

# **AIRPORT CERTIFICATION MANUAL**

## **Minneapolis-St. Paul International Airport (MSP)**

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# Airport Certification Manual

## Minneapolis-St. Paul International Airport (MSP)



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**Phil Burke**  
**Director of MSP Operations**

Metropolitan Airports Commission

## Minneapolis-St. Paul International Airport

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## Revision Control Sheet

Revision Number	Revision Date	Revision Contents and/or Remarks
001	07/01/07	Pages iv - vi, Revision Control Sheet, Distribution List
001	07/01/07	Page 11-2, Declared Distances & Displaced Thresholds
001	07/01/07	Page 11-3, safety areas for Taxiways K & L
001	07/01/07	Page 12-3, 12-4, 12-5, Taxiway reflectors
001	07/01/07	Page 15-1, & 15-2, paragraph a, vehicles 16 & 17
001	07/01/07	Page 16-1, items c & e
001	07/01/07	Page 21-1, 21-2, 21-3, 21-4, 21-5, Pedestrian and Ground Vehicles
001	07/01/07	Page 24-1, item 3.a
001	07/01/07	Exhibit 1, Operations Organization Chart
001	08/15/06	Exhibit 7, Sign Plan
001	07/01/07	Exhibit 9, Snow Plan
001	07/01/07	Exhibit 13, Letters of Agreement
002	01/22/09	Exhibit 7, Updated Sign Plan
003	03/31/09	Exhibit 9, Snow Plan: Added information related to continuous monitoring and crew resource management.
004	10/31/10	Complete update of the entire document.
005	01/01/12	Page 21-1, 21-2, 21-3, 21-4, 21-5, 21-6, Pedestrian and Ground Vehicles
006	03/18/13	Pages i, iv, Table of Contents and Revision Control Sheet. Pages v-vi, Elimination of Document Control Sheet (page renumbering). Page 4-1, Falsification, reproduction, or alteration of applications, certificates, reports, or records. Page 8-1, 8-2 (format), CEO, Personnel. Page 21-2, 21-4, Pedestrians and Ground Vehicles.
007	09/15/13	00 -Table of Contents; Sections 9, 11, 12, 15, 16, 20, 24, 26, 27; Exhibits 1, 2, 4, 5-2, 6, 7, 9-1, 9-2, 10, 11, 13-1, 13-2, 14, 16, 17.
008	07/31/14	00 - Table of Contents, Section 21
009	08/01/14	Table of Contents, Section 13, Exhibit 9
010	03/24/2016	Updates to 00 - Table of Contents and Sections 12, 15, 16, 17, 20, and 26 as well as Exhibits 1, 4, 7, 10, 12, 14, and 15. Addition of Exhibit 18.

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## Distribution List

- 00 Original ACM
- 01 FAA Airport Certification Inspector
- 02 MAC Executive Director/CEO
- 03 MAC Executive Vice President/COO
- 04 MAC Vice President Management and Operations
- 05 MAC Director of MSP Operations
- 06 MAC Assistant Director of Facilities
- 07 MAC Assistant Director of Maintenance & Operations
- 08 MAC Assistant Director of Airline Operations
- 09 MAC Airport Police Department
- 10 MAC Airport Fire Department
- 11 MAC Field Maintenance Department
- 12 MAC Electrical Department
- 13 MAC Paint Department
- 14 MAC Airport Development Department
- 15 MAC Airside Operations Department
- 16 MAC Emergency Communications Department
- 17 Air Traffic Manager, FAA Air Traffic Control Tower
- 18 Manager, FAA Airways Facilities
- 19 District Chief, FAA Airports District Office
- 20 Minnesota State Department of Transportation
- 21 General Manager, Signature Flight Support
- 22 Station Manager, Air Canada
- 23 Station Manager, Air France

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## Distribution List

- 24 Station Manager, American Airlines
- 25 Station Manager, Southwest Airlines
- 26 Station Manager, Delta Air Lines
- 27 Station Manager, FedEx
- 28 Station Manager, Frontier Airlines
- 29 Station Manager, Icelandair
- 30 Station Manager, Delta Global Services
- 31 Station Manager, Spirit Airlines
- 32 Station Manager, Skywest Airlines
- 33 Station Manager, Endeavor Airlines
- 34 Station Manager, United Airlines
- 35 Station Manager, Sun Country Airlines
- 36 Station Manager, Condor Airlines
- 37 Station Manager, Compass Airlines
- 38 Station Manager, AlaskAir Group
- 39 Station Manager, DHL
- 40 Station Manager United Parcel Service
- 41 934th Air Force Reserve
- 42 133rd Air National Guard
- 43 Swissport
- 44 Station Manager, Air Choice One
- 45 Station Manager, Boutique Air
- 46 Station Manager, JetBlue
- |47 Station Manager, KLM

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# Section 11

## 139.309 - Safety Areas

### A. Safety Area Dimensions

With the exception of runway 17/35, all runways were constructed prior to February 18, 1970. Runway 17/35 was completed in August of 2005. The safety areas associated with runways and taxiways conform as a minimum to those in existence as of December 31, 1987. Safety areas will be upgraded to current dimensions acceptable to the Administrator when new construction is undertaken. These areas shall be maintained as follows:

Current safety areas for surfaces used by air carrier aircraft are listed below:

Runway Safety Areas:

Location	Width	Length at Approach End	Distance to EMAS	Length of EMAS	Width of EMAS
Runway 04	500'	1000'			
Runway 12L	500'	1000'			
Runway 12R	500'	1000'			
Runway 22	500'	1000'			
Runway 30L	500'	785'	630'	160'	216'
Runway 30R	500'	620'			
Runway 17	500'	1000'			
Runway 35	500'	1000'			

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## Declared Distances / Displaced Thresholds

Runway 12L declared distance implemented to increase departure end safety area to 1000'

Location	TORA	TODA	ASDA	LDA	Displaced Threshold
Runway 04	11006'	11006'	11006'	9456'	1550'
Runway 12L	8200'	8200'	7620'	7620'	
Runway 12R	10000'	10000'	10000'	10000'	
Runway 22	11006'	11006'	11006'	10006'	1000'
Runway 30L	10000'	10000'	10000'	10000'	
Runway 30R	8200'	8200'	8200'	8000'	200'
Runway 17	8000'	8000'	8000'	8000'	
Runway 35	8000'	8000'	8000'	8000'	

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## Taxiway Safety Areas:

Taxiway	Location	Width	Design Aircraft
A	Taxiway A1 to Taxiway A10	214 feet	V
B	Taxiway A1 to Taxiway A3	125 feet	757
B	Taxiway A3 to Taxiway D	171 feet	IV
B	Taxiway D to Taxiway A10	214 feet	V
C	Taxiway S to Taxiway C10	214 feet	V
D	Taxiway K to Taxiway P	214 feet	V
G	Runway 12L/30R to Taxiway C	214 feet	V
H	Runway 4/22 to Taxiway P	214 feet	V
K	Taxiway K1 to Taxiway K10	214 feet	V
L	Taxiway L3 to Taxiway L10	214 feet	V
M	Taxiway S to Taxiway B	214 feet	V
M	Taxiway B to Taxiway H	171 feet	IV
M	Taxiway H to Runway 12L/30R	214 feet	V
N	Taxiway S to Taxiway L	214 feet	V
P	Taxiway P1 to Taxiway P10	214 feet	V
Q	Taxiway P2 to Taxiway D	125 feet	757
Q	Taxiway D to Taxiway P10	171 feet	IV
R	Taxiway R10 to Runway 4/22	214 feet	V
S	Taxiway D to Taxiway K	214 feet	V
T	Taxiway D to Taxiway Y	171 feet	IV
W	Taxiway W1 to Taxiway W10	214 feet	V
Y	Taxiway K to Taxiway W	214 feet	V
Z	Taxiway K to Taxiway W	214 feet	V

**COMPLIANCE:** The runway and taxiway safety areas are inspected in accordance with Section 20 - 139.327 Self Inspection Program of this manual. NOTAMS, as required, will be issued in accordance with Section 26 - 139.339 Airport Condition Reporting.

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**B. Required Conditions of Safety Areas**

1. Each safety area shall be cleared, drained and graded areas that have no abrupt surface irregularities, ditches, potentially hazardous ruts, bumps, depressions or other surface variations.
2. Each safety area is drained by storm sewers or grading to prevent water accumulation.
3. All objects located in the safety area are mounted on frangible bases, or fixed by their function, and the frangible part shall be no higher than 3 inches above ground.
4. All safety areas have adequate drainage to ensure rapid water runoff and are capable, under dry conditions, of supporting snow removal and fire fighting equipment, and supporting the occasional passage of aircraft without causing major damage to the aircraft.
5. Safety areas shall conform to dimensions acceptable to the FAA if any runways or taxiways are constructed, reconstructed, or extended.
6. The safety area at the departure end of runway 12R is 900' long. An EMAS system has been engineered and installed to create an effective distance equivalent to a 1000' long safety area. The EMAS bed is 160' long and 216' wide and is located 630' from the approach end of 30L.
7. Engineered Materials Arresting Systems (EMAS) at Minneapolis-Saint Paul International Airport (MSP) is installed and will be maintained per FAA Advisory Circular 150/5220-22, current edition, Engineered Materials Arresting System (EMAS) for Aircraft Overruns, standards. The EMAS is constructed on a surface capable of supporting the passage of critical design aircraft and fully loaded ARFF vehicles. The EMAS is capable of supporting pedestrian traffic for the purpose of maintaining the arresting material or any collocated navigational aid without surface damage.

Maintenance program of the EMAS system is listed as *Exhibit 17*.

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**C. Inspection**

The Airside Operations Department personnel will inspect the safety areas on each side of the runway and the safety areas on each end of the runways daily.

The Field Maintenance Department personnel will inspect the EMAS as described in *Exhibit 17*. The EMAS inspection checklist is listed in *Exhibit 17*.

**D. Maintenance of Safety Areas**

MAC Field Maintenance Department personnel shall initiate corrective action as soon as practical when any unsatisfactory conditions are found in the safety areas. MAC Field Maintenance Personnel are responsible for the correction of any unsatisfactory conditions within the safety areas.

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# Section 12

## 139.311 - Marking, Signs and Lighting

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139.311 - MARKING, SIGNS AND LIGHTING

### A. Marking

The airport will provide and maintain marking systems for air carrier operations in accordance with Part 139.311(a) and of AC 150/5340-1, current edition, Standards for Airport Markings. The following marking and lighting systems are provided and are operable:

1. Ground guidance signs identifying taxi routes per Exhibit 7 of this manual.
2. Runways 12L/30R, 12R/30L, 04/22 and 35 are marked with precision instrument runway markings. Runway 17 is marked with non precision instrument runway markings.
3. Runway 04 has displaced threshold markings for 1,550 feet. Runway 22 has displaced threshold markings for 1,000 feet. Runway 30R has displaced threshold markings for 200 feet.
4. All runway holding position markings are located at a distance of at least 288 feet from runway centerlines per Advisory Circular specifications for the most critical aircraft operating at this airport.
5. All taxiways have centerline and holding markings.
6. Feeder taxiways to all runways have enhanced taxiway centerline markings, enhanced holding position markings and surface painted holding position signs.
7. Instrument Landing System (ILS) critical area markings are located on taxiways "Y", "W" and "R".

### B. Signs

The Airport will provide and maintain a sign system for air carrier operations in accordance with 14 FCR Part 139.311(b). The Marking and Sign Plan is included in Exhibit 7. The signs will meet standards in AC150/5340-18, current edition, Standards for Airport Sign Systems, and sign specifications in AC 150/5345-44, current edition, Specifications for Taxiway and Runway Signs.

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**C. Lighting**

The Airport will provide and maintain lighting systems for air carrier operations in accordance with Part 139.311(c) and AC 150/5340-30, current edition, Design and Installation Details for Airport Visual Aids, to meet the specifications for the lowest instrument approach minimums authorized for each runway.

The following lighting systems are provided:

1. Runway lighting for each runway:

**RUNWAY 04-22**

H.I. RUNWAY EDGE LIGHTING SYSTEM  
LIGHTS PER FAA SPEC. L-862

**RUNWAY 12L-30R**

H.I. RUNWAY EDGE LIGHTING SYSTEM  
LIGHTS PER FAA SPEC. L-862

CENTERLINE LIGHTING  
LIGHTS PER FAA SPEC. L-850

**(RUNWAY 12L ONLY)**  
TOUCHDOWN ZONE LIGHTING  
LIGHTS PER FAA SPEC. L-850

**RUNWAY 12R-30L**

H.I. RUNWAY EDGE LIGHTING SYSTEM  
LIGHTS PER FAA SPEC. L-862

CENTERLINE LIGHTING  
LIGHTS PER FAA SPEC. L-850

TOUCHDOWN ZONE LIGHTING  
LIGHTS PER FAA SPEC. L-850

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**RUNWAY 17-35**

H.I. RUNWAY EDGE LIGHTING SYSTEM

LIGHTS PER FAA SPEC. L-862

CENTERLINE LIGHTING

LIGHTS PER FAA SPEC. L-850

**(RUNWAY 35 ONLY)**

TOUCHDOWN ZONE LIGHTING

LIGHTS PER FAA SPEC. L-850

- 2. Runway visual range for each runway:

**RUNWAY 04-22**

TOUCHDOWN, ROLLOUT

**RUNWAY 12L-30R**

TOUCHDOWN, MID, ROLLOUT

**RUNWAY 12R-30L**

TOUCHDOWN, MID, ROLLOUT

**RUNWAY 17-35**

TOUCHDOWN, MID, ROLLOUT

- 3. Taxiway Lighting for taxiways, which serve runways, used for night operations by air carrier aircraft with over 9 passenger seats.

**TAXIWAY EDGE LIGHTING SYSTEM**

BLUE MARKER LIGHTS

LIGHTS PER FAA SPEC. L-861

TAXI GUIDANCE LIGHTING SYSTEM

LIGHTED SIGNS PER FAA SPEC. L-858

**TAXIWAY CENTERLINE REFLECTIVE MARKER SYSTEM**

GREEN REFLECTIVE MARKERS

REFLECTORS PER FAA SPEC. L-853

4. An airport rotating beacon is equipped with a green and clear lens. The beacon is located in the north/west section of the airport on what is currently used as a U.S. Navy Base.
5. Obstruction lighting for obstructions identified under FAR Part 77. Exhibit 8 shows the location of obstruction lights under the Airport's control.
6. The following NAVAIDS and Visual Aids are provided and maintained by the FAA:

A.L.S.F.	RUNWAY 12L, 12R, 30L, 35
M.A.L.S.R.	RUNWAY 04
M.A.L.S.R.	RUNWAY 22
P.A.P.I.	RUNWAY 12L, 12R, 17, 30L, 35
R.E.I.L.	RUNWAY 17

7. The following NAVAIDS and Visual Aids are provided and maintained by the MAC:

P.A.P.I.	RUNWAY 04*, 22*, 30R*
----------	-----------------------

\* A preventive maintenance inspection procedure checklist is listed in *Exhibit 16*.

#### D. Maintenance

Each marking, sign, and lighting system installed on the airport that is owned by the airport shall be properly maintained by cleaning, replacing, or repairing any faded, missing, or nonfunctional item. Each marking, sign, and lighting system will be maintained unobscured, clearly visible and shall provide an accurate reference to the airport users. Marking, sign, and lighting systems are inspected daily and appropriate NOTAMs will be issued in accordance with Section 20 - 139.327 Self Inspection Program and Section 26 - 139.339 Airport Condition Reporting of this manual.

Each lighting system will be maintained at least to the minimum operational criteria listed in Appendix 1, Table 7, of AC 150/5340-26, current edition, Maintenance of Airport Visual Aid Facilities.

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In order to provide continuity of visual guidance, the allowable percentage of inoperable lights shall not be in such a way as to alter the basic pattern of the lighting system.

If the above operating limits cannot be maintained, and airport management determines that the outage may not provide an accurate reference to airport users, information concerning the outage shall be disseminated locally. If an entire lighting system is inoperable or out of service, an airport condition report shall be issued in accordance with Section 26 - 139.339 Airport Condition Reporting.

#### **E. Lighting Interference**

Any lighting, including apron, vehicle and aircraft parking areas, roadways, fuel storage areas, buildings, etc., shall be adjusted or shielded to prevent interference with aircraft operations and air traffic control.

#### **F. Lighting Back-up Power Source**

Each lighting system installed on the airport that is owned by the airport shall have a proper lighting back-up power source as required by Chapter 9 Standby Power-Non-FAA in AC 150/5340-30, current edition, Design and Installation for Airport Visual Aids. MAC Electric will record all maintenance of generators on their "Preventative Maintenance System". Generator maintenance procedures and inspection procedures are located in *Exhibit 16*.

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## Section 15

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### 139.317 - ARFF: Equipment and Agents

139.317 - AIRCRAFT AND RESCUE FIRE FIGHTING: EQUIPMENT AND AGENTS

- A.** ARFF equipment required by the airport index determination is housed between two stations. Station # 1 is located just north of Terminal 2 and Station # 2 is located near the base of the ATC Tower. Both stations provide direct access to taxiways, runways, and ramp areas. The stations and required equipment are staffed 24 hours a day, 7 days a week.
- B.** ARFF equipment consists of the following vehicles.
- Crash 12: 2006 Oshkosh Striker 1500, 1500 gal. Water, 210 gal. AFFF, 460 lbs. Halotron I, Roof Turret capable of flowing 375 gpm low rate / 750 gpm high rate of water or 3% foam mixture, Bumper Turret capable of flowing 375 / 750 gpm high rate of water or 3% foam, Halotron I hand line capable of flowing 5 lbs. per second.
- Crash 15 : 2014 Oshkosh Global Striker 3000, 3000 gal. Water, 420 gal. AFFF, 460 lbs. Halotron I, 450 lbs. Purple K Dry Chemical, Hydro-Chem Bumper Turret capable of flowing 625 gpm low rate / 1250 gpm high rate of water or 3% foam mixture and 20 lbs. per second of Dry Chemical, Roof Turret capable of flowing 625 gpm low rate / 1250 gpm high rate of water or 3% foam mixture, Dry Chemical hand line capable of flowing 5.4 lbs. per second.
- Crash 16: 2005 Oshkosh Striker 3000, 3130 gal. Water, 420 gal. AFFF, 450 lbs. Purple K Dry Chemical, Hydro-Chem Bumper Turret capable of flowing 625 gpm low rate / 1250 gpm high rate of water or 3% foam mixture and 20 lbs. per second of Dry Chemical, Roof Turret capable of flowing 375 gpm low rate / 500 gpm high rate of water or 3% foam mixture, Dry Chemical hand line capable of flowing 5-7 lbs. per second.
- Crash 17: 2014 Oshkosh Global Striker 3000 w/Snozzle, 3000 gal. Water, 420 gal. AFFF, 460 lbs. Halotron I, 450 lbs. Purple K Dry Chemical, Hydro-Chem Bumper Turret capable of flowing 625 gpm low rate / 1250 gpm high rate of water or 3% foam mixture and 20 lbs. per second of Dry Chemical, Snozzle Turret capable of flowing 500 gpm of water or 3% foam mixture, Piercing Nozzle capable of flowing 250 gpm water or 3% foam mixture, Dry Chemical hand line capable of flowing 5.4 lbs. per second.

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Crash 18: 2009 Oshkosh Striker 3000, 3130 gal. Water, 420 gal. AFFF, 450 lbs. Purple K Dry Chemical, Hydro-Chem Bumper Turret capable of flowing 625 gpm low rate / 1250 gpm high rate of water or 3% foam mixture and 20 lbs. per second of Dry Chemical, Roof Turret capable of flowing 375 gpm low rate / 500 gpm high rate of water or 3% foam mixture, Dry Chemical hand line capable of flowing 5-7 lbs. per second. The vehicle also has a 460 lbs Halotron (clean agent) system.

- C. Vehicle capacity and discharge rates are depicted in a table in Exhibit 10.

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**139.321 - Handling and Storing of Hazardous Substances and Materials**

- A.** Airport employees do not act as handling agents for any material regulated by 49 CFR Parts 171-180. The only substances handled by airport personnel are those substances used in normal daily airport operations and maintenance.
- B.** The following procedures have been established and shall be maintained for protecting against fire and explosion in storing, dispensing, and otherwise handling fuel, lubricants and oxygen (other than aircraft cargo) on the airport:
1. Grounding rods have been installed at all airline refueling locations and major general aviation refueling areas. During refueling operations, tenants are permitted to use the "Bonding Process" per the appropriate NFPA standard.
  2. All fuel storage areas and refueling facilities are fenced with gates to restrict entrance or are within the perimeter fence of the airport. All storage areas are lighted. Appropriate fire extinguishers are located at all fuel storage areas and on all mobile fuelers used at the airport. Warning signs and fuel identification markings are permanently displayed in fuel storage areas.
  3. Warning signs and fire extinguishers are permanently located at all storage areas including fueling cabinets, fueling pits, and mobile fuelers. Fire prevention personnel periodically inspect storage areas. These areas are kept clean of flammable material, debris, and vegetation.
  4. Those airport tenants acting as fueling agents are required to be trained and shall ensure that at least one supervisor has completed an aviation fuel training course in fire safety prior to initial duties or within 90 days of initiating duties and then also receives recurrent training every 24 consecutive months. All other fueling personnel receive initial on-the-job training in fire safety under the supervision of a trained supervisor as well as recurrent training every 24 consecutive months. Written confirmation of the above will be obtained every 12 consecutive months on approved supervisory and line service fuel safety training forms found in Exhibit 18. Record of this confirmation will be maintained by the Airport Fire Department for a period of 12 consecutive calendar months.
  5. The Metropolitan Airports Commission (MAC) enforces the most recent edition of the Minnesota State Fire Code, as per MN State Statute 299F.011.

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This applies to all properties and occupancies within the jurisdiction of the MAC Airport Fire Department. In addition, airport fueling systems relating to FAA Part 139 requirements, the MAC enforces the most recent editions of the National Fire Protection Association 407, Standard for Aircraft Fuel Servicing.

- C.** To ensure that fueling operations are conducted in an acceptable manner, all fuel facilities will be inspected regularly by airport personnel utilizing the fueling inspection forms found in Exhibit 18. Inspections by fire prevention personnel are conducted at least once every three consecutive months and a report of this inspection is retained for a period of twelve consecutive months. This inspection may also be conducted by the fuel suppliers, other governmental agencies, or the airlines.
- D.** Each tenant fueling agent is required to take immediate corrective action whenever a fire safety deficiency is reported. If corrective action of significant deficiencies cannot be accomplished within a reasonable time, the airport authority will take appropriate action and notification to the FAA shall be made.

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# Exhibit 10 ARFF Equipment/Personnel

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EXHIBIT 10 - ARFF EQUIPMENT/PERSONNEL

Vehicle Call Sign	Year	Manufacturer	Model	Condition of Vehicle	Number of Personnel Assigned to Vehicle	Water capacity (gallons)	Main Turret Discharge rate (gal/min)	AFFF capacity (gallons)	Halotron capacity (pounds)	Dry Chemical capacity (pounds)	Additional Info
Crash 12	2006	Oshkosh	Striker	Good		1500	750	210	460		Reserve Status
Crash 15	2014	Oshkosh	Global Striker	Excellent	2*	3000	1250	420	460	450	
Crash 16	2005	Oshkosh	Striker	Good	2*	3130	1250	420		450	
Crash 17	2014	Oshkosh	Global Striker	Excellent	2*	3000	1250	420	460	450	w/Snozzle
Crash 18	2009	Oshkosh	Striker 3000	Excellent	2*	3130	1250	420	460	450	
Engine 31	2017	Pierce	Dash	Excellent	3	500		40			
Engine 32	2018	Pierce	Dash	Excellent	3*	500		40			
Engine 34	2006	Custom/Spartan	Gladiator	Good		500		40			Reserve Status
Captain 4	2007	Chevrolet	Suburban	Good	1						Shift Commander
Foam 43	2014	KME/Ford	F-550	Excellent				1000			Foam Tender

\* Denotes cross-staffed vehicles; minimum on-duty staff is 13 persons

Original Date: 12/9/04

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*Kenneth M. Taira*

9/10/2018

FAA Approval

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## Exhibit 16

# Preventive Maintenance Inspection Procedures for PAPIs and Generators

Precision Approach Path Indicator (PAPI) at Minneapolis-Saint Paul International Airport (MSP) will be maintained per AC 150/5340-26, current edition, Maintenance of Airport Visual Aid Facilities.

Maintenance of the Runway 04, 22 and 30R PAPI visual aids will be according to the following program:

1. Operation of the lamps will be checked and visually inspected on a daily basis by Airside Operations and will be maintained in accordance with section 12.D of the MSP Airport Certification Manual.
2. A comprehensive inspection of the Runway 04, 22, 30R PAPI visual aids are conducted monthly per the PAPI inspection form included in this exhibit.
3. Personnel will check the integrity of obstacle free approach planes on a quarterly basis.
4. Insulation resistance of underground cables will be checked by airport trades personnel on a semi-annual basis.
5. Resistance of the grounding system will be checked by airport trades personnel on a semi-annual basis.
6. Findings from the monthly, quarterly and semi-annual comprehensive inspections will be noted on the inspection PAPI form included in this exhibit.
7. Repair, component replacement and/or deficiencies will be corrected as soon as practicable considering airport capacity and minimum weather criteria necessary to ensure proper repair.
8. All repair, component replacement and/or deficiency corrections will be logged on the corrective action form and will include a description and date of the corrective action taken. Airside Operations will be notified of completed corrective actions.
9. All completed PAPI inspection and corrective action forms will be reviewed by airport management personnel to ensure documentation includes inspection date, deficiencies found, and if applicable, a description and date of the corrective action taken.
10. A paper copy of the completed PAPI inspection forms will be kept on file in the MAC Trades Administration office. The completed inspection form will also be scanned into Laserfiche and stored electronically in a shared repository.

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### PAPI Preventive Maintenance Inspection Form

PAPI Location:  PAPI 04       PAPI 22       PAPI 30R

Inspection Type:  Monthly (M)       Quarterly (Q)       Semi-Annual (S)

Inspection Date: \_\_\_\_\_ Completed by: \_\_\_\_\_

**1) Lamp Operation: (M)**

- a. All lamps burning:  Yes       No
- b. All lamps equal brightness:  Yes       No

**2) Operation of Controls: (M)**  Yes       No

**3) Fixtures Damaged: (M)**  Yes       No

**4) Lamps and Filters Cleaned: (M)**  Yes       No

**5) Mechanical Parts Checked for Damage: (M)**  Yes       No

**6) Lighting Arrestors Damaged: (M)**  Yes       No

**7) Water Damage or Insect Infestation: (M)**  Yes       No

**8) Rodent Activity in Vicinity of Units: (M)**  Yes       No

**9) Alignment and Aiming of Light Boxes (M)**

- a. Horizontal/Lateral alignment checked:  Yes       No
- b. Aiming/Vertical angle checked:  Yes       No
- c. Vertical Angle Setting: \_\_\_\_\_

**10) Leveling and Operation of Tilt Switch Checked: (M)**  Yes       No

**11) Obstacle-Free Approach Plane Checked: (Q)**  Yes       No

**12) Insulation of Resistance of Underground Cables Checked: (S)**  Yes       No

a. Results: \_\_\_\_\_

**13) Resistance of Grounding System Checked: (S)**  Yes       No

a. Results: \_\_\_\_\_

Comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

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*Kenneth W. Taira* 9/10/2018

FAA Approval



Each back up power source installed on the airport that is owned by the airport shall be properly maintained as required by AC 150/5340-30, current edition, Design and Installation for Airport Visual Aids.

Maintenance of the North ALEC #1, North ALEC #2, and South ALEC generators will be according to the following program:

1. Weekly, monthly, quarterly, biannual, and annual preventative maintenance inspections will be conducted per the inspection checklist included in this exhibit.
2. Findings from the weekly, monthly, quarterly, biannual, and annual comprehensive inspections will be noted on the inspection checklist included in this exhibit.
3. Repair, component replacement and/or deficiencies will be corrected as soon as practicable considering airport capacity and minimum weather criteria necessary to ensure proper repair.
4. All repair, component replacement and/or deficiency corrections will be logged on the corrective action form and will include a description and date of the corrective action taken.
5. All completed generator inspection and corrective action forms will be reviewed by airport management personnel to ensure documentation includes inspection date, deficiencies found, and if applicable a description and date of the corrective action taken.
6. A paper copy of the completed generator inspection forms will be kept on file in the MAC Trades Administration office. The completed inspection form will also be scanned into Laserfiche and stored electronically in a shared repository.

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### Generator Preventative Maintenance Inspection

Generator Location:  North ALEC #1  North ALEC #2  South ALEC

Inspection Type:  Weekly (W)  Monthly (M)  Quarterly (Q)  Annual (A)  Biannual (B)

Inspection Date: \_\_\_\_\_ Completed by: \_\_\_\_\_

**THIS PROCEDURE IS TO BE COMPLETED BEFORE RUNNING THE ENGINE**

**1. Hour Meter** (M/Q/A/B)

Check hour meter. Reading: \_\_\_\_\_

**2. Engine Crankcase** (W/M/Q/A/B)

Check oil level. Maintain oil level between the ADD and FULL marks on the engine stopped side of the oil level gauge. Change oil and filter every 150 hours or annually. Comments: \_\_\_\_\_

**3. Cooling System** (W/M/Q/A/B)

Check coolant level. Maintain level within 13mm (1/2 in) to bottom of filler neck or proper level on sight gauges, change filter annually (if equipped).

Comments: \_\_\_\_\_

**4. Walk-Around Inspection** (W/M/Q/A/B)

Inspect engine, radiator and generator for leaks, debris, loose or broken fittings, hoses or wires and guards. Repair as necessary. Comments: \_\_\_\_\_

**5. Air Cleaner Indicator** (M/Q/A/B)

If available check indicator. Change elements if indicator diaphragm remains in the locked position.

Change air filter annually. Comments: \_\_\_\_\_

**6. Battery Charger** (W/M/Q/A/B)

Check battery for proper operation. Comments: \_\_\_\_\_

**7. Fuel System** (W/M/Q/A/B)

Check for leaks. Drain water separator (if equipped). Check fuel tank level. Check fuel filter indicator (if equipped) and change filters annually. Comments: \_\_\_\_\_

**8. Belts** (M/Q/A/B)

Inspect for worn, broken or loose belts. Adjust if necessary. Comments: \_\_\_\_\_

**9. Batteries** (W/M/Q/A/B)

Clean top of batteries. Check electrolyte level, unless maintenance free. Check for loose connections.

Replace batteries every two years. Comments: \_\_\_\_\_

**10. Block Heater** (W/M/Q/A/B)

Check for proper operation. Maintain 32DegC (90degF) coolant temperature in the block at all times.

Comments: \_\_\_\_\_

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**11. Governor** (W/M/Q/A/B)

Check and maintain oil level, if required. Change oil and filter annually. Comments: \_\_\_\_\_

**12. Gauges** (M/Q/A/B)

Check the condition of all gauges. Repair or replace any broken Gauges.

**13. Air System** (M/Q/A/B)

Drain water and check air pressure (if equipped). Comments: \_\_\_\_\_

**14. Control Panel** (M/Q/A/B)

Visually inspect. Check for loose, broken or damaged wiring or components.

Comments: \_\_\_\_\_

**15. Generator** (M/Q/A/B)

Check for moisture, dust, oil, grease and debris on Main Stator Windings, Exciter and PMG. Check air intake and outlets. Clean as necessary. Comments: \_\_\_\_\_

**THIS PROCEDURE IS TO BE COMPLETED WHILE THE ENGINE IS RUNNING**

**1. Oil Pressure Gauge** (W/M/Q/A/B)

Check for proper operating oil pressure. Refer to Operational Manual.

Comments: \_\_\_\_\_

**2. Oil Level Gauge** (W/M/Q/A/B)

Check oil level. Maintain oil level between the ADD and FULL marks on the engine running side of the dipstick. Comments: \_\_\_\_\_

**3. Frequency (RPM) Generator Voltage** (W/M/Q/A/B)

Check record readings\_\_\_\_\_. Note: The operating voltage of a cold just started generator will be slightly higher than the operating voltage of a generator that has been under load or warm.

**4. Generators Louvers** (W/M/Q/A/B)

Check for proper operation, able to open and close freely. Comments: \_\_\_\_\_

**5. Generator Air Inlet Filter** (W/M/Q/A/B)

If equipped, if differential pressure exceeds 0.6 inches of water, stop the engine and clean the elements by soaking in hot water with detergent. Rinse with clear water. Recharge the elements with a thin layer of light weight machine oil, such as WD-40. Comments: \_\_\_\_\_

**6. Leaks and Noises** (W/M/Q/A/B)

Check for leaks and unusual noises. NOTE: Engine must be stopped before making necessary repairs.

Comments: \_\_\_\_\_

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**7. Main Stator Winding Temperature** (M/Q/A/B)

If equipped with winding defectors, check and record Main Stator Winding Temperatures with engine under load. NOTE: nominal temperature for the alarm and 205degC (401degF) for the shutdown.

Record Main Stator Winding Temp: \_\_\_\_\_.

**8. Bearings Bracket Temperature** (M/Q/A/B)

Check and record bearing bracket temperature with the Engine under load (if equipped). NOTE: Nominal temperature valves for the bearing bracket are 85degC (185degF) for the alarm and 95degC (203degF) for the shutdown. Remove covers and inspect generator bearings for wear and condition of lubrication every two years. Comments: \_\_\_\_\_

**THIS PROCEDURE IS TO BE COMPLETED AFTER STOPPING THE ENGINE**

**1. Check Oil Level** (W/M/Q/A/B)

Check oil level. Maintain oil level between the ADD and FULL marks on the "Engine Stopped" side of the oil level gauge. Reading: \_\_\_\_\_ Comments: \_\_\_\_\_

**2. Automatic Switches** (W/M/Q/A/B)

Check all Switches are in proper position for automatic start (if equipped).  
Comments: \_\_\_\_\_

**3. Fuel Tank** (W/M/Q/A/B)

Check the Fuel level; Refill if below 3/4 full. Comments: \_\_\_\_\_

**4. Battery Charger** (W/M/Q/A/B)

Record charging Amperage reading.  
Reading: \_\_\_\_\_ Comments: \_\_\_\_\_

**5. Cooling System** (B)

Drain and flush every two years after operating the engine load for 1 hour. Comments: \_\_\_\_\_

**6. Malfunctions** (W/M/Q/A/B)

Report any Malfunction and make necessary repairs. Comments: \_\_\_\_\_

**Record the following readings after generator has operated for 15 minutes under load:** (W/M/Q/A/B)

Output Voltage      A: \_\_\_\_\_ B: \_\_\_\_\_ C: \_\_\_\_\_  
Output Current      A: \_\_\_\_\_ B: \_\_\_\_\_ C: \_\_\_\_\_

Original Date: 12/09/04

Revision Date: 08/31/18

Revision Number: 014

*Kenneth H. Taira* 9/10/2018

FAA Approval

## Exhibit 17

# Engineered Materials Arresting Systems (EMAS) Maintenance Program

EXHIBIT 17 - EMAS MAINTENANCE PROGRAM

Engineered Materials Arresting Systems (EMAS) at Minneapolis-Saint Paul International Airport (MSP) will be installed and maintained per AC 150/5220-22, current edition, Engineered Material Arresting Systems (EMAS) for Aircraft Overruns. An EMAS will be constructed on a surface capable of supporting the passage of critical design aircraft and fully loaded ARFF vehicles. The EMAS will be capable of supporting pedestrian traffic for the purpose of maintaining the arresting material or any collocated navigational aid without surface damage.

Maintenance of an EMAS system will be according to the following program:

1. Only those trained in inspecting EMAS may complete the monthly EMAS inspections. Training is completed during manufacturer inspections as on-the-job training.
2. Schedule inspection once a month, weather dependent during planned runway closures, ensuring any precipitation (snow, etc) is clear of the EMAS bed.
3. An annual inspection is required once per year.
4. A Corrective Action Repair Inspection is required after any repairs are completed.
5. Ensure PPE is available for inspection.
6. Walk EMAS bed, note deficiencies, and take pictures, as needed.
7. Fill out most current EMAS inspection form approved in MSP ACM.
8. Notify Field Maintenance Manager - Operations of discrepancies.
9. Field Maintenance Manager - Operations to coordinate repairs with Airport Development and Trades - Carpenters.
10. On-site inspection with Airport Development and Trades - Carpenters to document required repair work order within one week of inspection.
11. Order materials, as needed.
12. Repair.
13. All repair, component replacement and/or deficiency corrections will be logged on the corrective action form and will include a description and date of the corrective action taken. Airside Operations will be notified of completed corrective actions.
14. File electronic/scanned copy of inspection will be located at Field Maintenance.

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 9/10/2018

FAA Approval

# Engineered Material Arresting System Inspection Form

**EXHIBIT 17 - EMAS MAINTENANCE PROGRAM**

EMAS Location: \_\_\_\_\_ Inspector: \_\_\_\_\_

Day & Date: \_\_\_\_\_ Time: \_\_\_\_\_

Type of Inspection (check one) Manufacturer Present (check one)

Monthly  Yes, Name: \_\_\_\_\_

Annual  No

**—** = Satisfactory  
**X** = Unsatisfactory (If Unsatisfactory, remarks required.)  
**N/A** = Non-Applicable

Material	Condition	— or X or N/A	Remarks
Overall Condition	Clean		
	No Foreign Material		
	No Evidence of Chemical Attack		
	Free of Abrasions		
Tape	Lifted Tape		
	Tape Missing		
	Tape Secured		
Caulk	Caulk Cracked		
	Caulk Missing		
	Caulk around Lights		
Surface	Cracks greater than 1/8"		
	Cracked Lids/Voids		
	Minor Depressions (Top has not been penetrated)		
	Major Depression (Top HAS been penetrated)		
	Rubber Boots for Lights Anchored		
Blocks	Damage Block		
	Evidence of Vehicle on Blocks		
	Deflection Shields		
	Crushed Block		
Vertical Side Wall	Cracked Lids/Voids		
	Holes greater than 1/8"		
Deflector Shield	Cracked Voids		
	Screws Anchored		
Chevrons	Clean		

Comments: \_\_\_\_\_  
 \_\_\_\_\_

Work Order Required? \_\_\_\_\_ Work Order Number: \_\_\_\_\_

Inspector Signature: \_\_\_\_\_ Name: \_\_\_\_\_

Original Date: 12/09/04

Revision Date: 08/31/18

Revision Number: 014

*Kenneth W. Taira* 9/10/2018

FAA Approval



**MSP Airport Fire Department  
FUEL SERVICE VEHICLE INSPECTION REPORT**

Date:	Type of Fuel	Owner:
Vehicle Type: <input type="checkbox"/> Tanker <input type="checkbox"/> Hydrant Cart	<input type="checkbox"/> Gas/Diesel <input type="checkbox"/> Jet A <input type="checkbox"/> AvGas	<input type="checkbox"/> Swissport <input type="checkbox"/> Other:
<input type="checkbox"/> Other <input type="checkbox"/> Hydrant Truck	Vehicle #	<input type="checkbox"/> Signature _____

INSPECTION TYPE:  Spot  3 month periodic  Follow-up

<b>EMERGENCY CUTOFF SYSTEM</b>		Pass	Fail
NFPA 407 4.3.15			
1. Emergency Fuel Shut Off Sign indicated in 2" lettering of contrasting color	<input type="checkbox"/>	<input type="checkbox"/>	
2. Method of operation "PUSH" or "PULL" or indicated by an arrow	<input type="checkbox"/>	<input type="checkbox"/>	
3. Two cutoffs required, one on each side of the vehicle	<input type="checkbox"/>	<input type="checkbox"/>	
4. Quick acting, remote from fill openings and discharge outlets	<input type="checkbox"/>	<input type="checkbox"/>	
5. Must be operable from ground or any elevated platform	<input type="checkbox"/>	<input type="checkbox"/>	
6. Checked for proper operation during fueling (when available)	<input type="checkbox"/>	<input type="checkbox"/>	

<b>HOSES, NOZZLES and FILTERS</b>		Pass	Fail
NFPA 407 4.2, 5.16			
1. Dust caps and nozzles stored properly	<input type="checkbox"/>	<input type="checkbox"/>	
2. Extend/Recoil hose checking for kinks, crushed, soft, or severely worn areas	<input type="checkbox"/>	<input type="checkbox"/>	
3. Check fuel leaks at connections	<input type="checkbox"/>	<input type="checkbox"/>	
4. Deadman controls required, may be part of nozzle for overwing filling.	<input type="checkbox"/>	<input type="checkbox"/>	
5. Fuel Filter changed with-in 12 mos. Indicated on sticker	<input type="checkbox"/>	<input type="checkbox"/>	

<b>BONDING and GROUNDING</b>		Pass	Fail
NFPA 407 4.1.2			
1. Cables to be free of kinks, damage or paint	<input type="checkbox"/>	<input type="checkbox"/>	
2. Clamps free of paint, properly attached to vehicle, and in good working order	<input type="checkbox"/>	<input type="checkbox"/>	
3. Both clamps and cables stored properly to prevent damage	<input type="checkbox"/>	<input type="checkbox"/>	

<b>FUEL CART</b>		Pass	Fail
NFPA 407 4.3.7.6			
1. Check for damaged hose, bonding cable extinguishers, leaks, and garbage	<input type="checkbox"/>	<input type="checkbox"/>	
2. EFSO(2), deadman, all appropriate signage, chocks	<input type="checkbox"/>	<input type="checkbox"/>	

NOTES:

Airport Fire Dept
6920 34th Ave S, Minneapolis, MN 55450
612-726-5353

<b>VEHICLE SIGNAGE</b>		Pass	Fail
NFPA 407 4.4.5 4.3.18			
1. The word "FLAMMABLE" on each side and rear in 3" high letters.	<input type="checkbox"/>	<input type="checkbox"/>	
2. Product name "AVGAS" or "JET A" on each side and rear in 3" high letters	<input type="checkbox"/>	<input type="checkbox"/>	
3. "NO SMOKING" on all sides, front, rear and in cab of vehicle	<input type="checkbox"/>	<input type="checkbox"/>	
4. "EFSO" method of activation "Push/Pull"	<input type="checkbox"/>	<input type="checkbox"/>	

<b>FIRE EXTINGUISHERS</b>		Pass	Fail
NFPA 407 4.3.9, NFPA 10			
1. Tanker:(2) 20# B/C rated extinguishers, one on each side with current inspection tag. Hydrant cart:(1) 20# B/C rated extinguisher	<input type="checkbox"/>	<input type="checkbox"/>	
2. Readily accessible from the ground.	<input type="checkbox"/>	<input type="checkbox"/>	
3. Area adjacent to or behind extinguisher contrasting color	<input type="checkbox"/>	<input type="checkbox"/>	
4. Extinguisher to be kept clear of ice, snow, or equipment	<input type="checkbox"/>	<input type="checkbox"/>	

<b>GENERAL VEHICLE</b>		Pass	Fail
NFPA 407 4.3.6, 4.3.7, 4.3.8			
1. Exhaust discharge located away from fuel pumping equipment. No leaks allowed. Must be secured to vehicle.	<input type="checkbox"/>	<input type="checkbox"/>	
2. Electrical equipment located outside the cab must be rated for hazardous ops	<input type="checkbox"/>	<input type="checkbox"/>	
3. Head,tail,brake,marker lights operational No cracked/missing lense covers	<input type="checkbox"/>	<input type="checkbox"/>	
4. Batteries to be covered and secured	<input type="checkbox"/>	<input type="checkbox"/>	
5. Tire condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	<input type="checkbox"/>	<input type="checkbox"/>	
6. Check for fluid leaks/pooling from engine	<input type="checkbox"/>	<input type="checkbox"/>	
7. Wipers/Defroster in operating order	<input type="checkbox"/>	<input type="checkbox"/>	
8. Check gasket on dome cover (Tankers)	<input type="checkbox"/>	<input type="checkbox"/>	
9. Vehicle free of trash and combustibles	<input type="checkbox"/>	<input type="checkbox"/>	

<b>QUARTERLY FUEL SERVICING INSPECTION</b>		Pass	Fail
1. Overall Fuel Service Vehicle Inspection Pass/Fail	<input type="checkbox"/>	<input type="checkbox"/>	
2. Vehicle out of service until discrepancies corrected and reinspection completed	<input type="checkbox"/>	<input type="checkbox"/>	
3. Vehicle Reinspection_____	<input type="checkbox"/>	<input type="checkbox"/>	

INSPECTOR
Signature _____
Print Name _____

Fuel Service report 12/02/2015

Original Date: 12/09/04

Revision Date: 08/31/18

Revision Number: 014

*Kenneth H. Taire* 9/10/2018

FAA Approval



**MSP Airport Fire Department**  
**Line Service Fuel Safety Training Form**

In accordance with the requirements of 14 CFR Part 139.321(e)(2), "All other employees who fuel aircraft, accept fuel shipments, or otherwise handle fuel must receive at least initial on-the-job training and recurrent instruction every 24 consecutive calendar months in fire safety from the supervisor trained in accordance with paragraph (e)(1) of this section." If training was completed through an FAA approved course please attach a copy of the certificate.

<b>139.321(e)(2)</b>
Organization:
Individual Employee Name:
On-The-Job Training (OJT) Completion Date (within last 24 months):
Training Provided By:
Previous OJT Training Completion Date:
Hire Date into Position:
Hands-On Fire Extinguisher Training Date:
Fire Extinguisher Training Provided By:

Original Date: 12/09/04

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*Kenneth H. Taira* 9/10/2018

FAA Approval

**MSP Airport Fire Department**  
**Supervisory Fuel Safety Training & Confirmation Form**

14 CFR Part 139.321(f) requires "Each certificate holder must obtain a written confirmation once every 12 consecutive calendar months from each airport tenant fueling agent that the training required by paragraph (e) of this section has been accomplished. This written confirmation must be maintained for 12 consecutive calendar months."

**139.321(e)(1)**

In accordance with the requirements of 14 CFR Part 139.321(e)(1) "At least one supervisor with each fueling agent must have completed an aviation fuel training course in fire safety that is authorized by the Administrator. Such an individual must be trained prior to initial performance of duties, or enrolled in an authorized aviation fuel training course that will be completed within 90 days of initiating duties, and receive recurrent instruction at least every 24 consecutive calendar months." Approved **supervisory** training courses are listed in an addendum to AC 150/5230-4.

Organization:

Individual Fueling Agent Supervisor:

Supervisory Training Course Attended:

Current Training Course Completion Date (within last 24 months):

*Note: Attach a copy of the supervisory training course certificate.*

Previous Training Course Completion Date:

Hire Date Into Supervisory Position:

Hands-On Fire Extinguisher Training Date:

After attending an approved Supervisory Fuel Safety Training Course, the supervisor must obtain an initial briefing on "the fire code of the public body having jurisdiction over the airport" (if different from NFPA) from airport management, the local Fire Marshall, or the Authority Having Jurisdiction.

Date of Initial Local Fire Code Training Received:

Local Fire Code Training Provided By:

Supervisor Signature:

Date:

**139.321(e)(2)**

In accordance with 14 CFR Part 139.321(f), I certify that all other employees who fuel aircraft, accept fuel shipments, or otherwise handle fuel have received at least initial on-the-job training and recurrent instruction every 24 consecutive calendar months in fire safety from a supervisor trained in accordance with paragraph 139.321(e)(1).

Supervisor Name (Print):

Signature:

Date:

Original Date: 12/09/04

Revision Date: 08/31/18

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*Kenneth H. Taira*

9/10/2018

FAA Approval

# Exhibit 19 Corrective Action Form for PAPIs, Generators and EMAS

MSP ACM

EXHIBIT 19 - CORRECTIVE ACTION FORM

Corrective action for repairs of the PAPIs, generators and EMAS will be documented on the Corrective Action Form.

## Corrective Action Form

Corrective Action Inspection Type:  Generator  PAPI  EMAS      Location: \_\_\_\_\_

Inspection Date: \_\_\_\_\_      Completed by: \_\_\_\_\_

Inspection Checklist Item Number: \_\_\_\_\_      Corrective Action Date: \_\_\_\_\_

Corrective Action: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Inspection Checklist Item Number: \_\_\_\_\_      Corrective Action Date: \_\_\_\_\_

Corrective Action: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Inspection Checklist Item Number: \_\_\_\_\_      Corrective Action Date: \_\_\_\_\_

Corrective Action: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Inspection Checklist Item Number: \_\_\_\_\_      Corrective Action Date: \_\_\_\_\_

Corrective Action: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Inspection Checklist Item Number: \_\_\_\_\_      Corrective Action Date: \_\_\_\_\_

Corrective Action: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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