KYOWA

CORROSION-RESISTANT

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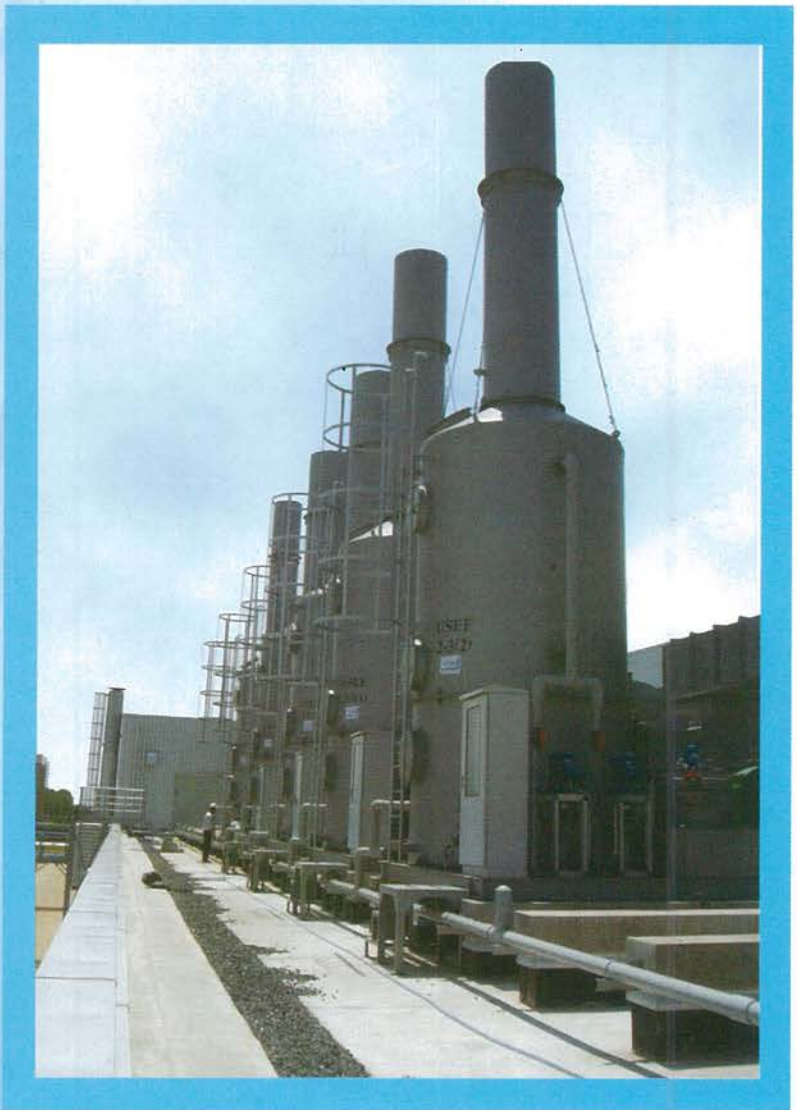
THAI KYOWA'S EXHAUST-GAS TREATING EQUIPMENT



KYOWA

THAI KYOWA KAKO CO., LTD.

www. kyowa.co.th

THAI KYOWA'S EXHAUST - GAS TREATING EQUIPMENT

The present day is in the energy saving time, but on the other hand, more severe regulation for preventing industrial pollution and necessity of environment maintenance have caused an adequate treatment for the exhaust gas from factories, laboratories, etc. to be regarded as important for factory location. The exhaust gas treatment is also an important means for rationalzation by improving product quality and working effciency. Since THAI KYOWA KAKO CO. was established, the company has been engaged in the manufacture of exhaust gas ejecting equipment and exhaust gas trating equipment consistently for about 15 years and commonly acknowledged as a poineer of exhaust gas treatment. At this time, the company has established new standards for the treatment of SOx and NOx together with wider standardization of the equipment for treating the exhaust gases such as sulfuric acid, hydrochloric acid, chromate, etc. in accordance with the experiment data and results for long years. The necessity of exhaust gas treatment has been felt strongly, but the circumstances such as various treating methods, difficult grasp of actual occurrence situation, indefinite factors for allowance limits, etc. have caused the treating equipment to be manufactured individually according to each condition and users to be required with much technical knowledges, thus giving troublesome feeling first.

There are many examples that the exhaust gas treating equipment only with form and without definited foundation or knoeledge for gas properties have not given any performance.

The THAI KYOWA KAKO CO. has specified the satandards for the exhaust gas treating methods in accordance with the actual data accumulated for long years by reproducing the actual occurrence situation in actual work condition with the subject of the sulfuric acid, hydrochloric acid, chromate, etc. occupying much percentage of pollution and standardized such the standards as the most universal equipment, and furthermore, has completed new standards for SOx and NOx by considering energy saving. The THAI Kyowa's exhaust gas treating equipment is a ready-made product in the equipment of this kind, and permits cost to be reduced greatly by standardization and an acceptance labor in user side to be omitted.

It has been guaranteed by strict tests that this catalogue permits the treating equipment for the above gases in general occurrence condition to be selected easily and the treated results to be with in the allowable range for pollution preventing standard values. It is said that pollution is the enemy of society, on the other hand.

It is very fortunate for this company that the exhaust gas treating technology fostered by this company with great diligence is helpful for controlling pollution rationally and developing industry by making a contribution to energy saving.

GASES TO BE APPLIED AND USE

Thai Kyowa's exhaust-gas treating equipment is guarnteed in performance only for the following gases to be applied. Care should be taken to the point that other rinsing treatment is necessary for the thickly occurring gas, low reaction gas with water, strictly regulated gas for pollution, etc. It is required for these cases to design the exhaust gas equipment with a responsibility according to each condition, so consult with this company about sush the case.

Application	Occurring gas	Occurring situation	Occurring source (use)	Remarks
Unconditional application	Fume and gas of sulfuric acid, Hydrochloric acid and chromiv acid.	Generation from tank surface. Up to liquid temperature of 80 °c	Acid using place in plating, pickling and general factories.	Treatment can be done by this equipment, but consult with this company about selection.
Conditional application	Fume and gas of caustic soda, Cyanide of soda, ammonia, etc.	Generation from tank, draft, clean bench, etc. Up to liquid temperature of 80 °c	Plating factory, metal surface treating factory, laboratory,etc.	
	Fume and gas of hydrogen sulfide, phosphoric acid, acetic acid, etc.	Generation from tank, draft, clean bench, etc. Up to liquid temperature of 80 °c	Chemical and food factories, fiber industry, laboratory,etc.	
	Fume and gas of sulfuric acid, Hyfrochloric acid and chromate.	Generation from enclosed tank, reaction tank and furnace, etc.	Chemical and medical factories, food factory, laboratory,etc.	
	When rarefied nitric acid is mixed with the above gases.	Generaion from tank surface. Normal temperature.	Bright dip.	
Special subject	Mixed acid gases including chlorine gas, nitric acid, nitrogen oxide and fluoric acid.	Generation from draft, furnace, Tank surface, etc.	Chemical factory, light metal factory, laboratory, glass industry, metal picking, etc.	Consult specially with this company about these subjects.

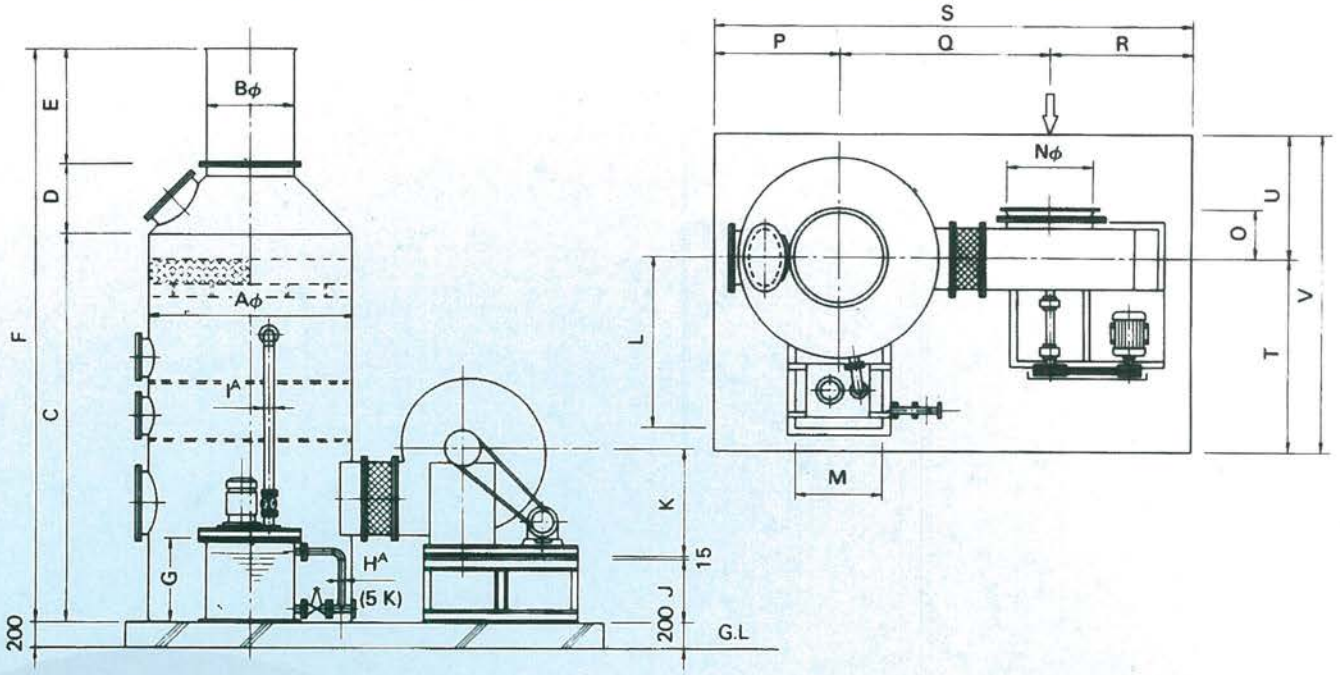
INQUIRY ABOUT THE THAI KYOWA'S EXHAUST - GAS TREATING EQUIPMENT

When ordering the Thai Kyowa's exhaust - gas treating equipment, inform this company of the following items in detail as possible.

1. Kind of treating gas
2. Treating air amount (m^3/h or m^3N/h)
3. Temperature, normal °C (max. °C)
4. Occurring source
5. Inlet gas concentration ppm (mg/ m^3N)
6. Outlet gas concentration ppm (mg/ m^3N)
7. Intel gas pressure
8. Kind of rinsing liquid
9. Running time (h/d)
10. Power supply V x Hz x ø
11 Scope of supply

FBS TYPE FOR LARGE AMOUNT OF GAS AND MIST DUST
ROUND TYPE PERFORATED PLATE TOWER

This type has a large capacity of treatment and is suitable to a total exhaust gas teatment at large scale.



Standards

Type	Treating air amount	Exhaust fan			Circulation pump				Circulation tank	Weight at the time of running
	m^3/min	Type	Power kW	Static pressure mmAq	Type	Power kW	Water amount ℓ/min	Head m	Dimension	kg
FBS-70	65	#2RFT-RB	3.7	130	40 VO	0.75	90	8	700Ø×550H	900
FBS-80	85	#3RFT-RB	3.7	130	40 VO	0.75	130	8	800Ø×550H	1000
FBS-100	130	#3RFT-RB	7.5	130	65 VO	2.2	200	10	1000Ø×650H	1600
FBS-120	190	#4RFT-RB	11	130	65 VO	2.2	280	10	1200Ø×650H	2000
FBS-140	260	#4RFT-RB	15	130	65 VO	2.2	380	10	1400Ø×700H	2900
FBS-160	340	#5RFT-RB	15	130	65 VO	2.2	500	10	1600Ø×700H	3200
FBS-180	430	#5RFT-RB	22	130	80 VO	3.7	640	10	1800Ø×750H	4400
FBS-200	530	#6RFT-RB	22	130	100 VO	5.5	780	10	2000Ø×750H	4900
FBS-220	640	#6RFT-RB	30	130	100 VO	5.5	950	10	2200Ø×750H	6000
FBS-240	770	#7RFT-RB	30	130	100 VO	5.5	1100	10	2400Ø×750H	6600
FBS-250	820	#7RFT-RB	37	130	125 VO	7.5	1200	10	2500Ø×750H	7200
FBS-260	880	#8RFT-RB	37	130	125 VO	7.5	1300	12	2600Ø×750H	7500
FBS-280	1000	#8RFT-RB	45	130	125 VO	7.5	1500	12	2800Ø×800H	9500

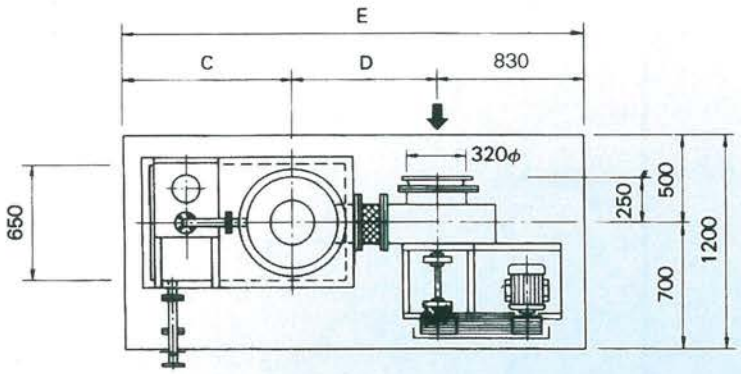
Note. Pressure loss inside tower $\Delta P = 90$ mmAq

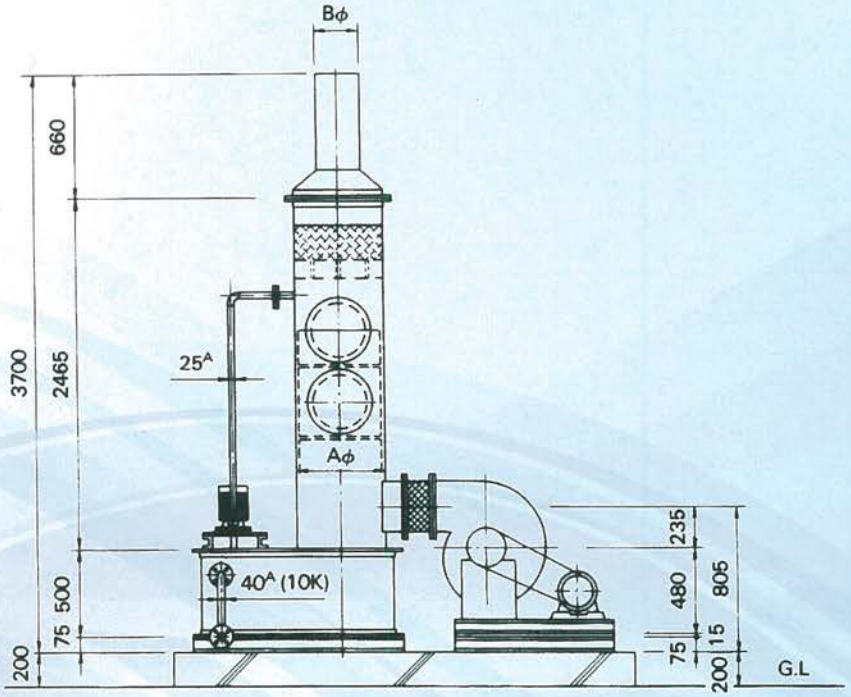
Dimension (mm) / Type	AØ	BØ	C	D	E	F	G	H^A	I^A	J	K	L	M	NØ	O	P	Q	R	S	T	U	V
FBS-70	700	350	3200	250	550	4000	550	40	40	435	520	1000	600	320	250	500	920	900	2320	1150	500	1650
FBS-80	800	400	3300	300	600	4200	550	50	40	395	700	1050	600	450	350	600	1030	950	2580	1200	600	1800
FBS-100	1000	500	3400	400	800	4600	650	50	50	495	700	1150	600	450	350	700	1130	950	2780	1300	700	2000
FBS-120	1200	600	3500	400	900	4800	650	65	50	505	850	1250	700	590	400	800	1400	1100	3300	1400	800	2200
FBS-140	1400	650	3550	450	1000	5000	700	65	65	555	850	1350	700	590	450	900	1500	1100	3500	1500	900	2400
FBS-160	1600	750	3350	500	1150	5000	700	80	65	480	1100	1450	700	750	450	1000	1720	1250	3970	1600	1000	2600
FBS-180	1800	850	3400	500	1800	5200	750	80	80	530	1100	1550	700	750	450	1100	1820	1250	4170	1750	1100	2800
FBS-200	2000	950	3550	500	1550	5500	750	80	100	565	1250	1800	900	930	520	1200	2140	1450	4790	1950	1200	2150
FBS-220	2200	1050	3550	600	1650	5700	750	100	100	565	1250	1900	900	930	520	1300	2240	1450	4990	2050	1300	3350
FBS-240	2400	1150	3650	600	1750	5900	750	100	100	570	1400	2000	900	1050	600	1400	2460	1600	5460	2150	1400	3550
FBS-250	2500	1200	3650	600	1750	6000	750	100	125	570	1400	2050	900	1050	600	1450	2510	1600	5560	2200	1450	3650
FBS-260	2600	1250	3750	600	1850	6200	750	100	125	462	1650	2100	900	1166	700	1500	2670	1750	5920	2250	1500	3750
FBS-280	2800	1300	3950	700	1950	6600	800	100	125	510	1850	2200	900	1340	780	1600	2970	2150	6720	2350	1600	3950

FRP made

FBS TYPE FOR GENERAL GAS AND MIST DUST
ROUND TYPE PERFORATED PLATE TOWER

This type can be used widely because of perforated plate tower.





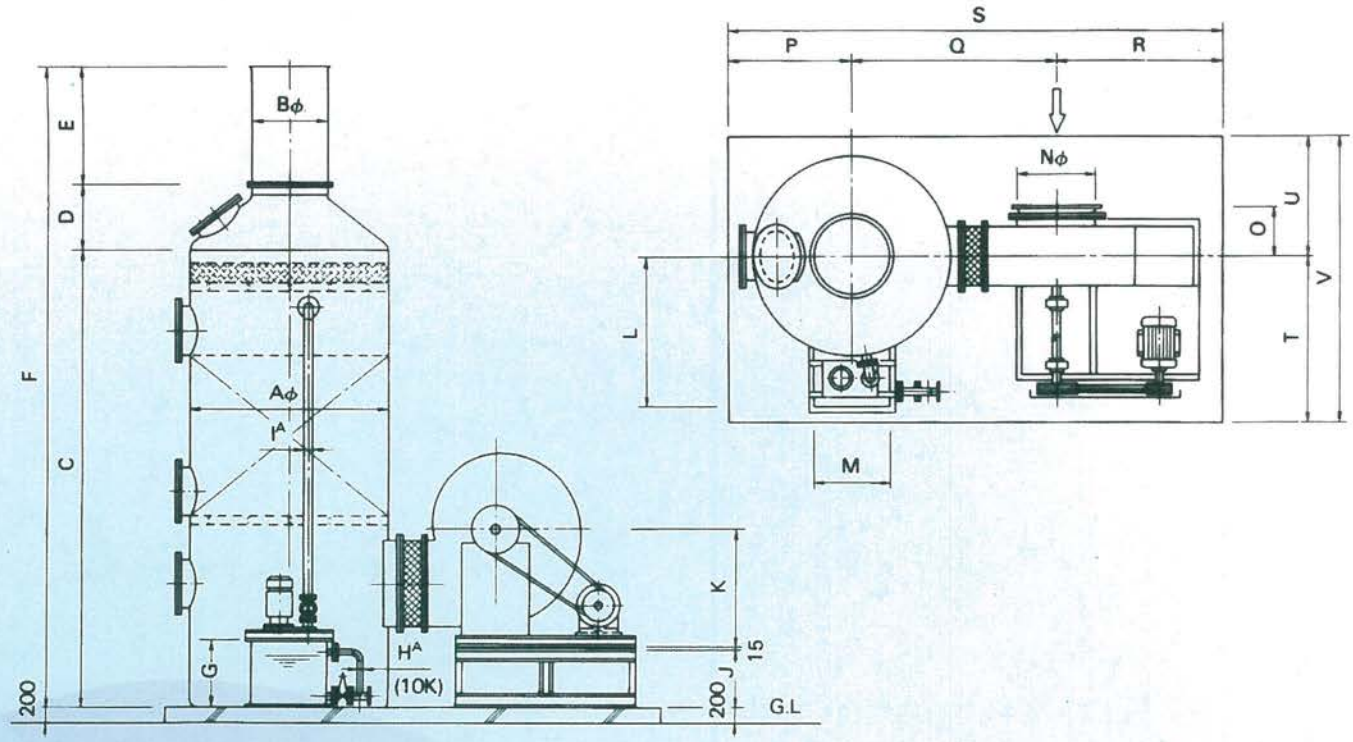
Standards

Type	Exhaust fan RFT - RB	Air amount m^3/min	Static pressure mmAq	Motor kW	Circulation pump PVC	Water amount m^3/min	Head m	Motor kW	Circulation tank Dimension	Static pressure inside system mmAq	Weight at the time of running kg
FBS-40	#2	20	125	1.5	25VO	30	8	0.4	650x1000x500H	85	750
FBS-50	#2	30	125	1.5	25VO	50	8	0.4	650x1100x500H	85	760
FBS-60	#2	45	125	2.2	25VO	70	8	0.75	650x1200x500H	85	800

Dimension (mm) / Type	AØ	BØ	C	D	E
FBS-40	400	200	900	770	2500
FBS-50	500	250	950	820	2600
FBS-60	600	300	1000	870	2700

FSW TYPE FOR LARGE AIR AMOUNT AND HIGHLY CONCENTRATED GAS
ROUND TYPE FILLING TOWER

This type is for large amount treatment and high level treatment



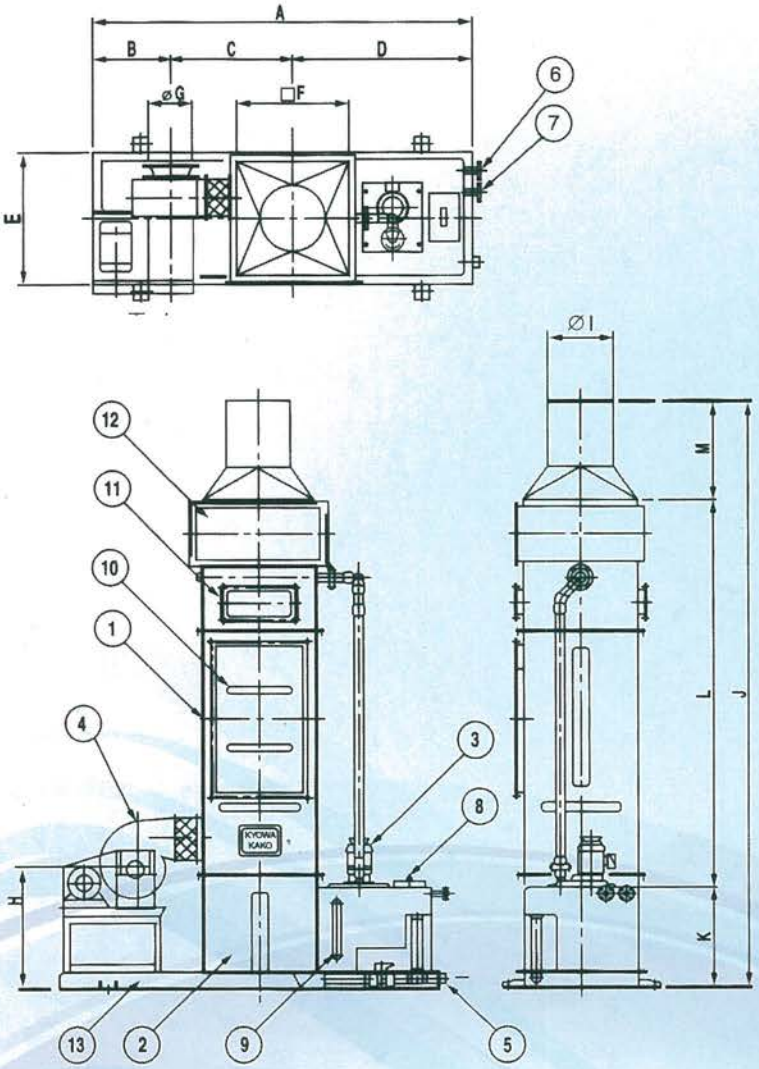
Type	Exhaust fan FRP	Air amount	Static pressure	Motor	Circulation pump PVC	Water amount	Head	Motor	Circulation tank FRP	Static pressure inside system	Weight at the time of running
		m³/min	mmAq	kW		//min	m	kW		mmAq	kg
FSW-60	#2RFT-RB	33	110	1.5	40 VO	85	10	0.75	600Ø x 550H	70	900
FSW-80	#2RFT-RB	58	110	3.7	50 VO	150	10	1.5	800Ø x 600H	70	1200
FSW-100	#3RFT-RB	90	110	3.7	65 VO	230	10	2.2	1000Ø x 650H	70	1900
FSW-120	#3RFT-RB	130	120	5.5	65 VO	340	10	2.2	1200Ø x 700H	80	2300
FSW-140	#4RFT-RB	175	120	7.5	65 VO	460	10	2.2	1400Ø x 700H	80	3000
FSW-160	#4RFT-RB	230	120	11	80 VO	600	10	3.7	1600Ø x 750H	80	3700
FSW-180	#5RFT-RB	290	120	11	100 VO	760	10	5.5	1800Ø x 750H	80	4700
FSW-200	#5RFT-RB	360	120	15	100 VO	940	12	5.5	2000Ø x 800H	80	5800
FSW-220	#5RFT-RB	430	120	22	100 VO	1140	12	5.5	2200Ø x 800H	80	6600
FSW-240	#6RFT-RB	520	120	22	125 VO	1400	12	7.5	2400Ø x 850H	80	8400
FSW-250	#6RFT-RB	560	120	22	125 VO	1500	12	7.5	2500Ø x 850H	80	9000
FSW-260	#6RFT-RB	600	120	30	125 VO	1600	12	7.5	2600Ø x 850H	80	9400
FSW-280	#7RFT-RB	700	120	30	125 VO	1850	12	7.5	2800Ø x 850H	80	11300
FSW-300	#7RFT-RB	800	120	37	125VSVL	2200	12	11	3000Ø x 850H	80	12500
FSW-320	#8RFT-RB	910	120	37	125VSVL	2400	12	15	3200Ø x 850H	80	14700
FSW-340	#8RFT-RB	1030	120	45	150VSVL	2700	14	18.5	3400Ø x 850H	80	17300
FSW-360	#9RFT-RB	1150	120	55	150VSVL	3100	14	18.5	3600Ø x 850H	80	18700
FSW-380	#9RFT-RB	1300	120	55	200VSVL	3400	14	22	3800Ø x 850H	80	21000

Note. Pressure loss inside tower △P = 30 mmAq

Dimension (mm) / Type	AØ	BØ	C	D	E	F	G	H	I	J	K	L	M	NØ	O	P	Q	R	S	T	U	V
FSW-60	600	250	4650	250	400	5300	550	40	40	435	520	950	600	320	250	500	870	900	2270	1100	500	1600
FSW-80	800	350	4700	300	500	5500	600	50	40	485	520	1050	600	320	250	600	970	900	2470	1200	600	1800
FSW-100	1000	400	4850	400	650	5900	650	50	50	495	700	1150	700	450	350	700	1130	950	2780	1300	700	2000
FSW-120	1200	550	4900	400	800	6200	700	65	65	545	700	1250	700	450	350	800	1230	950	2990	1400	800	2200
FSW-140	1400	550	5000	450	850	6300	700	65	65	555	850	1350	900	590	400	900	1500	1100	3500	1500	900	2400
FSW-160	1600	600	4700	500	1000	6200	750	80	80	605	850	1450	900	590	400	1000	1600	1100	3700	1600	1000	2600
FSW-180	1800	700	4850	550	1100	6500	750	80	100	530	1100	1700	900	750	450	1100	1820	1250	4170	1850	1100	2950
FSW-200	2000	850	4900	550	1150	6600	800	80	100	580	1100	1800	900	750	450	1200	1920	1250	4370	1950	1200	3150
FSW-220	2200	850	4900	600	1300	6800	800	100	125	580	1100	1900	900	750	450	1300	2020	1250	4570	2050	1300	3350
FSW-240	2400	950	5100	650	1450	7200	850	100	125	665	1250	2000	900	930	520	1400	2340	1430	5170	2150	1400	3550
FSW-250	2500	1000	5100	650	1550	7300	850	100	125	665	1250	2050	1100	930	520	1450	2390	1430	5270	2200	1450	3650
FSW-260	2600	1000	5100	650	2550	7300	850	100	125	665	1250	2100	1100	930	520	1500	2440	1430	5370	2250	1500	3750
FSW-280	2800	1100	5200	700	2700	7600	850	100	125	670	1400	2200	1100	1050	600	1600	2660	1600	5860	2350	1500	3850
FSW-300	3000	1150	5200	700	1800	7700	850	125	125	670	1400	2400	1300	1050	600	1700	2760	1600	6060	2550	1700	4250
FSW-320	3200	1250	5300	750	1850	7900	850	125	125	562	1650	2500	1300	1166	700	1800	2970	1750	6520	2650	1800	4450
FSW-340	3400	1300	5450	800	1950	8200	850	125	150	560	1850	2600	1300	1340	785	1900	3270	2150	7320	2750	1900	4650
FSW-360	3600	1400	5700	800	2100	8600	850	125	150	655	1880	2800	1300	1300	620	2000	3320	2250	7570	2950	2000	4950
FSW-380	3800	1500	5700	800	2300	8800	850	125	200	655	1800	2900	1300	1300	620	2100	3420	3420	7770	3050	2100	5150

FRP made

FSD HYPER MULTI FED TYPE SCRUBBER
HIGH QUALITY & LOW COST, READY MADE TYPE



NO. PART	DESCRIPTION	MATERIAL	QUANT	REMARKS
1	SCRUBBER	FRP	1	
2	CIRCULATION TANK	FRP	1	
3	CIRCULATION PUMP	PVC	1	
4	EXHAUST FAN	PVC	1	
5	OVERFLOW DRAIN	PVC	1	40A
6	WATER SUPPLY PORT	PVC	1	20A,JIS 10 K
7	WATER SUPPLY PORT WITH BALL TAP	PVC	1	20A, JIS 10 K
8	TANK INSPECTION PORT	FRP	1	
9	LEVEL GAUGE	PVC	1	
10	PACKING INSPECTION PORT	FRP	1	
11	SPRAY NOZZLE INSPECTION PORT	PVC	1	
12	DEMISTER INSPECTION PORT	FRP	1	
13	COMMON BASE	SS400	1	

TYPE	CAPACITY	EXHAUST FAN SPECIFICATION			CIRCULATION PUMP SPECIFICATION				CIRCULATION TANK CAPACITY (ℓ)	WATER SUPPLY (ℓ/min)	EXTERNAL STATIC PRESSURE (mmAq)	TOTAL WEIGHT (kg)	TOTAL OPERATION WEIGHT (kg)
	m³/min	TYPE	POWER (KW)	STATIC PRESSURE (mmAq)	TYPE	CAPACITY (ℓ/min)	POWER (KW)	TOTAL HEAD (M)					
FSD-55	10 - 30	100KS	1.5	55	25VO	55	0.75	6	250	3	35	240	500
FSD-70	31 - 50	150KS	1.5	55	40VO	90	0.75	6	360	5	35	300	680
FSD-85	51 - 70	150KS	2.2	55	40VO	130	0.75	6	450	7	35	350	830
FSD-100	71 - 100	200KS	3.7	65	40VO	180	0.75	6	560	10	45	450	1050
FSD-115	101 - 120	200KS	3.7	65	50VO	240	1.5	6	880	12	45	510	1450

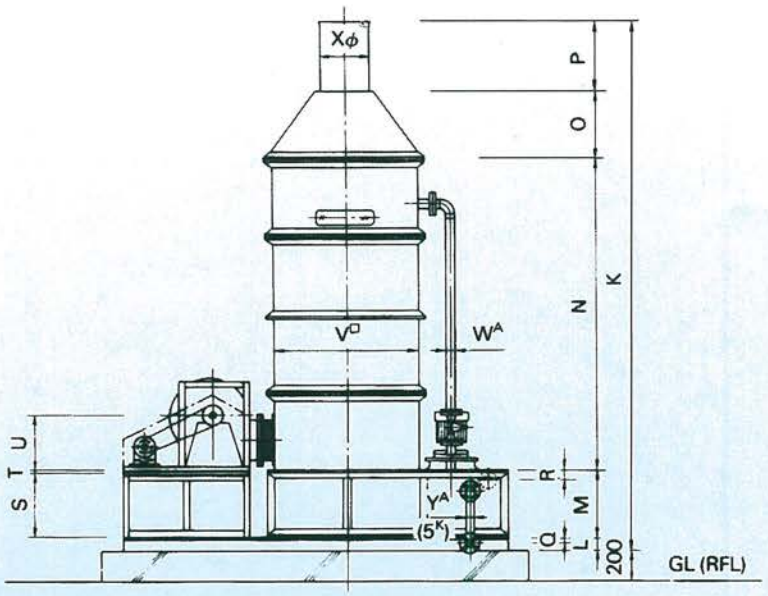
NOTE: PRESSURE DROP 20mmAq

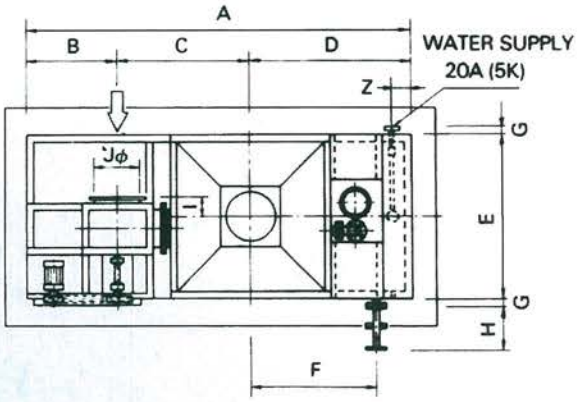
TYPE	A	B	C	D	E	□F	øG	H	øI	J	K	L	M
FSD-55	2115	430	660	1025	650	550	211	1052	300	3600	640	2360	600
FSD-70	2345	480	765	1100	800	700	280	1102	400	3600	640	2360	600
FSD-85	2495	480	840	1175	950	850	280	1102	450	3600	640	2360	600
FSD-100	2830	565	1015	1250	1100	1000	370	1172	550	3700	640	2460	600
FSD-115	3030	565	1090	1375	1250	1150	370	1272	650	3800	740	2460	600

PVC made

SD TYPE FOR DRAFT GAS AND LABORATORY GAS FILLING TOWER FOR GENERAL USE

This type can be installed on rooftop with light weight by reducing tower height.





Standards

Type	Treating air amount	Exhaust fan			Circulation pump				Circulation tank	Weight at the time of running
	m^3/min	Type	Power kW	Static pressure mmAq	Type	Power kW	Water amount ℓ/min	Head m	Dimension	kg
SD - 40	10	# 1SLR - RB	0.4	45	25VO	0.4	30	5	400 x 940 x 450	400
SD - 55	20	# 1-1/4 SLR-RB	0.75	55	25VO	0.4	60	6	550 x 1090 x 450	600
SD - 70	30	# 1-1/2 SLR-RB	1.5	50	40VO	0.75	90	8	700 x 1240 x 450	800
SD - 80	40	# 1-1/2 SLR-RB	1.5	60	40VO	0.75	120	8	800 x 1350 x 450	1000
SD - 90	50	# 1-3/4 SLR-RB	2.2	65	40VO	0.75	150	8	900 x 1450 x 450	1150
SD - 100	60	# 2SLR-RB	2.2	65	50VO	1.5	180	8	1000 x 1550 x 450	1300
SD - 105	70	# 2SLR-RB	2.2	65	50VO	1.5	210	8	1050 x 1600 x 500	1500
SD - 110	80	# 2-1/2 SLR-RB	2.2	65	50VO	1.5	240	8	1100 x 1650 x 500	1750
SD - 120	90	# 2-1/2 SLR-RB	3.7	65	50VO	1.5	270	8	1200 x 1760 x 500	2000
SD - 125	100	# 3TLR - RB	5.5	70	50VO	1.5	300	10	1250 x 1850 x 500	2200
SD - 140	120	# 3-1/2TLR- RB	5.5	80	65VO	2.2	360	10	1400 x 2000 x 500	2600
SD - 150	150	# 4TLR - RB	7.5	80	65VO	2.2	430	10	1500 x 2000 x 500	2800

Note. Static pressure inside tower △ P = 30 mmAq

Type	A	B	C	D	E	F	G	H	I	JØ	K	L	M	N	O	P	Q	R	S	T	U	V	W	XØ	Y	Z
SD-40	1650	410	460	780	480	540	60	246	203	164	3175	75	450	1900	250	500	25	40	450	20	200	400	25	205	25	110
SD-55	1860	440	565	855	630	615	60	246	198	184	3225	75	450	1900	300	500	25	40	450	20	240	550	25	205	25	120
SD-70	2060	475	655	930	780	690	60	246	183	232	3375	75	450	2000	350	500	25	40	450	20	290	700	40	307	25	120
SD-80	2180	475	705	1000	900	750	50	289	123	232	3400	100	450	2000	350	500	25	40	450	20	290	800	40	307	30	130
SD-90	2330	500	780	1050	1000	800	50	289	126	267	3400	100	450	2000	350	500	35	40	450	20	330	900	40	348	30	130
SD-100	2630	620	910	1100	1100	850	50	289	135	305	3650	100	450	2100	400	600	35	40	450	20	380	1000	50	348	30	130
SD-105	2680	620	935	1125	1150	875	50	378	110	305	3700	100	500	2100	400	600	35	40	480	20	380	1050	50	400	40	130
SD-110	2870	700	1020	1150	1200	900	50	378	221	400	3700	100	500	2100	400	600	30	40	480	25	470	1100	50	400	40	140
SD-120	2990	700	1070	1220	1320	960	90	378	161	400	3950	100	500	2200	450	700	30	40	480	25	470	1200	50	450	40	140
SD-125	3185	765	1135	1285	1370	1025	90	378	130	370	3975	125	500	2200	450	700	35	40	480	25	470	1250	50	450	50	140
SD-140	3425	805	1260	1360	1520	1100	90	420	171	430	4225	125	500	2300	500	800	35	40	480	25	535	1400	65	500	50	140
SD-150	3545	865	1370	1310	1620	1050	90	420	311	480	4325	125	500	2400	500	800	35	40	480	25	650	1500	65	500	50	140

TECHNICAL DATA

Elimination rate of each gas

Gas name	Molecular formula	Rinsing liquid	Elimination rate
Hydrogen chloride gas	HCl	H_2O	90~95%
		NaOH	95~99%
Hydrogen fluoride gas	HF	H_2O	90~95%
		NaOH	95~99%
Ammonia gas	NH_3	H_2O	90~95%
		H_2SO_4	More than 99%
Hydrocyanic acid gas	HCN	NaOH	90~98%
Sulfurous acid gas	SO_2	NaOH	More than 95~99%
Chlorine gas	Cl_2	NaOH	More than 95~99%
Hygrogen sulfide gas	H_2S	NaOH	95~99%
Sulfuric acid mist	H_2SO_4	H_2O	More than 95~99%
Chromic acid mist	CrO_3	H_2O	95~99%
Alkali mist	NaOH	H_2O	95~99%
Nitric acid mist	HNO_3	H_2O	70~90%

Each elimination rate tabulated above indicates the value of individual virgin gas by setting the concentration of 100 ppm or above as its reference.

Average elimination rate of SD type

Gas name	Molecular formula	Rinsing liquid	Elimination rate
Solfuric acid	H_2SO_4	H_2O	95%
Hydrochloric acid	HCl	H_2O	90%
Chromic acid	CrO_3	H_2O	95%
Nitric acid	20% as NOx 25 ~ 30% with NaOH rinsing		
Caustic soda	NaOH	H_2O	80%
Cyanida of soda	NaCN	H_2O	80%
Fluoric acid	HF	H_2O	90%

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