

SECTION 6 - TECHNOLOGY SAFETY DATA SHEET

**TECHNOLOGY SAFETY DATA SHEET
SURFACE TECHNOLOGY SYSTEMS (STS)
ADVANCED RECYCLABLE MEDIA SYSTEM (ARMS™)
(WALL/CEILING)**

SECTION 1: TECHNOLOGY IDENTITY	
<p>Manufacturer's Name and Address:</p> <p>Surface Technology Systems 75 East Market Street Akron, OH 44308</p>	<p>Emergency Contact:</p> <p>Steven M. Pocock (330) 849-6695 (330)376-2700</p>
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	<p>Date Prepared:</p>
<p>Other Names:</p> <p>ARMS™</p>	<p>Signature of Preparer:</p> <p>Operating Engineers National Hazmat Program 1293 Airport Road, Beaver, WV 25813, phone 304-253-8674, fax 304-253-7758.</p> <p>Under cooperative agreement DE-FC21-95 MC 32260</p>

SECTION 2: PROCESS DESCRIPTION

The ARMS™ uses a soft media that is highly absorptive and can be used either dry or wetted to capture, adsorb, and remove surface contaminants, such as oils, grease, lead compounds, chemicals, and radionuclides. Steam may also be used to provide for dust control without creating a liquid waste stream.

The system consists of transportable modules. The feed unit is a portable pneumatically powered device for propelling the cleaning media against the surface to be cleaned. A hopper, mounted atop the unit, holds the cleaning media. The media is fed by the auger device into a metering chamber which mixes the cleaning media with compressed air. The mixture is transported using standard abrasive blasting hose through a standard abrasive nozzle to the surface to be cleaned. By varying the unit air pressure and grade of cleaning media, the system can remove surface contamination from soot to fully cured high-performance protective coatings from steel and concrete surfaces.

The sifter unit is used to mechanically remove large debris and powdery residues from the cleaning media after each use. The cleaning media is collected in the work area and placed into the electrically-powered screener. The unit vibrates causing the used media to pass vertically downward through a series of separation screens. Any coarse materials, such as paint flakes, rust particles, etc., are collected in the first and coarsest screen. Next, the reusable media is collected on the finer screen. Finally, any dust particles pass through the screener for proper collection and disposal.

The system requires that a containment area be built where the ARMS™ is to be used. During the testing demonstration the containment was built using 2X4's as a frame and heavy plastic was attached to the frame to complete the containment. An air mover, which provided general ventilation at approximately 2000 cfm (according to the technology developer), was installed in the containment. The air from inside the containment was filtered by a high efficiency particulate air (HEPA) filter before being exhausted outside the containment.

Various blasting media may be used with the ARMS™ and the media needs to be identified prior to the start of the job.

SECTION 3: PROCESS DIAGRAMS



Figure 1. ARMS™ inside containment where wall decontamination is taking place.



Figure 2. Containment being built around wall decontamination area.



Figure 3. Filter unit in containment where wall decontamination is taking place.

SECTION 4: CONTAMINANTS AND MEDIA

The blasting operation creates an extreme amount of dust. The dust generated may contain coating, subsurface, and blasting media contaminants. These will need to be identified by the site characterization prior to the beginning of the job. A monitoring plan will need to be developed on a site-by-site job-by-job basis.

SECTION 5: ASSOCIATED SAFETY HAZARDS

Probability of Occurrence of Hazard:

- 1 Hazard may be present but not expected over background level
- 2 Some level of hazard above background level known to be present
- 3 High hazard potential
- 4 Potential for imminent danger to life and health

A. ELECTRICAL (LOCKOUT/TAGOUT)**RISK RATING: 3**

The technology has the potential to present electrical hazards. Electrical connections in the area of the steam unit present additional concerns due to the water in the area. Assure proper grounding and the use of GFCI on all equipment. Compliance with applicable electrical standards and codes and lockout/tagout procedures must be followed to assure the safety of personnel.

B. FIRE AND EXPLOSION**RISK RATING: 1**

Normal fire and explosion hazards in association with electrical powered equipment. The equipment is not intrinsically safe and could not be used in a potentially explosive atmosphere.

C. CONFINED SPACE ENTRY**RISK RATING: N/A**

Not part of this technology.

D. MECHANICAL HAZARDS**RISK RATING: 3**

The ARMS™ has moving parts which may cause severe injury from pinch points. The auger for feeding media is of particular concern. The area needs to be guarded and labeled as a potential hazard.

E. PRESSURE HAZARDS**RISK RATING: 2**

The air lines and the high pressure air present a potential struck-by hazard if they were to rupture or disconnect.

F. TRIPPING AND FALLING**RISK RATING: 3**

The water lines, air lines, and blasting hose present tripping hazards in the area where they are being used.

G. LADDERS AND PLATFORMS	RISK RATING: 3
Due to the nature of the work associated with the technology, i.e. wall decontamination, it is necessary to work at a height. This presents the potential for an object falling from above to injure workers at ground level as well as a fall hazard to workers on the platform/scaffold. Proper precautions must be taken.	
H. MOVING VEHICLES	RISK RATING: 3
The presence of multiple pieces of mobile equipment (which may be needed to unload and load the technology) in relationship to a small area of operation may pose a significant danger. Sufficient warning devices such as horns, bells, lights, and back up alarms should be utilized. Personnel should be trained to work with and around moving equipment.	
I. BURIED UTILITIES, DRUMS, AND TANKS	RISK RATING: N/A
Not part of this technology.	
J. PROTRUDING OBJECTS	RISK RATING: N/A
Not part of this technology.	
K. GAS CYLINDERS	RISK RATING: N/A
Not part of this technology.	
L. TRENCHING AND EXCAVATIONS	RISK RATING: N/A
Not part of this technology.	
M. OVERHEAD LIFTS	RISK RATING: 4
Unloading and loading of technology may require overhead lifts or the use of a forklift. Proper precautions indicated.	
N. OVERHEAD HAZARDS	RISK RATING: 1
Would only be present if a crane were required to unload or load equipment.	

SECTION 6: ASSOCIATED HEALTH HAZARDS	
A. INHALATION HAZARD	RISK RATING: 4
Dust exposure is excessive during the operation of the ARMS™. Air monitoring samples have shown values well in excess of the OSHA PEL and the ACGIH TLV. Air sampling filters have shown 1/4 to 3/4 inch of dust on them at the end of the sampling period. It is recommended that workers inside the containment wear air-line respirators or SCBAs. Additional PPE that is compatible with the identified contaminants needs to be utilized as appropriate.	

B. SKIN ABSORPTION	RISK RATING: 4
The dust from the blasting media may be a skin irritant and unless the PPE worn is impervious to it, skin irritation may occur. PPE appropriate for the contaminants needs to be utilized.	
C. HEAT STRESS	RISK RATING: 4
The need to wear PPE inside the containment area has the potential to increase the heat stress placed on the worker. Ambient conditions correlated with PPE levels, work rate, etc. must be considered.	
D. NOISE	RISK RATING: 4
Noise exposure is excessive during the operation of the ARMS™ blasting nozzle. Previous noise monitoring has shown values in excess of the OSHA PEL and ACGIH TLV. In addition to feasible engineering controls, administrative controls, and adequate hearing protection must be incorporated during operation. Workers will need to be included in a hearing conservation program.	
E. NON-IONIZING RADIATION	RISK RATING: N/A
Not part of this technology.	
F. IONIZING RADIATION	RISK RATING: N/A
Not part of this technology.	
G. COLD STRESS	RISK RATING: 1
Technology does not produce a hazard but ambient conditions need to be considered.	
H. ERGONOMIC HAZARDS	RISK RATING: 4
There is potential for ergonomic stressors when operating the ARMS™ blasting nozzle. The main ergonomic concern is the static posture the arms (of the operator) must be in while holding the weight of the blast nozzle. This has the potential to cause sprain/strain/fatigue to the arms, shoulders, upper back, and lower back. The need to hold the blast nozzle over the shoulder to support it instead of supporting it with the arms increases the stress on the neck and shoulders.	
I. OTHER	RISK RATING: 3
There are communication problems due to the noise generated by the technology during operation. Hand signals may be beneficial but due to the high levels of dust and therefore, low visibility inside the containment, they would be of limited value. Consideration needs to be given to installing other types of signals such as flashing lights. Since workers inside the containment may not be able to see each other well enough to avoid each other, it may also be necessary to limit the number of workers inside the containment to one.	

SECTION 7: PHASE ANALYSIS
A. CONSTRUCTION/START-UP
The set-up/start-up phase presents several hazards including struck-by/caught between hazards, pinch points, slips/trips/falls, struck by/caught between, falling from above hazards and muscular/back injury, and electrical hazards.
B. OPERATION
The operational phase presents several hazards including exposure to contaminant (extreme dust generation), noise hazards (extreme noise generation), hazards associated with the air lines, muscular/back injury, poor communication (between workers) due to operating conditions, and electrical hazards. Fall hazards may also be associated with the operation of the ARMS™ when the worker must be on scaffolding while operating it.
C. MAINTENANCE
The maintenance phase presents several hazards including pinch points, slips/trips/falls, struck by/caught between, muscular/back injury, electrical hazards, exposure to contaminants, and accidental activation of moving parts.
D. DECOMMISSIONING
The decommissioning phase presents several hazards, including exposure to contaminants, pinch points, slips/trips/falls and muscular/back injury.

SECTION 8: HEALTH AND SAFETY PLAN REQUIRED ELEMENTS
A. AIR MONITORING
Operation of the ARMS™ generates an excessive amount of dust. An air monitoring plan will need to be developed for total and respirable dust, contaminants of the coating being removed, contaminants and constituents of the subsurface, and constituents of the blasting media.
Noise generated during operation of the ARMS™ is excessive. A noise monitoring plan is essential.

B. WORKER TRAINING

Training that would apply in this case may include but not be limited to: HAZWOPER (Hazardous Waste Operations and Emergency Response), HAZCOM (Hazard Communication), Respiratory Protection, Hearing Conservation, Ergonomics (proper lifting, bending, stooping, kneeling), Heat Stress (learning to recognize signs and symptoms), Personal Protective Equipment, Emergency Response/Bloodborne Pathogens, Lockout/Tagout, Hand Signal Communication, Construction Safety (OSHA 500), and/or General Industry Safety (OSHA 501). Scaffolding safety is required if the work is to be conducted with the use of a scaffold.

C. EMERGENCY RESPONSE

Emergency response planning for a site needs to assure adequate coverage for hazards described in the TSDS. Having at least one worker per shift trained in CPR and first aid is recommended.

D. MEDICAL SURVEILLANCE

Evaluation of personnel's general health with emphasis on the back and cardiovascular/respiratory system. Medical surveillance as required by the OSHA standards must be conducted. Initial and annual audiograms.

E. INFORMATIONAL PROGRAM

Workers must be trained in specific operation of equipment before use.

SECTION 9: COMMENTS AND SPECIAL CONSIDERATIONS

Only personnel who have been adequately trained in the operation of the ARMS™ should be permitted to operate the system.

Consideration needs to be given to the compatibility of the PPE with specific contaminants and the exposure level of the contaminants.