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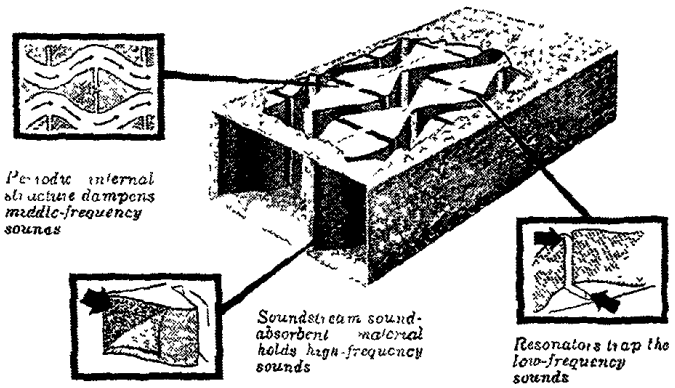
KOPPERS COMPANY, INC.

METAL PRODUCTS DIVISION

Sound Control Department • **Baltimore 3, Maryland**

Aircoustat®

INDUSTRIAL SOUND TRAPS



The Aircoustat broad band sound trap is a *fully effective means of suppressing* air-handling system noises of all frequencies in the audio range Its design is based on the Soundstream* principle used to silence aircraft jet engines.

All Aircoustat units are constructed entirely of galvanized sheet steel and are fitted with suitable flanges or fittings to make a quick, airtight connection with all ductwork.

The guaranteed decibel reduction and pressure drop resulting from installation of Aircoustat units is in every case clearly defined to the satisfaction of the architect and the consulting engineer

There are six basic types of Aircoustat units, each available in many sizes. They provide appropriate sound suppression for the full range of noise criteria demands, from the lowest—such as restaurants and general offices, to the highest – which includes studios and recording booths. Listed below are the sound attenuations in decibels for each of the basic Aircoustat units This range of application enables the air-handling engineer to maintain particular design *criteria reductions* commensurate with the permissible loss for given conditions

SOUND ATTENUATION FOR AIRCOUSTAT (IN DECIBELS)

Octave Band Frequency (CPS)	JA (2')	J (1')	STD A (5')	SA (6')	STD (7')	S (8')
37 5-75	4	6	8	10	12	20
75-150	6	8	11	16	21	27
150-300	10	13	22	25	27	46
300-600	21	31	38	47	50	60
600-1200	30	43	54	57	68	68
1200-2400	33	40	57	60	62	70
2400-4800	34	37	55	57	59	67
4800-10000	32	34	50	53	55	64

* See page 1011 ff of this Catalog for further information and tables

For complete information, data books, and free literature, write or contact the Sound Control Department, Koppers Company, Inc., 201 Scott St., Baltimore, Maryland.

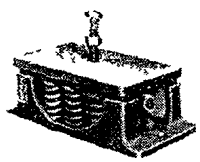
The Korfund Company, Inc.

48-01R 32nd Place, Long Island City 1, New York

Representatives in Principal Cities. See "KORFUND" in local phone directory or in "Thomas' Register."

Specialists in Vibration & Noise Control for Over Half a Century.

For a discussion of vibration control theory and chart for determining deflections required, see "Controlling Vibration From Machine Mountings" at end of Chapter 40. If in doubt about product selection, submit data on make, type, rpm and model number of equipment, and type of floor for specific recommendations; no obligation



Series L Isolator

STEEL SPRING VIBRO ISOLATORS provide greater deflections with isolation efficiencies approaching 100 percent. Though more expensive than rubber or cork, they are satisfaction guaranteed and provide maximum overall economy because: they eliminate bolting, speed equipment installation, usually eliminate special foundations, permit trouble-free upper floor installations, and will usually outlast the machine.

THE SERIES L VIBRO ISOLATORS contain from one to twelve steel springs of proper stiffness depending upon the loading and deflection desired. Loading: 75 to 23,000 lb. Maximum deflection 2 in. (special designs available for higher loads or larger deflections). Isolators are usually installed directly under machines (occasionally under steel bases or foundations supporting equipment). They have adjustable snubbers to control movement and built-in leveling bolts, a *Korfund feature for over 30 years.*



Vibro-Hanger

SERIES V VIBRO HANGERS: load range 20 lb to 3,800 lb. Maximum normal deflection 1 in. (larger deflections on request). For suspended equipment installations, also as vibration-absorbing pipe hanger.

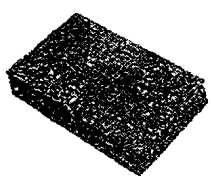
RUBBER AND CORK provide good sound insulation. However, rubber is not very effective as a vibration absorber for disturbances below 1200 cpm, is fair from 1200-1800, and good above 1800. Cork is effective only above 1800 cpm.



Elasto-Rib Pad

SERIES R RUBBER-IN-SHEAR HANGERS: Similar to spring hanger illustrated but incorporating rubber mountings of varying stiffnesses for loads from 10-1,000 lb.

ELASTO-RIB has a core of high-grade cork plate, permanently bonded between two layers of waffle embossed, Neoprene rubber. Just set the machine on Elasto-Rib—no fastening to floor is normally required but can be cemented or bolted if desired. Excellent sound insulation characteristics. Loading up to 60 lb per square inch. Also furnished as Elasto-Rib Dampers with load distributing top plate and built-in leveling bolt.



Vibracork

ARMSTRONG'S VIBRACORK & KORFUND LIGHT DENSITY MACHINERY CORK are strong, durable machinery isolation plates made of pure cork granules compressed and baked under pressure with accurately controlled density. Furnished in three densities for loads from 400-8,500 lb per square foot. 1 in., 2 in., 3 in., thicknesses. Plates 12 in. x 36 in.



Duplex Bases Motor Base with Built-in Slide Rails

DUPLEX TWIN RAIL FAN & MOTOR BASES: Rugged construction and built-in chocks to maintain alignment. Rubber or cork isolation. Advantages of separate fan and motor bases: no motor noise transmitted through ducts—complete adjustability permits job-site changes in motor position, belt length, rotation, equipment bolt location—quicker delivery of drawings and bases—easier handling—lower transportation costs. *INTEGRAL TYPE bases also available.*

FOR ADDITIONAL DATA, SEE SWEET'S FILES OR WRITE FOR COMPLETE CATALOG DATA

TABLE 4. LIMITS FOR TOXIC DUSTS, FUMES AND MISTS (Concluded)

SUBSTANCE	A.S.A. STANDARDS M.A.C. g/cu m[a]	THRESHOLD LIMIT VALUES, *A.C.G.I.H.* 1957 g/cu m[a]
Uranium		
(soluble compounds)		0.00005
(insoluble compounds)		0.00025
Vanadium		
(V_2O_5 dust)		0.0005
(V_2O_5 fume)		0.0001
(x) Warfarin (3-[α acetonylbenzyl]-4-hydroxycoumarin)		0.0005
Zinc oxide fumes		0.015
Zirconium compounds (as Zr)		0.005

[a] Grams of dust, fume, or mist per cubic meter of air.
(x) These values appeared on the *A.C.G.I.H.* tentative list, for 1956.
Radioactivity For permissible concentrations of radioisotopes in air, see "Maximum Permissible Amounts of Radioisotopes in the Human Body and Maximum Permissible Concentrations in Air and Water," Handbook 52, U. S. Department of Commerce, *National Bureau of Standards*, March, 1953. In addition, see "Permissible Dose from External Sources of Ionizing Radiation," Handbook 59, *U. S. Department of Commerce, National Bureau of Standards*, September 24, 1954.
Table 4 values reprinted by permission from *A.M.A. Archives of Industrial Health*, September 1957, Vol. 16, pp. 261-265.

temperature scale. It may be defined as the temperature to which a combustible liquid must be heated to produce a flash when a small flame is passed across the surface of the liquid. The higher the flash point, the more safely can the liquid be handled. Liquids with flash points under 70 F should be regarded as highly flammable.

Upper and lower limits of flammability of gases and vapors, and the flash points of the corresponding liquids are given in Table 6.

Methods for estimating the flammable limits of mixtures of gases or vapors must be applied with caution; the reader is referred to other publications for this information.[12, 13]

Design of equipment for the control of combustible anesthetics is outlined in Chapter 7. Construction of equipment for handling air containing flammable substances, or operating in atmospheres so contaminated, is discussed in Chapter 45.

It is customary to report the concentrations of flammable gases or vapors in percent by volume, or *volume percent*. Comparison with concentrations on the *part per million* scale used in chemical, medical or industrial hygiene literature is readily made by the conversion: 1 percent = 10,000 ppm (parts of contaminant per million parts of air, by volume, or in other

TABLE 5 LIMITS FOR MINERAL DUSTS

SUBSTANCE	THRESHOLD LIMIT VALUES *A.C.G.I.H.* 1956 mppcf[a]
Aluminum oxide	50
Asbestos	5
Carborundum	50
Cement Portland	50
Dust (nuisance, no free silica)	50
Mica (below 5% free silica)	20
Silica—high (above 50% free SiO_2)	5
Silica—medium (5 to 50% free SiO_2)	20
Silica—low (below 5% free SiO_2)	50
Slate (below 5% free SiO_2)	50
Silicon carbide	50
Soapstone (below 5% free SiO_2)	20
Talc	20

[a] mppcf—million particles per cubic foot of air, standard light field count
Table 5 values reprinted by permission from *A.M.A. Archives of Industrial Health*, September 1957, Vol. 16, pp. 261-265.

words, cubic feet of contaminant per million cubic feet of air). It will be noted in Table 6 that nearly all of the substances listed have lower explosive limits above 1.0 percent, while the *maximum allowable concentrations* for gases and vapors in Table 3 are below 1000 ppm or 0.1 percent in most cases. Therefore, control of toxic or injurious vapors to levels below their maximum allowable concentrations for health usually requires much more effective ventilation than for the prevention of a fire hazard.

COMBUSTIBLE DUSTS

A dust explosion is essentially a sudden pressure rise caused by the very rapid burning of airborne dust. The primary explosion often originates from a small amount of dust in suspension exposed to a source of ignition and the pressure and vibration it creates may be sufficient to dislodge large accumulations of dust on horizontal ledges or surfaces of the building and equipment, thereby creating a secondary explosion of great force. Thus the air conditioning engineer is involved for two reasons: (1) to obtain a movement of dust-laden air into exhaust hoods or openings, and through ventilating or pneumatic conveying ducts, in a manner that will prevent accumulation of highly flammable dust at points where it could ignite inside the equipment; and (2) to so design *process ventilation* as to prevent the escape of dust which might settle on horizontal surfaces and become a potential source of disaster at some distance from the dusty operation. (See Chapter 45).

Intensity of a dust explosion depends upon: chemical and thermal properties of the dust; particle size and shape; concentration in air; proportion of inert dust in the air; moisture content and composition of the air; size and temperature of the ignition source; and degree of dispersion of the dust cloud. Investigations on the explosibility of dusts require determination of the maximum pressure developed during explosion of a known air concentration, as well as determination of the rate of pressure rise. Investigators frequently experience difficulty in obtaining dust suspensions of uniform dispersion, and this should be kept in mind when comparing results from several sources.[14]

Minimum explosive concentrations of airborne dusts already tested range from 0.01 to 0.5 oz per cubic foot, or 10 to 500 grams per cubic meter of air. Maximum pressures generated have been reported as high as 500 psi, although they are more likely to be of the order of 50 psi. Investigations on the flammable characteristics of dusts are currently made at 0.1 and 0.5 oz per cubic foot.[15-21]

ATMOSPHERIC POLLEN

Properties of pollen grains discharged by weeds, grasses and trees and responsible for hay fever, are of special interest to designers of air cleaning equipment (see Allergic Disorders in Chapter 7, and Air Cleaning, Chapter 33). Whole grains and fragments transported by the air range chiefly between 10 and 50 microns in size, but some have been measured as small as 5 microns, and others over 100 microns in diameter. Ragweed pollen grains are fairly uniform in size within the range of 15 to 25 microns. Pollen grains can be removed from the air more readily than the particles of dust prevalent in outdoor air or produced by dusty processes, since the latter predominate in the range of 0.1 to 10 microns in size.

Most grains are quite hygroscopic and therefore vary in weight with the humidity. Illustrations and data on individual pollen grains are available