# INSPECTION BUREAU

## MECHANICAL INSPECTION OVERVIEW

The Standard Operations Procedures (SOP) listed in this Annex are to be used in addition to the applicable Code Sections of the City of Los Angeles Mechanical and Building Codes and the Inspection Bureau Operations Manual.

The SOP's are intended to be a quick reference to the most important aspects of the type of inspection being conducted to help standardize inspection procedures, and to make sure that inspectors perform their inspections in a thorough and safe manner.

Inspectors are required to perform complete, accurate and thorough inspections. Documentation that is complete, accurate and thorough aids the constituent, contractor, developer and the inspector who may be assigned to make an inspection during the absence of the district inspector. In addition, the supervisor can have readily available and clear information when responding to requests for information during or after the construction.

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# MECHANICAL INSPECTION

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PROCEDURE : Preparing Inspector's Notes Using Abbreviations
PERFORMED BY: Senior Inspector
APPROVALS REQUIRED: None
OTHER DIVISIONS / AGENCIES: None

INTRODUCTION:

List of abbreviations have been approved and may be utilized when making job notes. No abbreviations will be used when preparing formal correspondence unless the term is previously spelled out in its entirety.

ACTIONS REQUIRED: (See list of abbreviations)

Abbreviations:

| | |
|---|---|
| A.C. | Air Conditioning |
| A.R.O | Adaptive Re-Use Ordinance |
| B.D.D. | Back Draft Damper |
| B.I. | Building Inspector |
| B.T.U | British Thermal Unit |
| C.F.M. | Cubic Feet Per Minute |
| C.S.F.D. | Combination Smoke Fire Damper |
| E-Power | Emergency Power |
| F.D. | Fire Damper |
| L.A.M.C. | City of Los Angeles Municipal Code |
| M.U.A. | Make-Up Air |
| MOD | Modification |
| O.S.A. | Out-Side Air |
| R/A | Return Air |
| R.F.M. | Request For Modification |
| S/A | Supply Air |

PROCEDURE: Pre-Wrap Duct Inspection
PERFORMED BY: Inspector
APPROVALS REQUIRED: None
OTHER DIVISIONS / AGENCIES: None

INTRODUCTION:

Ductwork shall be inspected and approved prior to insulating or enclosing.

ACTIONS REQUIRED:

1. Joints and seams are sealed substantially air tight with approved material, rigid ductwork shall comply with Underwriters Laboratory (UL) 181A and factory made flex duct with UL 181B.

2. Round ducts crimp joints have a minimum overlap of 1½ inches and are mechanically fastened by at minimum (3) sheet-metal screws spaced equally around the joint.

3. Rectangular ductwork is constructed per the Mechanical Code under Table 6-1 and Table 6-2 of the Los Angeles Municipal Code (L.A.M.C.).

4. Ductwork is securely fastened in place at each change of direction and as set forth in Table 6-7 of the L.A.M.C.

5. Ductwork is braced and secured to prevent lateral and horizontal swing.

PROCEDURE: Rough Air Conditioning Inspection
PERFORMED BY: Inspector
APPROVALS REQUIRED: None
OTHER DIVISIONS / AGENCIES: None

INTRODUCTION:

Rough mechanical inspection and approval is required prior to the covering of any mechanical equipment.

ACTIONS REQUIRED:

1. Verify all ducts have been properly sealed and insulated.

2. All materials within the return air plenum are noncombustible and approved for plenum use (Plenum rated).

3. Register grilles and ductwork are supported to building structure per Table 6-7 of the City of Los Angeles Mechanical Code.

4. Verify clear service access to all fan coils, fire/smoke dampers, smoke duct detectors etc. have not been restricted by sprinkler lines, electrical conduits, plumbing lines etc.

5. Access doors have been framed out in the hard lid ceilings.

6. Verify condensate lines terminate to an approved drain location and insulated when required.

PROCEDURE: Rough Grease Duct Inspection
PERFORMED BY: Inspector
APPROVALS REQUIRED: None
OTHER DIVISIONS / AGENCIES: None

INTRODUCTION:

Rough inspection approval allows the contractor to cover up the grease duct with shafts or ceilings.

ACTIONS REQUIRED:

1. Obtain a copy of the manufacturer's installation instructions.

2. Verify grease duct is a minimum 16 gage steel or 18 gage stainless steel.

3. Verify grease duct has minimum slope ¼ inch per foot and all horizontal ducts exceeding 75 feet have a minimum slope of 1 inch per foot. The slope shall be towards the hood or an approved grease reservoir.

4. Verify grease duct seams, joints and penetrations have a continuous liquid-tight external weld.

5. Verify bolts, screws, rivets and other mechanical fasteners do not penetrate the duct walls.

6. Verify all grease duct is supported per Table 6-7 or the manufacturer's installation instructions, whichever is most restrictive.

7. Verify grease duct in drywall shafts have the minimum clearance 3 inches and a maximum clearance of 12 inches.

8. The drywall shaft for grease ducts is a dedicated shaft enclosure. No obstructions such as electrical conduits, plumbing lines, fire sprinkler pipes, etc. are permitted within the shaft enclosure.

9. Type I hoods or portions thereof penetrating a ceiling, wall or furred space shall comply with all the requirements of Section 510.7 of the L.A.M.C.

10. Ducts are braced and guyed to prevent lateral or horizontal swing.

11. Access doors have been cut into the ductwork every 12 feet or change of direction.

12. Ensure that any required fire sprinklers have been installed in the grease duct prior to the installation of any duct wrap.

PROCEDURE: Rough Residential Dryer Vent Inspection
PERFORMED BY: Inspector
APPROVALS REQUIRED: None
OTHER DIVISIONS / AGENCIES: None

INTRODUCTION:

Residential Clothes Dryers.

ACTIONS REQUIRED:

1. Verify that dryer vents terminate to outside the building, 3 feet from any opening into the building and 3 feet from property line.

2. Verify that dryer vents are constructed of metal and have a smooth interior surface.

3. Verify that dryer vents terminate with a back-draft damper (with no screen).

4. Verify that dryer vents are installed with the joints in the direction of airflow with no sheet metal screws or other fasteners that will obstruct the flow.

5. Verify that dryer vents are sealed substantially air tight with UL listed tape or sealer.

6. Verify that dryer vents terminate within 14 feet of the dryer including (2) 90 degree elbows and 2 feet in length shall be deducted for each elbow in excess of (2).

7. Verify that dryer vents do not pass through ducts or plenums.

8. Verify that dryer vents do not connect to any appliance venting system and only serves clothes dryer ventilation system.

9. Verify listed clothes dryer vent connectors do not exceed 6 feet in length and not concealed in construction.

10. Dryer ventilation ductwork shall comply with Chapter 6 of the L.A.M.C.

11. Verify the compartment or space designed for the installation of a clothes dryer, has the minimum 4 inch moisture exhaust duct and when installed in a closet, has the required (minimum) 100 square inches of make up air.

PROCEDURE: Rough Range Vent Inspection
PERFORMED BY: Inspector
APPROVALS REQUIRED: None
OTHER DIVISIONS / AGENCIES: None

INTRODUCTION:

Domestic range hoods and ductwork require inspection.

ACTIONS REQUIRED:

1. Range vent ductwork shall be made of metal and have a smooth interior surface.

2. All joints and seams including elbows shall be sealed substantially air-tight with UL approved tapes or sealer.

3. Ductwork is securely fastened in place at each change of direction and as set forth in Table 6-7 of the L.A.M.C.

4. Ductwork is braced and guyed to prevent lateral and horizontal swing.

5. Positive pressure exhaust ducts shall not pass through ducts or plenums.

6. Range vents shall terminate to outside of the building a minimum 3 feet from property line and 3 feet from any openings into the building.

7. Verify all ventilation terminations are complete with the required back draft damper.

8. Range hoods shall have a vertical clearance from cooking surface of not less than 24 inches.

PROCEDURE: Rough Product Conveying Ventilation
PERFORMED BY: Inspector
APPROVALS REQUIRED: None
OTHER DIVISIONS / AGENCIES: None

INTRODUCTION:

A product conveying ventilation system designed to convey solid or liquid particulates, such as dust, fumes, vapors or mists and air temperatures not exceeding 250 degrees.

ACTIONS REQUIRED:

1. All product conveying ventilation systems must be plan checked.

2. Duct systems shall be constructed of metal and constructed per Chapter 6 of the Los Angeles Mechanical Code.

3. Verify ventilation system termination location matches approved plans.

4. Duct system shall have a minimum velocity listed in Table-5 of the Los Angeles Mechanical Code.

5. Make up air shall be provided to replenish air exhausted by the ventilation system.

6. Product conveying outlets shall terminate (10) feet from property line: (3) feet from property line; (3) feet from exterior wall or roof; (10) from opening into the building;(10) feet above adjoining grade.

7. Verify hood system construction to be not less than (22) gage for Class 1 and 5, (20) gage for Class 2,(18) gage for Class 3 and (14) gage for Class 4.

PROCEDURE: Fire Damper Framing Inspection
PERFORMED BY: Inspector
APPROVALS REQUIRED: None
OTHER DIVISIONS / AGENCIES: None

INTRODUCTION:

Fire damper and smoke / fire damper framing is a Life-Safety assembly and shall be installed per manufacturer's framing details and installation instructions.

ACTIONS REQUIRED:

1. Obtain the fire damper manufacturer's installation instructions from the contractor.

2. Verify fire damper framing matches the manufacturer's framing detail sheet.

3. Verify framed opening is the correct size for the fire damper being installed.

4. Verify damper retaining angles overlap framing by the minimum 1 inch.

PROCEDURE: Factory Built Wood Burning Fireplaces
PERFORMED BY: Inspector
APPROVALS REQUIRED: Recognized Testing Agency
OTHER DIVISIONS / AGENCIES: Plumbing

INTRODUCTION:

All factory built wood burning fire places shall be listed and shall vent into an approved chimney.

ACTIONS REQUIRED:

1. Insure installation instructions are on site for reference and review with contractor if necessary.

2. Verify no vent damper within firebox assembly or venting system.

3. Verify that glass doors are installed.

4. Verify that hearth and mantel meet the requirements of the installation instructions for size, material and clearances.

5. Verify chimney terminates into a listed cap.

6. Verify that vent size is appropriate for the fire place appliance, and that the vent size is not reduced from fire place vent connector.

PROCEDURE: Decorative Gas Fireplace
PERFORMED BY: Inspector
APPROVALS REQUIRED: By a Recognized Testing Agency
OTHER DIVISIONS / AGENCIES : Plumbing and Electrical

INTRODUCTION:

All decorative gas fireplaces shall be listed, installed per the manufacturer's installation instructions and vented into approved venting system.

ACTIONS REQUIRED:

1. Insure installation instructions are on site for reference and review with contractor where necessary.

2. Verify glass doors are installed.

3. Verify gas connecter and shut off valve is accessible at appliance.

4. Verify vent termination above the roof surface through a flashing and terminates with a listed vent cap.

5. Verify vent terminates above the roof, as per Table 8-2 of the Los Angeles Mechanical Code.

6. Verify vent sizing agrees with manufacturer's installation instructions. Reducing vent size from fire place vent connector is never allowed.

7. Refer to installation instructions regarding fire place clearances to combustibles.

Note: Sealant is never used on B-vent.

PROCEDURE: Pressure Test-Natural Gas
PERFORMED BY: Inspector
APPROVALS REQUIRED: None
OTHER DIVISIONS / AGENCIES: None

ACTIONS REQUIRED:

1. Verify the location of the existing gas meter(s) on job-site [If no meter exists, a correction notice should be issued to have installer indicate the location of the meter(s)].

2. Inspect the gas line serving HVAC equipment only.

3. Verify flexible gas connectors are installed in accordance with their listing and sized properly.

4. Verify gas piping is supported per Table 13-3 of the L.A.M.C.

5. Verify stainless steel flexible gas lines are approved and installed in accordance with their listing and manufacturer's installation instructions and the installer is certified.

6. Test gauge is 15 pounds with 1/10 pounds increments or less.

7. All gas line test pressure is a minimum 3 pounds for a minimum 10 minutes.

PROCEDURE: Pressure Test-Refrigeration
PERFORMED BY: Inspector
APPROVALS REQUIRED: None
OTHER DIVISIONS / AGENCIES: None

Refrigeration Systems require pressure testing.

ACTIONS REQUIRED:

1. All field erected portions of a refrigeration system shall be pressure tested per Table 11-4, Los Angeles Mechanical Code.

PROCEDURE: Commercial Cooking Hood Velocity Test
PERFORMED BY: Inspector
APPROVALS REQUIRED: None
OTHER DIVISIONS / AGENCIES: None

INTRODUCTION:

Hood velocity tests are required on all Type-I and Type-II hoods to verify design fan capacities.

ACTIONS REQUIRED:

1. Verify exhaust hood and grease duct dimensions match approved plans.

2. Verify that the make-up air fan is electrically interlocked with the exhaust hood.

3. Contractor shall pretest the job site hood capacity and provide a completed velocity test worksheet to inspector.

4. Verify that the velocity values on the test sheet match those on the plans.

5. Witness the contractor air velocity readings and compare the reading with the hood velocity test worksheet.

6. Verify air measuring device has a current calibration certification.

PROCEDURE: Fan Shutdown / Life Safety Testing
PERFORMED BY: Inspector
APPROVALS REQUIRED: All Smoke Detectors to be Approved
OTHER DIVISIONS / AGENCIES: None

INTRODUCTION:

Shut down of all mechanical equipment supplying air in excess of 2,000 C.F.M.

ACTIONS REQUIRED:

1. Verify all equipment is running within the zone.

2. Have a installer activate duct smoke detector or area detectors.

3. Verify all air moving equipment shuts down with no delay (15 seconds maximum).

4. Verify that all smoke detectors are supervised at alarm panel if fire-detection or alarm systems are provided in the building.

5. Verify all smoke detectors are compatible with the operating velocities, pressures, temperatures and humidity of the system.

6. Verify that sampling tubes are installed as per the manufacturer's installation instructions (Holes to face the air system).

7. Review manufacturer's installation instructions on job site for duct smoke detectors.

PROCEDURE: Temporary Certificate of Occupancy (TCO)
PERFORMED BY: All Inspectors
APPROVALS REQUIRED: Mechanical Life Safety
OTHER DIVISIONS / AGENCIES: All Divisions

INTRODUCTION:

When the Department confirms, through inspection and testing that a building is substantially complete, and meets the primary Fire Life Safety requirements, a TCO may be issued for a building.

Prior to signing any TCO form, the Mechanical Inspector shall verify all applicable Fire Life Safety devices and systems have been completed, tested, and approved; such as noted below.

ACTIONS REQUIRED:

1. Verify that all Heating, Ventilation and Air-conditioning (HVAC) equipment shutdown upon activation of the fire alarm system.

2. Verify fire alarm control panel enunciates when duct or area smoke detectors initiate alarm.

3. Verify that all smoke/fire dampers open and close completely upon activation of alarm.

4. Verify that all stairway pressurization systems function as required in Section 91.905 of the Building Code.

5. Verify that all smoke control systems function as required in Section 91.905 of the Building Code.

6. Verify that all equipment associated with the smoke control system is tested and approved on utility and stand by power (emergency power).

7. Verify that all ventilation systems (e.g. garage and commercial cooking hood exhaust system) have been tested and approved.

8. Verify that all gas connectors to fuel burning HVAC systems have been installed and approved.

9. Verify that all Methane Ventilation Systems have been completed and approved (if applicable).

PROCEDURE: Final Approval
PERFORMED BY: Inspector
APPROVALS REQUIRED: None
OTHER DIVISIONS / AGENCIES: None

INTRODUCTION: Final Inspection

ACTIONS REQUIRED:

1. Verify all rough inspections have been completed.

2. Verify all equipment's electrical disconnects are installed and within sight of said equipment.

3. Verify all mechanical equipment is permanently identified (labeled) as to the area of building it serves.

4. Verify all grills, air filters, and thermostats are installed.

5. Verify all condensate lines are completed and terminate to an approved drain location.

6. Verify that all gas fired mechanical equipment have approved gas connectors, complete with gas cock.

7. Verify that no flexible connectors pass through equipment casing, instead verify solid nipples at these locations.

8. Verify all garage ventilation systems have been tested and approved.

9. Verify that the refrigeration machinery room refrigerant leak detection and ventilation systems have been tested and approved.

10. Verify all life safety testing is complete.

11. Verify that the eye wash and shower station is installed for chemical treatment systems related to cooling towers.

12. Verify all permit fees have been paid.