

Chemical Resistant Fume Jet -

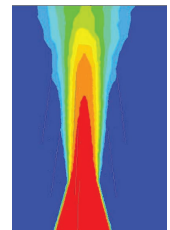
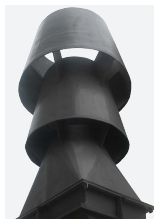
R10.2





- « High Plume / Induced Flow Fan ensures high efficiency and reliability in dispersion of fumes.
- « Designers and engineers to specify the required dispersion height.
- « To prevent the plume down wash and limit exposure level that may be detrimental to the health.
- « Suitable for use in hospitals, schools, waste treatment plants, restaurants, test and research laboratories etc.

• Figure 1 - Conventional stack • Figure 2 - Wolter fume jet system • Figure 3 - Fume Jet SE 30 • Figure 4 - Fume Jet HDE 80





Role

Wolter's CHEMCO with over 25 years of manufacturing experience has become one of the world's leading Chemical Resistant Plastic Fan and Ventilator manufacturers.

The years of experience and know-how in the areas of plastics and its designing capabilities enable Wolter's CHEMCO to develop a complete range of anti-corrosive Fume Jet dispersion stack.

Products and Performance

Wolter's CHEMCO Fume Jet mounted on fan, with casing build to a true volute form, is tested in accordance to AMCA 210, AMCA 260 and AMCA 300 to give exact amount of air and velocity.

The Fume Jet comes with 2 types. S type of Single windband with low pressure losses. The H type of Single and Double windband with higher plume and entrainment capability. Each type comes in 17 difference sizes. Capacity up to 180,000 cmh, static pressure up to 5,000 Pa and dispersion height up to 40 meter at 16Km/hr wind speed.

The cone is designed to increase induce draft by up to 3 times the exhaust flow volume.

Wolter's CHEMCO Chemical resistant plastic fans can be mounted with Fume Jet.

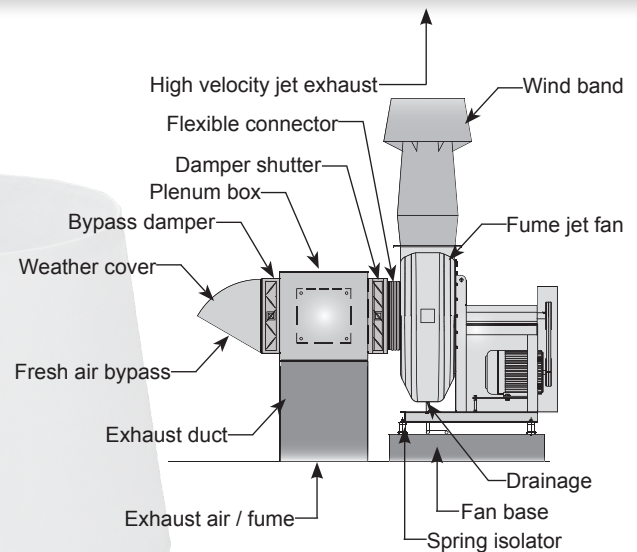
Fume Jet

Wolter's CHEMCO Fume Jet is a vertical taper nozzle mounted on the fan outlet for dispersion of fumes to the atmosphere to prevent the contamination from settling and plugging.

The Fume Jet nozzle is extremely rigid to ensure that it is free of vibration or drumming during operation. It is developed to give low noise level and trouble-free service.

Material of PP, PE, PVC, PVDF, GRP, epoxy coated steel or stainless steels offers superior corrosion resistance quality.

The Fume Jet nozzle is designed to provide adequate



exit velocities that will help prevent plume downwash. Usually it is 1.5 times the maximum expected wind speed at the nozzle exit (U.S. EPA, 1985).

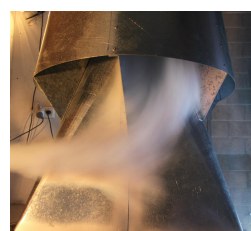
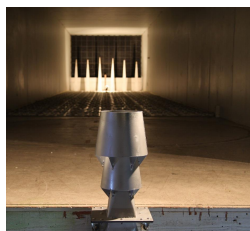
Dispersion Height

The flow rate, the minimum nozzle velocity and the wind speed determine the dispersion height. The wind dictates the speed and direction in which the bulk of the plume moves, and wind also affects the amount of dispersion that takes place.

The height to ensure that emissions do not result in excessive concentrations of the pollutant can be referred to (GEP) in 40 CFR 51 Section.

Service

Wolter's CHEMCO always strive to offer the best "value for money" and to maintain its primary objective of ensuring that all our products are safe, easy to use, whilst offering reliable quality with the latest in design technology, incorporating all useful and practical features, leaving the customers with superior products and service.



Quality, Testing and Certification

The Fume Jets are produced to strict quality standards. Only the best quality materials are used.

Our assembly, logistic and R&D centre has been certified in accordance to ISO 9001-2008 ensuring that all our products meet the highest standards of quality and each item is carefully inspected before shipment to ensure customer satisfaction.

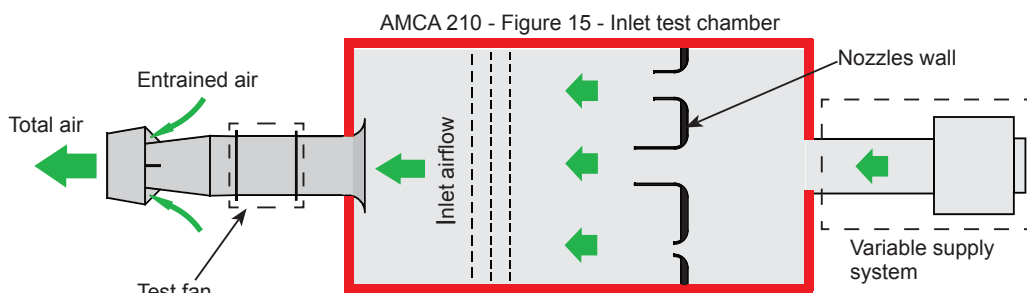
Our testing facilities include the latest state of-the-art equipments. Fans mounted with Fume Jet are rated and tested in accordance to ISO5801 and AMCA 210, 260 and 300 standards. In many cases, factory acceptance tests (FAT) are arranged prior to delivery to ensure that all specifications and standards are met.



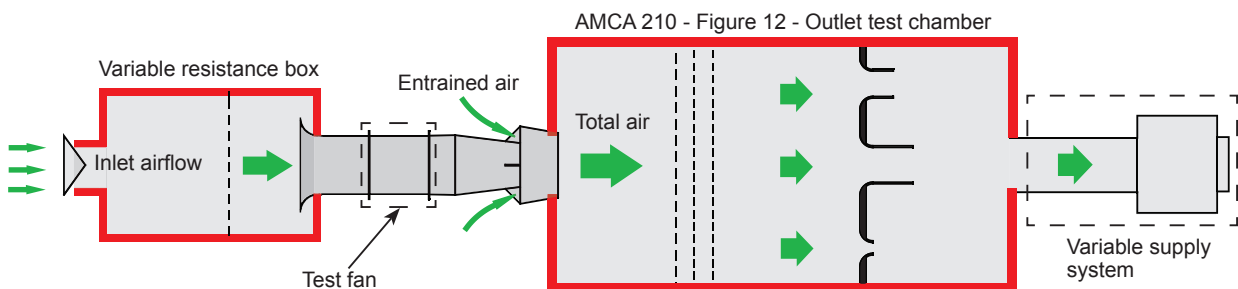
AMCA 260 Air Test Procedure

The following illustrations describe the procedure for determining the total laboratory exhaust fan discharge flow. The total discharge flow is the sum of inlet airflow and entrained airflow. The inlet air flow is determined first by using AMCA 210 Figure 15. Next, the key requirement to AMCA 260 is the variable resistance box. This box allows the measurement of total discharge flow ($P_s = 0$ Pa) to simulate discharging the fan to atmosphere) at all points along its fan curve.

Without the variable resistance box, the entrained airflow can only be measured at the free air point of its fan curve. The entrained airflow obtained can be used to calculate an effective plume height. Therefore, AMCA 260 certification is necessary to ensure the laboratory exhaust fan specified is providing the plume rise and entrainment submitted.



AMCA 210 - Figure 15 - Inlet Chamber Setup
(Determines the inlet airflow)



AMCA 260 - Figure 1 - Test Setup
(Determines induced flow outlet airflow)

« Bypass Air (Q_B)

Ambient air that is drawn through the bypass air plenum and mixed with the lab exhaust to increase dilution and plume rise. Bypass air is primarily used in variable volume applications to maintain a constant discharge volume but can also be used to increase overall exhaust volume and dilution.

« Dilution Ratio (D.R.)

The ratio of the total fan outlet volume to the lab exhaust volume. (Total Volume / Lab Exhaust Air Volume). Value includes any additional bypass air in the calculation.

« Entrainment Air (Q_E)

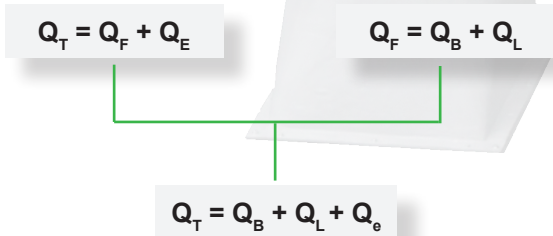
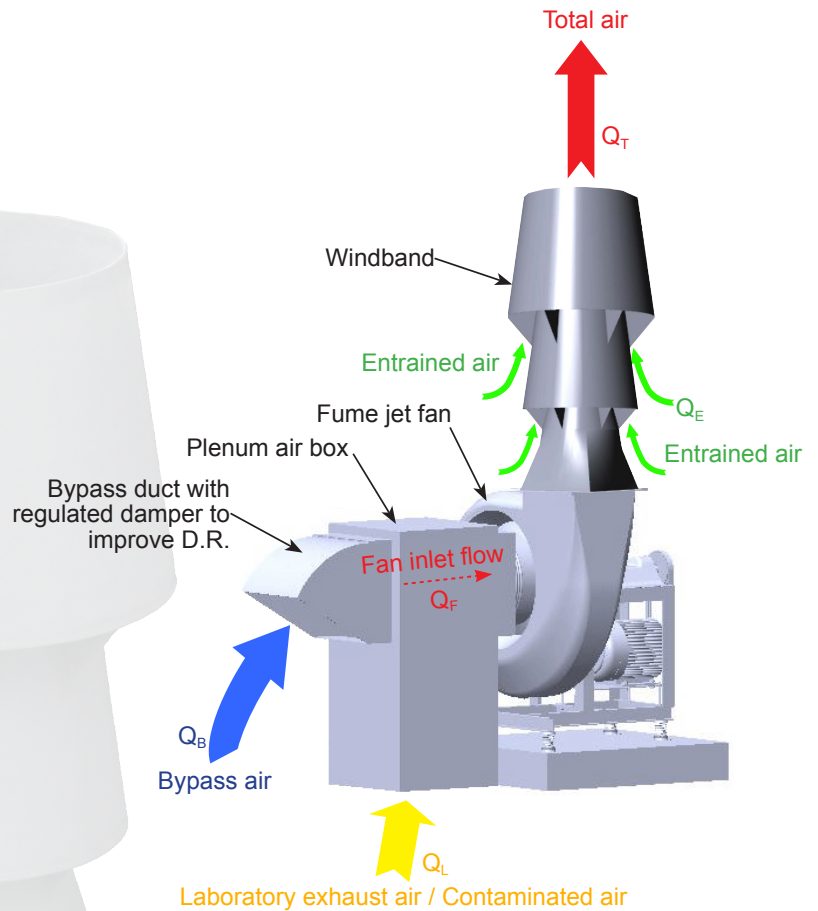
Air that is entrained (induced flow) through the windband and fan housing, mixed with the laboratory exhaust to increase the dilution ratio and plume rise.

« Entrainment Ratio (E.R.)

The ratio of the total fan outlet volume to the fan inlet volume. (Total Volume / Fan Inlet Volume).

« Total Airflow (Q_T)

The total airflow exiting the windband including fume exhaust, bypass air, and entrainment air. (See diagram to right).

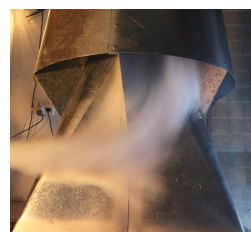
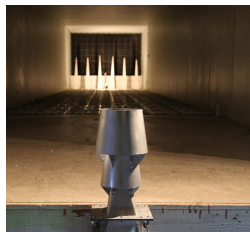


Dilution Ratio:

$$D.R = Q_T / Q_L$$

Entrainment Ratio:

$$E.R = Q_T / Q_F$$



Effective Plume Height Calculation

When studying laboratory exhaust design issues, it is important to consider effective stack height. This is the physical height of the equipment plus the plume height. The following explains how this is calculated.

$$h_e = h_r + h_s *$$

$$h_e = [3.0 \times V \times d / U] + h_s$$

where

h_s = fan height (dimensions section of this catalog)

h_r = plume rise, (m)

V = stack discharge velocity, (m/s)

d = effective stack diameter, (m)

U^{**} = cross wind velocity [m/s]

* From ASHRAE Laboratory Design Guide, Equation 9-2

** Plume rises shown on performance pages are calculated with a 10 mph (4.47 m/s) crosswind.

Pressure Loss and Effective Plume Height Selection

Example:

Flow volume at 3 m³/s with system static pressure 600 pa. Minimal height from floor is 10 meter. Max. fan rpm at 1400.

1) Refer to the Wolter's CHEMCO fan curve, select a fan to meet the above specification.

2) Base on fan curve CHEM 450 and 500 can perform the job.

3) Airs flowing through Fume Jet will encounters resistance to flow due to friction losses and turbulence losses.

Refer to graph "Pressure Loss due to Jet Action" "S type" on page 8 for actual Pa required.

a) Chem 450 = 213 pa losses, new static pressure = 813 pa

b) Chem 500 = 139 pa losses, new static pressure = 739 pa

4) Fan selected:

a) Chem 450 with RPM at 1273, 5.52 Bkw;

b) CHEM 500 with RPM at 982, 4.32 Bkw.

5) Option (a) CHEM 450 is within the specification RPM at 1273.

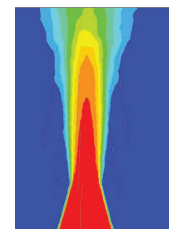
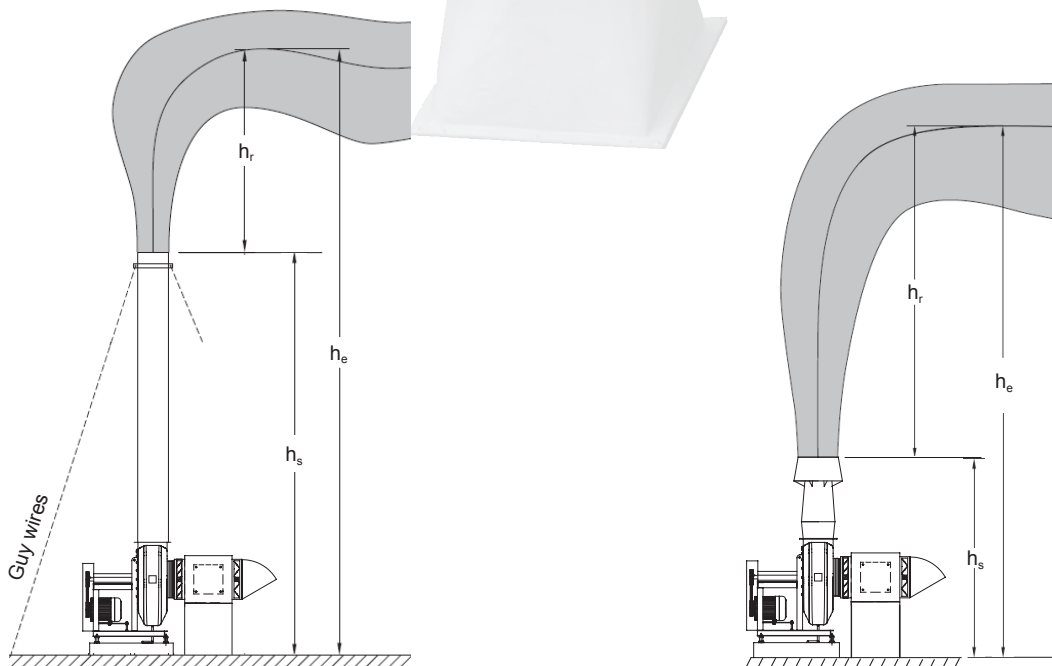
6) Refer to graph "Effective Plume Rise h_r (CHEM 450 to 710)" "SE 30" on page 12. From 3 m³/s intersect CHEM 450 curve result $h_r = 8.1$ m.

7) Refer to Wolter's CHEMCO Fume Jet dimensions chart for CHEM 450 total height from floor level:

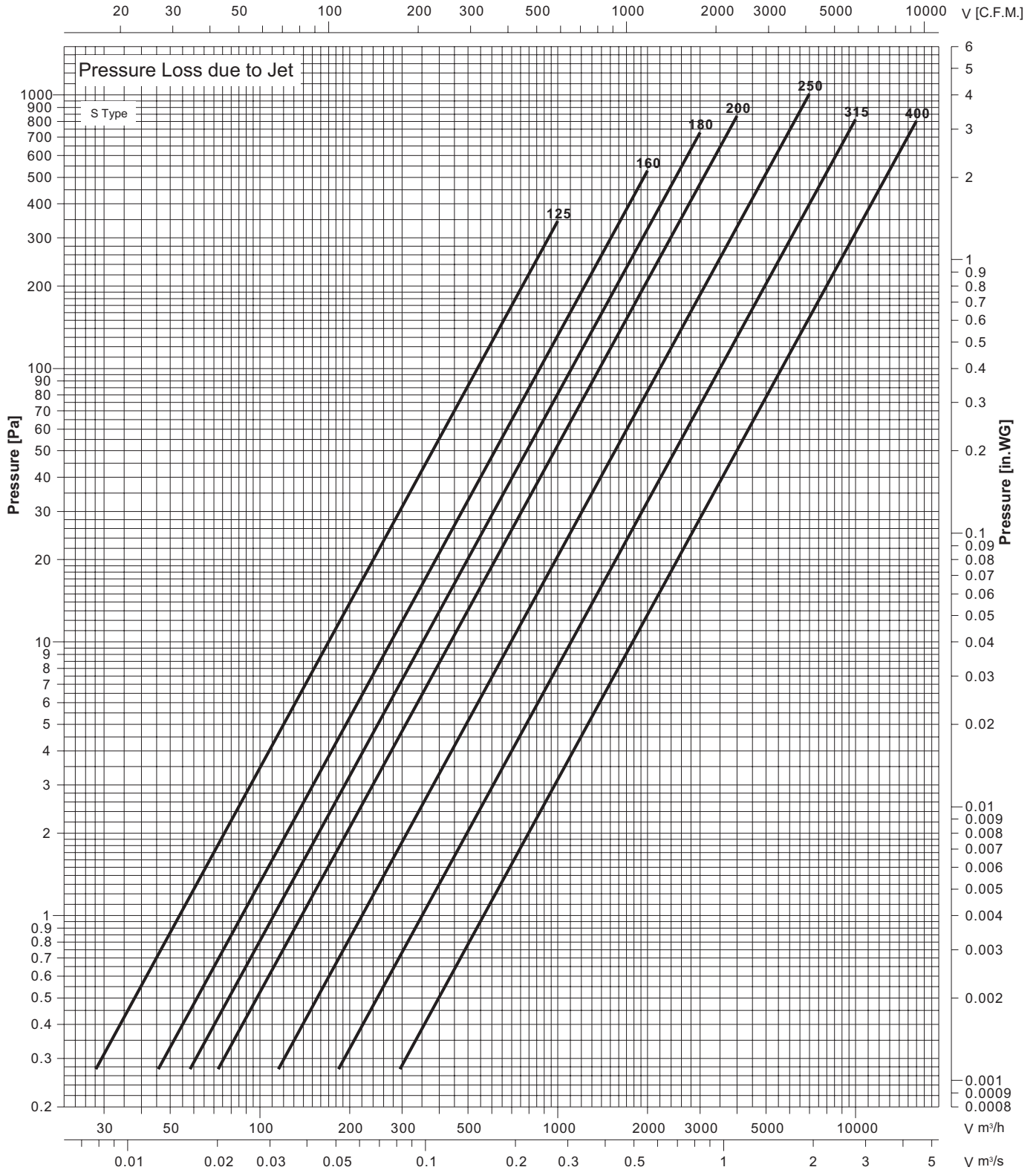
$$h_s = 1.091 + 1.152 = 2.243 \text{ m}$$

Total effective plume height h_e :

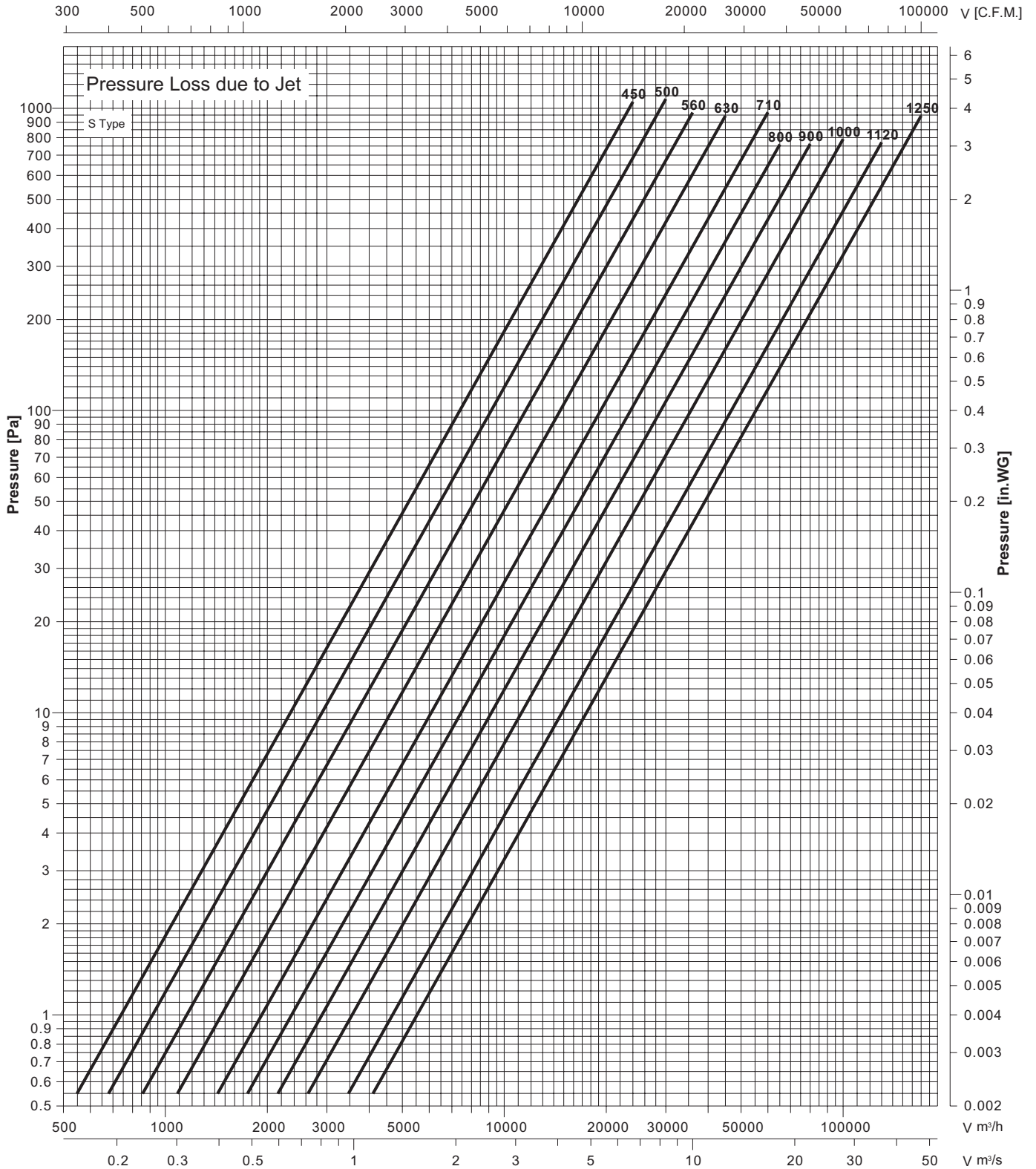
$$h_e = 8.1 + 2.243 = 10.37 \text{ meters.}$$



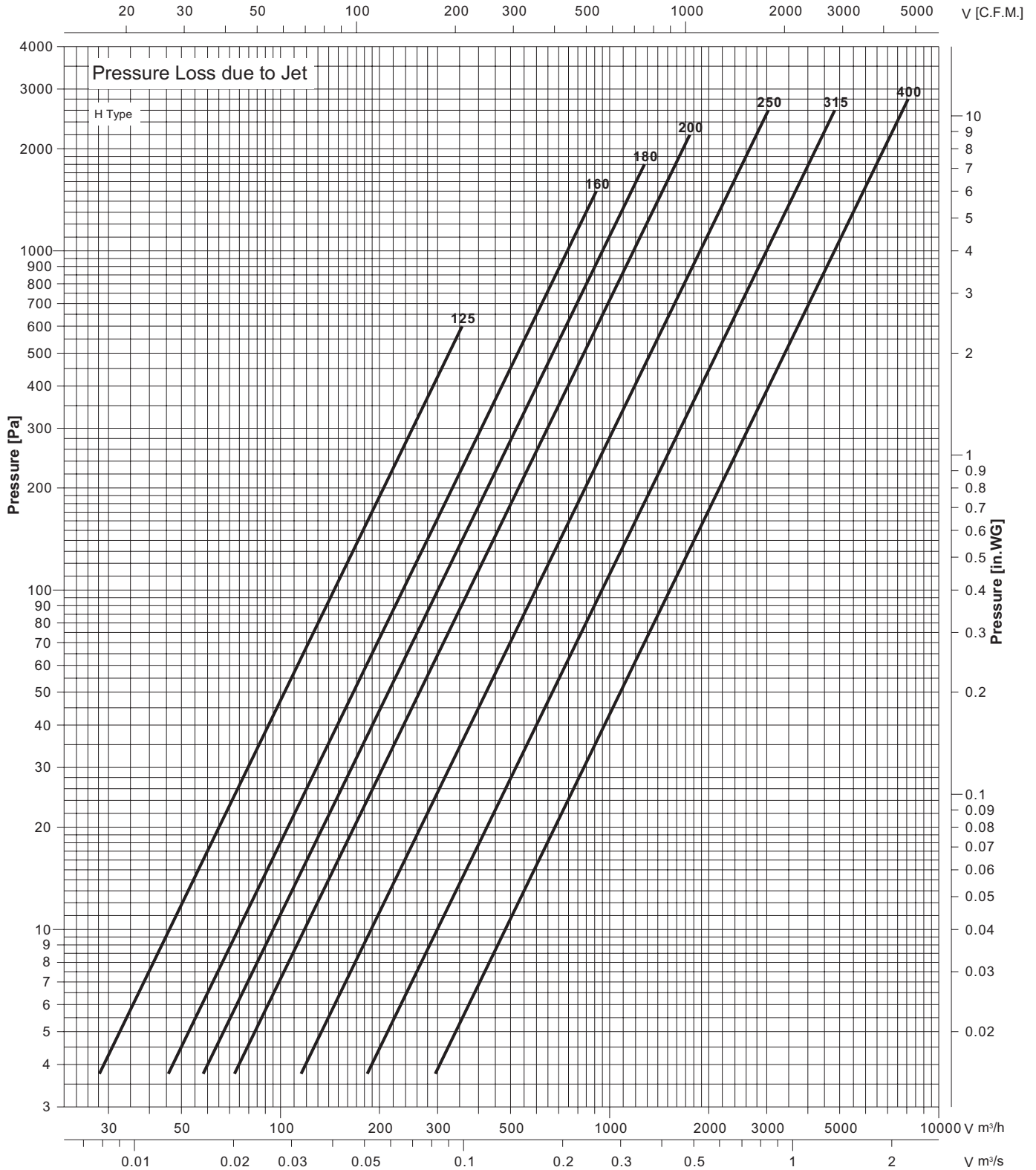
**Pressure Loss due to Jet Action (S Type)
Fan Sizes CHEM 125 to 400**



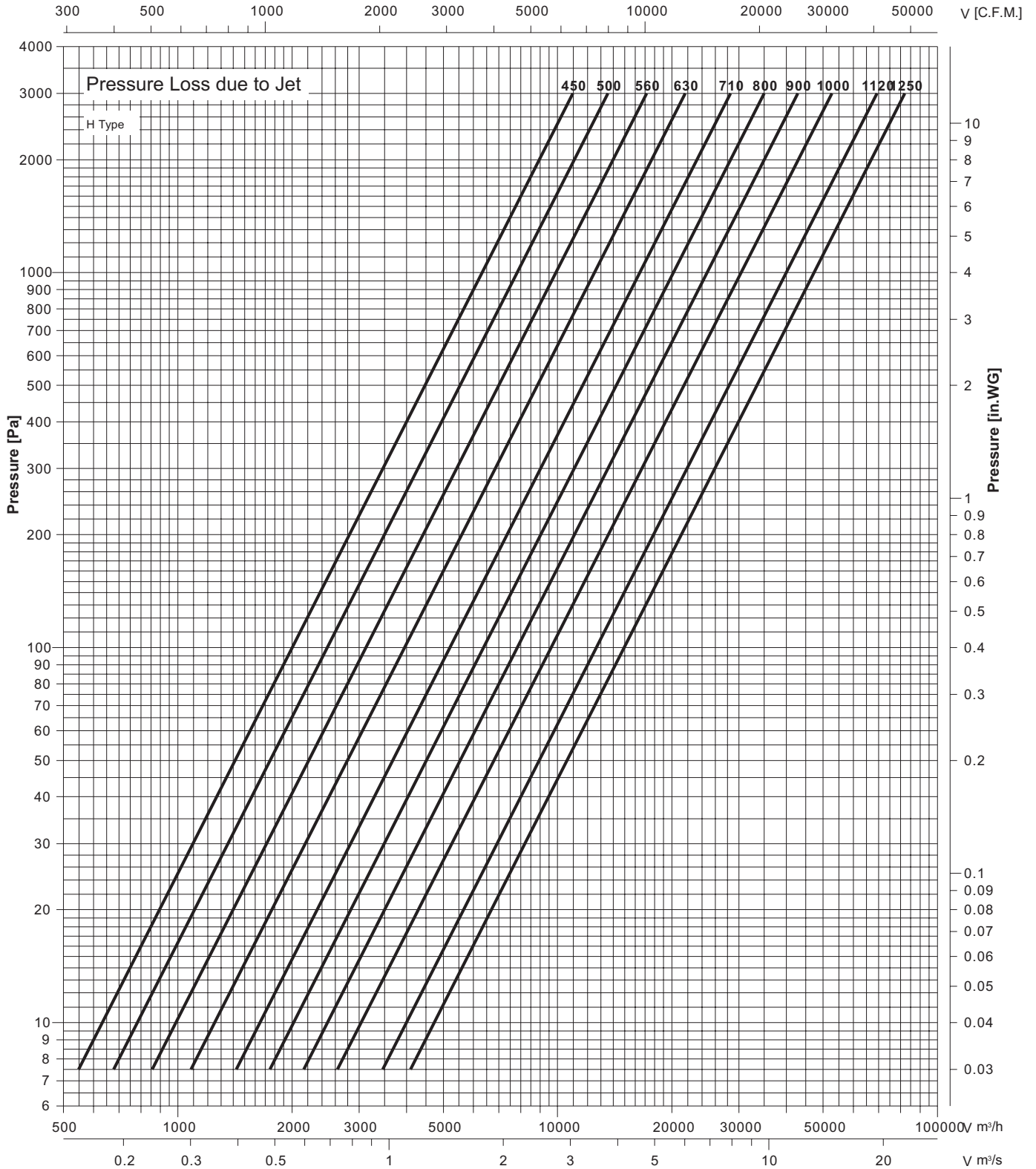
**Pressure Loss due to Jet Action (S Type)
Fan Sizes CHEM 450 to 1250**



**Pressure Loss due to Jet Action (H Type)
Fan Sizes CHEM 125 to 400**



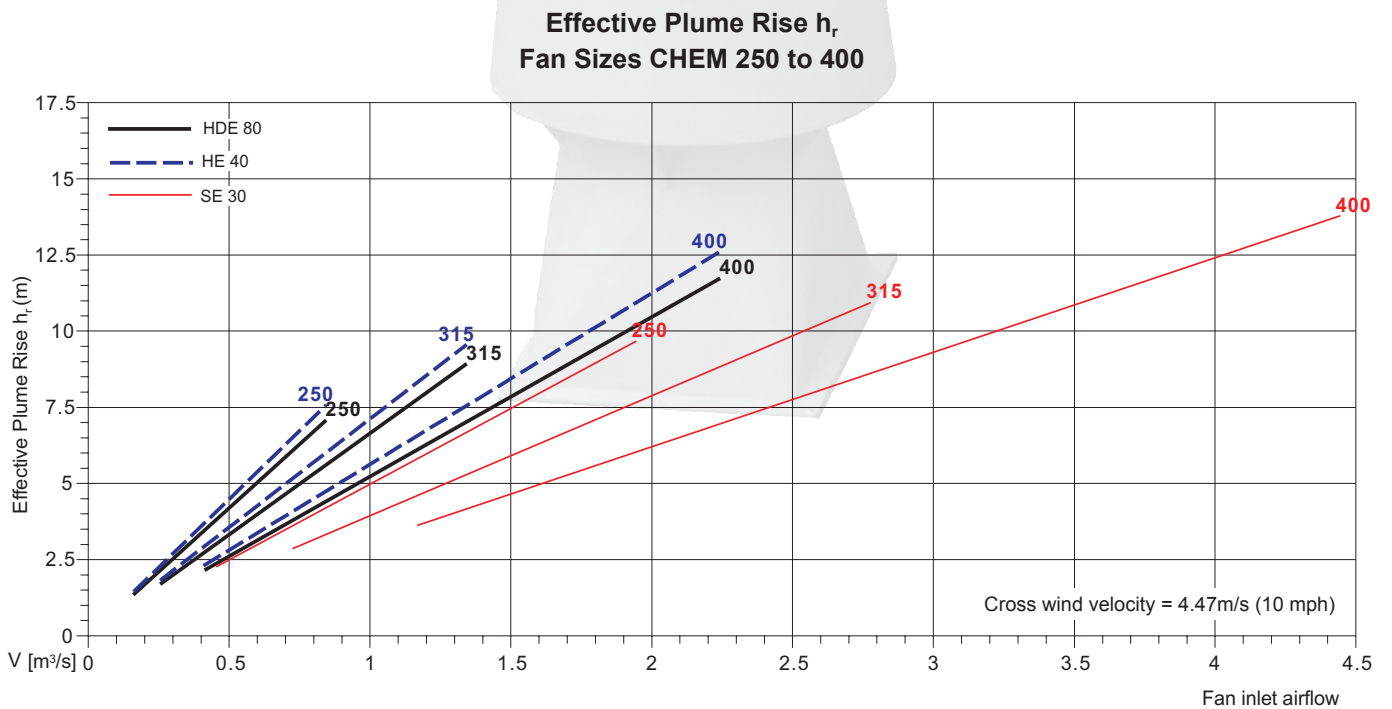
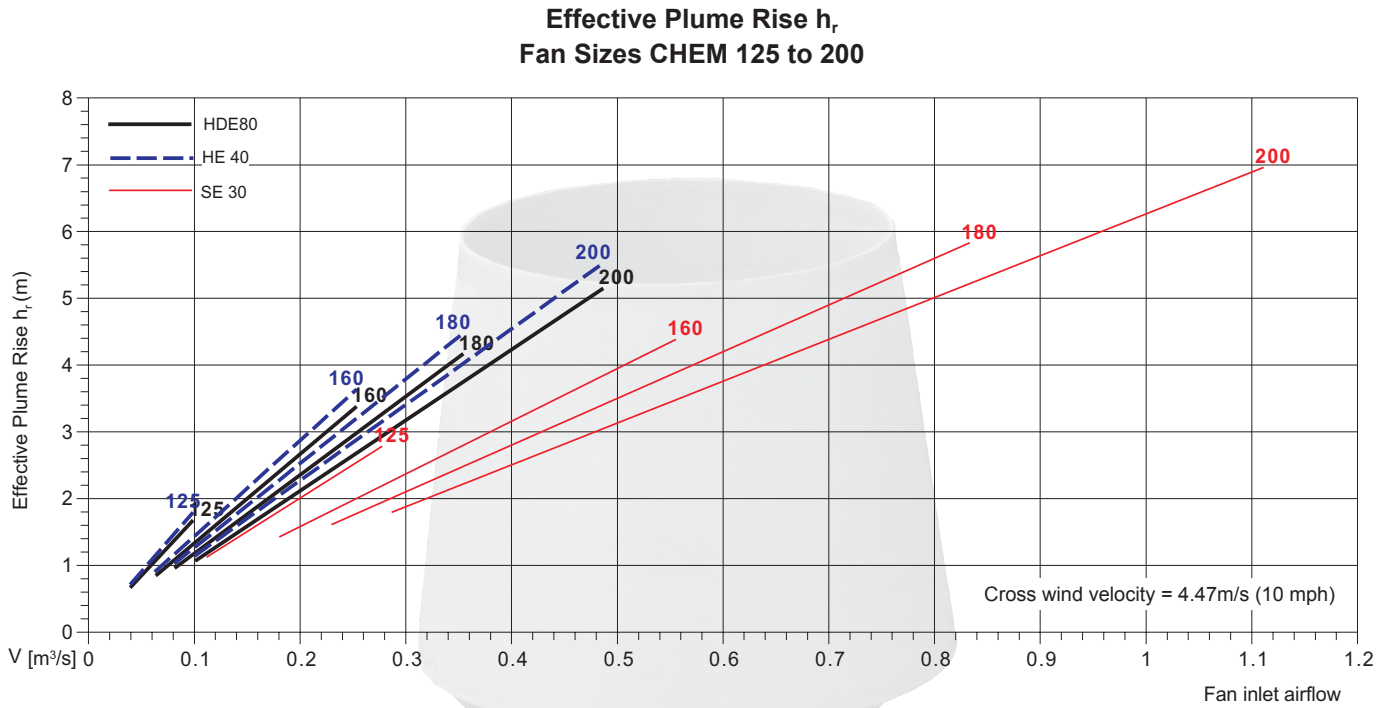
Pressure Loss due to Jet Action (H Type) Fan Sizes CHEM 450 to 1250



Chemical Resistant Fume Jet

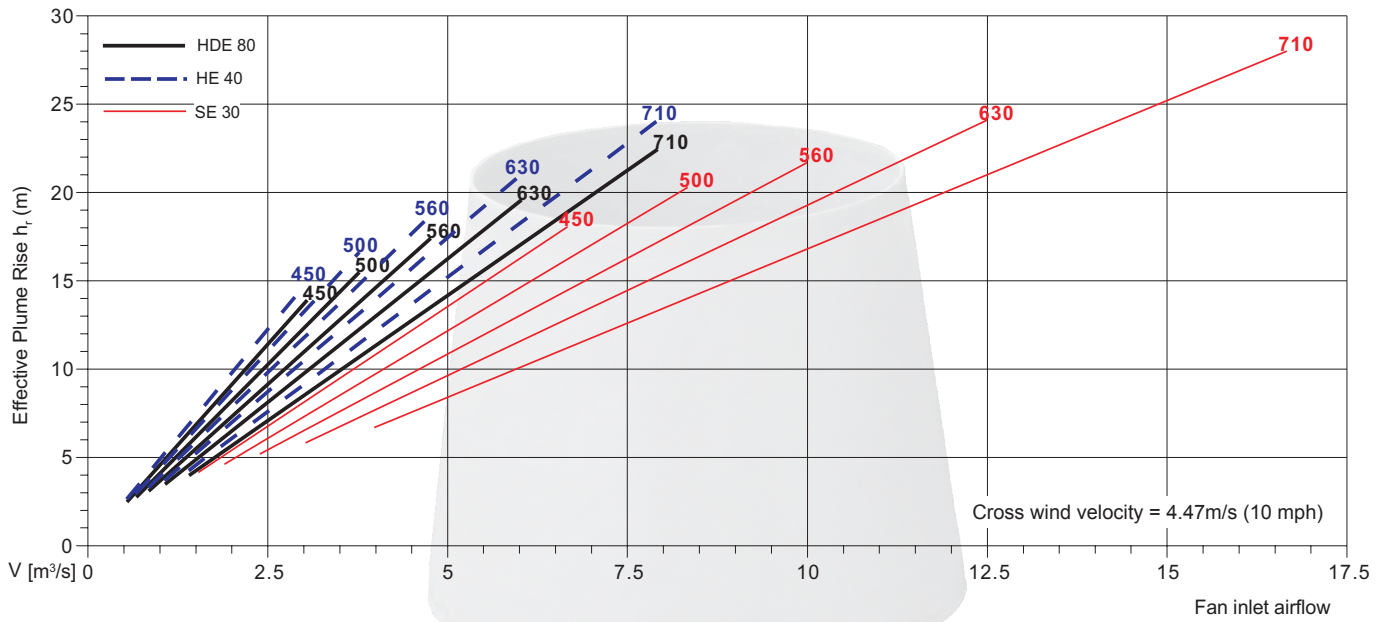


Fume Jet Models: HDE 80, HE 40 and SE 30

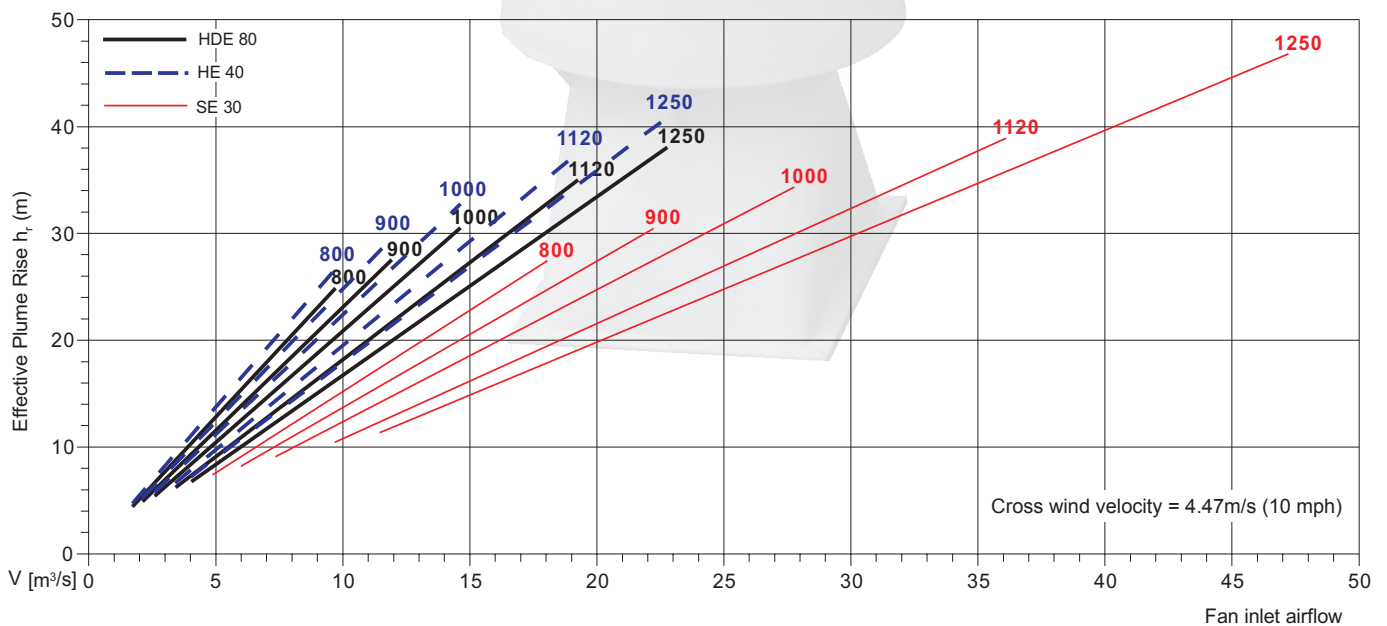


Fume Jet Models: HDE 80, HE 40 and SE 30

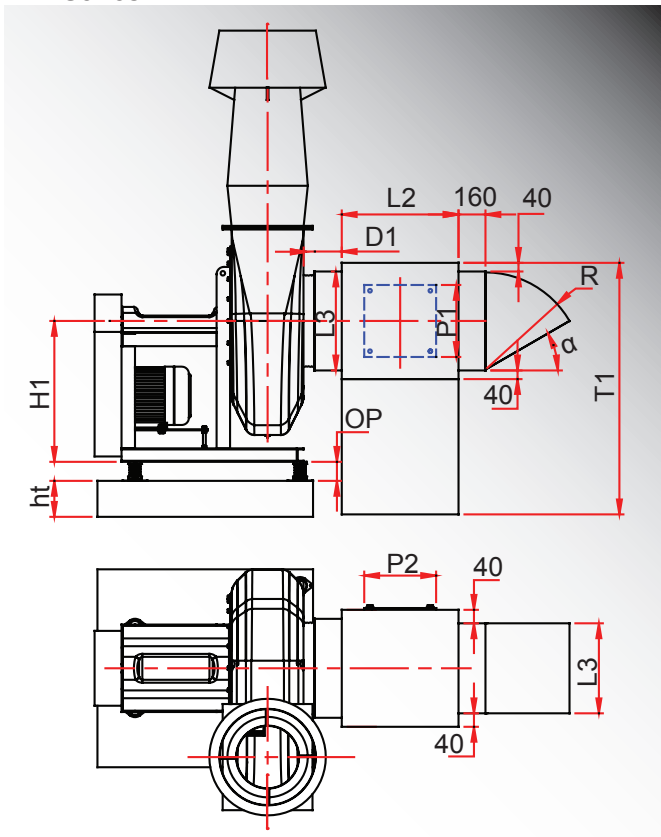
Effective Plume Rise h_r ,
Fan Sizes CHEM 450 to 710



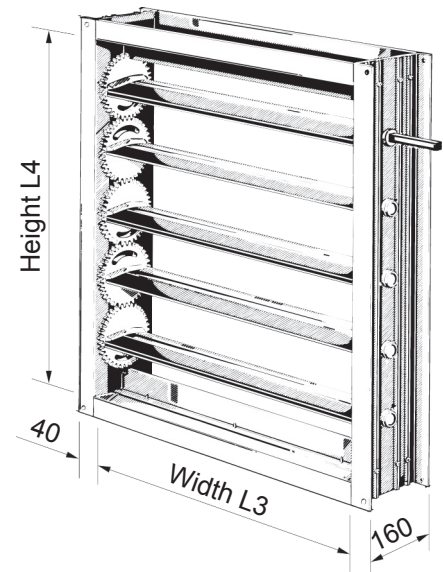
Effective Plume Rise h_r ,
Fan Sizes CHEM 800 to 1250



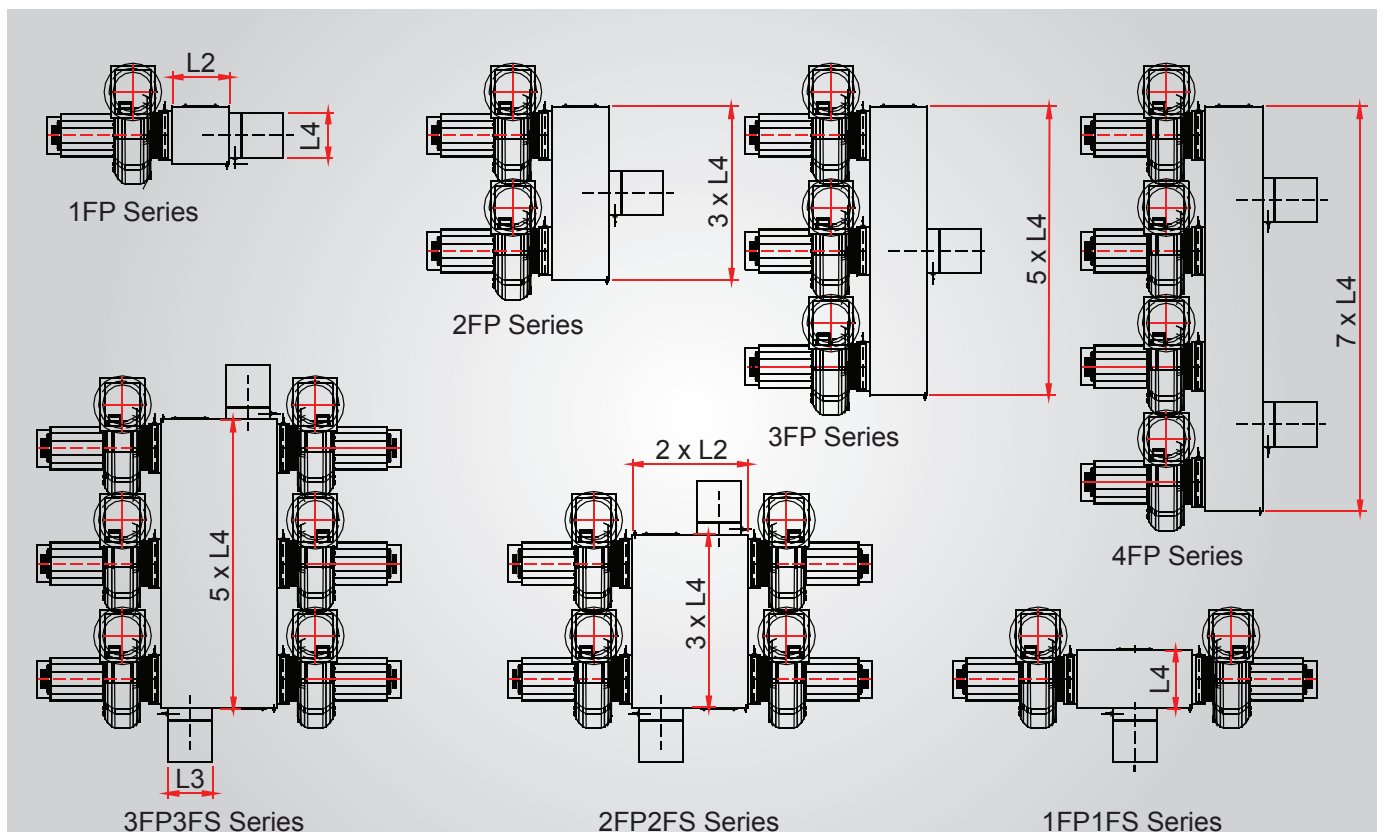
1FP Series



Damper



Various type of preferred plenum layout system



Chemical Resistant Fume Jet



Dimensions

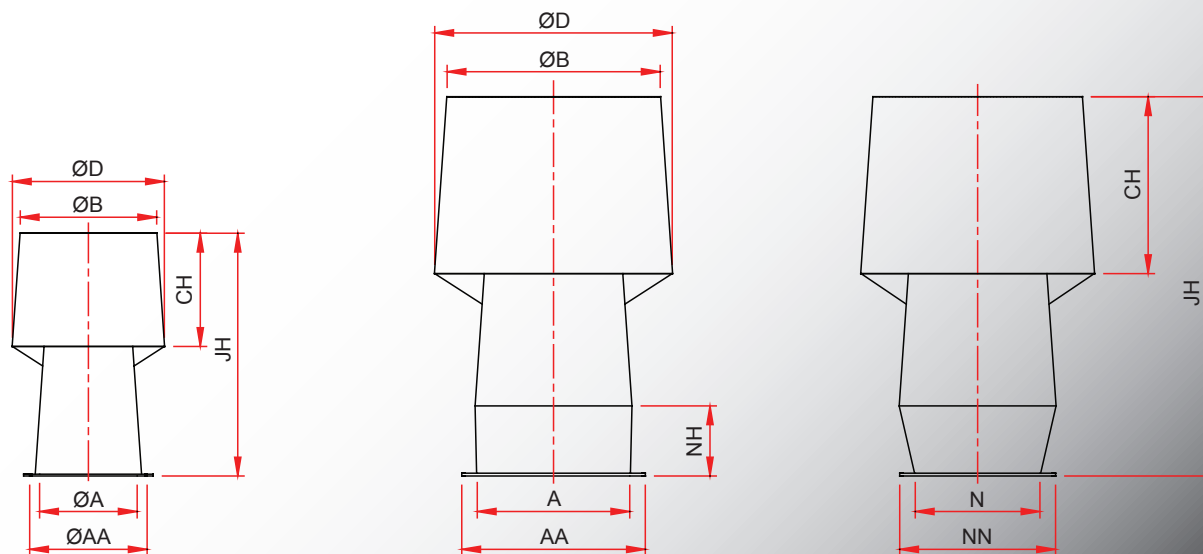
Fan Model size	D1 [mm]	L2 [mm]	L3 [mm]	L4 [mm]	Area* [m2]	H1 [mm]	ht [mm]	OP [mm]	P1 [mm]	P2 [mm]	R [mm]	α [°]	T1 [mm]
125	190	210	210	160	0,0288	278	150	50	140	190	160	30	598
160	190	210	210	310	0,0558	341	150	50	290	190	310	30	736
180	190	240	210	310	0,0558	377	150	50	290	190	310	30	772
200	210	260	310	310	0,0822	414	150	50	290	290	310	30	809
250	210	310	310	310	0,0822	529	200	90	290	290	310	30	964
315	210	410	410	460	0,1610	605	200	90	400	390	460	30	1165
400	235	410	410	460	0,1610	632	200	90	400	390	460	30	1192
450	235	460	510	460	0,2001	685	200	90	400	400	460	30	1245
500	235	510	510	610	0,2654	783	200	90	400	400	610	30	1418
560	235	610	610	610	0,3172	870	200	90	400	400	610	30	1505
630	235	710	710	760	0,4598	939	200	90	400	400	760	30	1649
710	235	760	810	760	0,5244	1030	250	90	400	400	760	30	1790
800	235	810	810	910	0,6279	1130	250	114	400	400	910	30	1989
900	235	1010	1010	1060	0,9116	1278	250	114	400	400	1060	30	2212
1000	235	1060	1010	1060	0,9116	1375	300	114	400	400	1060	30	2359
1120	235	1120	1010	1060	0,9116	1550	300	114	400	400	1210	30	2609
1250	235	1360	1010	1060	0,9116	1700	300	114	400	400	1360	30	2834

* Damper fully open area.

Chemical Resistant Fume Jet



Fume Jet Nozzles (S Type: SE 30)



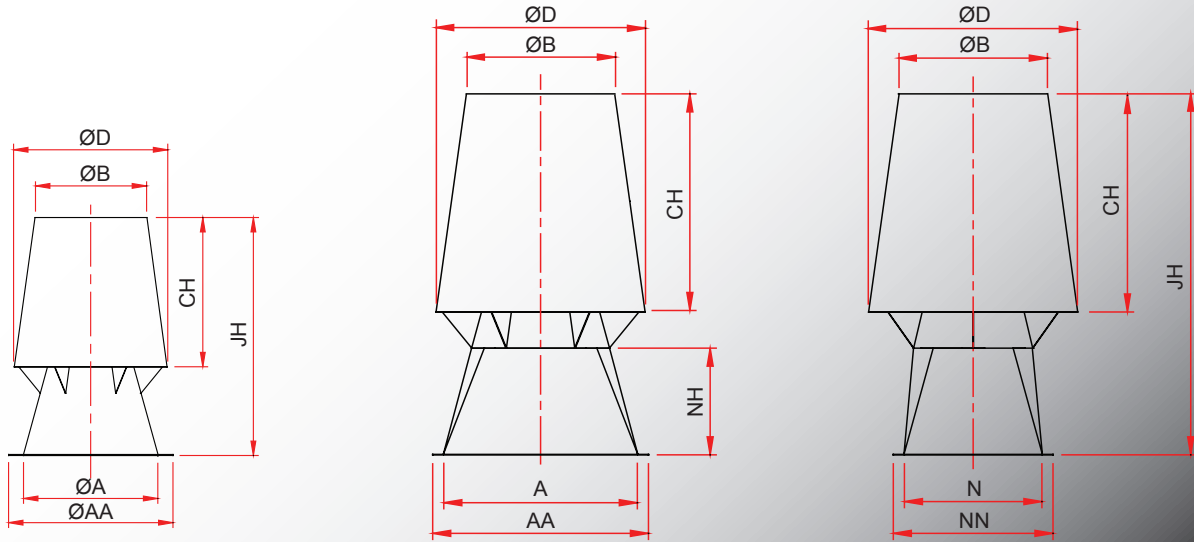
Fan model Size	AA [mm]	NN [mm]	A [mm]	N [mm]	B [mm]	D [mm]	CH [mm]	NH [mm]	JH [mm]	Fan Height [mm]
125	185	-	121	-	166	185	137	-	240	448
160	220	-	154	-	211	235	175	-	305	559
180	240	-	174	-	238	266	198	-	345	636
200	260	-	194	-	266	296	220	-	384	667
250	310	-	245	-	335	374	278	-	485	854
315	375	-	309	-	423	472	351	-	612	1018
400	480	-	392	-	537	599	445	-	777	1147
450	530	450	440	360	615	686	510	202	1091	1152
500	590	500	490	400	684	763	568	224	1214	1301
560	650	550	550	450	768	858	638	252	1364	1451
630	720	605	620	505	864	965	717	283	1534	1595
710	810	680	710	580	991	1106	823	325	1760	1770
800	940	700	830	590	1081	1206	897	354	1919	1960
900	1065	785	945	665	1224	1367	1016	401	2174	2200
1000	1186	886	1034	748	1358	1516	1127	445	2412	2420
1120	1325	992	1176	838	1533	1711	1273	503	2722	2700
1250	1439	1065	1291	917	1681	1876	1395	551	2984	3000

We reserve the right to alter measurements without notice in case of technical improvements

Chemical Resistant Fume Jet



Fume Jet Nozzles (H Type: HE 40)

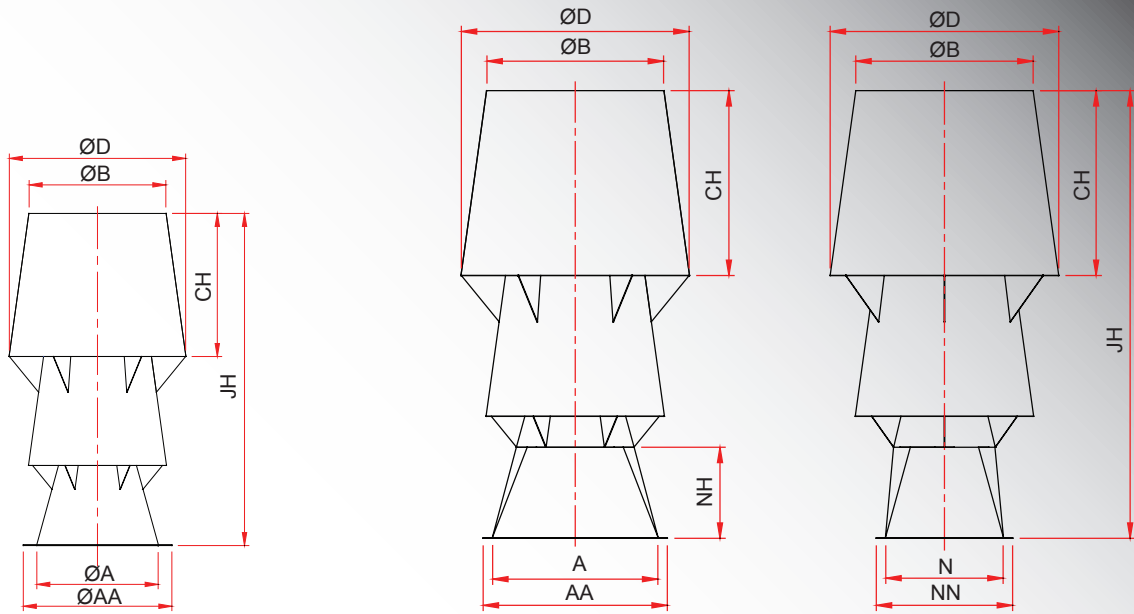


Fan model Size	AA [mm]	NN [mm]	A [mm]	N [mm]	B [mm]	D [mm]	CH [mm]	NH [mm]	JH [mm]	Fan Height [mm]
125	185	-	121	-	99	137	138	-	217	448
160	220	-	154	-	125	174	176	-	276	559
180	240	-	174	-	142	197	198	-	312	636
200	260	-	194	-	158	219	221	-	348	667
250	310	-	245	-	200	277	279	-	440	854
315	375	-	309	-	252	349	352	-	554	1018
400	480	-	392	-	319	443	447	-	703	1147
450	530	450	440	360	366	508	512	260	860	1152
500	590	500	490	400	407	565	569	289	957	1301
560	650	550	550	450	457	635	640	325	1075	1451
630	720	605	620	505	514	714	720	366	1210	1595
710	810	680	710	580	590	819	825	419	1387	1770
800	940	700	830	590	643	893	900	457	1513	1960
900	1065	785	945	665	729	1011	1020	518	1714	2200
1000	1176	886	1034	748	808	1122	1131	575	1901	2420
1120	1325	992	1176	838	912	1266	1277	649	2146	2700
1250	1439	1065	1291	917	1000	1388	1400	711	2352	3000

Chemical Resistant Fume Jet



Fume Jet Nozzles (H Type: HDE 80)



Fan model Size	AA [mm]	NN [mm]	A [mm]	N [mm]	B [mm]	D [mm]	CH [mm]	NH [mm]	JH [mm]	Fan Height [mm]
125	185	-	121	-	136	175	142	-	330	448
160	220	-	154	-	173	223	181	-	420	559
180	240	-	174	-	196	252	205	-	474	636
200	260	-	194	-	218	281	228	-	529	667
250	310	-	245	-	275	355	288	-	668	854
315	375	-	309	-	347	448	363	-	842	1018
400	480	-	392	-	441	569	461	-	1068	1147
450	530	450	440	360	505	651	528	260	1278	1152
500	590	500	490	400	562	724	587	289	1422	1301
560	650	550	550	450	631	814	660	325	1598	1451
630	720	605	620	505	710	915	742	366	1797	1595
710	810	680	710	580	814	1050	851	419	2061	1770
800	940	700	830	590	888	1145	928	457	2248	1960
900	1065	785	945	665	1005	1297	1051	518	2546	2200
1000	1176	886	1034	748	1115	1439	1166	575	2825	2420
1120	1325	992	1176	838	1259	1624	1317	649	3189	2700
1250	1439	1065	1291	917	1380	1780	1443	711	3495	3000

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