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INTERNATIONAL ASSOCIATION OF OPERATIVE MILLERS

CENTRAL VACUUM SYSTEM BASICS

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2018

TODAY WE'LL COVER . . .

- Why do you need a Central Vac System?
- How and Where do you install a Central Vac System?
- What Equipment is Required?
- Questions & Comments

WHY?

Reason #1: Safety

- Safer way to clean
  - Around dangerous areas
  - Around equipment

- "Blowing Down" suspends dust in the air
  - Becomes a fuel for potential explosions and fires.
  - Results in Poor Air Quality.

WHY?

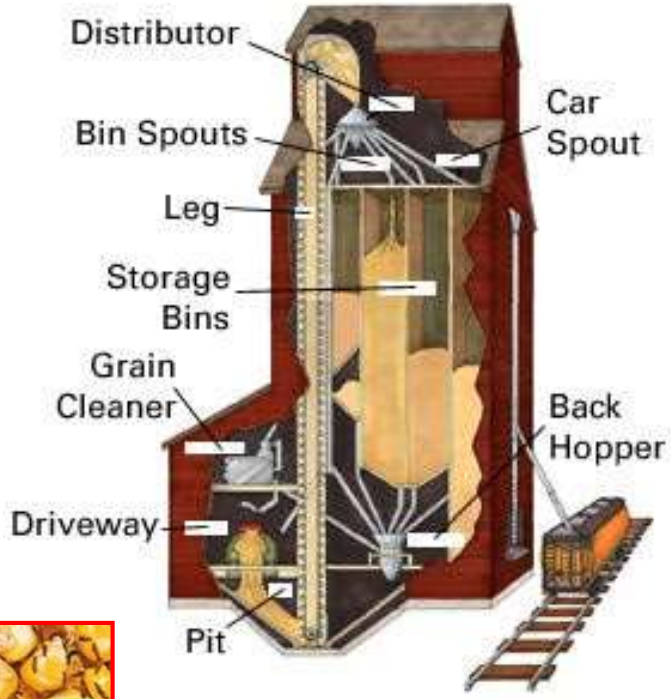
Reason #2: Efficiency

- Do a much better job than a broom and dust pan.
  - i.e. getting into cracks, crevices, beams, etc…
- “Blowing Down” does not remove dust.
- Manual sweeping takes more time.
- Manual sweeping requires moving of material once collected.
- Central Vac Systems collect material to a central, convenient location.
  - ***May have value as feed stock***

WHY?

Reason #3: Insect/Pest Control

- Insects “live” in the dust in the cracks and corners.
- Central Vac Systems tools allow you to get into crevices, on top of beams, and in tight corners to remove material, including:
  - Insects
  - Trash
  - Moist grain
  - Other potential non-grain items



IDENTIFY THE NEED

- Talk to your operators.
- Try to calculate how much time and money is spent on cleaning using current methods.
- Compare those costs to the cost of owning and operating a Central Vac System.

If the need is to provide a easy-to-use and convenient system for quickly cleaning up dust and material spills BEFORE it can be tracked or blown around by air currents, then a Centro-Vac is the answer.

WHAT IS A …..
"Central Vacuum System?"

A Central Vacuum System is a custom-designed network of tubing, fittings, and elbows which go to a centrally located baghouse filter and vacuum device (typically a very high static fan, turbine or vacuum Air Power Unit).

The Central Vacuum System provides a high vacuum to the end of a hose with nozzle for cleaning floors, walls, ducts and around processing and other equipment. The system can also move bulk materials in the event of spillage, equipment cleanout, etc…

WHAT EQUIPMENT DO YOU NEED?

- Vacuum Air Power Unit
- Deep Vacuum Filter/Receiver
- Rotary Airlock (or sealed container)
- Set of Vacuum Tools
- Tubing, fittings, elbows, couplings, and Snap Caps
- Control Panel; Remote Start/Stops

VACUUM AIR POWER UNIT

- Standard systems will use a Vacuum Air Power Unit.
  - Inlet filter for protection of the pump
  - Inlet filter is “secondary” in case of filter bag break. Not designed to be the only filter.
  - Inlet and Outlet Silencers
- Relief set at 12” HG.
  - To protect pump, not the system
- Can be located anywhere
  - Typically in existing pump room.
- MD Competitor or Sutorbilt L Series works well
  - More open clearances
  - Run cooler and MAY BE quieter

DEEP VACUUM FILTER/RECEIVER

- Sized for total CFM
- Built to handle deep vacuum requirements.
- Cyclonic inlet
- Typically located above a screenings bin or in close vicinity to final location of material.

PRODUCT DISCHARGE FROM FILTER

Airlock on filter receiver outlet acts as air seal and allows for continuous operation.

Air tight catch can is cheaper but requires manual dumping on regular basis.

TUBING AND FITTINGS

- Most simple method is to run multiple 3” lines from the filter receiver.
- “Out of the way” means running the tubing along the ceilings and along periphery.
- End each run with a Spring Cap on a 45-degree elbow so the hose does not start with a kink from the vertical or horizontal position.
- Install branches either upward or horizontal so branch leg does not fill with material over time.

COMMON TOOLS

Standard set of tools includes:

- 2” x 45” Wand
- 18” Extension
- 20” wide Floor tool
- 25-50 ft length of 2” ID Anti-Static vinyl hose
- 15” Crevice Tool
- Special transition from Hose end to 3” ducting line
- Optional: Tool Caddy

SIZING A CENTRAL VACUUM SYSTEM
HOW MANY SIMULTANEOUS OPERATORS?

- Each sweeper requires approx. 175-200 CFM @ 8”-10” HG vacuum
  - Flour/Plastics/General: 175-180 CFM / Grain Elevator or Feed Mill: 180-200 CFM
- Maximum of 2 operators/sweepers on a 3” OD line.
  - With 1 operator, suction is hot (good)
  - With 2 operators, suction is good
  - With more than 2 operators, you lose suction to all operators
- Run multiple 3” OD lines as needed through facility
- Distance is not critical
  - If you are not using the system for pneumatic conveying.
  - It can move piles of grain, but not as quickly as an actual conveying system, and the filter discharge location may need additional attention.

Sizing for more operators than you really need can be a waste of energy (HP) and capital resources. Really consider how many operators you really need at one time.

TYPICAL POWER REQUIREMENTS

1 Operator	7.5- 15 HP
1-2 Operators	15 - 25 HP
3 Operators	25 - 40 HP
3-4 Operators	30 - 50 HP
5 Operators (at same time)	40 - 60 HP

Much more economical than the "Multi-Stage" suction fan design.

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DESIGNING & INSTALLING A CENTRAL VAC SYSTEM

Layouts

Indoors, Outdoors, Ground Level, Upper Floor level are all okay locations. Just plan accordingly to meet your needs

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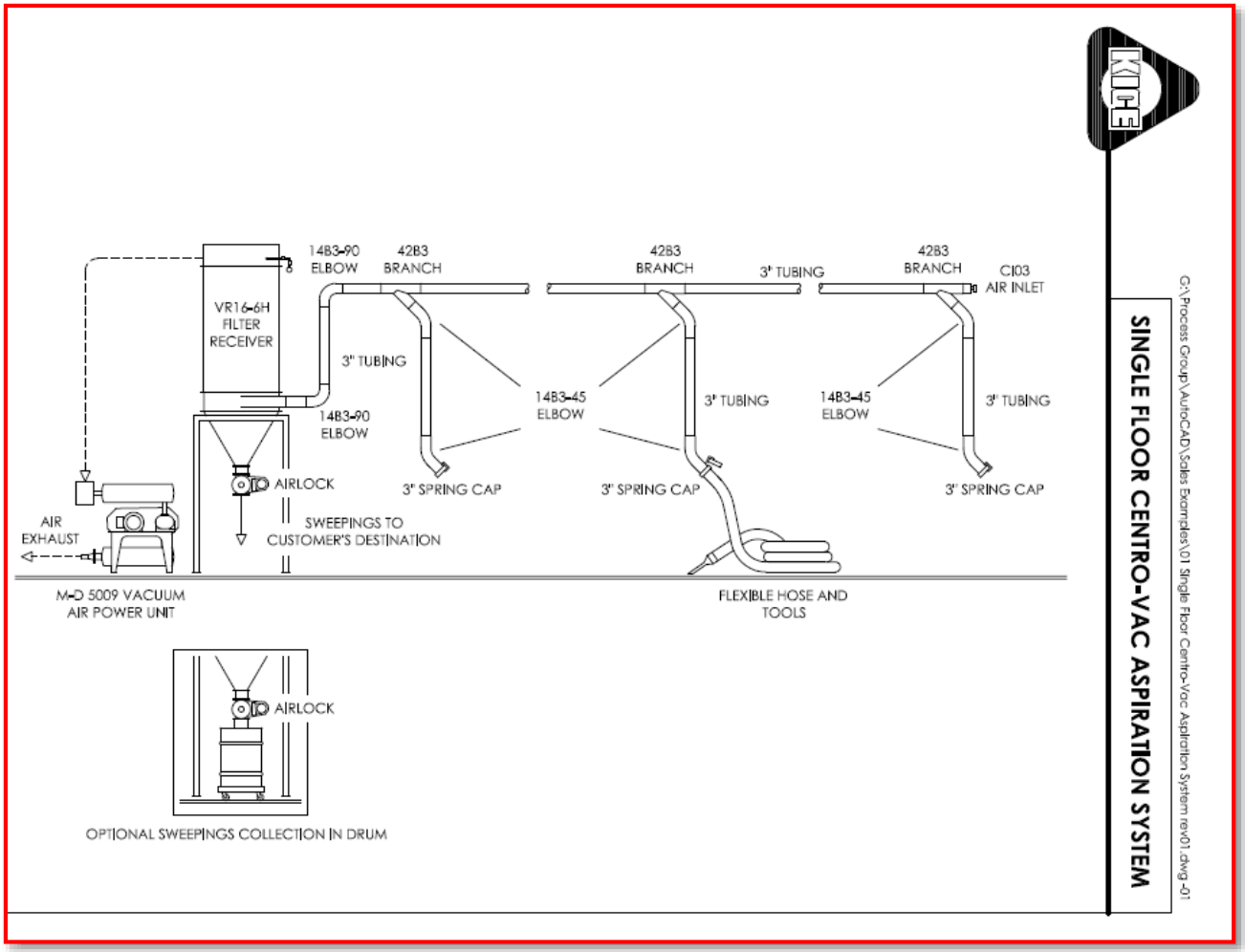
TYPICAL
SINGLE FLOOR CENTRO-VAC SYSTEM



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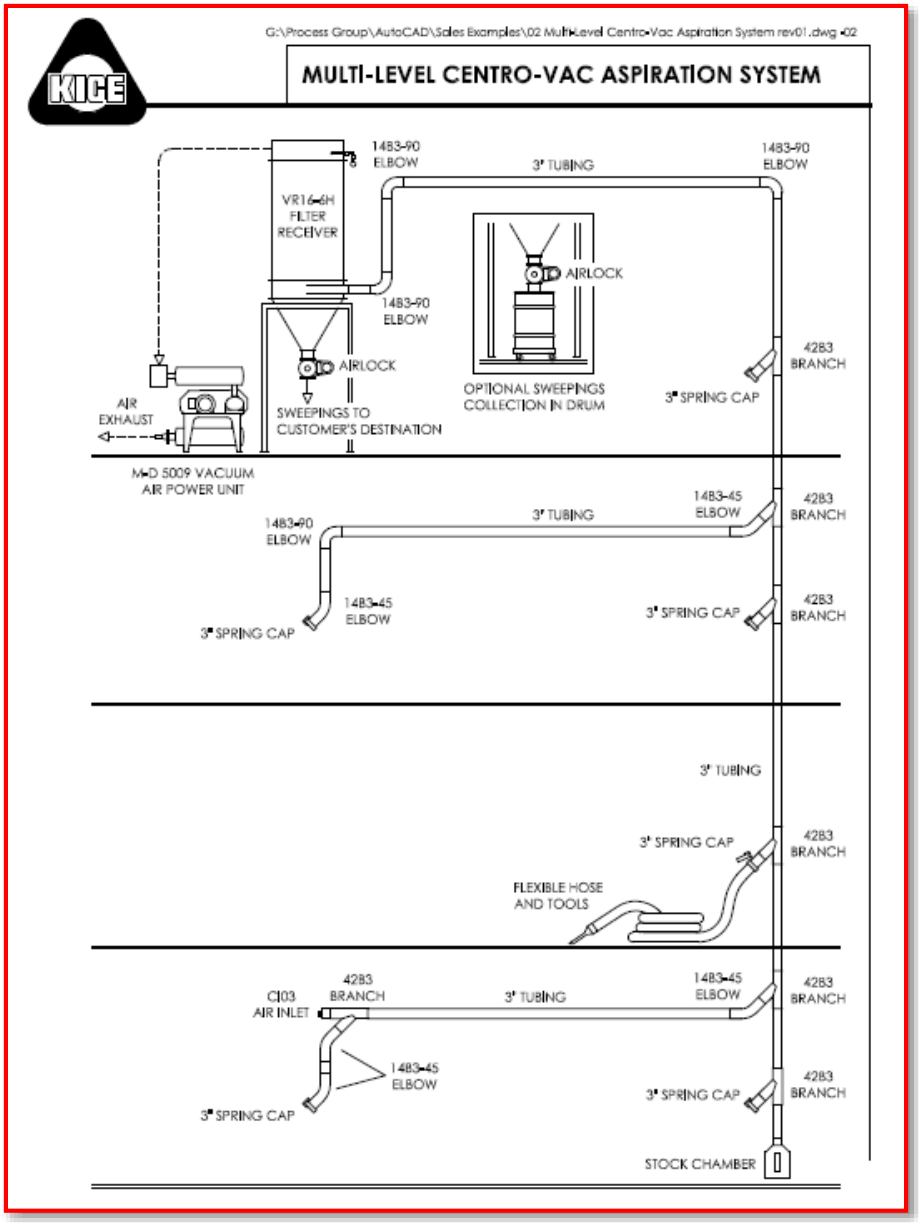
TYPICAL MULTI-FLOOR CENTRO-VAC SYSTEM

With Filter/Receiver at top of facility



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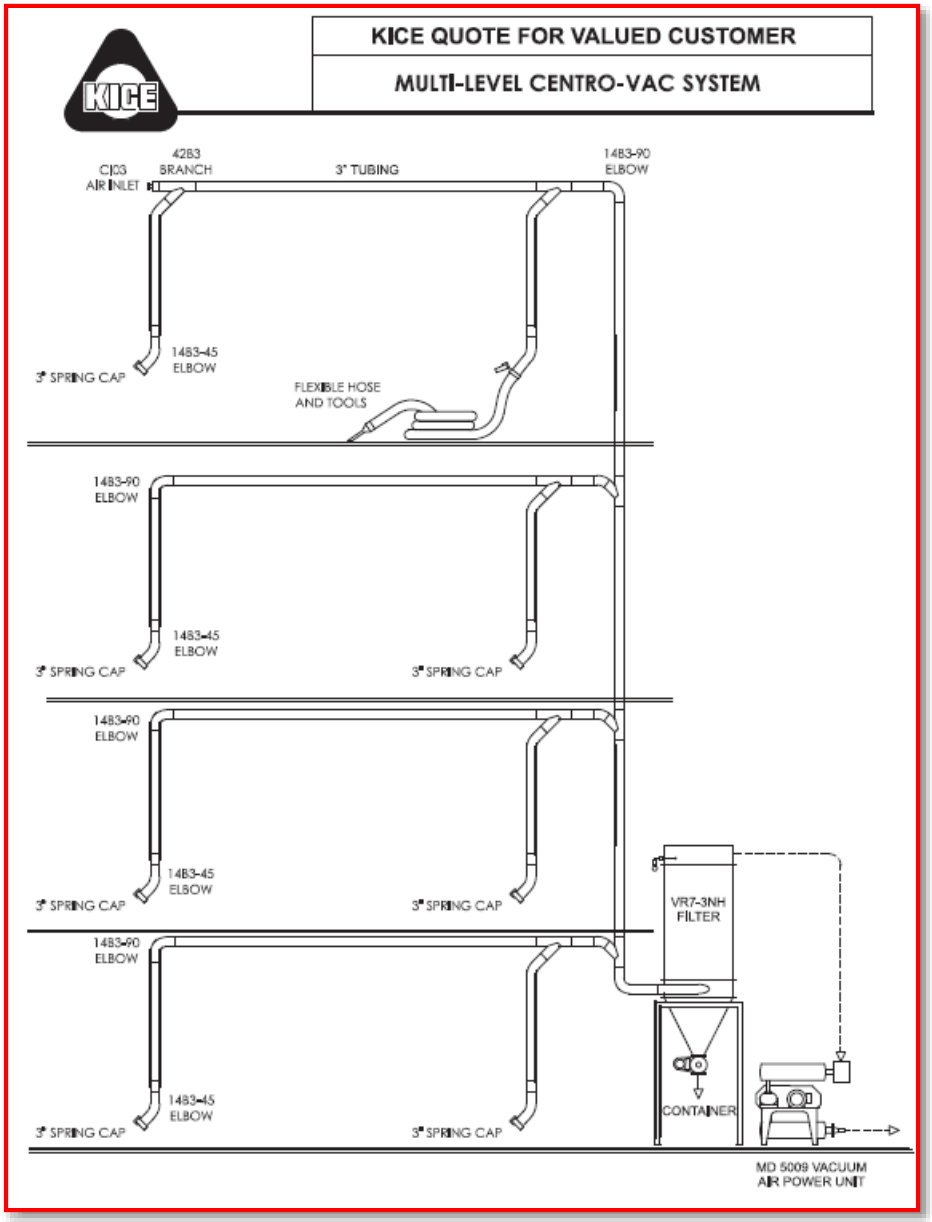
TYPICAL MULTI-FLOOR CENTRO-VAC SYSTEM

With Filter/Receiver at ground level



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CONSIDERATIONS

- A start/stop timer switch is recommended to insure that the Air Power Unit is shut off when not in use.
- Aluminum tubing with 16 gauge, short radius, carbon steel elbows recommended.

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OTHER CONSIDERATIONS EXPLOSION PROTECTION

Need to discuss with the "AHJ" (Authority Having Jurisdiction) the need for:

- Proper Electrical controls classification
- Explosion Venting
- Explosion Suppression (if inside building and cannot vent to outside)
- Explosion Isolation
  - (mechanical or chemical)

For more information, contact Kice Industries Sales or Engineering or refer to NFPA 61, 68, 69, 654, etc… which can be viewed for free at www.nfpa.org

WHEN TO ADD AUTOMATION

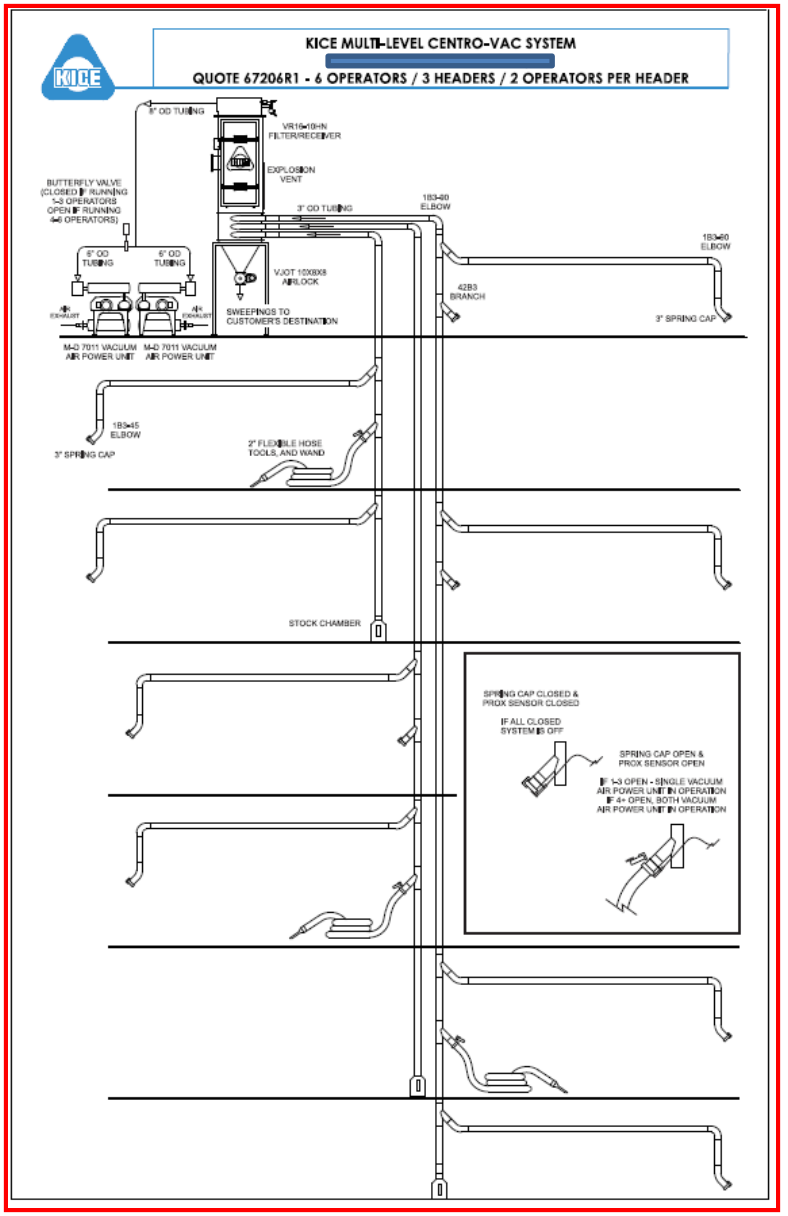
- 5-10 Operators at a time
- 2 separate Vacuum APU's
- Control system for detection of number of operator

Benefits:

- Allows for many operators and fast cleanup.
- Limits HP requirements to for the number of users

Disadvantages:

- Higher capital costs
- Still inefficient with low number of operators



Troubleshooting a Central Vacuum System (Suction Loss)

- Check Number of Operators
- Inspect Your Snap Caps
- Inspect Compression Couplings for Leaks
- Inspect the Filter Media in the Vacuum Receiver
- Inspect the Airlock or Receiving Drum for Wear
- Inspect the Blower

Thank you for your time today.

Should you have any questions
Please visit our website at www.kice.com
or contact us at sales@kice.com