



## **KIMBLE J. CLARK, Ph.D.**

### **MECHANICAL ENGINEER – THERMOSCIENCES**

Dr. Kimble Clark has over 45 years of experience in solving equipment and system problems in mechanical engineering and thermosciences using engineering analysis and testing. His technical specialties include heat transfer, fluid mechanics, thermodynamics, and combustion. He has conducted many forensic investigations into the origin and cause of fires and explosions in chemical process plants, industrial facilities, and commercial and residential buildings.

#### **SPECIALIZED PROFESSIONAL COMPETENCE**

- . Accident reconstruction
- . Combustion
- . Consulting and expert witness
- . Design defect analysis
- . Explosion origin and cause investigation
- . Failure analysis and prevention
- . Fire origin and cause investigation
- . Fluid mechanics
- . Forensic photography
- . Fuel science
- . Full-scale field testing
- . Heat transfer
- . Incident investigation
- . Laboratory testing
- . Patent evaluation
- . Process engineering
- . Thermal hydraulics
- . Thermodynamics

#### **EQUIPMENT**

- . Building HVAC
- . Combustion turbines
- . Engines
- . Fans
- . Gas water heaters
- . Heat exchangers
- . Industrial boilers
- . Industrial chillers
- . Industrial furnaces
- . Pressure vessels
- . Pumps
- . Residential gas furnaces
- . Steam tubing
- . Steam turbines
- . Structures
- . Utility boilers
- . Vacuum deposition
- . Valves and piping

#### **INDUSTRIES**

- . Aerospace
- . Agriculture
- . Commercial gas equipment
- . Construction
- . Electronics
- . Manufacturing
- . Marine
- . Medical
- . Petrochemical
- . Power generation
- . Refining
- . Residential gas appliance
- . Steel

## **RECENT WORK**

### **Large Loss Investigation**

Investigation of large losses, typically explosions and fires in refineries and power plants; interfacing with federal and state agencies that are typically at the site of a large loss; determination of origin and cause; coauthored a book on procedures, techniques, and lessons learned on the origin and cause investigation of large losses.

### **Fires and Explosions**

Investigation of origin and cause of fires and explosions in chemical plants, refineries, steel and metal heat treating plants, warehouses, commercial and residential buildings, and ships involving a wide range of fuels and explosives including wood, natural gas, propane, hydrogen, coke oven gas, gasoline, oil, epoxy, hydraulic fluid, bunker fuel, methanol, hydroxylamine, ammonium perchlorate, ammonium nitrate, sodium hydrosulfite, sodium nitrate, potassium nitrate, HMX, and metals (aluminum, titanium).

### **Boilers, Heaters, and Furnaces**

Investigation of equipment design defects and improper operation which cause waterwall and steam tube failures, burner and structural failures, fires and explosions, and carbon monoxide poisoning. Development of methods to prevent these failures; equipment includes utility boilers, heat recovery boilers, industrial furnaces and boilers, and commercial and residential water heaters and furnaces; fuels include coal, oil, gas, municipal waste, agricultural and wood waste, and mixtures thereof.

### **Engines and Turbines**

Investigation of stationary, truck and marine diesel engine failures; marine and land-based combined cycle and cogeneration steam and combustion turbine failures; determination of equipment impact due to use of off-specification fuels.

### **Petrochemical and Process**

Investigation of ethylene plant heat exchanger shell catastrophic failure, geothermal steam well casing failure, urea reactor vessel failure, oil well fires and explosions; natural gas pipeline regulator failure; analysis of precision metering pump patent dispute; process analysis and testing of synthetic and biomass fuels in engines, turbines, and boilers; analysis of heat and mass balances for combined cycle power plants; analysis of oxygen cylinder fires.

### **Agricultural**

Industrial refrigeration performance testing and system failure investigations; assessment of thermal insulation in growing room.

## **EARLIER WORK**

Research and development in the aerospace industry. Specific examples include aircraft fuel crash fire modeling; development of advanced temperature and heat flux instrumentation; electric arc plasma analysis and design; model development for the properties of high-pressure, high-temperature reacting gas mixtures; testing and analysis of intumescent paint heating response; testing of fire-resistant fabrics; testing of transpiration cooling for heated metal surfaces; and thermochemical ablation of spacecraft and missile reentry heat shields and rocket engine nozzles.

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## **INDUSTRY WORK EXPERIENCE**

**Alpine Research & Engineering, LLC**, Bend, Oregon, 2013-present  
Principal

**Intertek**, Sunnyvale, California, 2009-2013  
Principal Investigator, Forensic Science (last position)

**Aptech Engineering Services**, Sunnyvale, California, 1984-2009  
Vice President, Forensic Engineering (last position)

**Acurex Corporation**, Mountain View, California, 1971-1984  
Manager, Energy Systems (last position)

**Aerotherm Corporation**, Palo Alto, California, 1965-1967  
Staff Engineer (last position)

## **EDUCATION AND PROFESSIONAL BACKGROUND**

Ph.D., Mechanical Engineering, Purdue University, 1971

M.S., Mechanical Engineering, Stanford University, 1965

B.S., Mechanical Engineering, Stanford University, 1964

Research Assistant, Thermosciences Division, Department of Mechanical Engineering,  
Stanford University

Research Assistant, Thermodynamics Instructor, and Post Doctoral Researcher;  
High Temperature Gas Dynamics Laboratory, School of Mechanical Engineering,  
Purdue University

Member:

American Society of Mechanical Engineers

American Institute of Aeronautics and Astronautics

National Fire Protection Association

National Association of Fire Investigators

Pi Tau Sigma (Mechanical Engineering Honorary Society)

U.S. Patent: Method for Reduction of Sulfur Oxides and Particulates in Coal Combustion  
Exhaust Gases, 5,311,829; 5/17/1994

U.S. Patent: Method of Extending the Useful Life of Boiler Tubes, 5,050,108; 9/17/1991

Publications, list available on request

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