

# BAG FILTER

## DE-DUST EQUIPMENT INTRODUCTION

# OUTLINE

---

- General Information
- BF Dust Collection Mechanism
- BF Characteristic
- BF Structure
- BF Auxiliary
- BF Advantage
- Reference

# General

飛灰通常是由發電,冶金,石油,化工,紡織等工業生產過程產生,這些工業藉由燃燒媒產生熱源供應製程使用,但同時也產生大量的飛灰,排放的飛灰通常可藉由顆粒尺寸區分以下三種類型:



## 1. Settlement dust :

粒徑 $>10$ 微米的粉塵顆粒排放到大氣,幾天後會沉降到地面,污染建築物和農作物

## 2. Airborne dust :

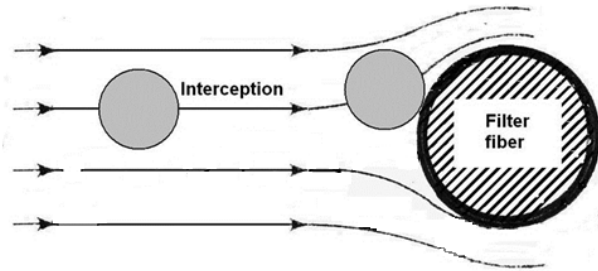
粒徑 $<10$ 微米的粉塵將會持續飄散在大氣中使能見度下降,空氣品質降低,酸雨等危害

## 3. Particulate matter :

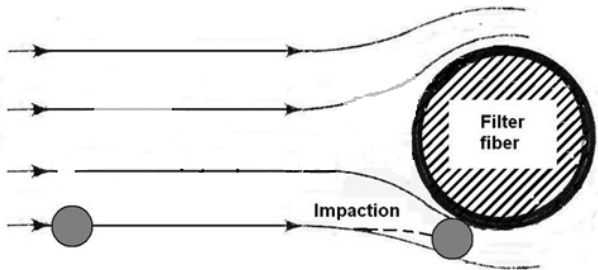
粒徑 $<2.5$ 微米,容易擴散到空氣中,直接影響人體,造成吸入性與過敏性疾病發生

# BF Dust Collection Mechanism

Interception motion



Impaction motion



Particle size:

Sieving >= impaction > interception > diffusion

## 1. 篩分作用:

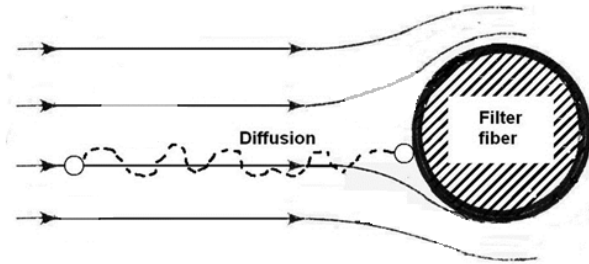
當氣體中的粉塵通過濾袋時粉塵被捕獲於濾料的空隙中,形成一層濾餅並增進過濾效果

## 2. 慣性作用:

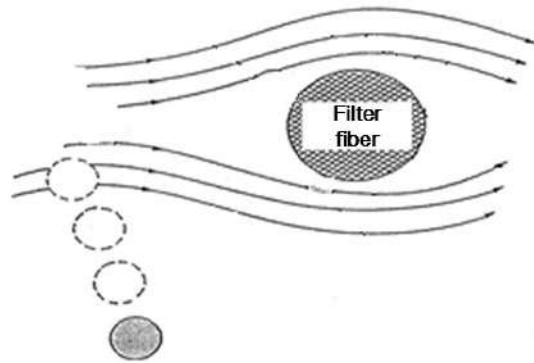
氣流繞過纖維通過濾材時,大於1微米的粉塵由於慣性作用仍保持直線運動撞擊到纖維上而被捕集,粉塵顆粒直徑越大慣性作用也越大,過濾氣速越高慣性作用也越大

# BF Dust Collection Mechanism

Diffusion Motion:



Sieving Motion:



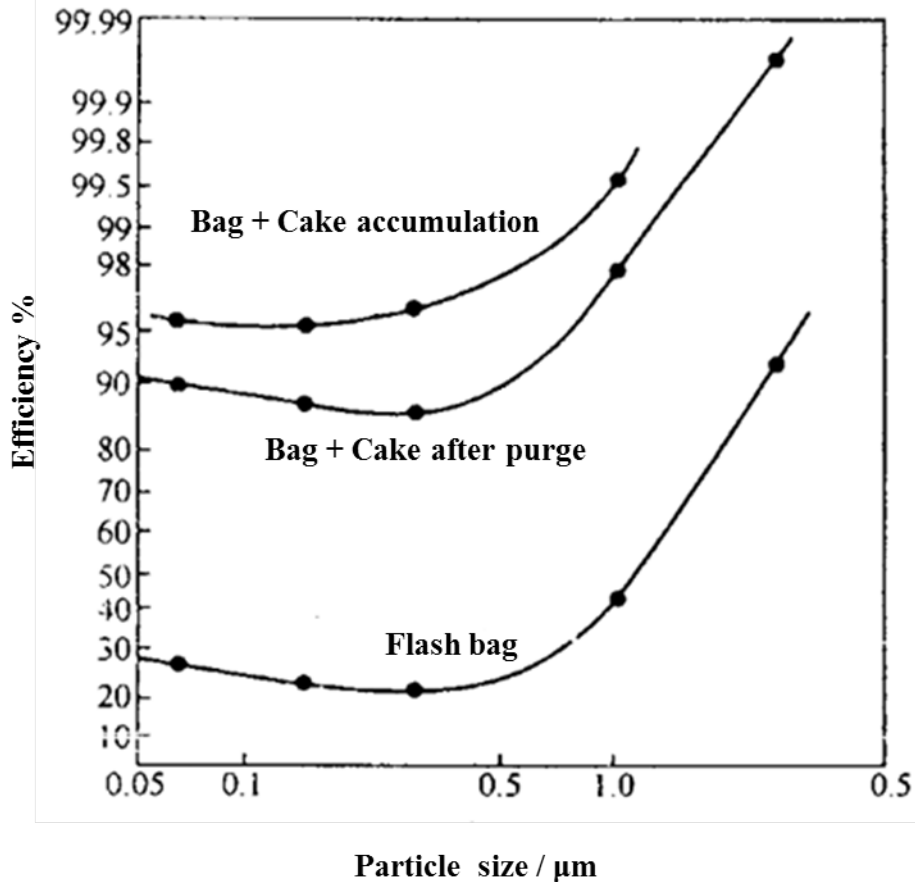
### 3. 擴散作用:

質量微小的粉塵(1~0.2微米以下)隨氣流以流線運動繞過纖維,受到布朗運動的氣體分子碰撞後變改變原運動方向,增加粉塵與纖維的接觸機會而捕獲

### 4. 沉降作用:

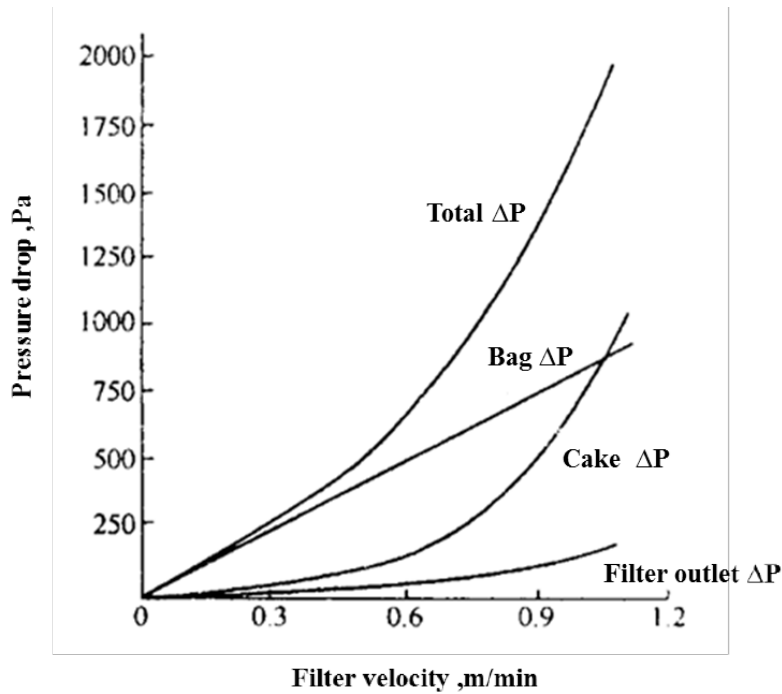
含塵氣體由灰斗上布進封口進入後在擋風板的作用下氣流風版向上流動,流速降低,部分大顆粒比重大的粉塵在重力作用下塵降下來落入灰斗

# BF Characteristic

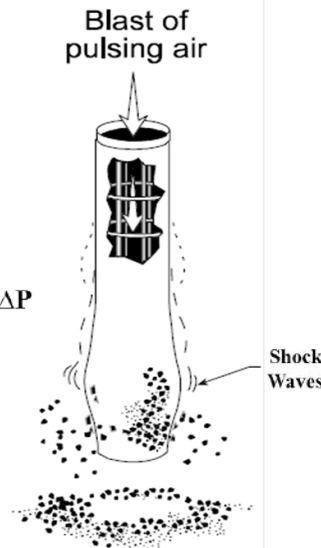


隨著過濾時間增加,累積在濾布外的濾餅厚度不斷累積,使得過濾層更加密集飛灰更難通過過濾孔隙從而使過濾效果增加,但濾餅厚度到一定程度後會造成過濾阻力增加,影響到總體製程壓力因此,需要定時開啟清灰程序清除濾袋表面的濾餅

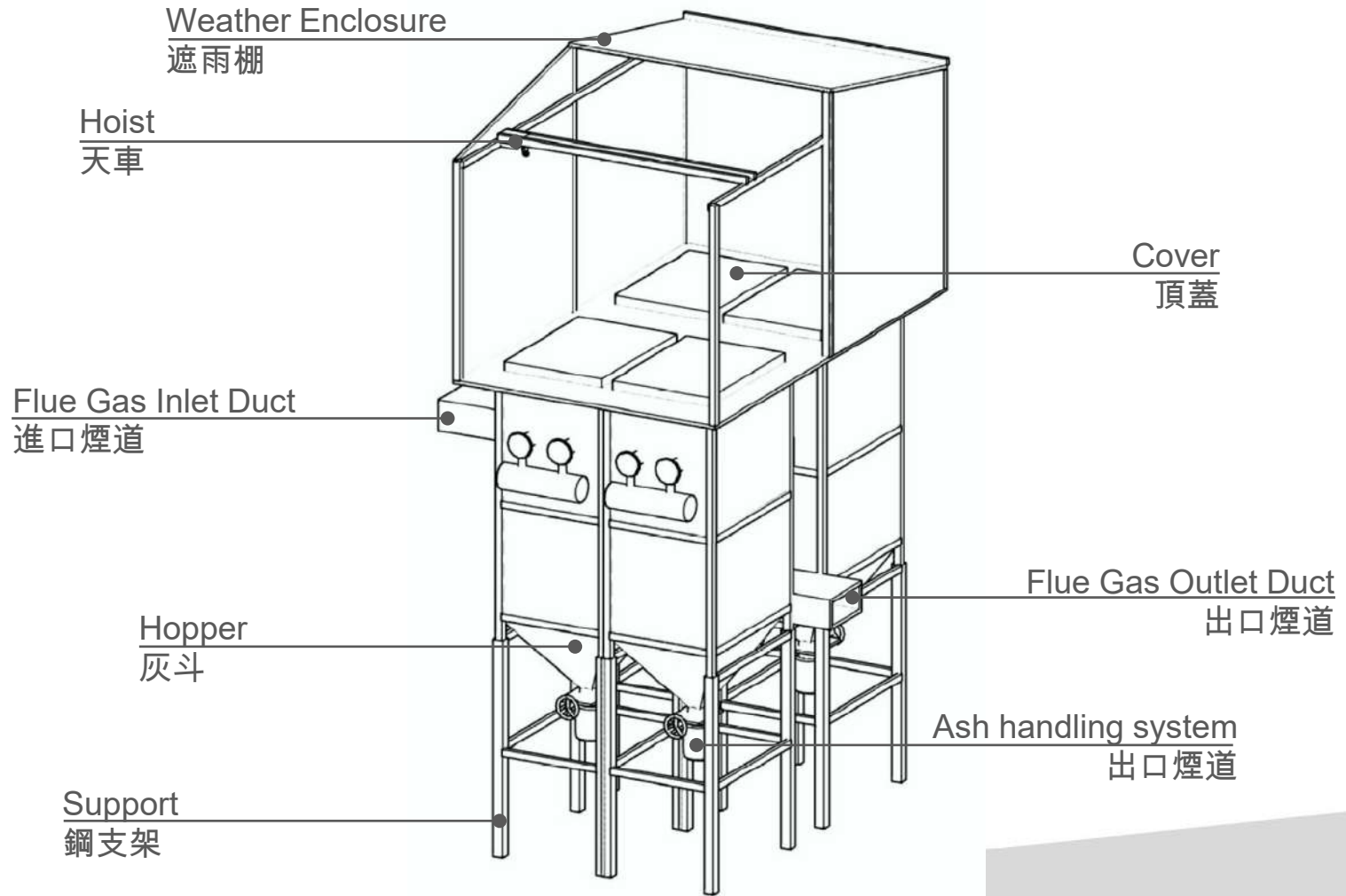
# BF Characteristic



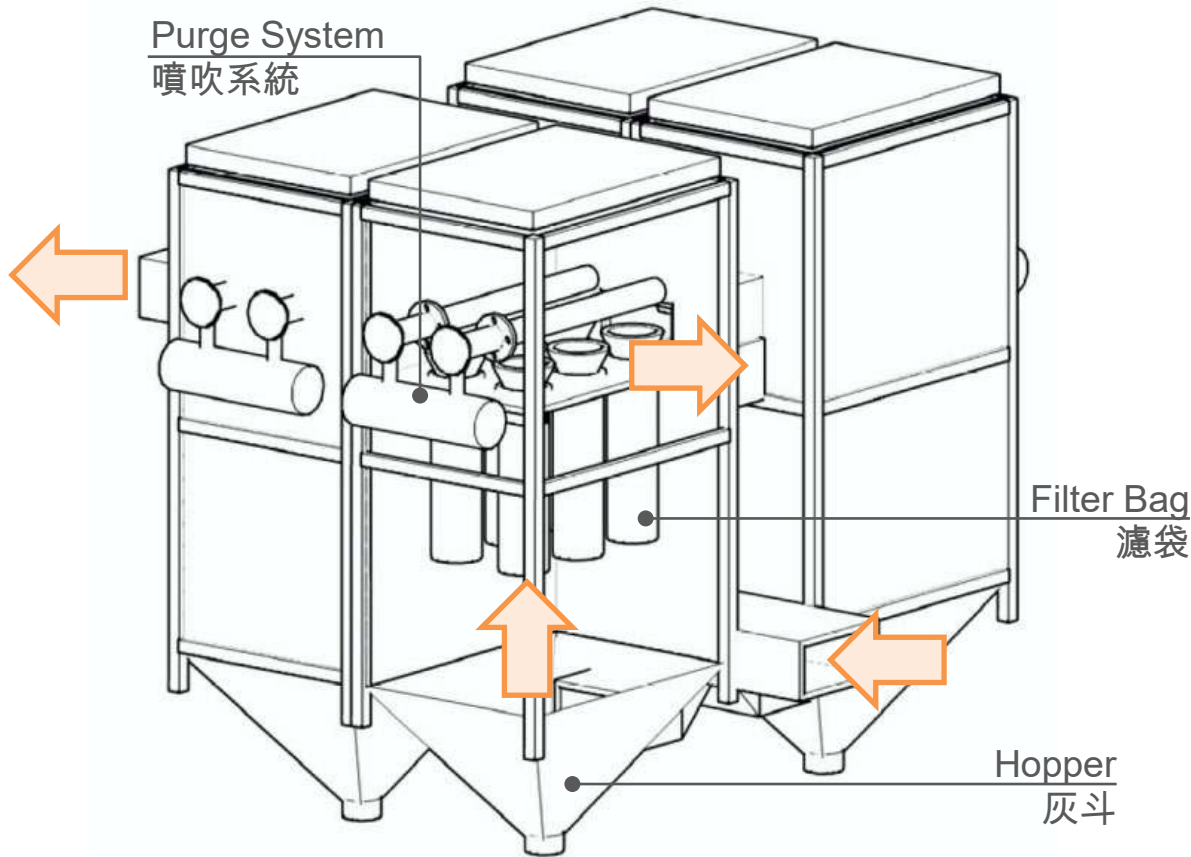
濾餅的累積會增加過濾效果,但卻會造成壓力降增加,因此在濾袋上方會裝設清灰裝置,利用注入壓縮空氣使濾袋產生震動藉此抖落濾袋外的濾餅,延長濾袋壽命與降低壓力損失



# BF Structure

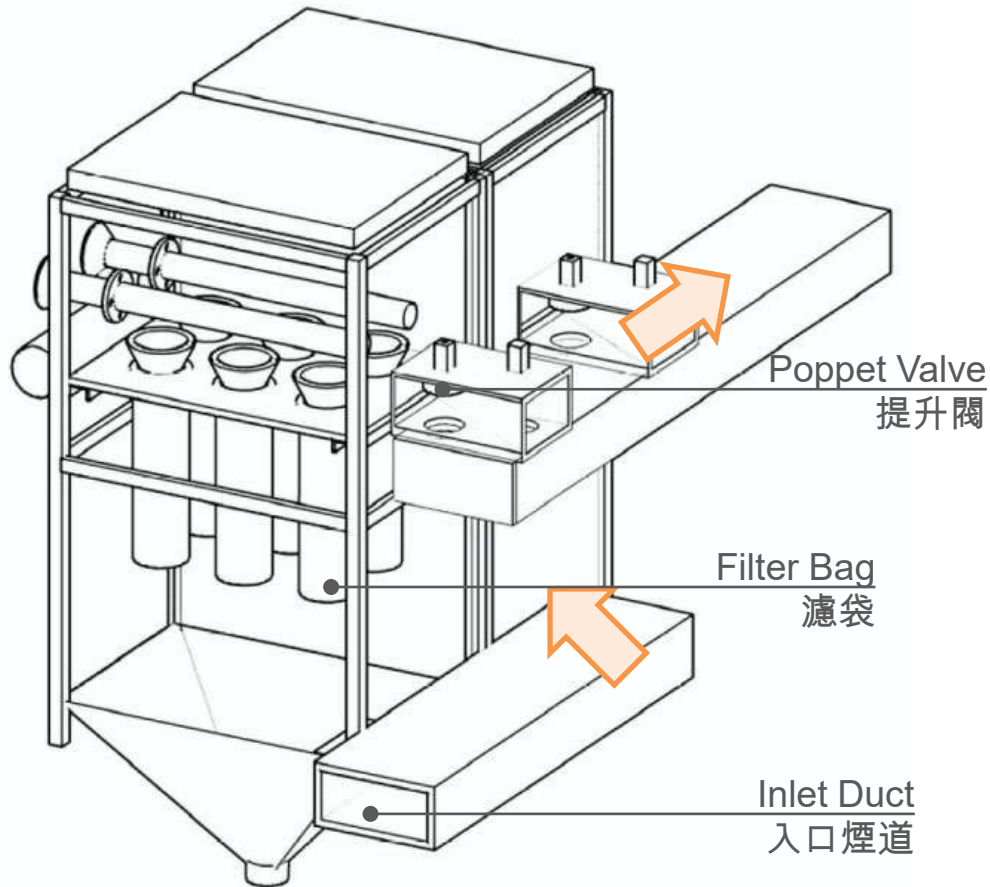


# BF Structure



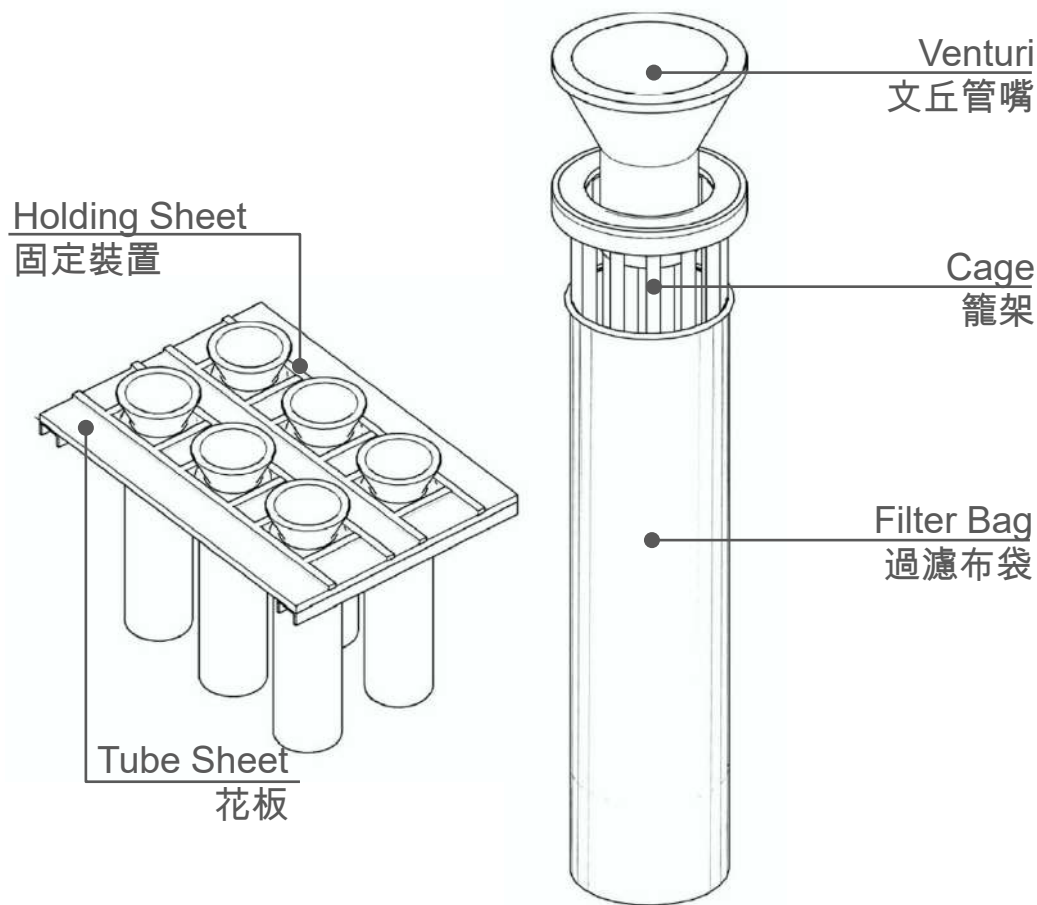
煙氣自下方的入口煙道進入袋式除塵器後分流進入數個除塵室,煙氣自濾袋外部穿過並過濾粉塵,粉塵累積在濾袋外部累積形成濾餅累積後由噴吹系統去除,處理後的煙氣由濾袋內部進入淨室,而後彙整並排放

# BF Structure



布袋除塵的出口設置提升閥，提升閥關閉時可封閉每一間除塵室使煙氣無法進入，因此布袋除塵器可以線上維修或更換布袋

# BF Auxiliary – Filter Bag



濾袋由籠架支撐,並於上頭裝設文丘管嘴,排列架設於花板上,接觸點再用固定裝置固定,以避免洩漏或布袋搖晃

# BF Auxiliary – Filter Bag



不同的煙氣條件選用不同材質,構造的布袋以下可粗分為四種:

1. Polyester fiber cloth or polyester fiber needle felt :

應用於煙氣溫度低於攝氏120度時,擁有良好的耐久性及輕微的腐蝕防護

2. P84、 PPS、 PTFE etc... :

應用於煙氣溫度高於攝氏250度時

3. Activated carbon fiber filter :

應用於需要去除戴奧辛及脫臭的項目

4. Glass fiber filter :

應用於高腐蝕性的煙氣處

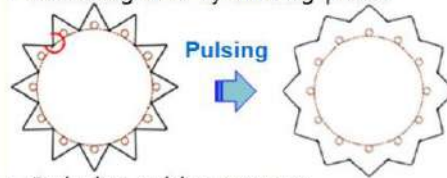
# BF Auxiliary – Filter Bag

Product Name	Physical Properties		Chemical Properties					Temperature	
	Fiber	Scrim	Acids Resistance	Alkalis Resistance	Hydrolysis Resistance	Oxidize Resistance	Abrasion Resistance	Max. Op. T (°C)	Max. Surge T (°C)
P84 Filter Material	P84	Self support	Good	Fair	Fair	Good	Good	240 (Dry)	260 (Dry)
PTFE Filter Material	PTFE	PTFE Scrim	Excellent	Excellent	Excellent	Excellent	Excellent	240 (Dry)	260 (Dry)
Aramid&P84 Filter Material	Aramid&P84 50:50	Aramid Spun Scrim	Fair	Good	Fair	Fair	Excellent	200 (Dry)	230 (Dry)
Aramid Filter Material	Aramid	PET Filament Scrim	Fair	Good	Fair	Fair	Excellent	200 (Dry)	230 (Dry)
Aramid Filter Material	Aramid	Selfsupport	Fair	Good	Fair	Fair	Excellent	200 (Dry)	230 (Dry)
Aramid Filter Material	Aramid	Aramid Spun Scrim	Fair	Good	Fair	Fair	Excellent	200 (Dry)	230 (Dry)
PPS Filter Material	PPS	PPS Spun Scrim	Excellent	Excellent	Excellent	Poor	Good	180 (Dry)	210 (Dry)
PPS Filter Material	PPS	Selfsupport	Excellent	Excellent	Excellent	Poor	Good	180 (Dry)	210 (Dry)
PET Antistatic Filter Material	Polyester and Carbon Fiber	PET Filament Scrim	Fair	Fair	Poor	Good	Excellent	130 (Dry)	150 (Dry)
PET Filter Material	Polyester Fiber	Selfsupport	Fair	Fair	Poor	Good	Excellent	130 (Dry)	150 (Dry)
PET Filter Material	Polyester Fiber	PET Filament Scrim	Fair	Fair	Poor	Good	Excellent	130 (Dry)	150 (Dry)
Glass Fiber Material	Glass Fiber	Double Twill	Good	Fair		Excellent		260 (Dry)	290 (Dry)

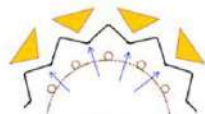
# BF Auxiliary – Pleated Bag



- Pulse jet air pressure : 2 ~ 3 kg/cm<sup>2</sup>
- Pulse frequency : about 5,000turns/yr.
- Removing dust by inflating pleats



- Reducing pulsing pressure = Dust drop by dust-agglomeration and drop to hopper.

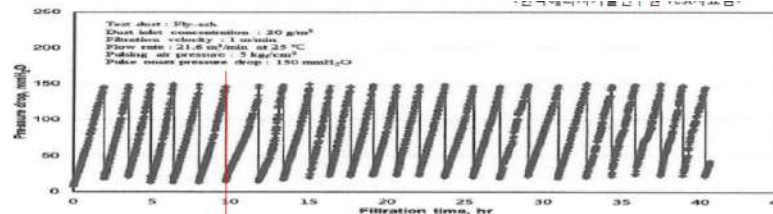
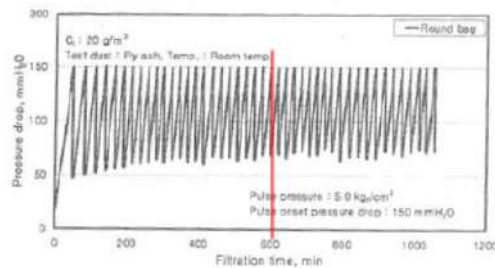


<Dust separated from pleated bag>



凱希公司的袋式集塵器配置百摺式濾袋，可使設備體積減少30%，布袋壽命極長並且使噴吹空氣耗用量大幅降低。此技術目前廣泛應用於各大水泥廠，電廠等大粉塵量的工廠。

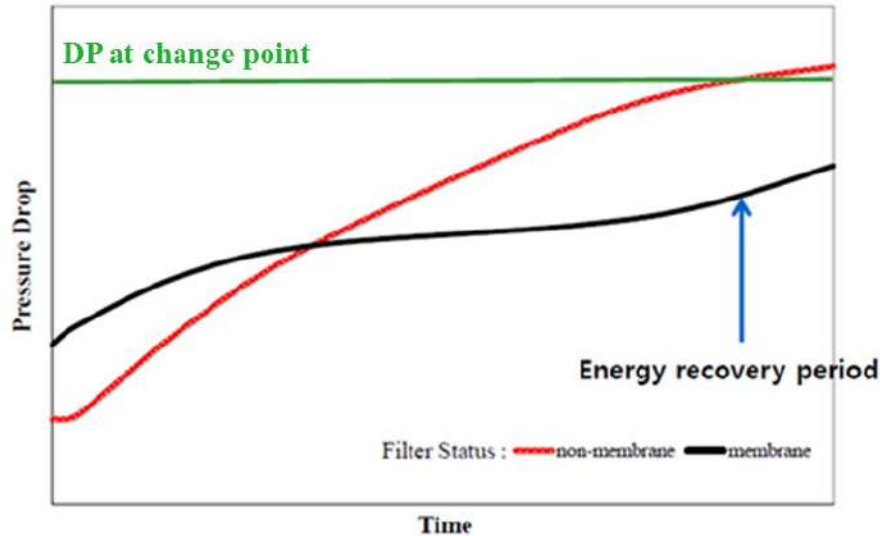
Filtration time vs. Pressure drop



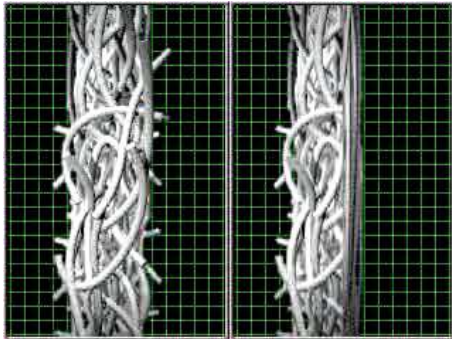
3<sup>rd</sup> factory (Production factory for EPIT Pleated Bag)

# BF Auxiliary – Filter Bag

Pressure Drop vs Time



由凱希公司所提供的布袋覆膜技術是在濾材外側鍍上一層保護膜,可避免細微的粉塵進入濾材纖維內部,使得吹灰清潔時更徹底,可延長布袋的使用壽命



# BF Auxiliary – Cage

籠架是為濾袋的支撐,將濾袋撐開增加過濾面積,每組濾袋由一組籠架所支撐,籠架的材質依照煙氣條件選擇,長度通常為6~9米(超過則須選用拆卸式籠架),支架數依照煙氣壓力選用11~16條



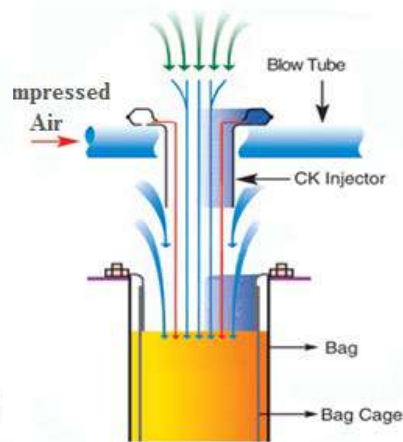
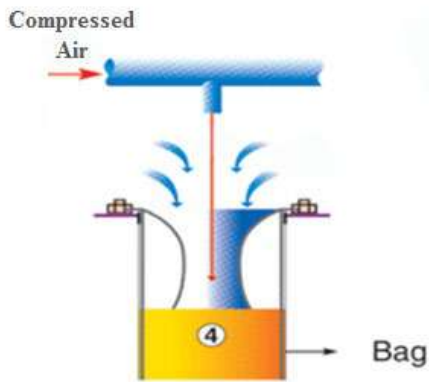
# BF Auxiliary – Venturi



Traditional Venturi



CK Inject Venturi

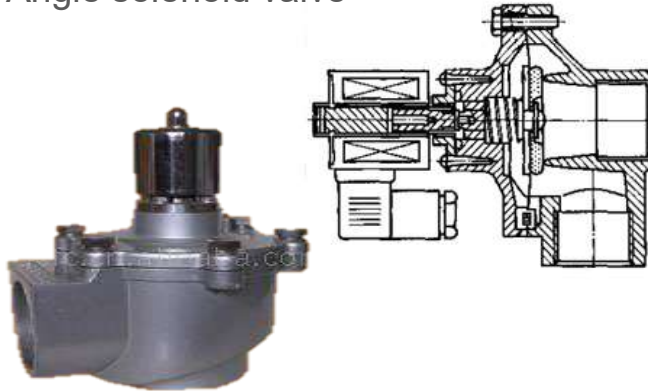


文丘管嘴的功能是將噴吹用的壓縮空氣集中注入濾袋內部,使濾袋震動以去除濾餅,CK Inject公司開發的文丘管嘴以特別的設計能夠誘引更多的空氣注入濾袋,使清灰效果更甚



# BF Auxiliary – Solenoid

Right Angle solenoid valve

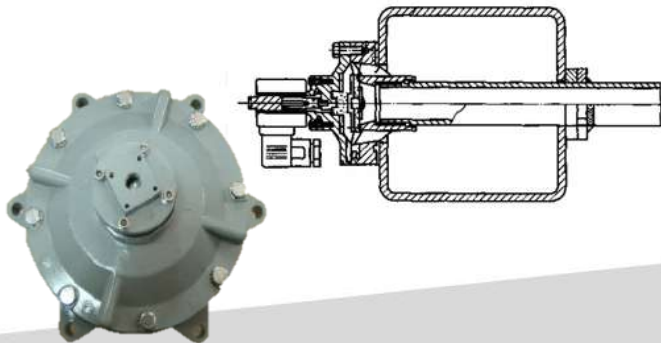


袋式除塵器的每隻噴吹管皆配有一組電磁脈衝閥,該閥是用來控制吹灰系統的吹灰頻率,長短可分為下列兩種形式:

Right Angle solenoid valve :

1. Easy to replace, repair and maintenance.
2. Installation is simple, easy adjustment
3. More accurate inject air position control
4. The cost is higher then Submerged type

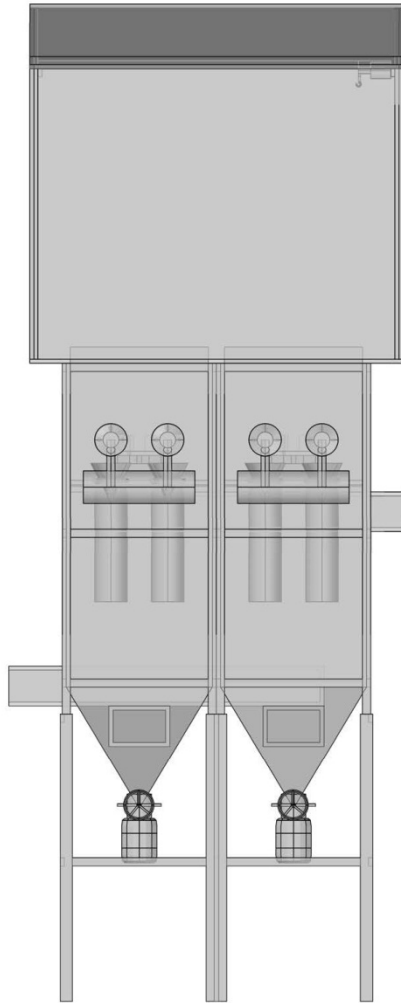
Submerged solenoid valve



Submerged solenoid valve :

1. Big blowing air volume,
2. good cleaning effect
3. The Price is cheaper then Right Angle type

# KCTW BF Advantage



The advantage of bag filter as below:

1. Height efficiency, outlet dust <math>< 15\text{mg}/\text{Nm}^3</math>
2. Bag filter casing size reduce 30%
3. Pressure drop reduce 15%
4. Purge air saving 30%
5. Filter bag lifetime 1~5 years
6. Online maintenance for replacing bag
7. Easy to replace the filter bag
8. Equipment is simple and easy maintenance
9. Easy to treat waste product

# Reference

---



## 台灣-正隆紙業后里廠

---

- 廠別: 紙廠
- 煙氣量:  $14.8 \times 10^4$  m<sup>3</sup>/hr
- 過濾面積: 6128m<sup>2</sup>
- 效率: 99.8%

# Reference

---



韓國浦項高爐

---



韓國浦項車間熱壓

---

# Reference

## 首秦一期高爐



- 廠別: 冶金廠
- 煙氣量 :  $55 \times 10^4$  m<sup>3</sup>/hr
- 過濾面積: 8019m<sup>2</sup>
- 3234m<sup>2</sup>
- 效率 : 99.4%

## 首秦一期聯合料倉



- 廠別: 冶金廠
- 型號: LCDM.02
- 煙氣量 : - m<sup>3</sup>/hr
- 過濾面積: - m<sup>2</sup>
- - m<sup>2</sup>
- 效率 : 99.4%



# Reference

## 首秦二期高爐



- 廠別: 冶金廠
- 煙氣量 :  $55 \times 10^4$  m<sup>3</sup>/hr
- $20 \times 10^4$  m<sup>3</sup>/hr
- 過濾面積: 8019m<sup>2</sup>
- 3234m<sup>2</sup>
- 效率 : 99.5%

## 首秦二期聯合料倉



- 廠別: 冶金廠
- 煙氣量 :  $75 \times 10^4$  m<sup>3</sup>/hr
- 型號: LCDM. 04
- 過濾面積: 11140m<sup>2</sup>
- 效率 : 99.4%



# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
Inchon Iron & Steel Co., Ltd. Inchon Factory Electric Arc Furnace No. 3	Electric Arc Furnace		6,347
Dongyang Cement Corp. Samchock Factory	Alkali by Pass Kiln Process	1976	1,200
Korea Tungsten Mining Co., Ltd. Sangdong Mine APT Dryer	APT Collection	1976	430
Korea Tungsten Mining Co., Ltd. Sangdong Mine Blue Tungsten Refiner	Blue Tungsten Collection	1977	500
Korea Mining & Smelting Co., Ltd. Janghang Factory Zinc Refining Plant	Zinc Furnace	1978	864
Taehan Suger Ind. Co., Ltd. Inchon Feed Mill Plant	Raw Mt'L Silo	1978	250
Pohang Iron & Steel Co., Ltd. Pohang Steel Work Lime Calcining Plant No. 2	Lime Calcining	1980	155



# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
Pohang Iron & Steel Co., Ltd. Pohang Steel Work Lime Calcining Plant No. 2	Lime Calcining	1980	100
Heatauda Cement Mfg. Co., Ltd. Cement Plant Nepal	Lime	1983	700
Heatauda Cement Cement Plant Nepal	Gypsum	1983	435
Sungshin Cement Ind. Co., Ltd. Tanyang Factory New NSP Plant No. 1	Raw Mt'L Grinding	1984	270
Sungshin Cement Ind. Co., Ltd. Tanyang Factory New NSP Plant No. 1	Raw Mt'L Grinding	1984	450
Sungshin Cement Ind. Co., Ltd. Tanyang Factory New NSP Plant No. 1	Pulverized Coal Bin	1984	150
Sungshin Cement Ind. Co., Ltd. Tanyang Factory New NSP Plant No. 1	Raw Mt'L Handling	1984	350

# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
Pohang Iron & Steel Co., Ltd. Pohang Steel Works Coke Plant No. 2 Coal Crusher No. 1, 2, 3 & 4	Coal	1984	2,300
Pohang Iron & Steel Co., Ltd. Pohang Steel Works Electrical Steel Sheet Plant HCL Line	MgO	1984	1,000
Pohang Iron & Steel Co., Ltd. Pohang Steel Works  Coke Plant No. 2 Cutter No. 3	Coke	1984	950
Pohang Iron & Steel Co., Ltd. Pohang Steel Works Coke Plant No. 2 Bunker No. 3	Coke	1984	850
Pohang Iron & Steel Co., Ltd. Gwangyang Steel Works Blast Furnace Plant No. 1 Air Filter for Blast Furnace Fan	Fan Inlet Air Filter	1986	7,800
Pohang Iron & Steel Co., Ltd. Gwangyang Steel Works Blast Furnace Plant No. 1 Blast Furnace Casthouse	Cast House Nuisance	1986	11,000

# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
Poongsan Steel Maf. Co., Ltd. Poopyung Factory	Cast Furnace	1986	500
Korea Shipbuilding & Engineering Corp. Pohang Iron & Steel Co., Ltd. Gwangyang Steel Works Coke Plant No. 2	Charging Car	1987	80
Korea Shipbuilding & Engineering Corp. Pohang Iron & Steel Co., Ltd. Gwangyang Steel Works Coke Plant No. 2	Transfer Car	1987	83
Korea Shipbuilding & Engineering Corp. Pohang Iron & Steel Co., Ltd. Gwangyang Steel Works Coke Plant No. 2	Pusher	1987	333
China Steel Corp.	Filter House Coal Pulverizer	1987	560
Nippon Eng.	Bin Vent	1987	-
Korea Mining & Smelting Co., Ltd. Janghang Factory Zinc Refining Plant	Zinc Furnace	1988	1,400

# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
Pohang Iron & Steel Co., Ltd. Pohang Steel Works New Foundry Pig Iron Blast Furnace Air Filter for Pig Iron Blast Furnace Fan	Air Filter For New Foundry Pig Iron Blast Furnace Fan	1989	2,500
Samsung Heavy Ind. Co., Ltd. Sammi Special Steel Co., Ltd. Changwon Factory	EAF/LF De-dusting System	1989	12,000
Samsung Heavy Ind. Co., Ltd. Sammi Special Steel Co., Ltd. Changwon Factory	Billet Caster Conveyor De-dusting System	1989	750
Samhan Corp. Sammi Special Steel Co., Ltd. Changwon Factory	Billet Caster Conveyor De-dusting System	1990	750 12,000
Pohang Iron & Steel Co., Ltd. Gwangyang Steel Works Blast Furnace Plant No. 3 Air Filter for Blast Furnace Fan	Fan Inlet Air Filter	1990	7,800
Aekyung Ind. Co., Ltd. Daejeon Factory N.S.D Powder Plant	Blowing Tower	1990	680

# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
Aekyung Ind. Co., Ltd. Daejeon Factory N.S.D Powder Plant	Air Lift Separator	1990	834
Aekyung Ind. Co., Ltd. Daejeon Factory N.S.D Powder Plant	Nuisance	1990	200
Aekyung Ind. Co., Ltd. Daejeon Factory N.S.D Powder	Nuisance	1990	85
Aekyung Ind. Co., Ltd. Daejeon Factory N.S.D Powder Plant	Nuisance	1990	70
Aekyung Ind. Co., Ltd. Daejeon Factory N.S.D Powder Plant	Nuisance	1990	64
Aekyung Ind. Co., Ltd. Daejeon Factory N.S.D Powder Plant	Base Powder Silo	1990	60
Aekyung Ind. Co., Ltd. Daejeon Factory N.S.D Powder Plant	Nuisance	1990	40



# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
Aekyung Ind. Co., Ltd. Daejeon Factory N.S.D Powder Plant	Nuisance	1990	20
Aekyung Ind. Co., Ltd. Daejeon Factory N.S.D Powder Plant	Zeolite Dry Vessel & Recovered Powder Tipping	1990	17
Asia Cement Mfg. Co., Ltd. Jaecheon Factory	K-4 A.Q.C (L-10)	1990	200
Asia Cement Mfg. Co., Ltd. Jaecheon Factory	K-1 Coal Feeding	1990	-
Sungshin Cement Ind. Co., Ltd. Danyang Factory	Cement Mill Feeding	1991	6,750
Sokang Co., Ltd. Ansung Factory	Nuisance	1996	600 50
Pohang Iron & Steel Co., Ltd. Pohang Steel Works Hansol Paper Co., Ltd.	Fabric Filter #1 Stock House for B.F & Blending Bin	1996	3,000
Korea Vetrotex Co., Ltd. Kunsan Factory	Furnace De-SOx & De-HCl Ash	1996	304



# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
Pohang Iron & Steel Co., Ltd. Pohang Steel Works Blast Furnace No. 1	Bag House for #1 Blast Furnace Source Material Bin Nuisance	1997	8,000
Sungshin Cement Ind. Co., Ltd. Dangyang Factory	SS-6 Cement Mill	1997	7,500 x 3
Pohang Iron & Steel Co., Ltd. Pohang Steel Works Stainless Steel Wax Cleaning House	Bag House for Wax Cleaning House Nuisance	1998	1,000
Samsung Corporation Haeundae MSW Incineration	Incinerator(Stoker) 200TPD x 2	1999	1,588 x 2
Pohang Iron & Steel Co., Ltd. Pohang Steel Works	Incinerator(Rotary Kiln) 100TPD	1999	980
Hyundai Eng. & Con. Co., Ltd. Kunpo MSW Incineration	Incinerator(Stoker) 200TPD	2000	1,568
POSCO Eng. Construction Co., Ltd. Gwangyang Steel Works Hot Strip Mill No. 1	Bag Filter for #1 Hot Strip Mill	2000	430

# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
Samsung Heavy Industries Co., Ltd. Guri MSW Incineration	Incinerator(Stoker) 100TPD x 2	2001	800 x 2
POSCO Eng. Construction Co., Ltd. Pohang Steel Works Cokes Plant No. 2	Coke Oven	2001	5,153 x 2
POSCO Machinery & Eng. Co., Ltd. Pohang Steel Works Cold Mill R/S Dull Machine No. 1	Bag Filter for #1 Cold Mill	2001	250
Pohang Iron & Steel Co., Ltd. Pohang Steel Works Steel Plate Plasma Cutting Plant No. 2	Bag Filter for #1 Cold Mill Cutting Machine	2002	500
Pohang Eng. & Construction Co., Ltd. Pohang Steel Works Limestone Calcination S/K Plant No. 1 & 2	Bag Filter for #1, 2 Limestone S/K Material Conveying Line	2002	550
Pohang Eng. & Construction Co., Ltd. Pohang Steel Works Limestone Calcination S/K Plant No. 1 & 2	Bag Filter for #1, 2 Limestone S/K Material Conveying Line	2002	800
Sungshin Cement Ind. Co., Ltd. Tanyang Factory	#5 Kiln	2003	13,625

# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
Asia Cement Co., Ltd. Jechon Plant	#1Kiln	2003	5,417
Asia Cement Co., Ltd.	#3Kiln	2004	13,000
POSCO Pohang Steel Works Steel Manufacturing No. 2	Cleaning For Crane Upper Deck # 1 & 2 Unit	2004	80 x2
Sunglim Oil Chemical Co., Ltd. Ansan Plant	Incinerator (Rotary Kiln+Stoker) 144TPD	2004	4,190
POSCOENC Gwangyang Steel Works Blast Furnace Plant No. 2	#1 & 2 PCI Process	2005	500
POSCO Machinery & Eng. Co., Ltd. Pohang Steel Works Plate Mill Plant No. 2	Cold Leveller	2005	1,200
POSCO Eng. & Const. Co., Ltd. Pohang Steel Works Flat Rolled Magnetic Steel Sheet	HCL #2 Dust Collector	2005	1,400

# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
Kawasaki / POSCO Gwangyang No. 1 Nickel Melting Plant	Bag filter for Nickel Melting Process	2009	5,530
POSCO E&C / Yahata Steel Mill Asia Special Steel in Japan Reverse Jet Type	Bag filter for EAF Process	2009	16,000
POSCO / Gwangyang Steel Mill Sinter Plant #5 (Flue Gas Cleaning System) Pulse Jet Type	Bag filter for Sinter plant	2010	44,322
Poshmetal / Gwangyang Works Fe-Mn Plant	EAF Process FeMn	2011	3,500
Poshmetal / Gwangyang Works Fe-Mn Plant	EAF Process SiMn	2011	2,000
POSCO / Gwangyang Steel Mill Sinter Plant #1-4	Very fine ore Conveyor process	2011	8,500 x 2 5,000
POSCO E&C / Gwangyang Steel Mill Hot Strip Mill No. 4	Bag Filter for Converter	2011	23,000

# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
POSCO E&C / Gwangyang Steel Mill Hot Strip Mill No. 4	Bag Filter for LF, RH	2011	4,000
POSCO E&C / Pohang Steel Mill High Purity Fe-Si Production Plant	Bag Filter for Raw Material Handling	2012	3,580
POSCO E&C / Pohang Steel Mill High Purity Fe-Si Production Plant	Bag Filter for Casting Bay and Building	2012	9,900
POSCO Eng. & Construction Co., Ltd. PT. Krakatau Engineering Sinter Plant #1 In Indonesia	Material Handling Environment	2013	500
SK E&C Gunjang in Korea	250ton/hr Coal Fired Boiler	2013	5,798
SNNC / Gwangyang Works Fe-Ni Plant #2	Bag Filter for Semi Dry Reactor(Rotary Atomizer)	2014	7,311
SNNC / Gwangyang Works Fe-Ni Plant #2	Bag Filter for Rotary Kiln(Dryer)	2014	7,311

# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Sinter Plant #1 In Brazil	Ore Material Handling Environment	2015	5,000
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Sinter Plant #1 In Brazil	Coke Material Handling Environment	2015	3,500
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Blast Furnace Plant #1 In Brazil	Stock House	2015	15,905
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Blast Furnace Plant #1 In Brazil	Cast House	2015	16,468
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Raw Material Handling Plant #1 In Brazil	Raw Material Conveying Environment	2015	3,700
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant	Raw Material Conveying Environment	2015	520

# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Raw Material Handling Plant #1 In Brazil	Raw Material Conveying Environment	2015	160
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Raw Material Handling Plant #1 In Brazil	Raw Material Conveying Environment	2015	600
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Raw Material Handling Plant #1 In Brazil	Raw Material Conveying Environment	2015	370
POSCO Eng. & Construction Co., Ltd. Vale Steel Plant Raw Material Handling Plant #1 In Brazil	Raw Material Conveying Environment	2015	2,800
POSCO Eng. & Construction Co., Ltd. Vale Steel Plant Raw Material Handling Plant #1 In Brazil	Raw Material Conveying Environment	2015	2,100
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant	Coal Surge Bin Environment	2015	450

# Reference

Fabric Filters

DUST COLLECTION SYSTEM

Customer & Location	Application	Start-Up Date	Gas Vol. (Am <sup>3</sup> /min)
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Coke Plant Plant #1 In Brazil	Coal Crusher Environment	2015	1,250
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Coke Plant Plant #1 In Brazil	Coal Blending Environment	2015	1,600
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Coke Plant Plant #1 In Brazil	Coal Tower Environment	2015	470
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Coke Plant Plant #1 In Brazil	Coke Conveying Environment	2015	250
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant Coke Plant Plant #1 In Brazil	Coke Bunker Environment	2015	1,600
POSCO Eng. & Construction Co., Ltd. CSP(Companhia Siderurgica do Pecem) Steel Plant	Coke Conveying Environment	2015	400





Thank You  
For Your Attention.