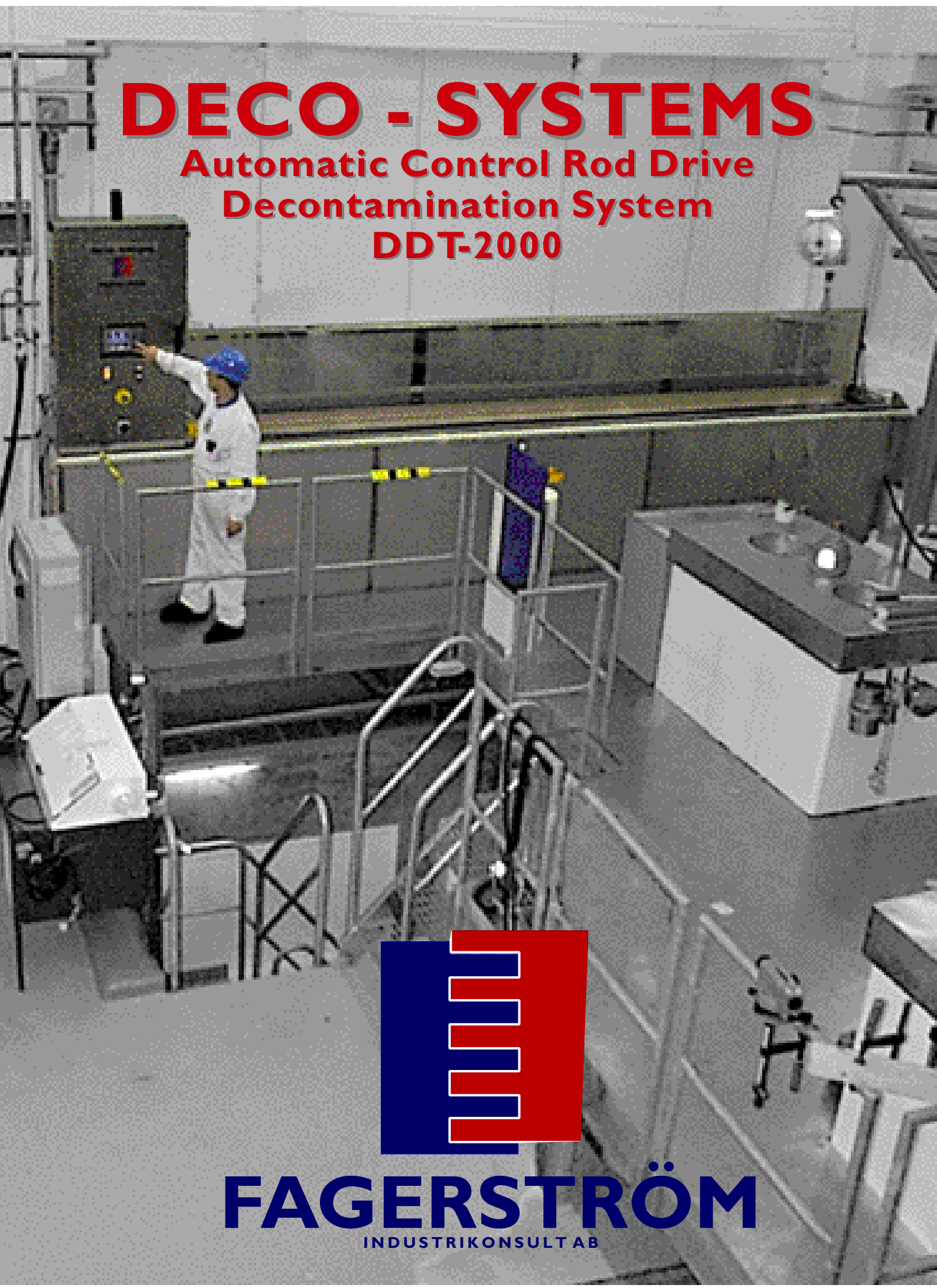


DECO - SYSTEMS

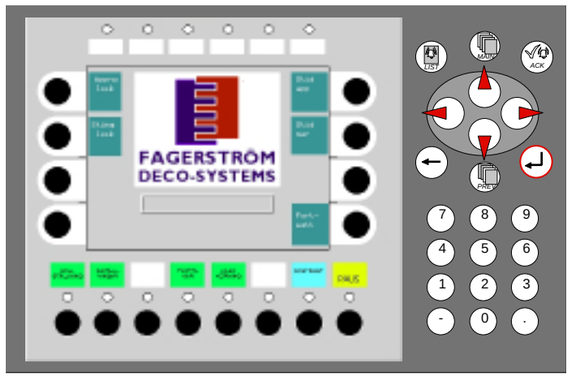
Automatic Control Rod Drive Decontamination System DDT-2000

FAGERSTRÖM

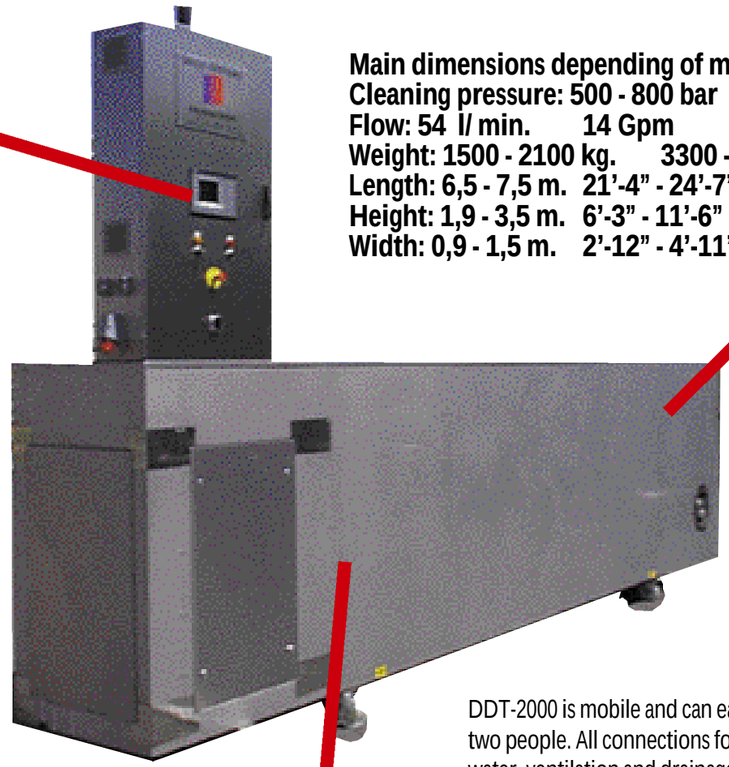
INDUSTRIKONSULT AB

DECO-SYSTEMS

Experience from BWR plants shows that conventional methods, e g ultrasonic cleaning and ethanol wiping, for **Control Rod Drive** decontamination no longer meets the requirements of the modern Nuclear Industry.
In close collaboration with the Swedish NPP Ringhals 1, Fagerström Industrikonsult has developed an efficient and ergonomic Decontamination System, which exceeds the requirements of tomorrow.

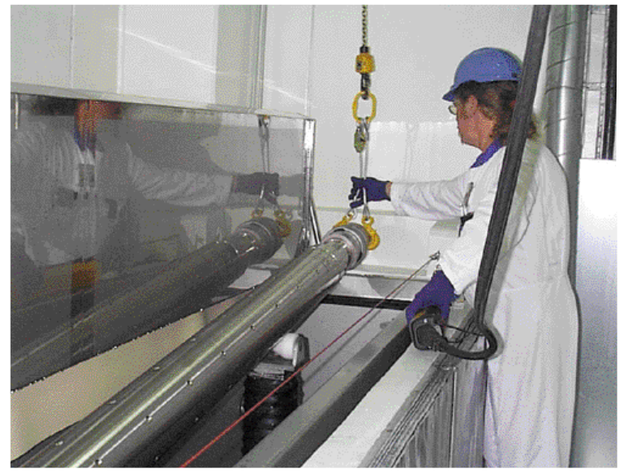


A powerful industrial PLC controls the DDT-2000 together with a LCD operator panel. The interface is designed according to the " stream technology" concept, which means that the operator can only run a cleaning process in the correct sequence. The DDT-2000 is pre programmed for optimal automatic decontamination of each individual CRD part, but permits the operator to adjust parameters such as nozzle velocity and washing time in the set up menu.
The operator panel indicates each stage of the process and the actual progress of each sequence.

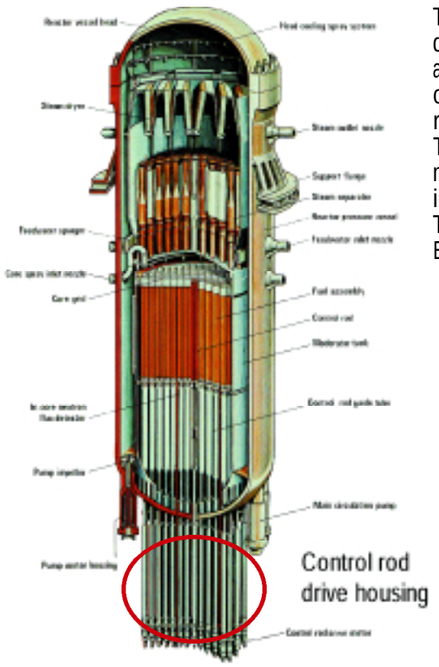


Main dimensions depending of model.
Cleaning pressure: 500 - 800 bar 7250 - 11600 Psi
Flow: 54 l/ min. 14 Gpm
Weight: 1500 - 2100 kg. 3300 - 4600 lb
Length: 6,5 - 7,5 m. 21'-4" - 24'-7"
Height: 1,9 - 3,5 m. 6'-3" - 11'-6"
Width: 0,9 - 1,5 m. 2'-12" - 4'-11"

DDT-2000 is mobile and can easily be moved by two people. All connections for electricity, water, ventilation and drainage are of the quick connector type.

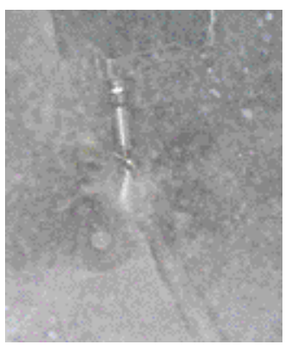


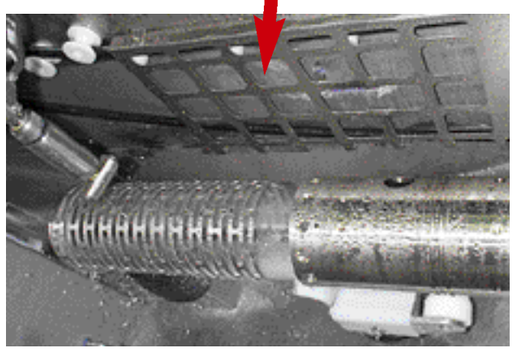
The DDT-2000 is designed for convenient loading and unloading of the CRD parts. Vertical or horizontal handling is possible. Automatic, vertically adjustable supports guarantee the correct location of the CRD parts. A fibre optic system indicates which of the different parts is loaded as well as its location.
The DDT-2000 loads automatically the appropriate cleaning program. During external decontamination when the parts are rotating the positioning of the CRD parts is automatically controlled.



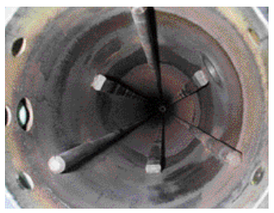
This picture is published with permission of ABB Atom AB, Sweden.

The Control Rods of a BWR reactor are defined as key components as their tasks are to regulate the power during normal operation and to rapidly shut down the reactor to a safe state.
To ensure the function of the system, maintenance is performed on each individual CRD at five yearly intervals.
The total number of CRD units on a typical BWR reactor is between 120 to 160.

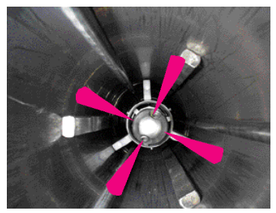




The noise from the nozzles is normally very high (120 dBA) due to very high water velocity. DDT-2000 is efficiently sound insulated which results in a noise level outside the machine of approximately 80 dBA.



In operation the CRD's are exposed to very high temperatures which means that the surfaces becomes coated with corrosion. The DDT-2000 efficiently removes oxide bound radioactive particles and residual graphite lubricant.



The internal decontamination is performed by four rotating jets. The internal nozzle fits in an internal pipe, diameter of 60 mm and up.

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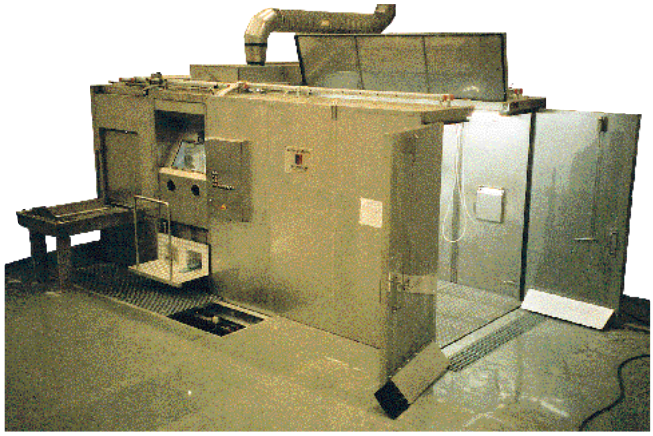
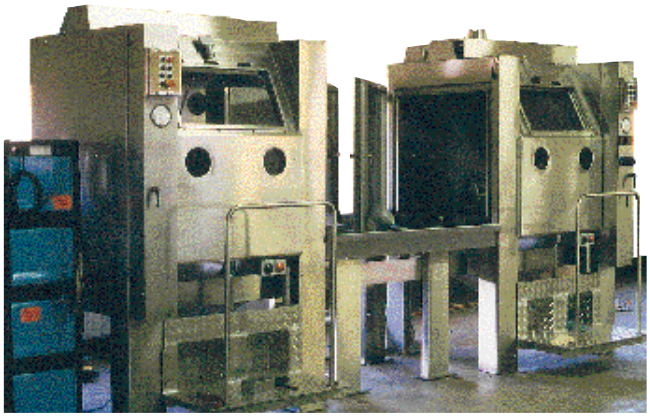
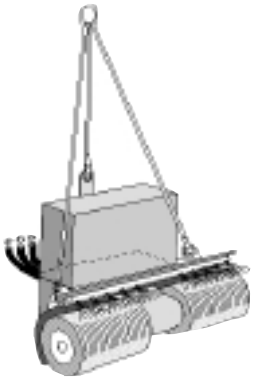
Fagerström Industrikonsult AB is primarily engaged in the design and manufacture of different sorts of decontamination equipment for the Nuclear Power Industry, world wide.



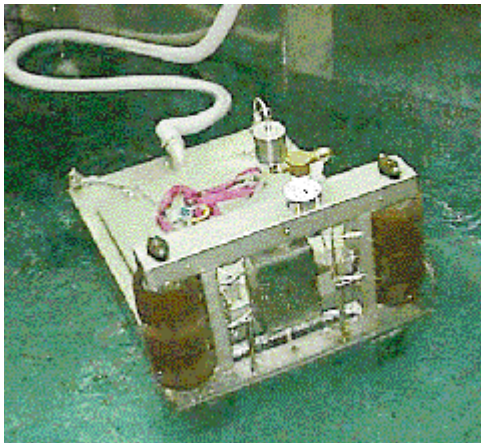
Large wet blasting cabinet DECO-System, a delivery to OKG II in Sweden.



Fagerström Deco-systems has also smaller alternative Wet blasting- and rinsing cabinets. We build after Your needs.



RCC 5



RCC 10

RCC 5 is our latest cleaning machine for reactor cavities.
RCC 5 is suspended from the reactor pool overhead crane.
RCC 5 minimises the time needed for cleaning and reduces airborne contamination which leads to a considerable reduction in personal radiation doses.

RCC 10 (Reactor Cavity Cleaner) cleans the cavity with two counter rotating brushes. The machine is easily manouvered along the walls by two joysticks.
The RCC 10 decontaminates the reactor pool at the same time it is emptied.
Minimises cleaning time.
Removes only the oxide layer.
Prevents airborne contamination by absorption.
The overhead crane is not occupied.
Reaches even curved walls.

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