

# California Institute of Technology

## Fire Prevention Plan



Caltech Environment, Health, and Safety Office  
1200 E. California Blvd., M/C 25-6  
Pasadena, CA 91125  
Phone: 626.395.6727  
Fax: 626.577.6028  
Email: [safety@caltech.edu](mailto:safety@caltech.edu)  
Website: [www.safety.caltech.edu](http://www.safety.caltech.edu)

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## Scope

The purpose of the fire prevention plan is to ensure fire prevention is a functional process for eliminating hazards from the workplace in compliance with California Code of Regulations (CCR), Title 8, § 3221. It provides faculty, staff, and students with information and guidelines which will assist them in recognizing, reporting, and controlling fire hazards.

This plan will apply to all employees of the Institute. Outside contractors will be expected to comply with sound fire prevention techniques and methods during their contracted jobs.

## Responsibilities

The Director of Design and Construction is responsible for Construction Fire Safety, and Public Event registration with the Pasadena Fire Department.

The Director of Operations and Maintenance is responsible for the maintenance of fire equipment and systems installed to prevent or control ignitions of fires.

The Director of Environment, Health, and Safety is responsible for the control of accumulation of hazardous flammable or combustible wastes and/or materials in areas such as laboratories.

The Director of Buildings and Grounds is responsible for the control of accumulation of combustible waste materials in areas other than laboratories.

The Vice President of Student Affairs ensures that the Office of Campus Life, the Undergraduate Dean's Office, the Graduate Studies Office, and other appropriate offices within the Division of Student Affairs are enforcing fire safety programs in areas under their control.

## Policy

### Institute Policy on Fire Safety

The purpose of this policy is to provide guidelines for establishing and maintaining fire safety procedures with respect to the undergraduate and graduate student houses and dormitories ("student living areas" or "student housing") at the Institute.

## Program

### Hot Work Procedures and Permits

The Institute follows CCR Title 8, §6777, which outlines the required practices and procedures necessary to protect employees from fires and explosions associated with hot work.

The Director of Design and Construction oversees the compliance of hot work done through outside construction contractors.

The Director of Operations and Maintenance oversees the compliance of hot work done through Central Plant, the Maintenance Department, and electrical shop.

The Director of Environment, Health, and Safety provides training on Hot Work practices and procedures for the Institute.

## **Training**

### **Undergraduates**

All incoming freshman receive Fire Safety Training during Freshman Orientation week.

Each House has an annual fire safety talk in addition to fire extinguisher training.

Once a year Dining Services sponsors a “Special Board Dinner” which includes the House undergraduates and the Pasadena Fire Department.

Evacuation drills are conducted four times a year in all student housing on campus. The times for the evacuation drills vary from the morning to midnight.

### **Facilities**

Operations and Maintenance, and select facilities personnel receive “Hot Work” training on an annual basis.

Operations and Maintenance, paint shop, key and lock shop, and the carpenter shop receive annual fire extinguisher training.

### **Dining Services**

Dining Services receives annual fire extinguisher training for their employees.

### **Laboratory Personnel**

On an annual basis laboratory personnel receive training on elements of the Fire Prevention Program, such as the evacuation and assembly areas of their buildings, and the handling and storage of hazardous materials and wastes in laboratories.

The Chemistry Department has a “Chemistry Safety Day”, every other year. During this “Safety Day” all chemistry students go through fire extinguisher training.

### **Institute Personnel**

All personnel at the Institute participate in evacuation drills twice a year.

Fire extinguisher training is offered on a monthly basis to Institute personnel.

## **Fire Safety Monitoring**

### **Environment, Health, and Safety Office**

The Environment, Health, and Safety Office conducts annual inspections of laboratories, facility operations, and undergraduate housing for compliance with the Fire Prevention Plan.

### **Pasadena Fire Department**

The Pasadena Fire Department, in conjunction with the Environment, Health, and Safety Office, conducts annual fire prevention inspections of 33% of the Institutes laboratories for compliance.

Also the Pasadena Fire Department, in conjunction with the Department of Design and Construction, conducts annual fire prevention inspections of Millikan and the Athenaeum.

### **FM Global**

FM Global, our fire insurance underwriter, conducts annual inspections and reviews of our fire protection systems. In addition they review and approve of new fire protections systems in new construction.

## Identification of Fire Hazards

The following is a list of potential fire hazards and their associated work areas:

Work Areas	Fire Hazards
Auditoriums	Electrical
Bloomboxes – Fuel Cells	Natural Gas and Electrical
Break Rooms	Paper, Plastic, and Electrical Appliances
Carpenter Shop	Wood, Paper, Plastic, Glue, and Electrical Equipment
Central Plant	Natural Gas, Flammable and Combustible Liquids, Flammable and Oxidizing Compressed Gases, Oxidizers
Electrical Vaults	Electrical
Kitchens	Natural Gas, Paper, Electrical, and Grease
Laboratories	Electrical, Paper, Plastic, Natural Gas, Flammable and Combustible Liquids, Flammable and Oxidizing Compressed Gases, and Oxidizers
Laboratory Stockrooms	Flammable and Combustible Liquids, and Oxidizers
Machine Shops	Flammable and Combustible Liquids, oily rags, Flammable and Oxidizing Gases, and Electrical
Motor Pool (Garage)	Flammable and Combustible Liquids and oily rags.
Offices	Electrical, Paper, and Plastic
Paint Shop	Wood, Paper, Plastic, Glue, Stain, and Paint
Parking Structures	Electrical, and Fuel
Satellite Plant	Natural Gas, Flammable and Combustible Liquids
Shipping and Receiving	Paper, Flammable and Combustible Liquids, Flammable and Oxidizing Compressed Gases, and Oxidizers
Stockrooms	Electrical, Paper, and Plastic
Sub-Station	Electrical

## Housekeeping Practices

The following are the practices used to control accumulations of flammable and combustible materials and wastes at the Institute:

Type of Fire Hazard	Fire Prevention Practices
Electrical	Annual inspections of outlets, electrical cords, and surge protectors in Undergraduate Housing.  Annual inspections of outlets, electrical cords, and surge protectors in laboratories
Flammable and combustible liquids	Store liquids in approved flammable storage cabinets or away from sources of combustion, oxidizing chemicals or other material that may contribute to a fire.
Laboratory flammable and combustible liquid wastes	Every laboratory building has its chemical waste picked up on a weekly basis.  Laboratories can also call the EH&S Department for their chemical waste to be picked up.
Flammable gases	Store gases in a gas safety cabinet or separate from oxidizing gases with either an approved non-combustible partition or a minimum of 20 feet.
Paper	Office trash cans are emptied on a daily basis
Plastic	Recycling Cans are emptied on a weekly basis
Welding Stations	Combustible materials must be cleared from area prior to welding.

## **Fire Protection Systems**

### **Fire Protection Maintenance and Inspection Frequencies**

The Director of Operations and Maintenance is responsible for the annual testing of the Institute's fire suppression and detection systems.

The Director of Environment, Health, and Safety is responsible for the monthly fire extinguisher inspections and the annual fire extinguisher servicing.

A list of Fire Protection Systems and their associated building areas are located in Appendix A and B.



## Appendix A

### Fire Protection Systems

Building	Fire Suppression System	Fire Detection System
40 Meter Lab	No Sprinkler	Yes
Academic Media Technology	No Sprinkler	Yes
Alles	Partial Sprinkler	Yes
Annenberg	Fully Sprinklered	Yes
Arms	No Sprinkler	Yes
Athenaeum	Fully Sprinklered Ansul Wet Foam	Yes Yes
Audit Services and Institute Compliance	No Sprinkler	No
Avery	Fully Sprinklered Ansul Wet Foam	Yes Yes
Baxter	Fully Sprinklered	Yes
Beckman Auditorium	Partial Sprinkler	Yes
Beckman Behavioral	Partial Sprinkler	Yes
Beckman Institute	Fully Sprinklered Fire Pump	Yes
Blacker	Fully Sprinklered	Yes
Braun House	No Sprinkler	Yes
Braun Lab	No Sprinkler	Yes
Bridge, Annex	Fully Sprinklered	Yes
Bridge, East	Fully Sprinklered	Yes
Bridge, West	Fully Sprinklered	Yes
Broad	Fully Sprinklered	Yes
Brown Gym	No Sprinkler	Yes

Cahill	Fully Sprinklered	Yes
California Parking Structure	Fully Sprinklered	Yes
Catalina's	Fully Sprinklered	Yes
Center for Student Services	Fully Sprinklered	Yes
Central Engineering Services	Fully Sprinklered	Yes
Central Plant	No Sprinkler	No
Chandler	Fully Sprinklered Ansul Wet Foam	Yes Yes
Children's Center at Caltech	Fully Sprinklered	Yes
Church	Partial Sprinkler	Yes
Credit Union and Security	No Sprinkler	No
Crellin	Fully Sprinklered	Yes
Dabney	Fully Sprinklered	Yes
Dabney House	Fully Sprinklered	Yes
Design and Construction	No Sprinkler	Yes
Downs-Lauritsen	Fully Sprinklered	Yes
Dabney	Fully Sprinklered	Yes
Facilities	Fully Sprinkler	Yes
Fairchild	Fully Sprinklered	Yes
Financial Services	Fully Sprinklered	Yes
Firestone	Fully Sprinklered	Yes
Fitzhugh House (USGS)	No Sprinkler	No
Fleming House	Fully Sprinklered	Yes
Gates Annex	Fully Sprinklered	Yes
Gates Laboratory	Fully Sprinklered	Yes
Gates-Thomas	Fully Sprinklered	Yes
Guggenheim	Fully Sprinklered	Yes

Holliston Parking Structure	Fully Sprinklered	Yes
Human Resources	Fully Sprinklered	Yes
IMSS	Fully Sprinklered	Yes
International Scholars Services	No Sprinkler	No
Investment Office	No Sprinkler	No
Karman	Fully Sprinklered	Yes
Keck	Partial Sprinkler	Yes
Keck Center	Fully Sprinklered	Yes
Keith Spaulding	Fully Sprinklered	Yes
Kellogg	Fully Sprinklered	Yes
Kerckhoff	Partial Sprinkler	Yes
Jorgensen (JCAP)	Fully Sprinklered	Yes
Linde-Robinson	Fully Sprinklered	Yes
Lloyd House	Fully Sprinklered	Yes
Marks House	No Sprinkler	Yes
Mead	No Sprinkler	Yes
Millikan Library	Fully Sprinklered Fire Pump	Yes
Moore	Fully Sprinklered	Yes
Morrisroe (IPAC)	Fully Sprinklered	Yes
Mudd, North	No Sprinkler	Yes
Mudd, South	Partial Sprinkler	Yes
Music House	No Sprinkler	No
Noyes	Partial Sprinkler	Yes
Page House	Fully Sprinklered	Yes
Parsons-Gates	No Sprinkler	Yes
Powell-Booth	Fully Sprinklered	Yes

Prufrock House	No Sprinkler	No
Ricketts House	Fully Sprinklered	Yes
Ruddock House	Fully Sprinklered	Yes
Safety Shed #1	No Sprinkler	Yes
Safety Shed #2	No Sprinkler	Yes
Safety Shed #3	No Sprinkler	Yes
Satellite Plant	Fully Sprinklered Fire Pump	Yes
Sloan	Fully Sprinklered	Yes
Sloan Annex	No Sprinkler	Yes
Spaulding Lab	Fully Sprinklered	Yes
Steele House	Fully Sprinklered	Yes
Steele Lab	Fully Sprinklered	Yes
Synchrotron	Fully Sprinklered	Yes
Watson Lab	Fully Sprinklered	Yes
Wilson Parking Structure, North	Fully Sprinklered	Yes
Wilson Parking Structure, South	Fully Sprinklered	Yes
Winnett Center	Fully Sprinklered	Yes
Young Health Center	Fully Sprinklered	Yes

## Appendix B

### Fire Protection Equipment

Building	Type	Number
40 Meter Lab	8 # Halon	9
Academic Media Technology	5 # ABC Fire Extinguisher	2
Alles	5 # ABC Fire Extinguisher	12
	8 # Halon	1
Annenberg	5 # ABC Fire Extinguisher	21
Arms	5 # ABC Fire Extinguisher	14
	8 # Halon	7
Athenaeum	5 # ABC Fire Extinguisher	23
	Class "K"	2
Audit Services and Institute Compliance	5 # ABC Fire Extinguisher	3
Avery	5 # ABC Fire Extinguisher	22
Baxter	5 # ABC Fire Extinguisher	22
	8 # Halon	1
Beckman Auditorium	5 # ABC Fire Extinguisher	10
	8 # Halon	3
	CO <sub>2</sub>	4
Beckman Behavioral	5 # ABC Fire Extinguisher	35
	8 # Halon	10
Beckman Institute	5 # ABC Fire Extinguisher	86
	8 # Halon	7
	Metal-X	1
Blacker	5 # ABC Fire Extinguisher	12
Booth	5 # ABC Fire Extinguisher	7
	8 # Halon	4

Braun Athletic Center	5 # ABC Fire Extinguisher	10
Braun Lab	5 # ABC Fire Extinguisher	49
Bridge, Annex	5 # ABC Fire Extinguisher	3
	8 # Halon	1
Bridge, East	5 # ABC Fire Extinguisher	12
	8 # Halon	13
Bridge, West	5 # ABC Fire Extinguisher	17
	8 # Halon	3
Broad	5 # ABC Fire Extinguisher	46
	8 # Halon	5
Brown Gym	5 # ABC Fire Extinguisher	5
Cahill	5 # ABC Fire Extinguisher	20
California Parking Structure	5 # ABC Fire Extinguisher	25
Catalina's	5 # ABC Fire Extinguisher	68
Center for Student Services	5 # ABC Fire Extinguisher	18
Central Engineering Services	5 # ABC Fire Extinguisher	16
Central Plant	5 # ABC Fire Extinguisher	28
Chandler	ABC Fire Extinguisher	7
	Class "K"	5
Children's Center at Caltech	5 # ABC Fire Extinguisher	8
Church	5 # ABC Fire Extinguisher	68
	8 # Halon	8
	Metal-X	3
Credit Union and Security	5 # ABC Fire Extinguisher	3
Crellin	5 # ABC Fire Extinguisher	28
Crellin	8 # Halon	6
	Metal-X	2

Dabney	5 # ABC Fire Extinguisher 8 # Halon	10
Dabney House	5 # ABC Fire Extinguisher	11
Design and Construction	5 # ABC Fire Extinguisher	2
Downs	5 # ABC Fire Extinguisher 8 # Halon CO <sub>2</sub>	14 3 2
Facilities	5 # ABC Fire Extinguisher	47
Fairchild	5 # ABC Fire Extinguisher	15
Financial Services	5 # ABC Fire Extinguisher	5
Firestone	5 # ABC Fire Extinguisher 8 # Halon	9 1
Fitzhugh House (USGS)	5 # ABC Fire Extinguisher 8 # Halon	7 1
Fleming House	5 # ABC Fire Extinguisher	12
Gates Annex	5 # ABC Fire Extinguisher	5
Gates-Thomas	5 # ABC Fire Extinguisher	10
Guggenheim	5 # ABC Fire Extinguisher 8 # Halon	42 7
Holliston Parking Structure	5 # ABC Fire Extinguisher	17
Human Resources	5 # ABC Fire Extinguisher	3
IMSS	5 # ABC Fire Extinguisher 8 # Halon	10 2
Industrial Relations Center	5 # ABC Fire Extinguisher	5
International Scholars Services	5 # ABC Fire Extinguisher	1
Isotope Lab	5 # ABC Fire Extinguisher	2
Investment Office	5 # ABC Fire Extinguisher	3

Jorgensen (JCAP)	5 # ABC Fire Extinguisher	25
Karman	5 # ABC Fire Extinguisher	12
	8 # Halon	1
	CO <sub>2</sub>	2
Keck	5 # ABC Fire Extinguisher	29
	8 # Halon	4
	Metal-X	1
Keck Center	5 # ABC Fire Extinguisher	5
Keith Spaulding	5 # ABC Fire Extinguisher	19
	8 # Halon	9
Kellogg	5 # ABC Fire Extinguisher	14
	8 # Halon	6
Kerckhoff	5 # ABC Fire Extinguisher	39
	8 # Halon	2
Lauritsen	5 # ABC Fire Extinguisher	21
	8 # Halon	3
	Metal - X	1
Linde-Robinson	5 # ABC Fire Extinguisher	30
Lloyd House	5 # ABC Fire Extinguisher	10
Marks/Braun House	5 # ABC Fire Extinguisher	6
Mead	5 # ABC Fire Extinguisher	12
Millikan Library	5 # ABC Fire Extinguisher	23
Moore	5 # ABC Fire Extinguisher	30
	8 # Halon	2
	CO <sub>2</sub>	1
Morrisroe (IPAC)	5 # ABC Fire Extinguisher	12
	8 # Halon	5



Mudd, North	5 # ABC Fire Extinguisher	23
	8 # Halon	1
Mudd, South	5 # ABC Fire Extinguisher	30
	8 # Halon	3
Music House	5 # ABC Fire Extinguisher	3
North Sub-Station	5 # ABC Fire Extinguisher	1
	8 # Halon	1
North Wilson Parking Structure	5 # ABC Fire Extinguisher	12
Noyes	5 # ABC Fire Extinguisher	63
	8 # Halon	8
	Metal - X	1
Page House	5 # ABC Fire Extinguisher	13
Parsons-Gates	5 # ABC Fire Extinguisher	8
Physical Plant	5 # ABC Fire Extinguisher	47
Powell-Booth	5 # ABC Fire Extinguisher	6
	8 # Halon	4
President's House	5 # ABC Fire Extinguisher	3
Ricketts House	5 # ABC Fire Extinguisher	13
Ruddock House	5 # ABC Fire Extinguisher	9
Safety Annex	5 # ABC Fire Extinguisher	4
Safety Shed #1	5 # ABC Fire Extinguisher	1
Safety Shed #2	5 # ABC Fire Extinguisher	1
Safety Shed #3	5 # ABC Fire Extinguisher	0
Satellite Utility Plant	5 # ABC Fire Extinguisher	9
Schlinger	5 # ABC Fire Extinguisher	46
	Metal - X	4
Sloan	5 # ABC Fire Extinguisher	31

	8 # Halon	2
Sloan Annex	5 # ABC Fire Extinguisher	5
South Sub-Station	5 # ABC Fire Extinguisher	2
South Wilson Parking Structure	5 # ABC Fire Extinguisher	27
Spaulding Lab	5 # ABC Fire Extinguisher	47
	8 # Halon	1
Steele House	5 # ABC Fire Extinguisher	2
Steele Lab	5 # ABC Fire Extinguisher	14
	8 # Halon	7
Student Activities Center	5 # ABC Fire Extinguisher	20
Synchrotron	5 # ABC Fire Extinguisher	7
	8 # Halon	2
	CO <sub>2</sub>	5
Watson Lab	5 # ABC Fire Extinguisher	19
	8 # Halon	8
	Metal - X	1
Winnett Center	5 # ABC Fire Extinguisher	10
Young Health Center	5 # ABC Fire Extinguisher	4