**SAFETY AND HEALTH SERVICES REPORT**

Wausau Insurance Companies

2000 WESTWOOD DRIVE
WAUSAU, WISCONSIN 54401

**FOR**

E. W. Ostrander, Treasurer
Bird and Son, Incorporated
Washington Street
East Walpole, Massachusetts 02032

April 15, 1980

(13)

PLAINTIFF'S EXHIBIT

BIR-158

**CONCERNING** Aero Drive
Shreveport, Louisiana

**REPORTED BY** M. S. Freshwater, environmental health engineer; and
T. D. Hemmings, safety consultant; on March 3, 1980

**PERSONS CONTACTED**
Frank Burris, manufacturing manager
Michael W. Bottoms, personnel manager
Larry Batey, project engineer
Huey Haire, plant engineer

**REPORT SUMMARY**

ENVIRONMENTAL HEALTH ENGINEERING SERVICE

This survey was made at the request of Mr. Michael W. Bottoms, personnel manager, to determine the concentrations of silica dust, asbestos fibers, and fibrous glass to which selected employees are exposed during normal plant operations.

Air samples were collected and ventilation measurements were made.

The following comments and suggestions are based upon the results of this survey:

Air Sampling Program

1. Airborne asbestos samples were collected on 0.8 micron membrane filters, mounted open face downward in the breathing zones of the workers. The samples were subsequently returned to the laboratory (AIHA Accreditation Number 34) and analyzed using phase contrast microscopy. During the survey, the operator in the cement plant used the old mixer.

   The results given in Table I show that all the samples were well below the OSHAdministration permissible exposure limits. Since respiratory protection





*This report covers only conditions and practices observed and considered at the time of this call. It is not intended to indicate that any hazards are adequately controlled or that such conditions or practices meet the requirements of any applicable federal, state, or local law, regulation, or ordinance.*

***If you have any comments or questions concerning this report, write to G. B. Lemke, Vice-President, Safety & Health Services.***

*Consultative safety and health services are available to all policyholders, and we encourage you to contact your servicing safety*

was worn at these operations, actual exposure concentrations would have been lower than the sample results.

An analysis of a bulk sample of talc showed it to be nonfibrous.

2. Three airborne silica samples were collected on preweighed, five micron pore-sized membrane filters using the respirable mass sampling techniques described in "OSHA Standard Method for Respirable Gravimetric Dust Sampling." The samples were then returned to the laboratory, reweighed, and examined by X-ray diffractometry to determine the amounts of dust and the percentages of free crystalline silica present.

The results of the air sampling program are shown in Table II together with the OSHAdministration permissible exposure limits as calculated from the silica analyses (29 CFR 1910.1000, Table Z-3).

Sample number 3 exceeded the OSHA Standard, being almost five times the permissible exposure limit.

As indicated in sample number 4, the bulk sample of talc was also analyzed and found to contain five percent silica.

3. Two additional personal samples for fiberglass were collected on preweighed, 0.8 micron cellulose acetate filters mounted open face downward in each worker's breathing zone. The samples were returned to the laboratory, reweighed, and checked for fibrous glass using polarized light microscopy and X-ray diffraction.

The results given in Table III show that no fibrous glass was detected in either of the samples. However, both samples exceeded the OSHAdministration permissible exposure limit for nonasbestosform talc dust of six milligrams per cubic meter (29 CFR 1910.1000, Table Z-3). This value (six milligrams per cubic meter) is arrived at by converting the 20 million particles per cubic foot standard to a mass concentration based on the equivalence of six million particles per cubic foot equalling one milligram per cubic meter respirable mass and respirable mass equalling 50 percent total mass. This conversion is described in the "Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment for 1979," by the American Conference of Governmental Industrial Hygienists.

Using X-ray diffraction, approximately one percent free crystalline silica was detected in each sample which further increases the hazard potential. Since the method used was for the purpose of determining fiberglass exposures, additional samples would be needed for a more accurate assessment of the silica and talc exposures at these locations, if needed.

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The dust exposure is primarily from the handling of talc during "thread-up" operations. Total dust concentrations varied from 0.98 milligrams per cubic meter to 27 milligrams per cubic meter, depending on periods of felt breakdown. Results given in the table are average values or time weighted averages.

Ventilation Survey and Controls

4. Ventilation measurements made in the cement plant showed inflow velocities at the old mixer of 50 feet per minute (fpm) at the hood over the bag storage barrel and 500 to 700 fpm (from right side to left side, respectively) at the bag cutting and dumping station. At the new mixer, inflow velocities of 25 to 50 fpm were detected at the bag barrel and 300 to 380 fpm at the cutting and dumping station. These values can be compared to the recommended rate of 250 fpm. Reducing the open areas at the bag dumping hoods would increase ventilation effectiveness further.

   Duct velocities of 500 fpm and 350 fpm were measured at the bag barrel hoods of the old and new mixers, respectively. These rates are well below the minimum transport velocity of 3,500 fpm which is needed for self-cleaning systems.

5. Additional ventilation measurements were made at the hood over the top drum roll of number 9 section, FSPM number 1 line. Inflow velocities ranging from nondetected (less than 25 fpm) at the front and up to 80 fpm at the side of the hood were measured with the front lid up. When the lid was lowered, corresponding rates of 50 fpm and 100 fpm resulted.

   To improve dust control, it is advisable that the lid be lowered at all times, when possible. Further enclosing the roller by reducing the open area on the sides would also improve the ventilation control.

6. As mentioned in comment number 3, the main dust exposure to the dry felt men on FSPM number 1 line seemed to be from handling the talc during "thread-up." During the survey, the talc barrels were located against the wall causing the workers to have to carry handfuls of the talc a long distance to the rolls. If possible, the barrels or smaller containers should be located as close to the rolls as possible to reduce the talc handling time and distance. Since a lot of talc is spilled during the hand carrying process, this change would also seem to reduce the amount of talc that is wasted.

7. It is believed that some of the dust to which the slate man is exposed is from the talc on the top drum roll on number 9 section, FSPM number 1 line. Better control of this dust source (as previously described) should help to reduce his dust exposure. However, a substantial dust exposure comes during the sweeping of slate and from leaks in the material handling equipment.

Any steps that could be taken to minimize the need for sweeping and shoveling would help to reduce this exposure. Wetting the slate prior to sweeping/ shoveling would also reduce the amount of dust becoming airborne.

Material handling equipment needs to be as enclosed as possible and also be provided with exhaust ventilation to reduce escaping dust. Such dust sources include material transfer points, screens, conveyors, and bucket elevators. Enclosed are Prints VS-304 through VS-307 from "Industrial Ventilation" (Committee on Industrial Ventilation, Post Office Box 16153, Lansing, Michigan) which illustrate typical ventilation design specifications for these sources.

Until the dust exposure can be adequately controlled through engineering means, the slate operator should wear a NIOSH approved respirator for protection against silica dust.

8. A vacuum cleaner is used in the cement plant to clean up possible asbestos dust. To minimize the recirculation of the dust back into the workplace, you should check and make sure that the vacuum filter is of the high efficiency (HEPA) type and replaced with this type if not.

9. A respiratory protection program should be written and implemented for the employees who wear the protective devices. Items to be included in the program were discussed and are given in the OSHA Regulations (29 CFR 1910.134). For example, for respirators to be effective, they need to be properly fitted, maintained and cleaned, and stored.

   Specific respiratory and other requirements for asbestos exposures are given in the OSHA Regulations (29 CFR 1910.1001, Asbestos).

The aforementioned comments and suggestions, except for analytical results, were discussed with the gentlemen contacted (as aforementioned) at a meeting following the survey. The analytical results were given to Mr. Bottoms by telephone on March 14, 1980. Please let us know if we can be of further assistance.

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cc: Robert C. Roby (11)
Frank Burris

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TABLE I

CONCENTRATIONS OF ASBESTOS

Bird and Son, Incorporated
Shreveport, Louisiana
March 3, 1980

| Sample Number | Sample Location | Found Fibers/cc(2) | OSHA Acceptable(1) Fibers/cc(2) |
|---|---|---|---|
| 1 | FSPM number 3, dry felt man(3) | 0.2 | 2 |
| 2 | FSPM number 3, dry felt man(3) | 0.17 | 2 |
| 3 | Cement plant operator during cutting and dumping of bags(3) | 0.15 | 10(4) |
| 4 | Cement plant operator, time weighted exposure(3) | 0.07 | 2 |

(1) OSHA Acceptable - Title 29 Code of Federal Regulations Part 1910, Subpart Z, Section 1910.1001, Asbestos.

(2) Fibers/cc greater than 5 mu - Asbestos fibers per cubic centimeter of air greater than 5 microns in length.

(3) Operator wore respiratory protective device.

(4) Acceptable Ceiling Concentration.

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TABLE II

CONCENTRATIONS OF SILICA DUST

Bird and Son, Incorporated
Shreveport, Louisiana
March 3, 1980

| Sample Number | Sample Location | Percent Silica | Found mg./$M^3$(2) | OSHA Acceptable(1) mg./$M^3$(2) |
|---|---|---|---|---|
| 1 | FSPM number 1, foreman | 5 | 0.4 | 1.43 |
| 2 | FSPM number 1, coater operator | 5 | 0.3 | 1.43 |
| 3 | FSPM number 1, slate man | 12 | 3.4 | 0.71 |
| 4 | Talc, bulk sample | 5 | - | - |

(1) OSHA Acceptable - Title 29 Code of Federal Regulations Part 1910, Subpart Z, Section 1910.1000, Air Contaminants, Table Z-3.

(2) mg./$M^3$ - Milligrams of contaminant per cubic meter of air.

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## TABLE III

## CONCENTRATIONS OF FIBROUS GLASS

Bird and Son, Incorporated
Shreveport, Louisiana
March 3, 1980

| Sample Number | Sample Location | Total Dust mg./$M^3$(3) | Found Fibers/cc(2) | NIOSH Recommended Value(1) Fibers/cc(2) |
|---|---|---|---|---|
| 1 | FSPM number 1, dry felt man | 16.23 | ND(4) | 3 |
| 2 | FSPM number 1, dry felt man | 7.81 | ND(4) | 3 |

(1) Fibrous Glass Acceptable Airborne Concentration, as recommended by NIOSH "Criteria For a Recommended Standard...Occupational Exposure to Fibrous Glass."

(2) Fiberglass fibers per cubic centimeter of air equal to or greater than 10 microns in length and a diameter equal to or less than 3.5 microns.

(3) mg./$M^3$ - Milligrams of contaminant per cubic meter of air.

(4) ND - None detected.

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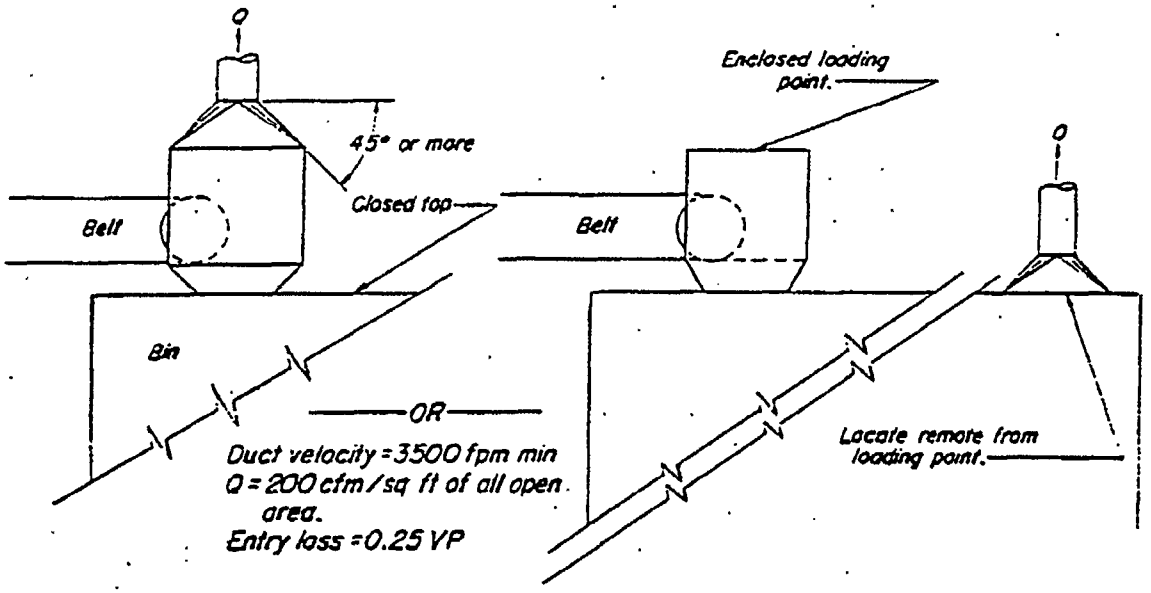
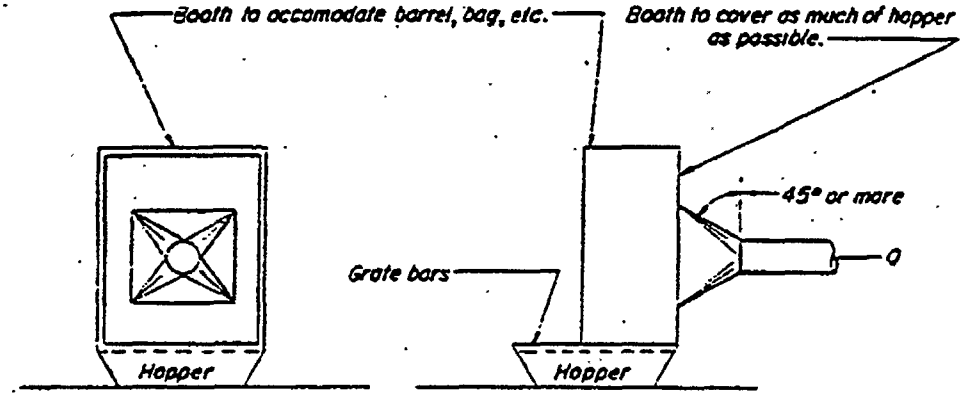



MECHANICAL LOADING *




Duct velocity = 3500 fpm minimum
Q = 150 cfm/sq ft face
Entry loss = 0.25 VP

MANUAL LOADING

*BELT SPEED — VOLUME

Less than 200 fpm - 350 cfm/ft of belt width. Not less than 150 cfm/ft of opening.

Over 200 fpm - 500 cfm/ft of belt width. Not less than 200 cfm/ft of opening.

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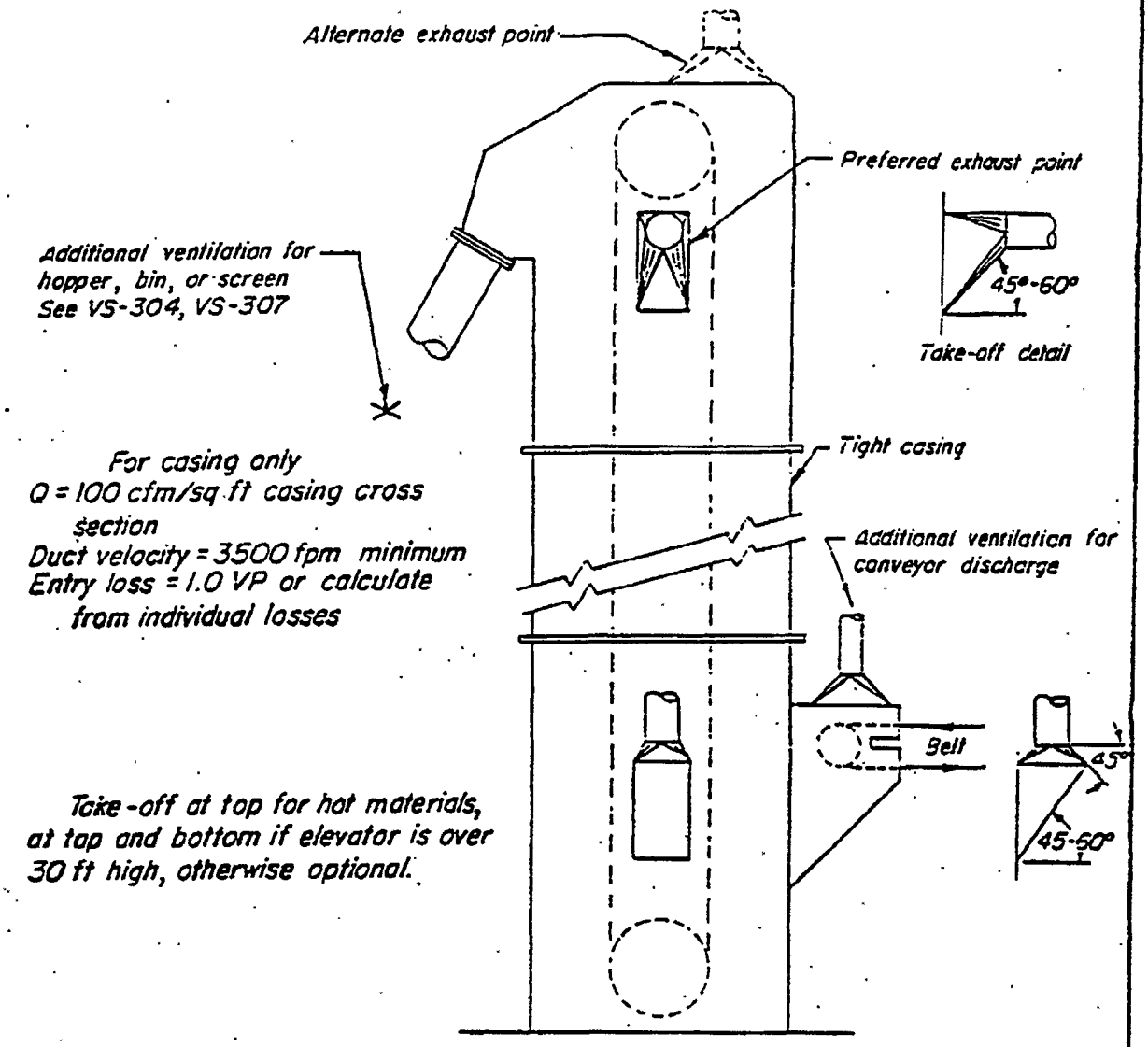
BIN & HOPPER VENTILATION

DATE 1-72 | VS-304




For casing only
Q = 100 cfm/sq ft casing cross section
Duct velocity = 3500 fpm minimum
Entry loss = 1.0 VP or calculate from individual losses

Take-off at top for hot materials, at top and bottom if elevator is over 30 ft high, otherwise optional.

| Belt speed | Volume |
|---|---|
| Less than 200 fpm | — 350 cfm/ft of belt width. Not less than 150 cfm/ft of opening |
| Over 200 fpm | — 500 cfm/ft of belt width. Not less than 200 cfm/ft of opening |

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BUCKET ELEVATOR VENTILATION

DATE 1-66 | VS-305

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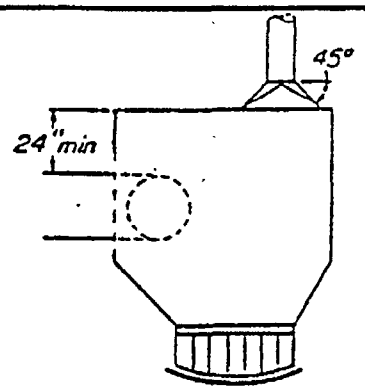
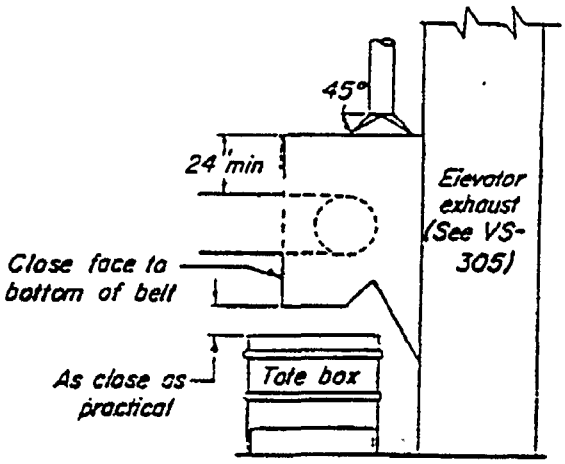



1. Conveyor transfer less than 3' fall. For greater fall provide additional exhaust at lower belt. See 3 below.




2. Conveyor to elevator with magnetic separator.

DESIGN DATA

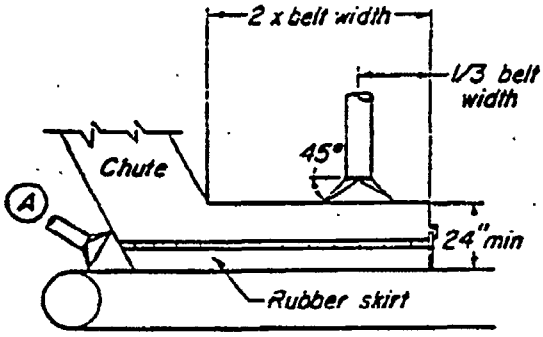
Transferpoints:

Enclose to provide 150-200 fpm indraft at all openings.

Minimum Q=350 cfm/ft belt width for belt speeds under 200 fpm
= 500 cfm/ft belt width for belt speeds over 200 fpm and for magnetic separators

Duct velocity = 3500 fpm minimum

Entry loss = 0.25VP




3. Chute to belt transfer and conveyor transfer, greater than 3' fall.
Use additional exhaust at (A) for dusty material as follows:
Belt width 12"-36", Q=700 cfm
above 36", Q=1000 cfm

Conveyor belts:

Cover belt between transfer points

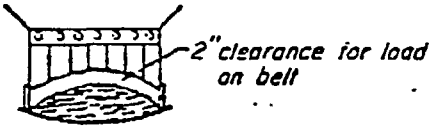
Exhaust at transfer points

Exhaust additional 350 cfm/ft of belt width at 30' intervals. Use 45° tapered connections.

Entry loss = 0.25 VP

Note:

Dry, very dusty materials may require exhaust volumes 1.5 to 2.0 times stated values.




Detail of belt opening

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# CONVEYOR BELT VENTILATION

DATE 1-72 | VS-306

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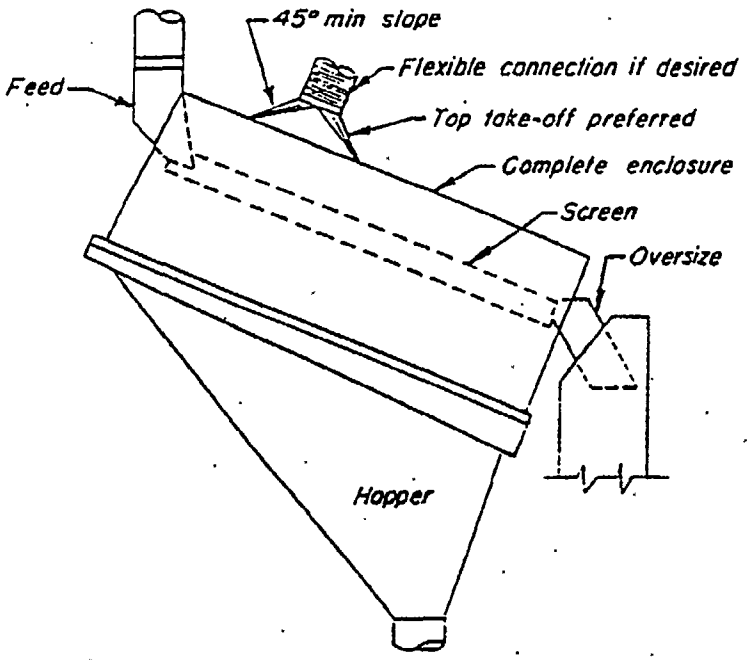
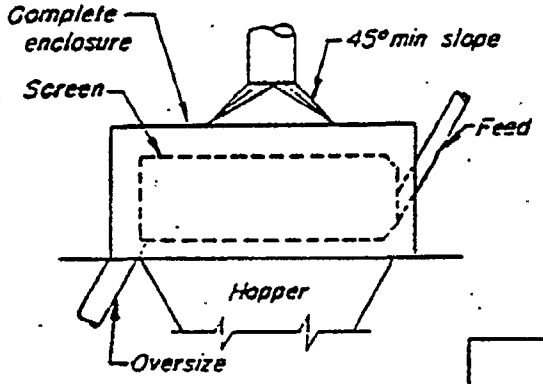



## FLAT DECK SCREEN

Q = 200 cfm/sq ft through hood openings, but not less than 50 cfm/sq ft screen area. No increase for multiple decks
Duct velocity = 3500 fpm minimum
Entry loss = 0.50 VP




## CYLINDRICAL SCREEN

Q = 100 cfm/sq ft circular cross section of screen; at least 400 cfm/sq ft of enclosure opening
Duct velocity = 3500 fpm minimum
Entry loss = 0.50 VP

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|---|---|
| SCREENS | |
| DATE 1-64 | VS-307 |

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