oil Chemicals	Oil Chemicals Pollutants already present in the environment
	Depends on protocol	Depends on protocol
	Custom protocol designed according to client's needs	Deployment based on client's needs

Shoreline clean-up equipment (vacuum recovery, mechanical recovery and washing equipment)

Vacuum or mechanical recovery equipment can be used to recover pollutants deposited on the shoreline mechanically rather than manually. Washing equipment is designed to clean various surfaces contaminated by pollutants such as rocks, wood, concrete, vegetation, etc. These different types of equipment play an essential role in shoreline clean-up.

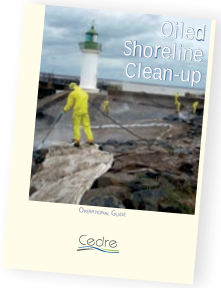




	Custom tests	Deployment tests
	Evaluate the performance of shoreline clean-up equipment on different substrates and under different usage conditions. Example of parameters studied: • Selectivity tests • Optimisation tests • Effectiveness tests	Assess the use of the equipment in specific conditions that take into account the client's specific constraints.
	Cedre: • Technical facilities • Laboratory Natural environment Industrial site	Cedre: • Technical facilities Natural environment Industrial site
	Oil Chemicals Microplastics including plastic pellets Spill simulant	Pollutants present in the environment Spill simulant
	Depends on protocol	≈ 1 to 2 days
	Custom protocol designed according to client's needs	Deployment based on client's needs

Bonus

▶ An operational guide on "Oiled Shoreline Clean-up" and a guide on "Plastic pellets: loss prevention on industrial sites and response in the environment" are available at www.cedre.fr!



Who we work with

Cedre is a partner in many European projects and plays a key role in testing spill response equipment and products, either at its facilities or directly at its partners' sites.

Co-funded by the European Union

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Interested in developing your own project?

KEY PHASES

01 Needs definition and scoping

02 Selection of test type(s)

03 Technical and financial proposal by Cedre

04 Implementation of tests at Cedre or at your facilities and results analysis

05 Provision of test report, recommendations and presentation materials

Contact us to examine your needs together!

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