Ensuring LEV System Performance
OSHA Perspective

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OSHA Ventilation Standards have elements to ensure optimization of ventilation engineering controls:

- Elements include:
  - Design requirements
  - Performance assessment
  - Maintenance
  - Training
  - Management of change
  - Operation
For Example: OSHA Standard 1910.94
Ventilation (a) Abrasive blasting

- **design requirements**: be able to empty dust enclosure without contaminating other areas.
- **maintenance**: repair leaks ASAP
- **performance assess**: check static pressure periodically. Use this check to initiate cleaning
- **operation**: ventilation until dust clears before entry
For Example: OSHA Standard 1910.94 Ventilation(b) grinding, polishing, buffing

- **design requirements:** particle path into hood, branch duct velocities = 3500 fpm, main duct velocities = 4500 fpm, cfm = f(wheel width and wheel diameter).

- **performance assess:** average face velocity of 200 fpm for portable grinding hoods

- **operation:** so that particles not directed into breathing zone
For Example: OSHA Standard 1910.107
Spray finishing using flammable and combustible materials

- **design requirements:**
  1. For dry spray booths 100 fpm at face of spray booth
  2. Minimize area of conveyor openings to booths
  3. Independent exhaust system for each booth. Combine if same spray in each booth and total face less 18 SF.

- **maintenance:** keep free of deposits of combustible residues

- **performance assess:** must have gauges, alarms, etc. to demonstrate required air velocity

- **operation:** mechanical ventilation shall operate while spraying and sufficient time thereafter to allow purge
For Example: OSHA Standard 1910.1025
Lead (e) Engineering Controls

- **design requirements:**
  1. describe method to control exposure, air monitoring data and technology considered
  2. Provide Pb/dust monitor in recirculation schemes to divert make-up air outside if contaminated.

- **performance assess:** quarterly vent measurements such as capture velocity, duct velocity to demonstrate effectiveness in controlling exposure

- **training:** must receive annual training on ventilation use

- **management of change:** new vent measurements within 5 days of change in production or process
For Example: OSHA Standard 1910.1025 Lead (e) Engineering Controls Quarterly ventilation measurements
For Example: OSHA Standard 1910.1027 Cadmium (f)(2) Engineering Controls

- **design requirements:** (1) describe method to control exposure, air monitoring data and technology considered, (2) Provide high efficiency filters in recirculation schemes

- **performance assess:** “as necessary” vent measurements such as capture velocity, duct velocity to demonstrate effectiveness in controlling exposure

- **training:** annual training on ventilation use

- **management of change:** new vent measurements within 5 days of change in production or process

- **maintenance:** implement procedures to minimize exposures when maintaining vent system and filters
Potential problems with performance assessment programs.

1. Paper program to meet intent of mandated standards.
2. No trending of collected data
3. Other operations affect data collection such as make-up-air systems, environmental systems, etc.
4. Calibration of test equipment
5. Training of test technician
6. No correlation with employee exposure data
Elements of a successful performance assessment program. Checklist before making measurements.

1. Check operational status of make-up air system
2. Check status of unintentional makeup air paths
3. Use smoke trails and micromanometer to describe pressure relationships with adjoining spaces
4. Check operational status of environmental exhaust systems.
5. Check filter or baghouse loading
6. Check position of all airflow valves
7. Upset conditions (e.g., cross drafts)
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1. Check operational status of make-up air systems.
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2. Check status of unintentional makeup air paths such as doors and windows
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3. Use smoke trails and micromanometer to describe pressure relationships with adjoining spaces and outdoors.
Elements of a successful performance assessment program. Checklist before making measurements.

4. Check operational status of environmental exhaust systems.
Elements of a successful performance assessment program. Checklist before making measurements.

5. Check filter or baghouse loading
Elements of a successful performance assessment program. Checklist before making measurements.

6. Check position of airflow valves such as recirculation valves.
Elements of a successful performance assessment program. Checklist before making measurements.

7. Check upset conditions such as cross drafts.