



SOUTH METRO FIRE RESCUE

LIFE SAFETY DIVISION

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"Providing high-quality, timely service that meets adopted standards of life safety and produces customer satisfaction"

South Metro Fire Rescue/ International Fire Code General Requirements and Safety Procedures for Centennial Airport

To further expand on the Centennial Airport Rules & Regulations, South Metro Fire Rescue (SMFR) is providing a list of regulations applicable to conditions which may be normally encountered during aircraft fueling, defueling, misfueling operations, general hanger use and occupancy. Applicability is based on the most currently adopted International Fire Code. The purpose of this code is to establish the minimum requirements consistent with nationally recognized good practice for providing a reasonable level of life safety and property protection from the hazards of fire, explosion or dangerous conditions in new and existing buildings, structures and premises and to provide safety to firefighters and emergency responders during emergency operations. The intent is equally created to establish working partnerships between SMFR personnel, The Arapahoe County Public Airport Authority, building owners and occupants, individual tenants; as well as to provide an informational aid in complying with periodic fire safety inspections and audits, or other regulatory inspections.

Where no applicable standards or requirements are set forth in the Fire Code, or are contained within other laws, codes, regulations, ordinances or bylaws adopted by this jurisdiction, compliance with applicable standards of the National Fire Protection Association or other nationally recognized fire safety standards, as approved, shall be deemed as prima facie evidence of compliance with the intent of the Fire Code. Where differences occur between the provisions of the Fire Code and nationally recognized standards, the provisions of the Fire Code shall apply.

The following information is intended to be used as a tool for regulatory compliance and also as a broad-spectrum of general safety precautions:

Aircraft Fuel System Maintenance/Fuel Transfer Equipment and Operations

The requirements of this section shall apply to aircraft fuel transfer operations during aircraft maintenance and overhaul operations. The fuel transfer operations shall include the following:

1. Transferring fuel from one tank to another within an aircraft while on the ground preparatory to maintenance
2. Transferring fuel from a tank in an aircraft to a tank in ground equipment or vice versa in order to achieve a maintenance objective
3. Transferring fuel for the purpose of performing tank repairs, replacement of tank accessories, or balancing of fuel loads.

Aircraft fuel transfer operations shall use one of the following methods:

1. A fixed fuel transfer piping shall be used where fuel transfer operations are conducted on a routine basis.
2. A limited-capacity self-contained trailer having a closed liquid transfer system
3. Self-propelled fuel servicing vehicles

Fuel transfer operations shall be conducted only out of doors if the aircraft tanks contained gasoline or JET B fuels during the preceding 20 flying hours

Each fuel transfer operation shall be tailored to the fuel system design features of each type of aircraft and shall be performed only after the detailed procedures have been approved by the authority having jurisdiction

Where multiple aircraft occupy one aircraft storage and servicing area (within each hanger), the location used for fuel transfer operations shall be identified.

During each fuel transfer operation, separate trained and qualified personnel shall be assigned to specifically oversee the fire safety of the procedures used, including the handling of the fire protection equipment provided, spill emergency precautions, and ventilation techniques.

Any fuel hose shall be continuous, without intermediate couplings

Only one aircraft shall undergo fuel transfer operations at any one time in single aircraft storage and servicing area

Any other simultaneous maintenance operations on that aircraft or within 25' of the aircraft fuel system vents, fuel tank openings, or fuel servicing vehicle, if used, that could constitute a source of ignition of vapors that could be released during an operation shall not be permitted

Personnel selected for fuel transfer operations shall have a thorough knowledge of the fuel system of the aircraft involved and the handling of flammable and combustible liquids and shall be familiar with the operation and limitations of the fire extinguishing equipment available. Documentation of such qualifications should be as specified in N.A.T.A. /N.F.P.A. standards, Code of Federal Regulations, and/or company policies and procedures.

At least two extinguishers, each with a minimum rating of 80-B:C and a minimum capacity of 125 lb of agent shall be located within a 50' distance, one on each side of the aircraft undergoing maintenance

All open flame and spark producing equipment or devices within the vapor hazard area shall be shut down and not operated during the fuel transfer operations

Electrical equipment used in the vapor area shall be listed for use in Class 1, Group D, Division 1, hazardous locations

Procedures to guard against the static accumulation of static electrical charges on the aircraft wing section or tank, shall be followed

Internal combustion engine-powered equipment shall not be operated within 25' of the aircraft fuel system vents or fuel tank openings prior to the start of fuel transfer operations

When transferring fuel from an aircraft tank by suction using an external pump or fuel servicing truck, sufficient personnel shall be assigned to accomplish the operation, to prevent overfilling, and to guard against hose slippage and any flammable or combustible liquid spillage

Aircraft radio, radar, strobe lights, and electronic transmitting equipment shall not be operated during fuel transfer operations

Any fuel transfer hose nozzle used during these operations shall be electrically bonded to the aircraft. These bonding connections shall be made prior to the start of operations and maintained until after the fuel transfer operations have been completed

When removing fuel from an aircraft tank by gravity, free fall of the fuel shall be avoided and a positive electrical bond shall be provided between the fuel tank and the receiving container

When transferring aircraft fuels by hose into a tank or drum, the hose shall be extended and fixed below the liquid level of the receiving tank to reduce the hazard of liquid surface electrostatic generation (exception: siphoning operations where a system is provided with bonding to reduce the hazard of liquid surface electrostatic generation)

Airport Fuel Systems

Work shall not be started on the construction or alteration of an airport fuel system until the design, plans, and specifications have been approved by the authority having jurisdiction. The system and each of its components shall be designed for the working pressure of the system. In establishing each aircraft fuel dispensing location, consideration shall be given to the accessibility of the location in an emergency by fire-fighting personnel and equipment.

Fueling/Defueling

The transfer of fuel from an aircraft to a tank vehicle through a hose generally is similar to fueling, and the same requirements shall apply. In addition, each operator shall establish procedures to prevent the overfilling of the tank vehicle, which is a special hazard when defueling. General design requirements are established in N.F.P.A. 407 for the following:

- Deadman Controls,
- Pressure Fuel Servicing System Controls,
- Aircraft Fueling Hose Requirements,
- Materials Used in the Construction of Fuel Servicing Vehicles and Hydrant Fuel Service Carts
- Static Protection
- Containers and Systems for Flammable Liquids Other than Cargo Tanks
- Engine Exhaust Systems
- Vehicle or Cart Lighting and Electrical Equipment
- Cabinets
- Fire Extinguishers for Aircraft Fuel Servicing Vehicles or Carts
- Full Trailers and Semi trailers
- Smoking Restrictions
- Cargo Tanks
- Fill Openings and Top Flashings
- Piping, Joints, Flanged Connections, and Couplings
- Outlet Valves and Emergency Shutoff Controls
- Fuel Dispensing System
- Tests
- Product Identification Signs
- Loading
- Top Loading/Bottom Loading
- Emergency Remote Control Stations
- Product Recovery Tanks

Misfueling

In the event that the accidental fueling of an aircraft or refueling vehicle results in an incorrect grade of product; the product, if no longer useable for its intended purpose, may be subject to regulation as a hazardous waste and shall be stored, handled and disposed of, in accordance with local, state and federal regulations. Useable product(s) in containers and tanks (portable, stationary, underground) will be subject to restrictions on general storage, use and dispensing, or as applicable to the installation.

Operations

Only personnel trained in the safe operation of the equipment and fuels they use, the operation of emergency controls, and the procedures to be followed in an emergency shall be permitted to handle fuels. Records should be kept of personnel training and should be made available to the authority having jurisdiction upon request

Where a valve or electrical device is used for isolation during maintenance or modification of the fuel system, it shall be tagged/locked. The tag/lock shall not be removed until the operation is complete.

Fuel nozzles shall not be dragged upon the ground

Approved pumps, either hand operated or power operated, shall be used where aircraft are fueled from drums. Pouring or gravity flow shall not be permitted from a container with a capacity of more than 5 gallons.

Prior to making any fuel connections to the aircraft, the fueling equipment shall be bonded to the aircraft by use of a cable, thus providing a conductive path to equalize the potential between the fueling equipment and the aircraft. The bond shall be maintained until fueling connections have been removed, thus allowing separated charges that could be generated during the fueling operations to reunite. Grounding during aircraft fueling shall not be permitted.

Where a hydrant servicer or cart is used for fueling, the hydrant coupler shall be connected to the hydrant system prior to bonding the fuel equipment to the aircraft. Bonding and fueling connections shall be disconnected in the reverse order of connection.

Where a funnel is used in aircraft fueling, it shall be kept in contact with the filler neck as well as the fueling nozzle spout or the supply container to avoid the possibility of a spark at the fill opening. Only metal funnels shall be used.

Combustion heaters on aircraft (e.g., wing and tail surface heaters, integral cabin heaters) shall not be operated during fueling operations.

Equipment, other than that performing aircraft service functions, shall not be permitted within 50 ft. of aircraft during fuel servicing operations.

Battery chargers shall not be connected, operated, or disconnected while fuel servicing is performed on the aircraft. Aircraft ground-power generators or other electrical ground-power supplies shall not be connected or disconnected while fuel servicing is performed on the aircraft.

Personnel shall not carry lighters or matches on their person while engaged in fuel servicing operations. Lighters or matches shall not be permitted on or in fuel fueling equipment.

Aircraft fueling hose shall be inspected before use each day. At least once each month the hose shall be completely extended and inspected. The hose shall be extended as it normally would be for fueling and checked for evidence of blistering, carcass saturation or separation, cuts, nicks, or abrasions that expose reinforcement material, and for slippage, misalignment, or leaks at couplings. Defective hose shall be removed from service. Kinks or short loops in fueling hose shall be avoided. Suitable records shall be kept of required inspections and hydrostatic tests (for recoupled hose assemblies).

Failure of aircraft fueling hose in service is a potential source of fuel spillage and a potential fire hazard.

The principal reasons for failure of aircraft fueling hoses include the following:

- Using damaged hoses
- Using aged hoses
- Exceeding pressure limits
- Improper installation

General Hanger Use and Operations

Material Safety Data Sheets (MSDS) shall be readily available **on the premises** for ALL hazardous materials regulated by the fire code. This provides vital information access to SMFR.

Individual containers, cartons or packages of hazardous materials, shall be conspicuously marked or labeled in an approved manner. Rooms or cabinets containing compressed gases shall be conspicuously labeled: COMPRESSED GAS.

Containers of regulated hazardous waste shall be in conformance with state and federal regulations (C.D.P.H.E. /E.P.A.), as specified by the individual generator classification.

Empty containers and tanks previously used for the storage of hazardous materials shall be free from residual material and vapor as defined by DOTn, the Resource Conservation and Recovery Act (RCRA) or other regulating authority or maintained as specified for the storage of hazardous materials and waste. For information on hazardous waste generation and RCRA regulations, please contact the Colorado Department of Public Health & Environment Generator Assistance Program at 1-888-569-1831 (x-3415), or 303-692-3415.

Buildings or portions thereof, in which hazardous materials are stored, handled or used shall be constructed in accordance with the International Building Code or shall be maintained in accordance with the adopted code during initial construction and approved use. Construction and design provisions shall apply to:

Structures, facilities and conditions arising after the adoption of the fire code

Existing structures, facilities and conditions not legally in existence at the time of the adoption of the fire code

Existing structures, facilities and conditions when identified in specific sections of the fire code.

Existing structures, facilities and conditions, which in the opinion of the fire code official, constitute a distinct hazard to life or property

The purpose of this Fire Code extraction is to call attention to the fact that the fire or building code does not consist of terminology such as "grandfather clause". The intent of this direction is to ensure no changes in building use or activities, or physical changes have been made without obtaining consultations or approvals from the local Building Department and S.M.F.R.

Maximum allowable quantities of hazardous materials in storage and use,

Shall not be exceeded, and may be addressed by the code official during a premises inspection. Typical maximum allowable quantities found in most hangers are including, but not limited to:

- Oxygen-gaseous; 1500 cu. Ft.
- Class I-B and I-C flammable liquids (MEK, Isopropyl Alcohol, etc.); 120 gallons
- Class II combustible liquids; (i.e.: Jet A fuel); 120 gallons

Increases in storage (not dispensing) will usually be allowed under the following conditions:

- The building is equipped with an approved automatic sprinkler system
- Approved cabinets are utilized
- "Control areas" are utilized. Interior control areas are areas within a building surrounded by exterior walls and/or a minimum of one-hour rated interior doors, walls, and ceiling, where the maximum allowable quantities are not exceeded. Further determination of control areas can be evaluated during a site inspection or a review of original "as-built drawings". Exterior control areas can also be utilized and will be based on hazard classifications, proposed locations, surrounding conditions and quantities. Further information can be obtained by contacting S.M.F.R.

Flammable liquid cabinets:

In all occupancies, quantities of flammable and combustible liquids in excess of 10 gallons used for maintenance (building maintenance) purposes and the operation of equipment shall be stored in approved cabinets. The combined total quantity of liquids in each cabinet shall not exceed 120 gallons. Doors shall be well fitted, self-closing and equipped with a three-point latch; all cabinets shall be in good condition, interior storage kept neat and orderly. If current cabinets do not meet this criteria, SMFR will help prioritize replacement(s) and allow sufficient time to budget for such expense. Approved flammable liquid cabinets may also be utilized to increase the maximum allowable quantities for the storage (not use) of hazardous materials, as previously described.

Empty tanks or containers;

Previously used for the storage of flammable or combustible liquids, unless free from explosive vapors, shall be stored as required for filled containers and tanks. Portable tanks and containers, when emptied, shall have the covers or plugs immediately replaced in openings.

Use, dispensing and mixing of flammable liquids;

Where differences of potential could be created, vessels containing Class 1 liquids or liquids handled at or above their flash points shall be electrically connected by bond wires, ground cables, piping or similar means to a static grounding system to maintain equipment at the same electrical potential to prevent sparking. Locations of dispensing activities, or other areas where flammable vapor/air mixtures could exist, should be carefully examined prior to use. Please consult your local building department representative, or licensed electrician for electrical requirements for such locations

Parts cleaning and degreasing;

Shall be conducted in listed and approved machines. Solvents shall be compatible with the machines within which they are used. Work areas of machines with remote reservoirs shall not be used for immersion soaking of parts. Multiple machines shall be separated by each other by a distance of not less than 30 ft. or by a fire barrier with a minimum 1-hr fire-resistance rating. Machines shall be located in areas adequately ventilated to prevent accumulation of vapors. Machines shall be installed in accordance with their listing.

The application of flammable or combustible liquids;

Applied by means of spray apparatus in continuous or intermittent process shall be conducted within spray rooms, spray booths, or spray spaces, in accordance with the fire code.

Limited spraying operations shall comply with the following:

The aggregate surface area to be sprayed shall not exceed 9 sq. ft.

Spraying operations shall not be of a continuous nature

Positive mechanical ventilation providing a minimum of six air changes per hour

Electrical wiring within 10 ft. of the floor and 20 ft. horizontally of the limited spraying space shall be designed for Class 1, Division 2 locations in accordance with the currently adopted Electrical Code.

Sources of ignition;

Open flames, flame-producing devices and other sources of ignition shall not be permitted in a hanger, except in **approved** locations or in any location within 50 ft. of an aircraft-fueling operation. Repairing of aircraft requiring the use of open flames, spark-producing devices or the heating of parts above 500 degrees F. shall only be done outdoors or in an area complying with the provisions of the International Fire Code for Group F-1 occupancy (assembling, processing, finishing, fabricating, manufacturing, packaging, repair, processing operation uses)

Aircraft cleaning and paint removal;

In selecting materials for cleaning, and paint removal purposes, materials which are non-hazardous or materials which have the highest flash point available should be used. Please refer to the Material Safety Data Sheet (MSDS) for further information on hazards. Associated uses will be evaluated and will include, but not be limited to; location of use, surrounding conditions, adequacy of air movement, fixed and portable electrical equipment, use of heat lamps, cleaning operations and waste generated, installation and availability of fire protection equipment.

Aircraft breathing-oxygen systems;

Because of the possibility of fire or explosion involving quantities of oxygen, the person choosing the site for oxygen charging operations shall consider such items as exposure of other aircraft, vehicles, structures, utilities, general safeguards (including good housekeeping practices) and people in the vicinity, and the accessibility of the aircraft to fire-fighting equipment.

Annual reporting of Chemicals/.S.P.C.C.;

Please report all chemicals in use, storage and waste conditions as required by the Arapahoe County L.E.P.C. and S.M.F.R. The web site and instructions can be accessed at: <http://www.co.arapahoe.co.us/apps/hazmat>. All S.P.C.C plans should be available upon request as required by the Code of Federal Regulations.

Fire Protection Systems;

Once installed, fire protection systems should not be forgotten. In order to alleviate nuisance alarms, and to ensure of reliable system function and protection, fire department personnel conducting fire inspections will verify that all testing and maintenance is performed as specified in the currently adopted fire code and N.F.P.A. standards. Where systems are changed, altered or substitutions made, it is imperative that such changes are justified. The burden will be placed upon the person(s) making such changes, to thoroughly document, in writing, those changes. A construction permit is required for installation or modification to a fire protection system or related equipment. Maintenance performed in accordance with the fire code is not considered a modification and does not require a permit.

Records of all system inspections, tests and maintenance required by the referenced standards, shall be maintained on the premises for a minimum of three years and shall be copied to the fire code official upon request.

Foam systems;

At least annually, all foam systems shall be thoroughly inspected and checked for correct operation. The inspection shall include performance evaluation of the foam concentrate or premix solution quality or both. An inspection of foam concentrates and their tanks, or storage containers shall be conducted annually, for evidence of excessive sludging or deterioration. Samples of concentrates shall be sent to the manufacturer or qualified laboratory for quality control testing. Quantity of foam concentrate in storage shall meet design requirements, and tanks or containers shall normally be kept full, with space allowed for expansion. Test results that deviate more than 10% from those recorded in the acceptance testing shall be discussed immediately with the manufacturer. The inspection report, with recommendations, shall be filed with the owner. Proportioning devices, their accessory equipment, and foam makers shall be inspected.

Building alterations;

Any alterations, additions, changes from the original intended use of a building, or portion therefore (including all hangers regardless of ownership), shall be made in accordance with the currently adopted Building and Fire Codes. If, at **any** time, such changes have been made without required permits, those installations may be considered in violation of such codes and ordinances and shall be removed or altered, modified or approved by the local authority having jurisdiction (S.M.F.R./Building Dept.). Changes, additions and alterations may include but not be limited to the following:

1. The addition, removal or altering of walls
2. The addition, removal or altering of decks and mezzanines
3. Electrical modifications, additions or deletions, as indicated by the local building department
4. The alteration of any structural building components
5. The creation of openings (i.e.: into adjoining spaces)
6. The alteration, addition, elimination of any fire protection system
7. The addition, alteration of any HVAC system
8. The addition of temporary or permanent heating (natural gas or propane). However it should be understood that the currently adopted fire code does not authorize lp-gas/propane as a permanent heating source