Duct Silencer

Application Notes

Whenever ventilation is required in the enclosed compartment and at the same time noise is to be controlled, installing duct silencers or attenuator are the best way to solve the problem. The silencers permit air to flow through while reduce the noise by absorbing it.

In selecting a silencer, a balance between noise attenuations and pressure drop need to be considered carefully. By using internally developed software, **ISTIQ NOISE CONTROL** can help to make the right choice quickly and most importantly, accurately.

Introduction

ISTIQ DUCT SILENCER are designed to efficiently reduce noise by generator sets, air handling systems, compressor, blower system and all situations requiring air intake and outlet for these equipments to operate.

A duct silencer should always positioned in the plant room and if possible as close to the noise source as possible. Normally for a single equipment, two units of duct silencers - intake and discharge is required to effectively reduce the noise to a desired level.

Construction
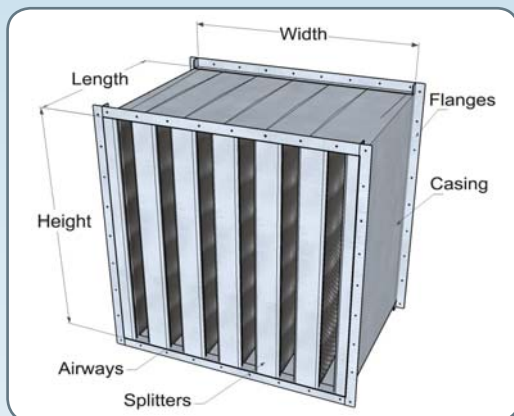
ISTIQ DUCT SILENCER are available in two different models, which basically have two different thicknesses of splitters - 200 mm and 300 mm. The thicker the splitter the better performance at lower frequencies. Each of the models have six length sizes from 900 to 3000 mm. The cross sectional area has no limited size. The performance or the insertion loss of each model is shown in the table 1.

ISTIQ DUCT SILENCER will be supplied in sections whenever the silencer dimension exceeded 2100W x 2100H x 2100mmL. This will make the transportation and installation easier. The assembly of sectionalized silencers to be done at site.

Features

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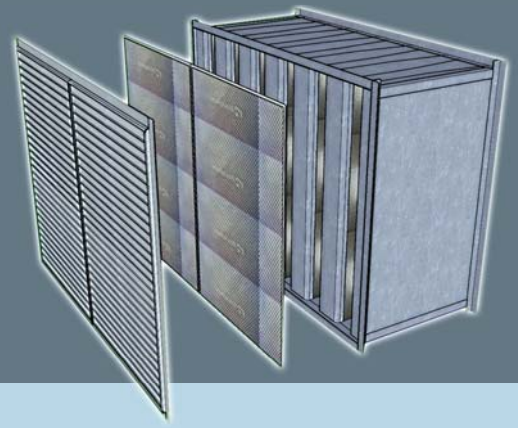
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Selection Guidelines

The right selection of silencer should gives the essential attenuation at a permissible amount of pressure drop of a given air requirement. The selection method therefore can be simplified as follows :

- Establish the noise target. Noise target could be in noise overall value or in NC criteria as recommended in Table 1.
- Obtain the noise level of the source,
- Calculate the difference of the level between the noise target and the noise source. Should there is any distance involve or any condition which noise will reduce naturally, it should be considered.
- Match up the difference of the level with the insertion loss of **ISTIQ** silencer and select the model as shown in Table 2.
- The silencer can be sized up by knowing the airflow requirement and the allowable pressure drop across the silencer by using the formulae below:

$$\text{Pressure Drop} = kv^2$$
$$\text{where } v = \frac{\text{Air Flow in m}^3\text{/s}}{\text{Width x Height in m}^2}$$

And k as listed in Table 3.

For detailed procedures of calculating the required attenuation, ISTIQ Engineers will be glad to help.

Table 1: Recommended NC Curves for Different Environment

Environments	Acceptable NC Curves
Heavy Industrial Factory	55 - 75
Light Industrial Factory	45 - 65
Hotel Kitchens	40 - 50
Swimming Pools and Sports Areas	35 - 50
Department Stores and Shops	35 - 45
Restaurants, Bars, Cafeteria, and Canteens	35 - 45
Plant Room Offices	45 - 55
General Offices	35 - 45
Private Offices, Libraries, Courtrooms & Schools	30 - 35
Home and Bedrooms	25 - 35
Hospital Wards and Operating Theaters	25 - 35
Cinemas, Assembly Halls & Mosques/Churches	30 - 35
Concert Halls	25 - 30
Broadcasting and Recording Studios	20 - 30

NC Curves

Frequency	63	125	250	500	1k	2k	4k	8k
NC 65	80	75	71	68	66	64	63	62
NC 60	77	71	67	63	61	59	58	57
NC 55	74	67	62	58	56	54	53	52
NC 50	71	64	58	54	51	49	48	47
NC 45	67	60	54	49	46	44	43	42
NC 40	64	57	50	45	41	39	38	37
NC 35	60	52	45	40	36	34	33	32
NC 30	57	48	41	35	31	29	28	27
NC 25	54	44	37	31	27	24	22	21
NC 20	51	40	33	26	22	19	17	16

NC Curve

ISTIQ
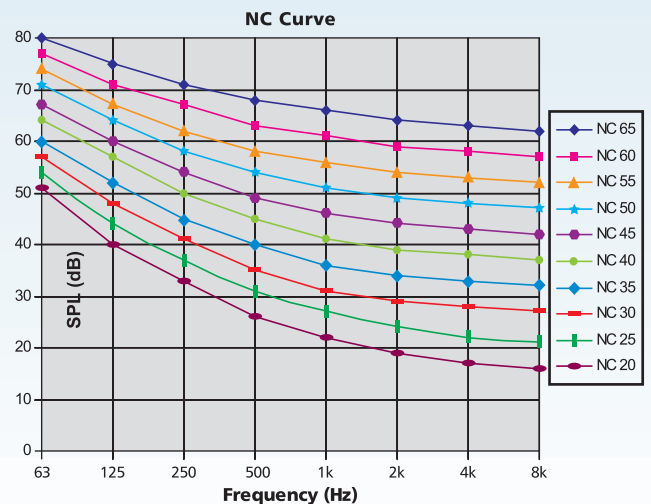
Duct Silencer

Acoustic Performance

Rectangular Splitters Silencer Performance

The Insertion Loss of the Silencers performance below have been determined in accordance to BS 4718 : 1971 - Method of Test for Silencers for Air Distribution System.

**Table 2 : Data of Insertion Loss in dB**

MODEL I -2S 27

Length (mm)	63	125	250	500	1k	2k	4k	8k
900	5	12	19	23	42	34	29	23
1200	6	16	25	40	47	39	35	30
1500	7	19	29	45	53	43	37	31
1800	7	20	36	52	54	49	39	33
2400	10	25	43	58	60	57	42	36
3000	11	28	48	61	62	59	45	38

MODEL I -2S 33

Length (mm)	63	125	250	500	1k	2k	4k	8k
900	3	7	14	28	38	40	30	20
1200	4	10	16	30	43	45	33	23
1500	6	15	23	39	45	48	36	26
1800	7	18	30	44	48	51	40	30
2400	9	21	37	48	51	55	45	34
3000	11	25	43	55	57	60	49	37

MODEL I -2S 38

Length (mm)	63	125	250	500	1k	2k	4k	8k
900	3	7	14	25	31	30	22	15
1200	4	12	20	29	40	42	32	21
1500	6	15	24	35	43	45	40	25
1800	7	17	30	44	45	48	43	28
2400	8	19	34	55	48	48	46	30
3000	9	22	39	60	55	53	51	33

MODEL I -2S 43

Length (mm)	63	125	250	500	1k	2k	4k	8k
900	3	9	12	18	24	22	18	12
1200	5	11	16	23	33	30	20	14
1500	5	14	22	29	37	33	22	16
1800	6	15	26	34	40	35	24	18
2400	7	16	29	38	50	41	28	20
3000	8	18	35	43	54	45	32	21

MODEL I -3S 33

Length (mm)	63	125	250	500	1k	2k	4k	8k
900	8	12	17	21	28	21	16	14
1200	9	16	23	27	31	27	21	16
1500	11	18	28	34	38	32	25	19
1800	12	21	32	39	44	35	29	21
2400	14	24	42	48	52	45	36	26
3000	16	29	45	50	52	48	41	29

MODEL I -3S 40

Length (mm)	63	125	250	500	1k	2k	4k	8k
900	7	12	14	26	28	17	15	14
1200	8	13	20	30	32	20	18	16
1500	9	16	13	35	36	25	20	18
1800	12	18	28	39	40	29	21	17
2400	13	21	37	48	50	35	26	20
3000	14	25	45	55	55	45	30	22

MODEL I -3S 45

Length (mm)	63	125	250	500	1k	2k	4k	8k
900	4	10	14	21	22	14	12	9
1200	5	12	19	26	23	18	15	10
1500	6	14	22	30	29	21	17	12
1800	8	16	25	35	34	23	19	14
2400	11	20	30	45	42	28	21	17
3000	14	24	41	49	51	34	22	20

MODEL I -3S 50

Length (mm)	63	125	250	500	1k	2k	4k	8k
900	3	9	12	18	14	13	11	10
1200	5	11	16	23	18	14	12	11
1500	5	14	22	29	25	16	14	12
1800	6	15	26	29	30	18	15	13
2400	7	16	29	38	42	25	17	14
3000	11	18	35	40	45	28	18	16

Table 3: Silencer Loss Coefficient Factor (k)

| MODEL Length	I - 2S 27	I - 2S 33	I - 2S 38	I - 2S 43	I - 3S 33	I - 3S 40	I - 3S 45	I - 3S 50
900	3.29	1.90	1.20	0.80	2.91	1.71	1.18	0.83
1200	3.73	2.10	1.36	0.90	2.94	1.73	1.19	0.85
1500	4.17	2.35	1.52	1.00	2.97	1.75	1.19	0.85
1800	4.61	2.60	1.68	1.11	3.00	1.76	1.20	0.86
2400	5.48	3.09	2.00	1.32	3.04	1.79	1.21	0.87
3000	6.36	3.59	2.32	1.53	3.11	1.81	1.23	0.89

Applications

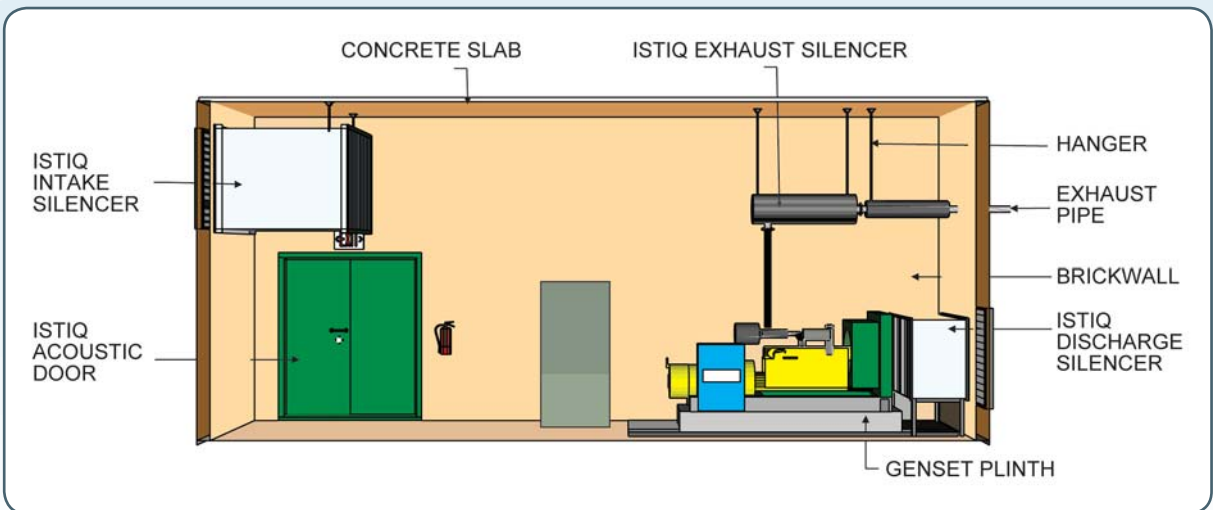Some typical ISTIQ Duct Silencer applications and installations.
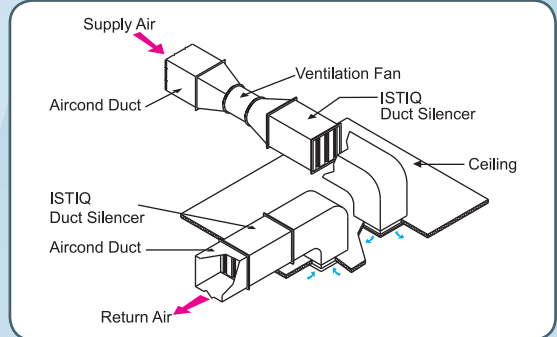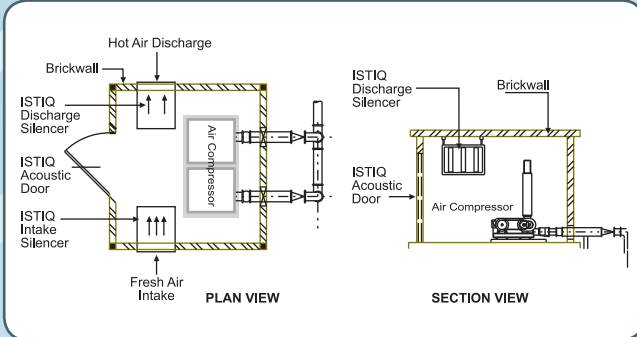
ACOUSTIC TREATMENT ON COMPRESSORS

ACOUSTIC TREATMENT FOR VENTILATION SYSTEM
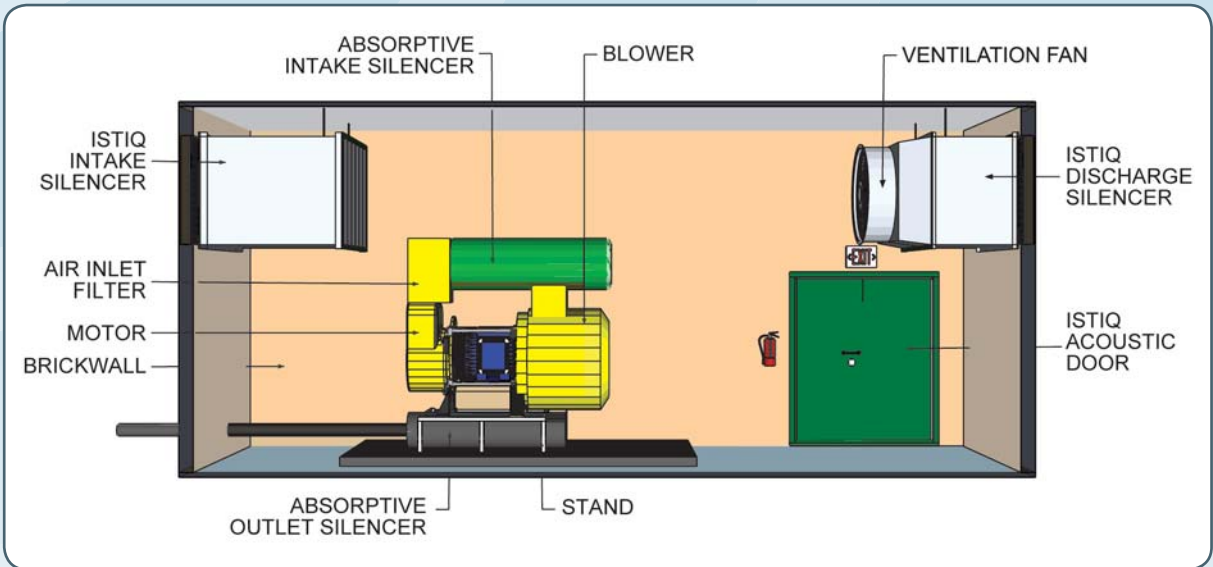
ACOUSTIC TREATMENT ON BLOWERS

ACOUSTIC TREATMENT ON DIESEL GENSET