

**ISA-S77.41-1992**

Approved October 9, 1992

Standard



# **Fossil Fuel Power Plant Boiler Combustion Controls**



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ISA-S77.41, Fossil Fuel Power Plant Boiler Combustion Controls

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## Preface

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## Foreword

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A variety of combustion control systems have been developed over the years to fit the needs of particular applications. Load demand, operating philosophy, plant layout, and type of firing must be considered before the ultimate selection of a system is made. Therefore, this standard is not intended to limit the complexity or scope of the combustion control system design that one might wish to implement, but rather to establish a minimum of control needed.

This standard is part of a series resulting from the efforts of the SP77 Committee on Fossil Power Plant Standards, especially subcommittee SP77.40 on Boiler Controls. It should be used in conjunction with the other SP77 series of standards for safe, reliable, and efficient design, construction, operation, and maintenance of the power plant. It is not the intent of this standard to establish any procedures or practices that are contrary to any other standard in this series.

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## Contents

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<b>1 Purpose</b> .....	<b>11</b>
<b>2 Scope</b> .....	<b>11</b>
<b>3 Definitions</b> .....	<b>11</b>
<b>4 Minimum design requirements for combustion control system</b> .....	<b>12</b>
4.1 Process measurement requirements .....	13
4.2 Control and logic requirements .....	13
4.3 Final control device requirements.....	14
4.4 System reliability and availability .....	14
4.5 Minimum alarm requirements .....	15
4.6 Operator interface .....	15
<b>References</b> .....	<b>17</b>
<b>Appendix A</b> .....	<b>19</b>
<b>Appendix B</b> .....	<b>23</b>

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## 1 Purpose

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**1.1** The purpose of this standard is to establish the minimum requirements for the functional design specification of combustion control systems for drum-type fossil-fueled power plant boilers.

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## 2 Scope

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**2.1** The scope of this standard is to address the major combustion control subsystems in boilers with steaming capabilities of 200,000 lb/hr (25 kg/s) or greater. These subsystems include, but are not limited to, furnace pressure control (balanced draft), air flow control, and fuel flow control when firing coal, oil, gas, or combinations thereof. Specifically excluded from consideration are development of boiler energy demand, all burner control, interface logic systems, and associated safety systems, as well as all controls associated with fluidized bed and stoker-fired combustion units.

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## 3 Definitions

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The following definitions are provided to clarify their use in this standard and may not be relevant to the use of the word in other texts. For other definitions, please refer to ISA-S51.1, Process Instrumentation Terminology.

**air:** The mixture of oxygen, nitrogen, and other gases, which, with varying amounts of water vapor, forms the atmosphere of the earth.

**air purge:** A flow of air through the furnace, boiler gas passages, and associated flues and ducts that will effectively remove any gaseous combustibles and replace them with air. Purging may also be accomplished by an inert medium.

**balanced draft:** A system of furnace pressure control in which the inlet air flow or the outlet flue gas flow is controlled to maintain the furnace pressure at a fixed value (typically slightly below atmospheric).

**boiler:** A closed vessel in which water is heated, steam is generated, steam is superheated, or any combination thereof, by the application of heat from combustible fuels in a self-contained or attached furnace.

**combustion:** The rapid chemical combination of oxygen with the combustible elements of a fuel, resulting in the production of heat.

**combustible:** The heat producing constituent of a fuel, flue gas, or fly ash.

**control (controller):** Any manual or automatic device or system of devices used to regulate processes within defined parameters.

**convection:** The transmission of heat by the circulation of a liquid or a gas such as air. Convection may be natural or forced.