

ENDEGS ADEX Robot

For maintaining and cleaning storage tanks
in the chemical, petrochemical, oil and gas industries



ENDEGS ADEX Robot

Great time and cost savings,
consistent high quality

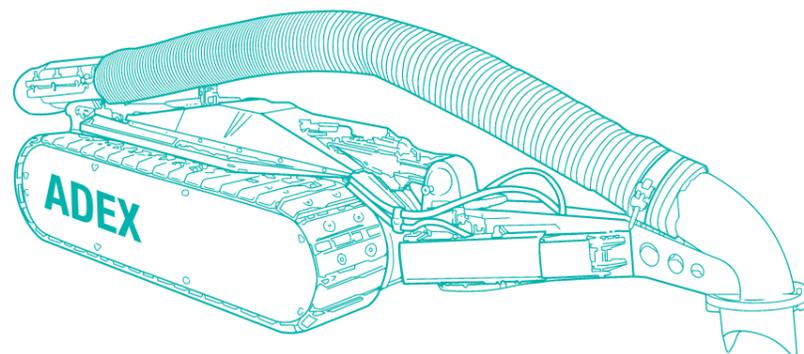
It works quickly, doesn't get tired, and cleans dependably and thoroughly, 24 hours a day, seven days a week. ADEX Robot works in ATEX Zone 0 – without getting tired.

AT ENDEGS, RESPONSIBILITY FOR THE SAFETY OF PEOPLE AND THE ENVIRONMENT IS ALWAYS IN FOCUS

We've added another pioneering technology to our line-up: Powerful robots, for the cleaning of above-ground and underground industrial tanks. Customers can rent them to replace people where health risks are acute.

ADEX Robot is designed primarily for the rough cleaning of flat-bottom tanks. These were formerly cleaned by three workers in chemical resistant suits, in four shifts of round about two to danger-filled hours.

Our robot is a compact, tough multi-talent of stainless steel that meets all current environmental and safety standards. It features maximum traction on the floor through patented magnetic track plates, and has a strong hydraulically operated arm that can grip in any direction with 2,000 Newton metres of force. It's a safe, efficient and cost-effective way to remove hazardous and non-hazardous materials from industrial tanks.



ADEX Robot for rough cleaning of flat-bottom tanks in ATEX Zone 0



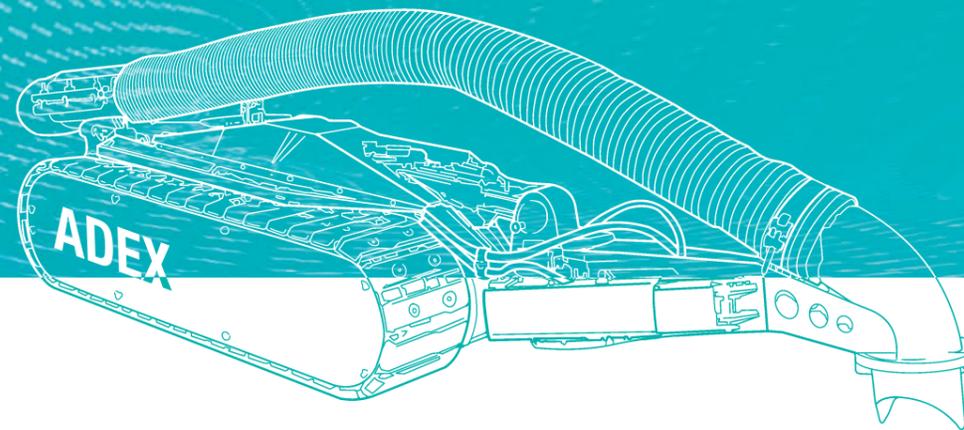
A tough multi-talent in stainless steel

ADEX Robot meets current environmental and safety standards



The Sophisticated ESOT System

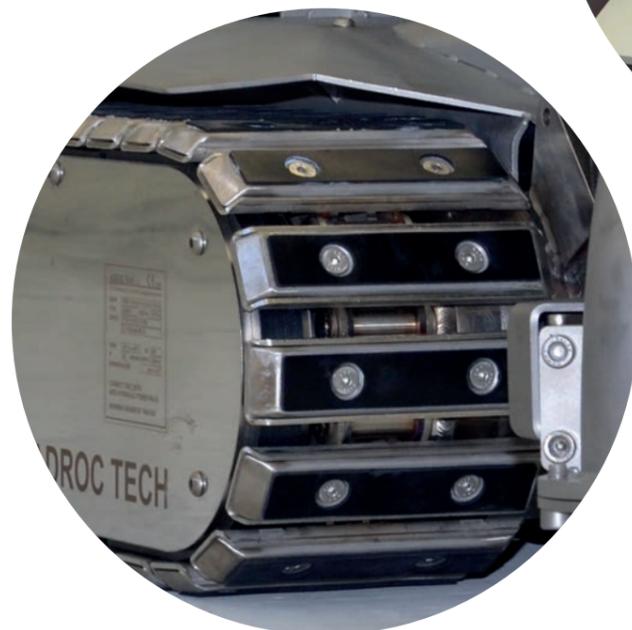
More than just a robot



The operator controls the ADEX Robot safely from ATEX Zone 1



The operator sees every movement of the robot in real time on a high-definition monitor



The patented magnetic track plates give the ADEX Robot the best possible traction on the floor

The remote-controlled ADEX Robot is part of the sophisticated ESOT (Equipment Set for Oil Tank Cleaning) system, which is simple to set up and control. In addition to the robot, ESOT includes a transportable vented cabin, or TVC for short. This likewise meets all relevant European safety standards and is certified for ATEX Zone 1. Inside the cabin are the radio remote control and the hydraulic unit.

The robot can be used in ATEX Zone 0. Its patented magnetic tracks give it maximum traction on the floor. The ADEX Robot has two semi-automatic settings that make the operator's job easier by allowing him to concentrate on steering the robot. The robot's continuously repeating multidirectional arm movements enable it to move easily even through thick sludge. The hydraulically controlled arm can grip in any direction with 2,000 Newton meters of force.

The robot is connected by a hose to a suction truck outside the tank. This quickly removes the material taken in by the suction head, be it heating oil, crude oil, sludge or anything else.

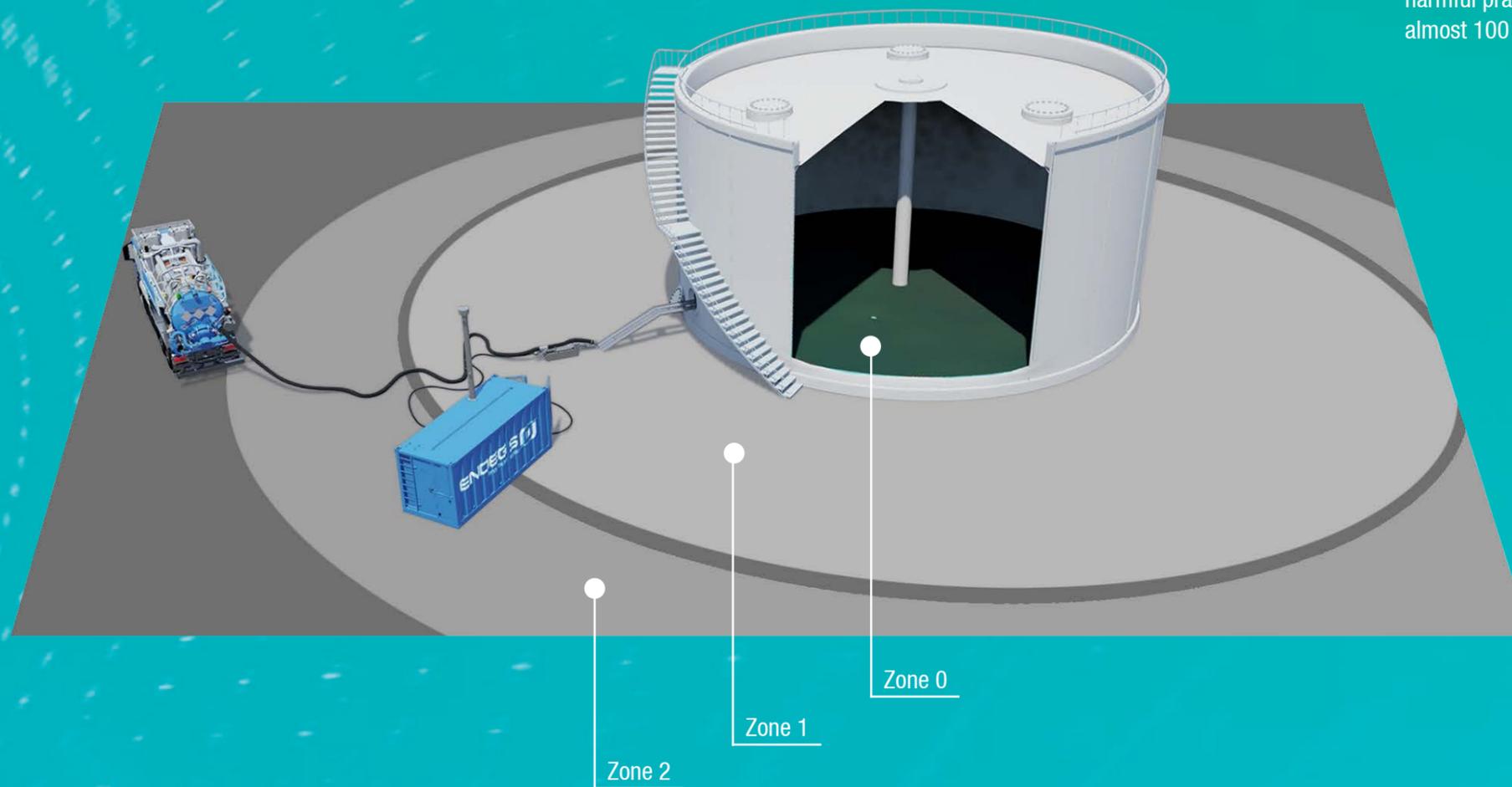
ROUGH CLEANING BY JOYSTICK: CONTROL FROM THE CABIN

While the robot is at work, the operator is at a safe distance in the TVC. From the ergonomic chair he controls the robot via a control panel with two joysticks. An HD TV monitor shows each movement in real time. The ADEX Robot enters the tank by a ramp and through the manhole (min. 600 mm). It has an LED light and three ADEX Cameras. This eliminates the complication of extra lighting in the tank.

Safe and Emissions-free

The cleaning cycle from start to finish

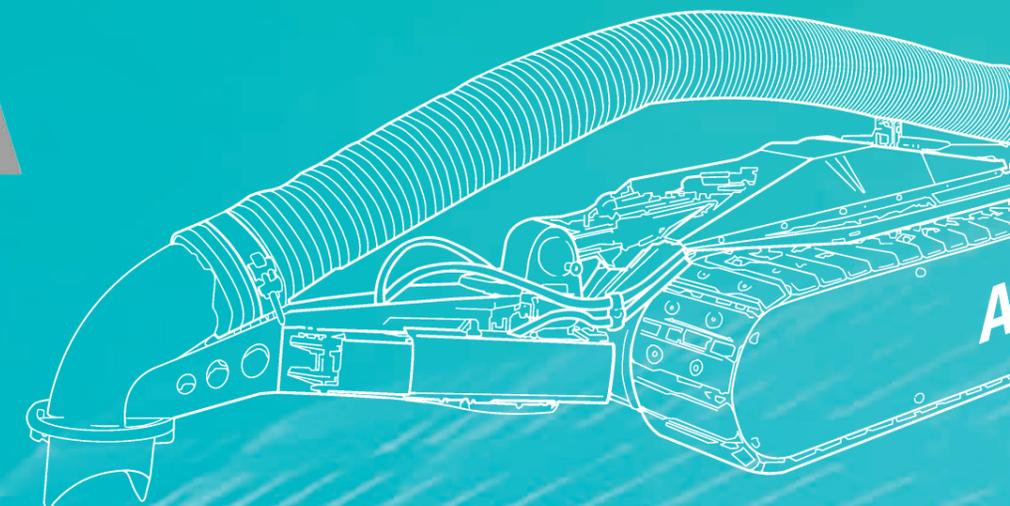
ENDEGS looks at more than just the rough cleaning of the tank. We want to make the entire cleaning and degassing process safe and emissions-free. Accordingly, before the robot enters the tank a mobile ENDEGS combustion unit is connected to it for degassing. This sets up a slight negative pressure within the tank, preventing vapours from escaping. Manual fine cleaning can start as soon as robot rough cleaning is finished.



When the combustion unit and robot have done their jobs, the VOC concentration in the tank is almost 0 % LEL. Cleaning personnel in the tank need only wear a respiratory mask with filter while they remove the small amount of material remaining.

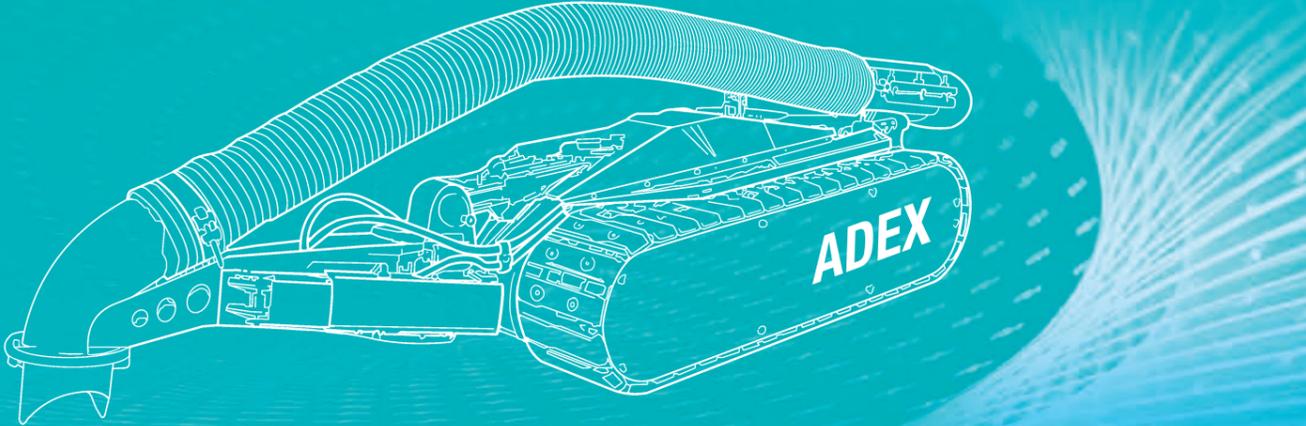
THE SUCTION TRUCK IS DEGASSED TOO

Our mobile combustion unit doesn't just degas the tank, but also the suction truck. As the hazardous materials are pumped into the suction truck, they create dangerous gas concentrations. Instead of just releasing these into the atmosphere, a common but harmful practice, we burn them off with a combustion rate of almost 100 percent.



Versatile Uses

Maintenance and cleaning

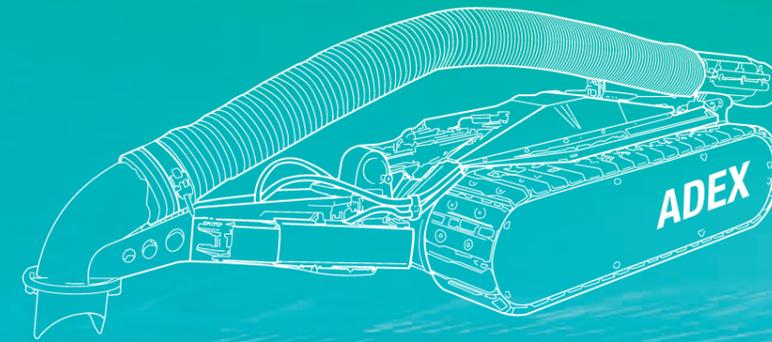


Thanks to its small size, mobility and versatile robot arm movements, the ADEX Robot can be used in many industries for many different materials.



No Chemical Protection Suits

No oxygen supply needed –
lower costs



Higher efficiency, lower costs and outstanding quality. Manual rough cleaning requires chemical protection suits and respirators with air supply – both major cost factors. What’s more, tank cleaning personnel are only allowed to stay in a tank for about two hours at the most. Thus, as many as 18 workers are needed for three eight-hour shifts. That means 18 hazmat suits and oxygen tanks per day, which not only have to be paid for, but also need to be disposed of – a major cost and time factor.

If ADEX Robot is used, you only need two people for eight-hour shift, one to control the robot from the cabin, the other to operate the suction truck. Neither needs heavy, costly personal protective equipment. Neither is exposed to hazards. Neither comes out of a hot tank drained and exhausted.

The same goes for the fine cleaners who manually get the last residues out of the tank after automatic rough cleaning. Since the VOC concentration at this point is very low or zero, all they need is a respiratory protection mask with filter. The work is easy and risk-free.

ROUGH CLEANING: MANUAL VERSUS ADEX ROBOT

	MANUAL	ROBOT
Putting on PPE		
24/7 use		
Investment in chemical suits, respirators and oxygen tanks		
Shift change		
Decline in performance		
Team travel costs		
Cleaning separate from degassing		
Suction truck only partially utilized		
High total time requirements		



24/7 at no risk for people or environment



Only the ADEX Robot enters the hazardous ATEX Zone 0



Robot is controlled from a ventilated cabin



Cleaning and degassing go hand in hand



No investment in special lighting



As low as 0 VOC emissions



No contact with hazmats



No protective clothing needed

Rental Instead of Purchase

Certified machines and trained personnel

ENDEGS provides robots to customers exactly when and for how long they need them, maintained and fully functional. Naturally we take care of getting them to and from the site, wherever it is – because ENDEGS rents worldwide.

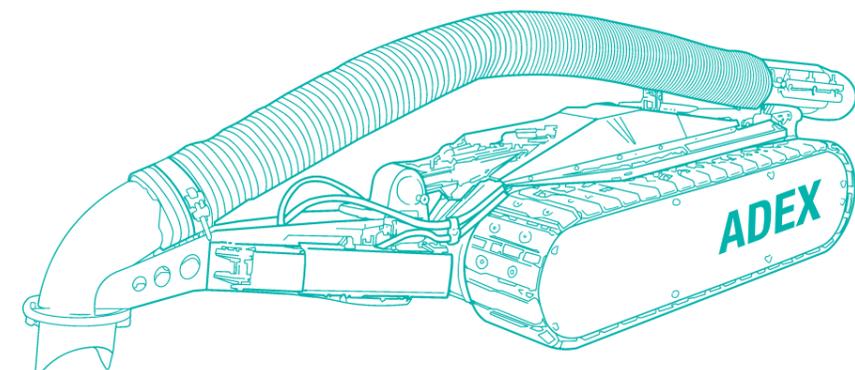
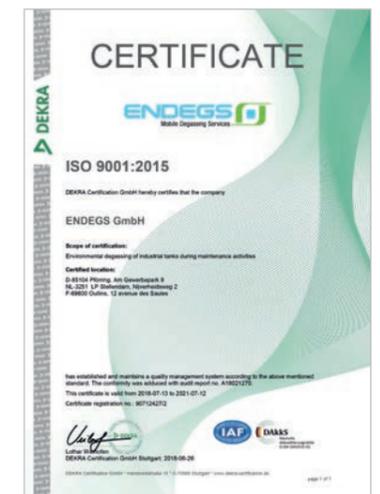
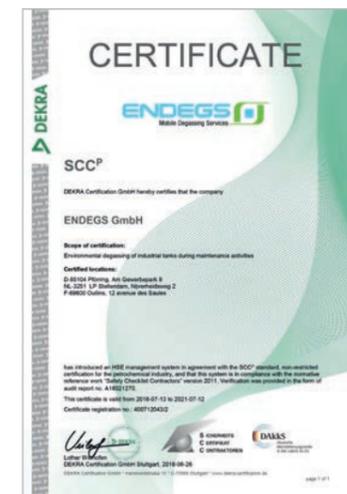
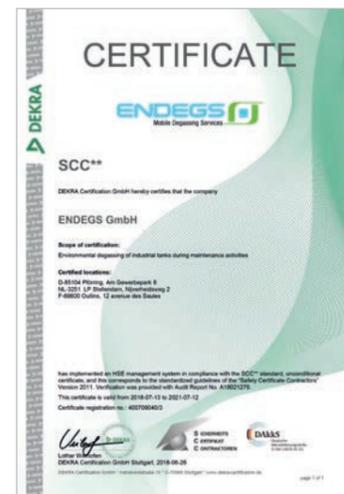
WE SUPPLY ONLY CERTIFIED QUALITY PRODUCTS

- The ADEX Robot is the first to be certified for ATEX Zone 0, and meets German safety requirements.
- Every system component meets all important European standards.
- All safety-relevant parts, including mechanical components, are intrinsically safe, and can be used in ATEX Zones in accordance with the rules for storage tanks and refineries.



Well-trained personnel is the other key requirement for safe, robot-assisted cleaning and efficient processes. If desired, our ENDEGS specialists will be happy to instruct your operators on-site to prepare them for their specific maintenance and cleaning tasks. We'll train them in the use of the robot and the entire ESOT system, and rehearse operations.

ENDEGS ADHERES TO THE FOLLOWING STANDARDS



Facts at a Glance

Product details

OUR ALL-IN, NO-WORRIES OFFER

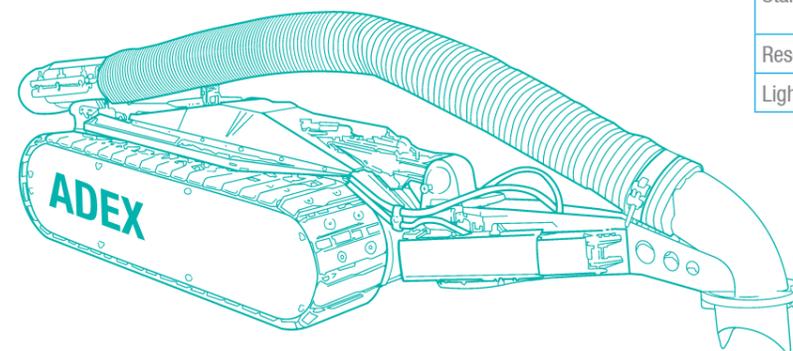
- ADEX Robot certified for ATEX Zone 0
- Transportable, ventilated 20-foot cabin for ATEX Zone 1
- Comfortable control chair
- Radio remote control for ATEX Zone 0
- Mobile manhole camera with light for ATEX Zone 0
- Extra lighting for ATEX Zone 0
- Patented magnetic track plates for the best traction on the tank floor
- Wide selection of suction heads for any application
- Mobile combustion unit connected to the tank and suction truck

EQUIPMENT OPTIONS

- Suction attachment for high pressure water for fine cleaning of the floor and vertically up to 1.5 m high
- Arctic Package for the hydraulic system
- Rubberized or abrasive magnetic track plates

PROJECT SCOPE INCLUDES

- On-site appointments, e.g. site check
- Delivery
- Installation and removal
- Maintenance and inspection
- Optional: Two-day operating personnel training



Datasheet

ADEX Robot, KOKS ESOT System (Equipment Set for Oil Tank Cleaning)

CATEGORY	DESCRIPTION
ROBOT	
Type	ADEX Robot
Material	• Stainless steel, AISI 316 grade • Material no. 1.4404
Certifications	• ATEX Zone 0 • 1G IIB T4
Standards	• EN 13463-1:2009 • EN13463-3:2005 • EN 13463-5:2011 • EN 13463-6:2005 • EN13463-8:2003
Max. range	100 m
Traction force	• 3,000 Nm • Measured on Fe plate • Thickness 10 mm • Covered in oil
Speed in ATEX Zone 0	1 – 10 m/min
Wading depth	250 mm
Ambient temperature	- 10° C to 50° C
Tracks	Stainless steel • Reinforced with magnets and patented abrasive tracks
Arm motion	35° in any direction
Arm force	2,000 Nm
DIMENSIONS ROBOT	
Length / Width	Approx. 1,800 mm / approx. 545 mm
Height / Height with elevated cameras	Approx. 400 mm / approx. 900 mm
Man hole	24" / 600 mm
Weight	420 kg
CAMERAS	
Type	Image transfer system
Certifications	• ATEX Zone 0 • ATEX directive 2014/34/EU • EMC directive 2014/30/EU
Standards	• EN 50303:2000 • EN 60079-0:2012 • EN 60079-11:2012 • EN 60079-26:2007
Resolution	520 lines • Analogue
Lights	Integrated LED lighting • Max. 235 lux

CATEGORY	DESCRIPTION
PREMIUM TRANSPORTABLE, VENTED CABIN. (PTVC)	
Certifications	• ATEX Zone 1 premium • II 2G Ex v2 IIB T3 Gb
Ambient / storage temperature	- 20° C to 40° C / - 20° C to 50° C
Max. wind force	6 Beaufort (high wind 10,8 – < 13,9 m/s)
Dimensions for transport	L x W x H: 6,058 x 2,591 x 2,438 mm (without suction chimney)
Dimension at work	L x W x H: 6,058 x 2,438 x 6,910 mm (with suction chimney)
Weight	Approx. 7,500 kg (incl. robot and all accessories)
Amount / ventilated and conditioned rooms	3/2
Supply voltage / rated current	• 3 ~ 400 V • TN-S • 50 Hz /40 A without residual current circuit breaker
Max. / average power consumption	11,5 / 7,5 kW
Directives / norms	• EN 60079-0:2012+A11:2013 • EN 50381:2004
DVR recording system	For 4 camera feeds • 1 TB storage
Control system	Industrial computer enabling semi-automated cleaning program
Additional accessories	• Full HD TV screen 32" • 1080 px • Air conditioning and ventilation unit • Sensors for door • Overpressure • Air flow • Fire emergencies • Control panel for robot • Steel safety plates to cover the windows during transport
HYDRAULIC POWER PACK	
Type	HAH120-2x1 • 6-2x9-2x100/a
Pressure	70 – 100 bar
Max. power supply	5 kW
Aggregate connection	3 x 400 V • 50 Hz
Directive	• Machinery directive 2006/42/EG • EN ISO 12100 • EN ISO 614-1+A1 • EN ISO 4413 • EN 60204-1 ED.2.
Noise level (decibels)	Max. 80 dB(A)

When can we show you ADEX Robot?

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