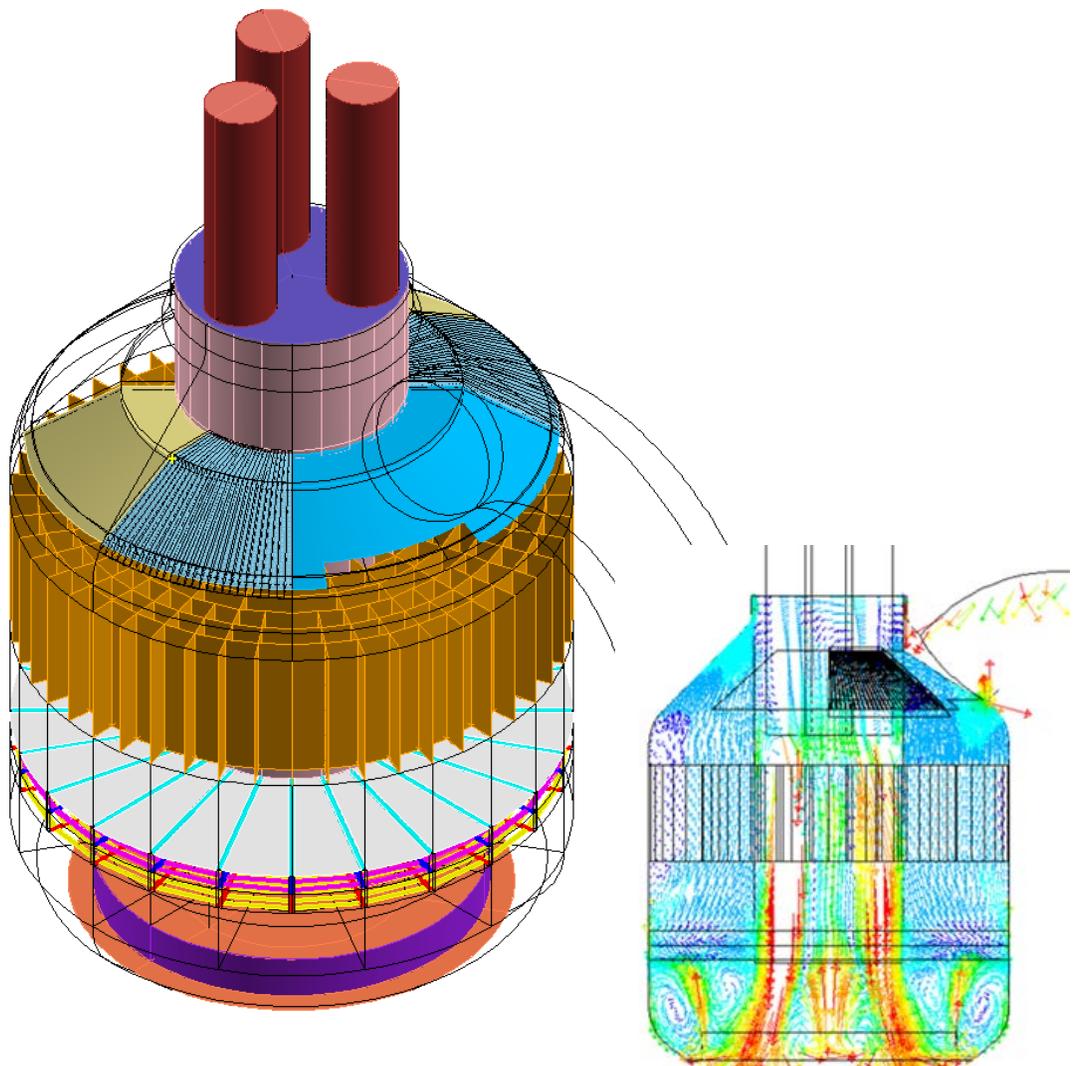


# Gas Cleaning System



## Gas Cleaning System

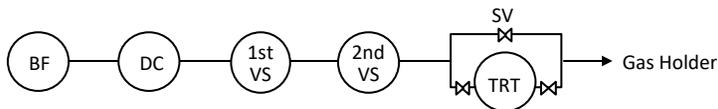
### Gas Cleaning System

Blast furnaces have been changed, through growth in size along with higher pressure, to an energy-saving and power-saving type in response to the needs of the times. Similarly, blast furnace gas cleaning system has been changed in response to such needs. Nippon Steel Engineering has had abundant experiences for a long time and advanced technologies concerning environment-responsive equipment, and has consistently developed and provided the blast furnace gas cleaning system conforming to these needs.

### System lineup

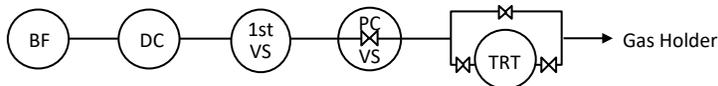
#### ● 2-stage venturi scrubber

It is a representative system that has been adopted in high-pressure blast furnaces, and has been highly evaluated with high performance stability (outlet cleanliness of 5mg/Nm<sup>3</sup> or lower) and reliability.



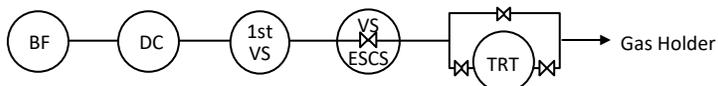
#### ● 1-tower 2-stage V. S.

It is a compact type 2-stage V. S. (venturi scrubber). It has dust collection performance, top pressure control function and noise reduction function at the same time, and has achieved high performance and long life.



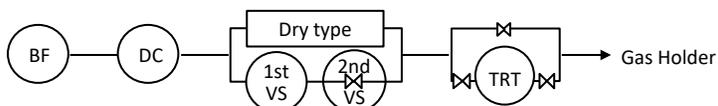
#### ● VS-ESCS

It is the system that high-performance Electrostatic Space Cleaner Super (E. S. C. S.) is incorporated in the secondary mist separator, and has the characteristics of stability in VS method and low pressure loss and high performance in ESCS system at the same time.



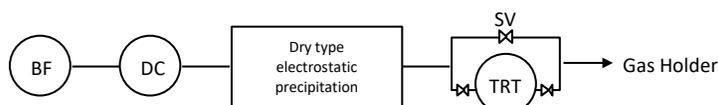
#### ● 2-stage venturi scrubber + Dry type bag filter

It is the system which has achieved lower pressure loss and higher performance than ESCS method by the installation of dry type bag filter system.



#### ● Multi-vessel electrostatic precipitator

It is the newest system that is made from the technologies which have been cultivated in ESCS and multi-vessel dry type bag filter, and has achieved much lower pressure loss and higher performance than the dry type bag filter system.

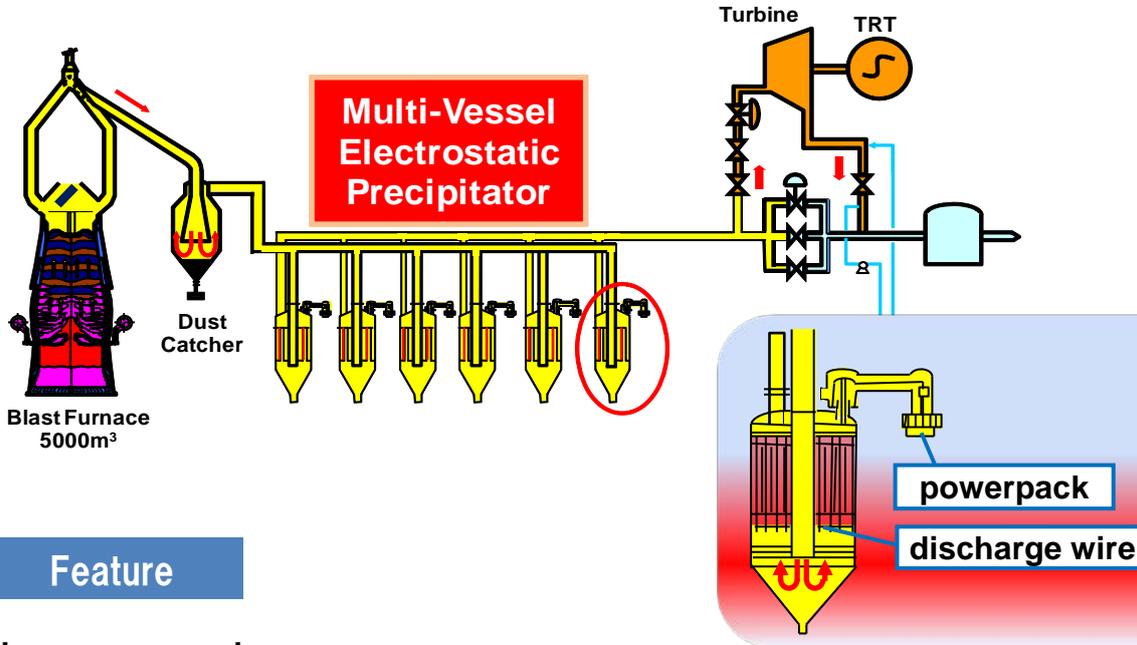


BF: Blast Furnace  
 DC: Dust Catcher  
 VS: Venturi Scrubber  
 ESCS: Wide electrostatic precipitator  
 PCVS : Top pressure control type VS  
 TRT: Top pressure Recovery Turbine  
 SV:Septum Valve

Gas Cleaning System

Multi-vessel electrostatic precipitator

Multi-vessel electrostatic precipitator (E. S. C. S.), instead of the existing 2-stage venturi scrubber, is arranged in the system, and dust and water drops are removed by electric energy in ESCS located in the gas turnover/rising section in each vessel, which generates clean gas.



Feature

(1) Low pressure loss

Since there's no pressure loss in water spraying gas and filter in 2-stage V. S., the pressure recovery is maximized in the system.

(2) Low heat loss

Since there's no water spraying in 2-stage V. S., the system has a heat loss similar to that in the dry type bag, and the heat loss is minimized.

(3) No limitation on exhaust gas temperature

Because there's no risk of damage to the equipment, including filter, etc., even in case of abnormal operation, such as gas blow-out in blast furnace, the operation rate of the equipment will be enhanced.

		wet-type	bag filter type	Multi-Vessel Electrostatic Precipitator-type	
Top gas	pressure loss	kpa	about 30	about 10	about 4
	Temp. loss	°C	about 90	about 10	about 10
TRT output	MW	19.0	24.0	25.0	
Energy loss due to Gas Cooling	%	-	5	0	
Annual Electricity Generated	GWh	165	200	220	

※ in the case of 5000m<sup>3</sup> BF

The amount of Electricity Generated is;

*-10% larger than bag filter type.*

*-30% larger than wet-type.*