Safety: Observe all area and lab PPE requirements

Purpose: MEASUREMENT OF PARTICULATE (MgO) EMISSION FROM DIGESTER VENT STACKS

Procedure:

Introduction

Giles Chemical Corp. operates under an **NCDENR PERMIT TO DISCHARGE** Particulate matter reaching the atmosphere must be limited to tons per year. . Magnesite (MgO) and salt dust are the only particulates generated by Giles and both are controlled. For regulatory purposes measurements have to be taken from time to time. This procedure allows a close estimation of discharge.of MgO from digester vent stacks

Procedure.

The digester tanks are both equipped with vent stacks through which particulate magnesite has to pass. A wooden frame has been constructed to which loosely woven (tobacco) cloth can be attached and placed in the discharge stream, thus capturing most of the magnesite being emitted. The exposure time of the cloth to the stream is measured, the cloth folded to retain the particulates, dried, and weighed. The result is calculated in terms of pounds per day.

Equipment

Loosely woven fabric – cheese or tobacco cloth
Wooden Frame
Stop Watch
Drying Oven – S/P TemoCon NB 6205
Weighing Scale – B440 Sartorius

Method

1. Cut a section of the collection cloth to be used 28” x 28” square.
2. Weight the cloth on the laboratory scale. **Record the weight.**
2. Obtain the wooden frame at its storage location and attach the cloth to the frame securely over the protruding nails.
3. Proceed to the stack to be tested
4. With stop watch at the ready, invert the frame and place it over the vent stack with the nails facing downward.
5. Start the watch immediately. Carefully time the exposure period from the moment of placing the cloth over the stack to the moment of removal.

   Timing may have to be adjusted depending upon the amount of dust being emitted and the vapor condensation encountered. A trial run or two may be needed. Generally, the shorter the time the better since excess condensation will induce dripping and introduce error.

6. Allow about two minutes exposure time, then quickly remove and invert the cloth covered frame. **Record the time.**
7. Carefully remove the cloth from the inverted frame, folding the cloth inward to avoid loss of accumulated material.
8. Place the cloth with contents in the drying oven overnight.
9. Weigh the cloth on the laboratory scale. **Record the weight**.
10. Subtract the weight at item 9 from the weight at item 2. **This is the grams of magnesite emitted during the exposure period.**

Calculation

Determine the grams per minute as above.
Particulate emission for permit purposes is expressed in terms of Tons Per Year.
Grams per ton = 454 (g / pound) x 2000 (lbs./ ton) = 908,000
The operating time of GCC digesters is estimated to be 75% of 7 / 24 per year.
= 0.75 x 60 x 24 x 365 = 394,000
Two digeaters, say 800,000 minutes.
800,000 x g/m divided by 900,000 = tons per year.

TRAINING DOCUMENTATION

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