Electrostatic Precipitator Performance Improvement

SIPREC I – the only ESP high voltage power supply that taps existing potential to the fullest

Industrial Technologies
Demands on environmental technologies are increasing...

...so are those on electrostatic precipitators (ESPs), which separate particles and vapors from industrial process and exhaust gases. Stricter environmental regulations, new process conditions, or the use of different fossil fuels place higher performance requirements on ESPs.

Ensuring conformity with emission regulations often requires the modernization and expansion of ESP systems. However, mechanical refitting and expansion of an ESP are too costly or too difficult to implement.

**Challenge**

A higher corona power supplied to the ESP fields generally leads to increased ESP efficiency. Conventional thyristor-based power systems fail to supply the ESP fields with maximum possible power; their line-frequency-dependent switching cycles lead to an ESP voltage waveform with a ripple and a low average value. However, the achievable ESP peak voltage and therefore the ESP current are limited only by the system flash-over value.

**Using available potential**

Using advanced IGBT power semiconductors and their 1000-fold shorter switching frequency, the Siemens SIPREC I high-voltage power supply will furnish your ESPs with smooth, ripple-free DC voltage/current, thus resulting in maximum ESP corona power and a considerable increase in ESP efficiency.

An additional advantage of the SIPREC I system manifests itself during flash-over/spark processing. Typical over-current is prevented as current flow is stopped immediately due to the short switching time and fast response of the IGBTs. This results in lower de-ionization times and shorter ESP voltage/current recovery increases the average corona power and ESP efficiency.

**Synergy effect with a positive impact on your budget**

Modernization of just the ESP inlet fields with SIPREC I is in most cases sufficient since synergy effects also increase the efficiency of subsequent electrical fields with conventional power supplies. This saves you the time, effort and cost associated with a mechanical ESP expansion. As an option and based on operating conditions, your existing TR-sets may be reused with the new SIPREC I control systems.
Your benefits

- Increase in ESP efficiency to meet regulatory emission requirements
- Maximum ESP efficiency even with changing operating conditions due to integrated optimization tools based on Fuzzy Logic
- Reduced reactive load, better phase distribution compared to conventional thyristor systems (three-phase mains supply, power factor ~ 1)
- Lower cost compared to mechanical ESP expansion
- Increased availability and minimized maintenance costs using advanced semiconductor technology

Technology that already includes the future

The SIPREC I power supply and the SIPREC C, our advanced controller for conventional thyristor systems, complement each other optimally; both are based on the same hardware platform. Supplemental modernization of your ESP controls yields even more advantages:

- Direct access to all ESP controls via our ESP expert software SIPREC ODS
- Complete system operation and signalization with familiar “touch and feel”
- Lower operating costs using the SIPREC ODS energy management system

Modernizing using Siemens Industrial Services

We offer all services for your ESP upgrade with the SIPREC I system from a single source:

- Clarification of your specific plant requirements
- Test installation to document the improvement potential with SIPREC I
- Supply and installation of all hardware components
- Rapid ESP re-commissioning by experienced specialists
- Complete project documentation
- Siemens remote service: in connection with our SIPREC ODS ESP Expert Software, you have access to a wide range of diagnostic tools as well as remote service through our technical personnel. This saves travel costs and provides immediate support.

References

The increase of ESP efficiency using SIPREC I technology has been proven successfully in the following process applications:

- ESPs for coal-fired power plants (precipitator for boilers and desulfurization plants)
- Wet ESPs (precipitation of acid vapors, burning of residual waste, incineration plants)
- ESPs for steel converter plants
- ESPs for the Glass industry
- ESPs for the Pulp & Paper industry
Maintaining the highest plant availability and gaining transparency in your ESP operation

Upgrading to SIPREC I enables you to tap into the full potential of your ESP – and ensures the maximum ESP efficiency needed to meet regulatory emission requirements. Potential loss of production can be avoided and in addition you save the high investment costs associated with the mechanical ESP expansion. You also gain top operational availability as well as detailed information about your ESP's operation and condition through SIPREC ODS and its specific diagnostic tools.

We welcome the opportunity to demonstrate the performance of our SIPREC I technology during a field test at your facility. Simply contact us for more details.