

DUST 3P

Pneumatic Debris Uptake Suction Tool

The Problem

Foreign material in nuclear power plants can cause fuel failures and reactor components damage. The foreign material is carried by the coolant through the core at high speed, potentially damaging the fuel cladding. This can lead to expensive fuel failures and significantly increased doses in the primary system.

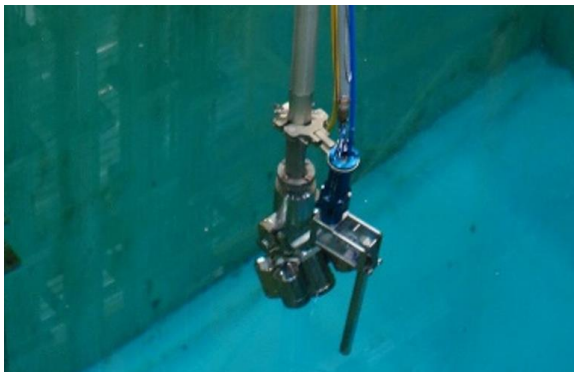
The Westinghouse Solution

The DUST (Debris Uptake Suction Tool) tool family has been used successfully in the field since 2011 for underwater retrieval of foreign material at nuclear power plants worldwide.

A new pneumatic version, DUST 3P, was developed in 2022 by Westinghouse, and allows for longer vacuuming times and retrieval of heavier debris.

Description

The foreign material that can be captured, using the DUST, includes things like small bolts, washers, shavings, plastic tie wraps, and pieces of cloth. The suction force can be adjusted by the operator in a fully variable fashion, allowing for high precision during retrieval of debris. The ability to collect and retrieve foreign material allows the utility to analyze and identify the source and take action to prevent material from entering the system in the future.



Customer Benefits

- Saves time on critical path.
- Easy to use and implement.
- Foreign material is safely removed in a single-step operation.
- Mitigates fuel failures.
- Mitigates damage of reactor components.
- The integrated see-through debris trap enables visual verification of debris retention.
- The entire suction nozzle and/or debris trap can be removed under water remotely.

DUST 3P

DUST 3P, the pneumatic version of the DUST 3, has been developed as an improvement from the previous electric version of the DUST 3, bringing the following new benefits:

- Better vacuuming performance and retrieving of heavier debris
- Longer vacuuming time to clean up a wide surface (such as the reactor vessel Lower Core Plate)
- Less maintenance and more reliability, due to its design without electrical components

The use of the DUST 3P remains very similar to the previous version with an electric motor, except that the control box is replaced by a control panel for opening/closing the air valve.



DUST 3P can be used with any camera system. Any suitable camera can easily be deployed as the DUST 3P is mounted on a handling pole.

Areas of use:

- Lower Core Plate in PWRs during visual inspections
- Fuel Assemblies
- Pump deck in BWR (reach behind obstacles like main circulation pumps, feedwater sparger and insert pipes)
- Any pool or cavity
- Small RPV nozzles and orifices with customized suction nozzles.

Technical Data

Compatible cameras	Any pole mounted camera
Equipment weight	3kg in air
Length x Width x Depth	600 x 280 x 60mm
Filter mesh sizes	0,1 – 1mm
Max ambient temperature	45°C
High radiation tolerance	Yes
Flexible hose length between the DUST 3P and the control panel	25m (up to 40m on demand)
Operating air pressure	Standard utility air supply (~ 6 bar)
Control panel	Compressed air regulator and a single ON/OFF valve