**Section 370.620 Grit Removal Facilities**

a) Where Required

Grit removal facilities should be provided for all sewage treatment plants and are required for plants receiving sewage from combined sewers or from sewer systems receiving substantial amounts of grit. If a plant serving a separate sewer system is designed without grit removal facilities, the design shall include provision for future installation. Consideration shall be given to possible damaging effects on pumps, and other preceding equipment, and the need for additional storage capacity in treatment units where grit is likely to accumulate.

b) Location

Grit removal facilities should be located ahead of pumps. In such cases, coarse bar racks should be placed ahead of mechanically cleaned grit removal facilities. Comminution equipment, when used, shall be located downstream of the grit facility in order to reduce the operation and maintenance problems associated with grit.

c) Type and number of units

1) The selection of the type of grit removal shall be based on necessary flexibility of velocity control to remove the selected size grit particulates through the range of expected plant flows, the volume of grit expected, and available area and hydraulic gradient limits at the site. Aerated or area type grit removal units equipped with adequate controls for operational flexibility are recommended where flow rates and grit characteristics and volume are expected to vary widely.

2) Plants treating wastes from combined sewers shall have at least one, preferably two or more, mechanically cleaned grit removal units, with provision for unit bypassing. A single manually cleaned or mechanically cleaned grit chamber with unit bypass is acceptable for small sewage treatment plants serving separate sanitary sewer systems. Minimum facilities for larger plants serving separate sanitary sewers shall be at least one mechanically cleaned unit with a unit bypass.

d) Design Factors

1) Channel Type Units

A) Turbulence Control

The equipment and inlet and outlet structures shall be designed to minimize turbulance throughout the channel.

B) Velocity and Detention

Channel-type chambers shall be designed to provide controlled velocities as close as possible to 1 foot per second. The detention period shall be based on the size of particle to be removed.

2) Aerated Units

A) Inlet

The inlet shall be located and arranged to prevent short circuiting to the outlet and oriented to the unit flow pattern so as to provide for adequate scouring segregation of organic and grit materials prior to discharge.

B) Detention

A detention time of at least 3 minutes at design peak flow should be provided.

C) Air Supply

Air should be supplied at 5 cubic feet per minute (cfm) per foot of tank length. The rate of air supplied shall be widely variable so as to maximize unit process effectiveness.

3) Grit Washing and Freeze Protection

All facilities not provided with positive velocity control should include means for grit washing to further separate organic and inorganic materials. Grit elevator and washing facilities shall be housed to prevent freezing. Provision for adequate heating and ventilation shall be provided to prevent corrosion.

4) Drains

Provisions should be made for dewatering each unit.

5) Water

An adequate supply of water under pressure shall be provided for clean up.

e) Grit Removal

Grit removal facilities located in pits shall be provided with mechanical equipment for pumping or hoisting grit to ground level. Pits deeper than 4 feet shall be provided with stairway access. An approved-type elevator or manlift may be desirable in some locations. Adequate ventilation, as described in Section 370.600(a)(5), and lighting shall be provided for pits that are deeper than 4 feet or are within an enclosed area.

f) Grit Handling

Impervious, non-slip, working surfaces with drains back to process shall be provided for grit handling areas. Safety handrails shall be provided around the working platform areas. If grit is to be transported, the conveying equipment shall be designed to avoid loss of material and protection from freezing. Grit disposal methods shall be in compliance with 35 Ill. Adm. Code 700 and shall be described in the plan documents.

g) Electrical

All electrical fixtures and controls in enclosed or below grade grit removal areas where hazardous gases may accumulate shall meet the requirements of the National Electrical Code (1996) for Class 1, Group D, Division 1 locations.

(Source: Amended at 21 Ill. Reg. 12444, effective August 28, 1997)