

Electroadhesion for Energy-Efficient Material Handling and Manufacturing



A New Way to Handle Objects

SRI's electroadhesion technology addresses challenges faced by manufacturers in handling objects that are:

- Porous
- Fragile or delicate
- Irregularly shaped
- Dusty or damp
- Rough or smooth

Electroadhesion allows two surfaces to reversibly attach to each other without the use of suction, mechanical grippers, fasteners, or chemical adhesives. Applications under development include:

- Replacing suction cups for moving large, porous flat sheets
- Systems to sort mixed objects such as food, materials, or recyclable waste

How SRI's Electrodeposition Technology Works

Electroadhesion uses electrostatic forces between the substrate material (e.g., a part on an assembly line) and the electroadhesive sheet, which has thin electrodes embedded in it. When alternate positive and negative charges are induced on adjacent electrodes, the resulting electric field sets up opposite charges on the substrate. The electrostatic attraction between the electrodes and the induced charges on the substrate cause the surfaces to adhere to each other.

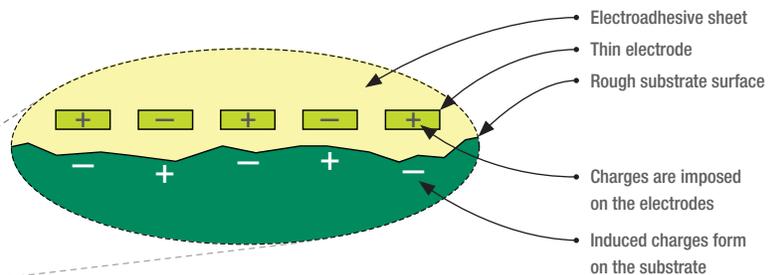
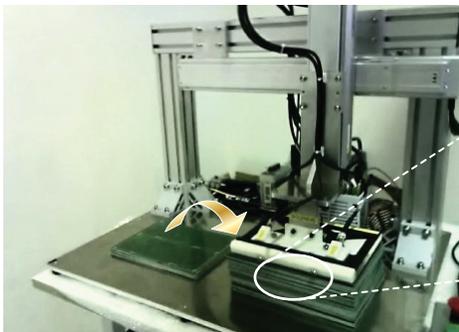
Representative Performance*	
Supported Payload	0.8 lb
Clamping Speed	< 10 ms
Steady-State Power	70 μ W

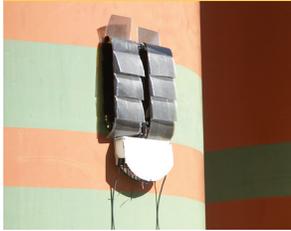
*Assumes 1 inch² pad on wood

Electroadhesion can reduce the energy used in pick-and-place applications by three orders of magnitude.

Benefits to the Materials Handling Industry

Electroadhesion has the potential to reduce the energy used in pick-and-place applications by three orders of magnitude. Electrodeposition is quiet and low cost relative to systems that use compressors and vacuum lines. Electrodeposition does not use mechanical force, which can damage objects, or glues, which can leave a residue. Electrodeposition works on virtually any material, of any size or shape, rough or smooth, dusty or clean.





Electroadhesion-enabled wall-climbing inspection robot on industrial exhaust pipes

Wide-Ranging Market Applications

Electroadhesion's unique properties enable new applications in industrial, consumer, and military applications. Examples include:

- Robots that can climb walls, pipes or other structures to inspect or clean surfaces
- Electrically controlled door seals
- Temporary signage
- Toys

How to Work with SRI

SRI offers flexible working arrangements to address client needs. We conduct contract research to create custom solutions, collaborate to pursue research projects, and license SRI technology to qualified organizations.

SRI's core expertise is solving complex problems for commercial and government clients. SRI routinely leads multimillion-dollar government projects and has the requisite infrastructure for cost accounting, legal compliance, and project management.

SRI brings products to market by a combination of licensing and new company creation. Notable and diverse examples include natural speech recognition, robotic surgery, and DNA testing services.

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