ESP Replacement Parts: Wet & Dry
RIGID DISCHARGE ELECTRODES (RDEs)

SEI / ELEX
Discharge Electrode

For more than 20 years SEI/ELEX electrostatic precipitators have been equipped with our patented RS Discharge Electrodes.

The RS Discharge Electrode consists of a rigid tubular mast to which emitter points are positively attached by spot welding. The RS Discharge Electrode is, in turn, firmly connected to its own suspension system.

This unique electrode is incorporated in over 1,000 SEI/ELEX precipitators with more than 500,000,000 linear feet of installed electrodes worldwide.

• It is unbreakable and not susceptible to electrical erosion or mechanical wear, which are the principal causes of discharge electrode failure.

• Improved Cleaning Effects. The vibrations set up by the rapping systems are transmitted over the entire length of each and every electrode.

• Optimum Corona Effect. The corona discharge is guaranteed at every point because the points are geometrically disposed throughout the whole effective column of the precipitator. The excellent corona distribution ensures optimum charging of particles; therefore, a superior and constant cleaning efficiency is achieved.

• No Bending or Distorting. The provisions of suitable guides ensure that the RS Electrode will not bend or deform, even when it is subjected to excessive variations of temperature in the precipitator.

• Easy and quick installation of the RS Electrode in gas passages spaced from 8" to 16".

• The RS Discharge Electrode is essential to the high efficiency and reliability required of the precipitator.
Why are so many precipitator manufacturers copying the SEI style Rigid Discharge Electrode? There is bound to be confusion, but it is easy to tell the original – SEI’s RS Electrode.

- Look for equally spaced dual emitter sources. They assure equal corona over the entire length of the electrode.
- Look for cantilevered suspension of the emitter arms away from the center support. It is a design feature that makes sure dust cannot build up and cover the discharge points.

The SEI Rigid Electrode has been retrofitted into 8", 9", 10", 11", 12" and 16" spaced units replacing weighted wires.

- More installations than any other manufacturer
- Over 20 years installed experience
- Over 1,000 precipitator installations worldwide
- Over 500,000,000 linear feet in service

Do not settle for a copy – Insist on the original!
REPLACEMENT WIRES AND SHROUDS

When properly designed and manufactured, weighted wires can provide you with years of reliable cost effective service.

Choose the shroud style that best suits your needs from the illustrations on the following page.

Be sure to record the required dimensions listed below.

- **A** – Overall length
- **B** – Top shroud length
- **C** – Bottom shroud length
- **D** – Wire Diameter
- **E** – Top shroud diameter
- **F** – Bottom shroud diameter
- **G** – Electrode hanger style (see next page)
- **H** – Weight hanger style (see next page)
DISCHARGE ELECTRODES

[Diagram of various discharge electrodes]
WEIGHTS

Weights are used on rigid discharge electrodes and weighted wire systems. The weights are designed to keep the RDE’s and wires straight and aligned, also to deter any swaying which could lead to breakage through arcing and fatigue.

We offer a designed weight for our unique RDE’s and can provide a direct replacement casting for most weighted wire OEM weights.

SEI Standard Rigid Discharge Electrode Weights
COLLECTING PLATES

Solid Collecting Plates

Solid collecting surfaces are roll-formed surfaces that are factory assembled to form a single-piece baffled structure, providing maximum stiffness, optimum gas exposure, uniformity of profile and require no field assembly.

The smooth curving geometry of the top and bottom edges of the collecting surfaces prevent edge effect arc-over where the discharge electrodes enter and leave the collecting field.

The arrangement of the collecting plate baffles are specifically designed to match the discharge electrode arrangement for your application. This design flexibility ensures the optimum relationship between the collecting plates and the discharge electrodes.

Segmented Plates

This type of collecting surface is comprised of roll-formed segmented steel collecting surfaces.

The roll-formed ribbed design resists bowing and resulting misalignment due to temperature excursions and rapping forces. Aerodynamically, when properly rapped, the collected dust particles are effectively sheared from the entire length of the plate segment with minimum re-entrainment.

The supporting “tadpoles” are designed to prevent edge effect arc-over where the discharge electrodes enter and leave the collecting field.
COLLECTING SURFACES

PLATE STRAIGHTENERS

Having problems with bowed collecting plates?

Plate straighteners are designed to keep the collecting plates apart and in their original positions.

Whether you need replacement plate straighteners or you would like to install new ones, we can supply you with what you need.

COLLECTING PATCH PLATES

Intact collecting plates are vital to maintaining the efficiency of your precipitator. Plates that are damaged could decrease the rapping effectiveness, gas flow distribution and cause reduction in corona generation. The corrosion of the plates decreases the amount of available collecting surface and the rough, jagged edges could cause arcing. SEI can offer a designed patch plate to attach to the existing collecting plate to help eliminate these potential problems.
Electrostatic precipitators require various electronic components to function optimally:

- The transformer/rectifier set is specifically designed to provide the high voltage DC necessary for electrostatic precipitation.
- T/R Controls - The control units contain all components necessary for controlling and protecting a T/R set. Serial data ports are included for transmitting and receiving data from a central control system.
- Microprocessor-based controls are used to manage and control the rapping of the precipitator for proper cleaning of the collecting plates and discharge electrodes.
- A computer program monitors, predicts and troubleshoots electrostatic precipitator performance.

Whether you need a transformer/rectifier set, controls or current limiting reactor, we can facilitate your order. We provide AVC’s and T/R’s for any requested manufacturer.

Photos courtesy of NWL and Stock Equipment
ELECTROMAGNETIC RAPPERS

The acceptable balance of rapping intensity, frequency and duration is vital for optimum precipitator performance.

Southern Environmental supplies rappers for dependability and minimal maintenance.

Some of the rapper features include:

- The rappers are “solenoid-driven,” meaning an electric solenoid lifts the plunger which is then returned by gravity to impact the rapper.
- 20 pound plungers with stainless steel laminated ends eliminate magnetizing.
- Coils are available in 120v DC or 240v DC.
- Shaft mounted or roof mounted
- Pigtail or junction box electrical connections.

PNEUMATIC RAPPERS

Inexpensive and reliable pneumatic rappers successfully remove persistent deposits.

The air-cushioned pistons lessen stress on plate heads.

The mounting design is tapered to fit most metal and insulated shafts.
RAPPER COMPONENTS

Our rapper components are available individually or as custom-engineered systems that specifically suit your needs.

Our inventory consists of:

- Steel Rapper Shafts
- Insulated Rapper Shafts
- Boot Seals/Clamps
- Impact Caps
- Double-Tapered Adapters
- Ground Straps
- Rapper Sockets
- Rapper Donuts

GROUND STRAPS

Ground straps insure electrical bonding of the rapper, the stationary anvil rod, and the ESP casing to prevent electrostatic build up, which can result in damage to the rapper controller due to electrostatic discharge.
RAPPER COMPONENTS

BOOT SEALS

Boot seals ensure that atmospheric elements such as rain and cold air do not enter the ESP.

Leakage of gasses and corrosion of rapper shafts is prevented by the positive seal between the rapper shafts and nipple guides.

Rapper sleeves that are too small can cause various problems including corrosion, particulate buildup and binding of the rapper shaft, which ultimately can lead to rapping of the roof instead of the plates or discharge electrodes.

We offer an assortment of boot seals in various styles and materials suitable for your particular application.

RAPPER CAGES

Electromagnetic rappers are designed to drop a piston from their housing for both the collecting and high voltage systems. These pistons can weigh anywhere from eight (8) pounds to twenty (20) pounds. To prevent safety mishaps, rapper cages are used as a safety guard on the rapper at the area of the exposed piston. SEI can offer a designed rapper cage to attach to the existing collecting plate and high voltage rappers to deter safety incidents.

RAPPER INSULATORS

Rapper insulators electrically isolate the discharge electrode rappers while dispersing the mechanical forces required to generate vibration or shock in the high voltage system.
The ceramic material of choice for discharge electrode system support insulators, rapping system insulators and feed-through bushing insulators is 85% alumina ceramic. These insulators are engineered to perform in hostile electrostatic precipitator environments.

This material has been shown to considerably reduce the costs associated with repeated system repairs and plant downtime. Replacement insulators are available for any OEM.

**Material Temperature Limitations**

- Teflon – Up to 450 degrees
- FRP – 250 to 400 degrees
- Alumina – Up to 1,400 degrees

SEI CAN SUPPLY THE FOLLOWING INSULATOR PARTS:

- Support Insulators
- Anti-Sway Bars
  - Alumina
  - Teflon
- Rapper Shafts
  - Alumina
  - Fiberglass
  - Porcelain
- Wall Bushings
- Stand-Off Insulators
- Bus Duct Insulators
- Feed-Through Insulators
- Insulator Gaskets
- Drive Shaft Insulators
INSULATORS

SUPPORT INSULATORS

Support insulators physically support and electrically isolate the high voltage system from ground. The support insulators are designed to support compressive strength loads generated by the high voltage electrodes and frames.

ANTI-SWAY INSULATORS

Anti-sway insulators are connected to the high voltage guide frame to sustain alignment and stability. The anti-sway insulators are used to prevent the high voltage system from swaying. One end of the insulator is attached to a grounded portion of the ESP while the other end is attached to the lower high voltage frame. The material of choice is either Alumina or Teflon. The Alumina insulator is available in a flat bar or a solid round bar. The flat bar is also available in Teflon.

COMPRESSION SPRINGS

A component of the high voltage suspension system is compression springs. They are used to support and distribute the weight of the system. There are varying sizes to choose from which are dependent on the weight and frame size of the high voltage system.

INSULATOR HEATERS

Rapid temperature changes or the introduction of moisture can cause tracking and cracking of insulators. Heaters should be utilized to prevent condensation and ash build up by warming the insulators prior to start up.
Purge Air Systems protect high-voltage support insulators from moisture and dust that could accumulate on their surfaces and cause them to fail.

Support insulators provide many years of use when properly maintained, such as preheating prior to start-up. The constant flow of dry heated air prevents condensation and prevents flue gas from entering.

Volume, temperature and pressure of the purge air are critical design parameters that vary significantly. Southern Environmental designs each purge air system to satisfy the specific requirements of each application.

Purge Air System Components:

- Heaters
- Filters
- Fans
- Heater Box
- Purge Air Controller
- Heater Controller
PURGE AIR SYSTEMS

PURGE AIR FILTERS

Filters are utilized on the Purge Air to prevent foreign matter from entering the system. Filters should be changed or cleaned on a routine basis.

INSULATOR COMPARTMENT

Insulator compartments provide heated purge air to keep the high voltage insulator of a WESP free from dirt and moisture that can accumulate on their surfaces and cause them to fail.

The insulator compartment shown is a low purge flow design with an integral heating element that uses a very low flow of air (or inert gas for combustible gas applications). These units can be designed to permit use on any WESP unit. Engineering support is available to allow an exact match for any application.

Insulator Compartment Components:

- Heating elements
- Temperature controls
- Sight glasses
- Purge flow controls (complete with flow alarms)
DOORS
Southern Environmental can provide all types of doors for precipitators, fabric filters and ductwork.

Our standard carbon steel doors resist harsh environments and hard wear, providing years of leak-free service.

We offer round and rectangular doors in various standard and custom sizes for your specific application. Stainless steel doors are also available.

DOOR SEALS
Door seals require regular inspection and replacement. Over time, seals may shift, deform, become brittle or fail to seal properly due to warping of the door itself.

Stock material consists of a variety of quality door seals to meet the specific needs of any application.

High and low temperature caulking material is also available.

One tube of caulking material can cover a length of 25 feet. (Expect to use an additional 10% on corners and splices.)
GROUND STICKS

Ground sticks are used to positively de-energize/ground the precipitator before entering the door. They are a critical safety component to have at each access point to an ESP.

KEY INTERLOCK SYSTEMS

A functioning key interlock system provides protection for your precipitator and for your operators. The interlocking system ensures the voltage has been locked out and the equipment rendered safe before entry is permitted.

LADDERS & PLATFORMS

Would improved ladders, stairs and platforms make your ESP maintenance easier and more efficient? If you are in need of ladders or platforms, Southern Environmental can help.

We custom design, fabricate and install ladders and platforms to suit your specific needs. Access can be fabricated in carbon steel, stainless steel or fiberglass. Coating options can be provided by SEI or we can coat the equipment to your specifications.
PROCESS DAMPERS

Most air pollution control systems incorporate process dampers for flow control, compartment isolation or bypass. Dampers can be actuated manually, electrically or pneumatically. SEI can provide replacement parts, such as actuators, solenoids, limit switches, bearings, seals or linkage, for your existing dampers. We can also supply complete replacement dampers to match your existing damper specifications, including size, flange, bolt pattern, pressure, temperature, flow and actuation. Damper styles include butterfly (wafer), multi-blade louver, poppet and guillotine.

Damper Components

- Seals
- Actuators (pneumatic and hydraulic cylinders)
- Control Solenoid valves
- Limit Switches

EXPANSION JOINTS

Expansion joints are utilized on both process gas duct and in process liquid (irrigation and flushing fluid) systems. Expansion joints can be tailored to the application as required to exceed the original process conditions, thereby providing an equal or superior replacement to original equipment. SEI’s engineering department can assist in determining failure modes to offer the optimum materials and construction in the full range of expansion joints to restore or improve the overall system performance.
Various process instrumentation is available to replace and upgrade an assortment of critical operational parameters.

- Pressure transmitters (gauge and differential)
- Temperature transmitters
- Thermocouples
- Flowmeters (magnetic flowmeters, turbine meters, rotameters and totalizers)
- Flow switches
- pH analyzers/transmitters
- Level transmitters
- Level switches
- Conductivity, turbidity and specific ion analyzers and transmitters

All popular communication and data handling protocols are available. Process control equipment that can be smoothly integrated to existing DCS or PLC is available.
PUMPS

Pumps utilized to supply irrigation and flushing water are essential to the optimum operation of any WESP.

Pump Components

- Seals
- Impellers
- O-rings
- Motors
- Couplings
- Complete pumps

SPRAY NOZZLES

Proper operation of a WESP requires aggressive cleaning of the internal components on varying frequencies to remove material buildup that is inherent in the operation of any WESP system. Spray nozzles are available to cover the range of potential requirements. SEI can offer direct replacement components or engineer a retrofit to enhance the cleaning effectiveness of your existing equipment. Two-fluid nozzles are available to ensure 100% saturation of the flue gas.
FILTERS

Process fluids utilized in WESP systems contain varying amounts of entrained suspended solids that require removal from the process fluid streams in order to achieve the optimum design performance of a WESP. We provide an extensive selection of filter equipment to replace existing filter systems or, when the application demands have changed, upgrade the filtration equipment to address changing performance requirements in the fluid system.

Filter Components

- O-rings
- Seals
- Filter media (bags, cartridges, screens, etc.)
- All related controls
- Complete filtration systems

VALVES

Valves are utilized in a variety of WESP support equipment. Valves are available for all liquid systems for process fluid isolation as well as flow control in the full range of available materials to suit any process requirements. Actuators are also available for on/off service as well as modulating service as either direct replacements or add-on equipment where an enhanced level of automated process control is required. Isolation and control valves for purge air and water are available to ensure optimum WESP operation. Check valves in all materials are available.