



Guide for
**Burning Crude Oil and
Slops in Main and
Auxiliary Boilers**

1978

American Bureau of Shipping

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Foreword

The "Rules for Building and Classing Steel Vessels" have no specific requirements for burning of crude oil and slops in main and auxiliary boilers. This Guide has been prepared to make available in published form the Bureau recommendations for such an installation.

When an Owner elects to install such a system in a vessel classed with this Bureau the system is to be of an approved design. Crude-oil burning installations which are fitted in accordance with this Guide are considered to be of an approved type. When the design and installation of the system are in accordance with this Guide, a certificate will be issued by the Bureau when requested by the Owners or Builders and a notation will be made in the Record.

This Guide is based on the recommendations of the International Association of Classification Societies (IACS).

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Notice No. 1

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Change Notice

A new sub-section 16.0 is added in order to implement IACS URM24.17 (1976, Rev. 1) as follows.

16.0 Pilot Burner

One pilot burner is to be provided in addition to the normal burning control.

Guide for Burning Crude Oil and Slops in Main and Auxiliary Boilers

1.0 General

The following recommendations apply to vessels fitted to burn crude oil or crude-oil slops as fuel in main or auxiliary boilers.

2.0 Plans to be Submitted

Plans showing the following details and arrangements are to be submitted for approval when compliance with this Guide is requested or when such a system is to be installed on a Bureau classed vessel.

Piping, including material specifications, for burning the crude oil and slops

Ventilation including vent hoods, vent fans, and ducting

Gas monitoring system

Associated electrical installation and control systems

3.0 Crude-Oil Supply

Crude oil or slops are to be taken directly from cargo tanks, slop tanks, or suitable tanks fitted in cargo tank area. They are to be separated from non-gas-dangerous areas by means of cofferdams with gas-tight bulkheads. The entire system of pumps, strainers, separators, and heaters, if any, is to be located in the cargo pump room or other space considered dangerous. Such spaces are to be separated from the engine and boiler room by gas-tight bulkheads (See 10.0). When the crude oil is heated by steam or hot water the outlet of the heating coils is to be led to a separate observation tank installed with the above mentioned components. This closed tank is to be fitted with a vent pipe led to the atmosphere in a safe location in accordance with the requirements for tankers in the "Rules for Building and Classing Steel Vessels." This vent outlet is to be fitted with a suitable flameproof gauze of corrosion-resistant material which is to be easily removable for cleaning.

4.0 Fuel-Oil Burning

Arrangements are to be provided in all cases for burning fuel oil as well as crude oil and slops. These arrangements are to comply with the "Rules for Building and Classing Steel Vessels." The fuel-oil supply to and the returns from burners are to be equipped with a suitable mechanical interlocking device that precludes the simultaneous burning of fuel oil and crude oil.

5.0 Boilers

Boilers are to be of a type suitable for burning low-flash-point fuels. The boiler casings are to be gas tight and are to be tested for gas tightness. When boilers are fitted with a double casing, particular care is to be taken to preclude the possibility of gases leaking into and being trapped between the casings or accumulating in pockets in the inner casing. Means are to be provided so that the boiler can be purged automatically before firing.

6.0 Vent Hood

Boilers are to be fitted with a suitable hood constructed in such a way as to enclose burners, valves, and oil pipes as much as possible without preventing or restricting the flow of air into the burner registers. The hood is to be fitted with suitable doors placed in such a way as to enable inspection of and provide access to oil pipes and valves enclosed within it and is to be connected with a duct exhausting to the open deck in a safe location. This duct is to be fitted with a suitable protective screen, easily removable for cleaning. At least two mechanically-driven exhaust fans having nonsparking impellers are to be fitted to insure that pressure inside the hood is maintained at a level less than that in the boiler room. These exhaust fans are to be connected with an automatic changeover in case of the stopping or failure of the fan in operation. The exhaust-fan prime movers are to be outside the duct with a gas-tight penetration for the driving shaft.

7.0 Pipe Duct

Crude-oil or slop piping is to be enclosed within a gas-tight metal duct for its entire length within the engine and boiler room. The duct and enclosed piping are to be inclined so that the boiler side is higher than the pump-room side in order to provide for the return of oil toward the pump room in case of leakage or failure in delivery pressure. This duct is to be fitted inboard of the vessel's side a distance at least equal to one-fifth of the vessel's beam amidships. The duct is to be fitted with gas-tight doors for inspection of pipe connections, and an automatic-closing drain trap at the pump-room side of the duct arranged for discharge into the pump room in the event of crude-oil or slop leakage. A vent pipe is to be fitted on the highest part of the duct discharging to a safe location and fitted with a suitable flameproof gauze of corrosion resistant material which is to be easily removable for cleaning. The duct is to be permanently connected to an approved inert-gas system or steam supply in order to provide for the following.

Injection of inert gas or steam in the duct in case of fire or leakage
Purging the duct before carrying out work on the piping in case of leakage

8.0 Crude-oil Piping

The crude-oil or slop piping and drain pipes from drip trays are to be of extra-heavy seamless steel. Pipe connections are to be reduced to a minimum and are to be of the heavy-flange type. Such piping is to be in accordance with the requirements for fuel-oil pressure piping and the "Rules for Building and Classing Steel Vessels".

Crude-oil or slop supply and return pipes are to be fitted on the pump-room side with remote-control shut-off valves operated from a position near the boiler fronts or the machinery control room. These valves are to be interlocked with the hood exhaust fans to ensure that the fans are operating when crude oil is being circulated. In addition, a quick-closing master valve is to be fitted on the oil supply line to each boiler manifold.

Each boiler is to be fitted with a drip tray placed in such a way as to collect any possible oil leakage from burners, valves, and connections. This drip tray is to be provided with a corrosion-resistant wire gauze top which is to be easily removable for cleaning. Supply and return oil pipes are to pass through the tray by means of a tight penetration and are to be connected to the oil supply manifolds. The tray is to be fitted with a drain line discharging into a drain tank in the pump room. This tank is to be fitted with a vent pipe led to the open in a safe location with the outlet fitted with corrosion-resistant wire gauze easily removable for cleaning. This drain line is to be fitted with arrangements to prevent the return of gas to the boiler or engine room. The drain tank is to be provided with a high-level alarm.

9.0 Crude-oil Pumping and Heating

Crude-oil pumps are to be provided with a pressure-relief bypass from the supply to the suction side and with remote shutdowns located near the boiler fronts or machinery control room and from a safe location outside of the machinery space. Where the crude oil or slops are preheated, the temperature is to be controlled automatically and a high-temperature alarm is to be provided.

10.0 Prime Movers

Electric, internal combustion, and steam (when steam temperature is higher than 220C or 428F) prime movers for pumps, separators (if provided), etc. are to be located in the engine room or other non-gas-dangerous room. Where drive shafts pass through the pump-room bulkhead or duck plating, gas-tight glands are to be fitted. The glands are to be lubricated from outside the pump room.

11.0 Electrical Equipment

Electrical equipment installed in gas-dangerous areas or in areas which may become dangerous (i.e. in the hood or crude-oil pipe ducting) is to be of the explosion-proof or intrinsically-safe type.

12.0 Ventilation

The boiler compartments are to be provided with mechanical ventilation designed to avoid formation of gas pockets. Particular attention is to be given to insure that efficient ventilation is provided in areas where equipment and other sources of ignition are present. This system is to be entirely independent from other ventilation systems.

13.0 Gas-detection System

A gas-detection system is to be installed with sampling points fitted in the pipe ducts, vent hood, boiler front and other areas where dangerous gases may accumulate from leaks or ventilation failures. Effective visual and audible alarms are to be provided near the boiler fronts and in the machinery control room.

14.0 Fire-extinguishing Systems

An additional fire-extinguishing system independent of the fixed systems required for the engine and boiler rooms is to be provided and arranged so that an approved fire-extinguishing medium can be discharged directly at the boiler fronts and on the drip tray. Automatic shutdown of the vent-hood exhaust fans upon release of the fire-extinguishing medium is to be provided.

15.0 Warning Notice

A warning notice is to be provided near the boiler front and in the machinery control room which will specify that whenever the gas-detection system indicates a level of gas equal to 30% of the lower explosive limit the following action is to be taken.

Shut off the pump room remote-control valves on crude-oil supply and return pipes

Shut down the crude-oil pumps

Inject inert gas or steam into crude-oil pipe ducting

Change boilers to normal running on fuel oil