Designers Choice Cabinetry

Determination of Potential To Emit VOC

Designers Choice Cabinetry is a manufacturer of wood cabinets. The cabinets manufactured are primarily residential kitchen and bathroom cabinets but they also manufactures some wood cabinets for commercial (business) use.

The manufacturing of wood cabinets consists of two main operations: (1) Building of the wood cabinets, and (2) Surface Coating of the wood cabinets that are built. No cabinets built in other facilities are coated at this facility.

Recently employees at this facility have performed time studies to determine the maximum amount of cabinets that could be manufactured and coated at this facility given the current equipment and floor space. Below are two separate determinations:

(1) The first determination is titled "Wood Product Production Count". At the bottom of this study it was determined that the maximum number of parts that could be produced in a 8 hour shift is 700 parts. In a 24 hour (3 shift) day the maximum number of parts per day would be 2100 parts/day.

(2) The second determination is titled "Finish Room Max Production". This is the determination of the maximum number of parts that could be surface coated at this facility in a 24 hour (3 shift) day. At the bottom of this study it is determined that this facility could surface coat a maximum of 2775 parts/day.

To relate the maximum number of parts this facility could manufacture to the maximum amount of VOC emissions this facility could potentially emit, we developed an emission factor based on a known 12 month time period of operation (Starting on 9/1/12 and ending on 8/31/13). During this 12 month period the facility emitted 97.02 tons of VOC emissions. Recently this facility discontinued the use of a non-compliant lacquer thinner and replaced it with a compliant R7K305 HAP Free Reducer.

To make the emission factor work with the use of the new R7K305 HAP Free Reducer we did a 1 for 1 replacement of the 1936 gallons of non-compliant with the compliant on the (9/1/12 and ending on 8/31/13) spread sheet. The spreadsheet shows what the VOC emissions would have been during this 12 month period. Assuming the compliant reducer was used during this period, the adjusted VOC emission rate came out to be 97.487 tons/year. During this same 12 month period the facility manufactured 307,500 parts averaging 1230 parts/day. With this data we calculated an emission factor as calculated here:

Emission Factor = 97.487 tons VOC / 307,500 parts manufactured = 0.000317 tons VOC/part.

The maximum potential of this facility to emit VOC emissions is limited by the maximum number of wood parts this facility could possibly build given the current equipment and floor space available. The bottle neck in this facility is the building of wood parts, not the coating operation. If this facility produced at its maximum capability for 365 days per year it could produce up to: 2100 parts/day X 365 days/year = 766,500 parts/year.

Potential To Emit VOC = 766,500 parts/year X 0.000317 tons VOC/part = 242.98 tons/year

Wood Product Production Count

Door Assembly – 3 people 1920 parts shift

Mortise and Tenon - 400 parts x 3 shifts [1200 per day]

Mitre – 1 person per shift - 240 parts x 3 shifts [720 per day]

Face Frame Assembly – 4 people

1 person to cut the work order, 1 person to stage and 2 to build

10 parts per hour [depending on difficulty] x 2 assembly tables – 160 parts per day

Door Prep Sanding – 3 people

1 person to putty joints and sand front side and 2 people to sand back side, edges and slabs

50 to 70 parts per hour [depending on difficulty] for sanding the face – 400 to 560 a day

20-30 parts per hour [depending on difficulty] for sanding the backs and slabs – 320 to 480 a day

Face Frame Sanding

1 person to sort and sand veneer and 2 to sand frames

15 frames per hour [depending on size and configuration] x 2 sanders – 240 parts per day

Mortise and Tenon Profiling

2 machine operators

50 parts per hour – 400 per shift

Wide Belt Operation

2 machine operators

80 - 100 per hour [depending on joint type] – 800 parts per shift

These numbers constitute the amount of wood product that can be produced in one shift consisting of eight hours with our existing equipment and floor space limitations [averaging 700 pieces/shift and 2100 pieces/24 hour (3 shifts)].

Finish Room Max Production

Overhead Hanging Line
Capacity: 125 hooks (for parts)
Spray Booths: 3
Cycle Time: 4 hours
Finish: Completed Parts 750 finished parts

Flat Line 1: max rate 100 parts per hour per step
Stain: 800 Parts
Sealer: 800 parts
Topcoat: 800 Parts
Max Capacity 800 Finished Parts

Flat line 2: Max rate 100 parts per hour per step
Primer: 1200 parts
Pigmented TC 1200 parts
Max Capacity 1200 Finished Parts

Offline Booths: for misc. parts 20-25 parts per day as needed

Total Max Finishing Capacity : 2775 finished parts per day