A M E R I C A N S T A N D A R D

Graphical Symbols for Process Flow Diagrams

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Foreword

THE development of these symbols under the American Standards Association procedure has been sponsored by The American Society of Mechanical Engineers and the American Institute of Electrical Engineers.

The cooperation of the American Petroleum Institute, American Institute of Chemical Engineers, Instrument Society of America, and the National Electrical Manufacturers Association is hereby acknowledged together with the response received from over 60 individual companies who submitted their drawing symbols for review and consideration by the Task Group.

Following approval by the Sectional Committee and the sponsors, this Standard was approved by the American Standards Association and received its designation on September 11, 1961.

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AMERICAN STANDARD

Graphical Symbols for Process Flow Diagrams

1. SCOPE

This preliminary set of standard symbols has been developed for use on the basic process flow diagrams in order to represent the major items of equipment used by the petroleum and chemical industries.

A process flow diagram is the first drawing made to show the basic items of major equipment and their relation to one another in the process scheme. The more important flow lines are indicated as connecting these pieces of equipment and help to describe how the process operates.

2. BASIC PRINCIPLES

Simplicity of outline form were considered as paramount in the development of these symbols. The main idea is to preserve the general physical appearance of the equipment, with the minimum strokes to a draftsman.

No scale is applied to a process flow diagram, but the relative size of the symbols should be selected in keeping with the overall size of the completed drawing. The symbols should be arranged on the drawing in logical sequence of flow, from the charge material to the main product, with a minimum of cross-over lines.

It is suggested that the equipment outlines be drawn by heavy lines, and that the connecting piping be shown as lighter lines. For the purpose of most process flow diagrams it is not considered necessary to indicate any instrumentation or electrical symbols.

3. GENERAL

The following 79 symbols are by no means all that were suggested or that may be required; however, by adopting these as a standard the majority of present processes may be adequately represented.

In the preparation of final drawings for the detailed design, erection or operation of a unit, the process flow diagram must be supplemented by the more detailed engineering flow sheets and the final piping layout drawings.

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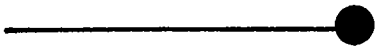
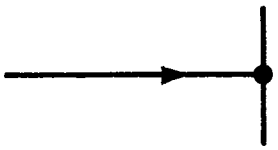
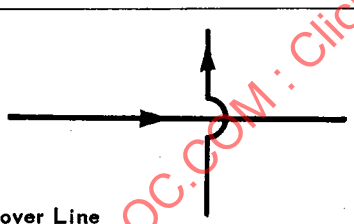
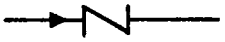
Code No.	SUBJECT: LINES
1	Feed Stock (Identify by Name)
2	 Products (Identify by Name)
3	 Connecting Lines
4	 Crossover Line (Break all vertical lines and show loop)

REMARKS:

Code No.	SUBJECT: VALVES
5	Gate
6	Globe
7	Plug (Cock)
8	 Check

REMARKS: Show valves only where necessary to clarify Process Flow.
See: ASA Z32.2.3–1949
If valve is closed during normal operation write "CLOSED" directly above the valve.

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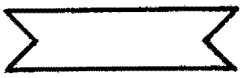
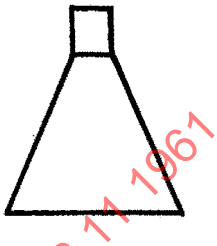
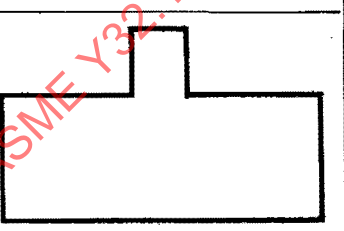
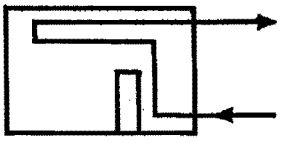
GRAPHICAL SYMBOLS FOR PROCESS FLOW DIAGRAMS

Code No.	SUBJECT: PROCESS QUANTITIES
9	 Liquid Flow
10	Weight Flow
11	Gas Flow
12	Pressure
13	Temperature

REMARKS:

Indicate in drawing legend the values assigned to all units.

Place numerical quantities specified within symbol.

Code No.	SUBJECT: FURNACES & BOILERS
14	 "A" Frame
15	 Box Type
16	 Radiant Type (Single Coil)
17	Vertical
18	Boiler Fired or Waste Heat

REMARKS:

Indicate approximate position of inlet and outlet.

If dual coil indicate path of both streams.

Do not indicate type of fuel or firing position.

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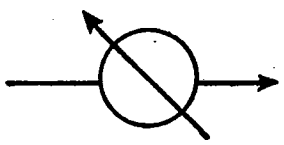
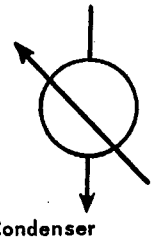
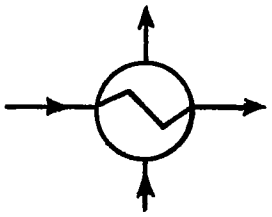
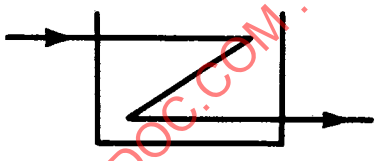
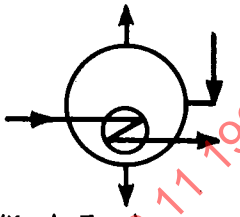
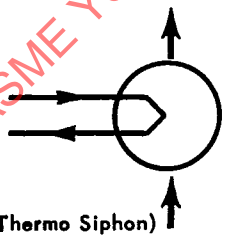
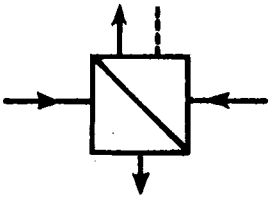
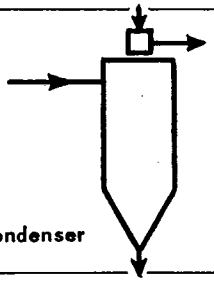
Code No.	SUBJECT: HEAT TRANSFER
19	 Water Cooled Exchanger
20	 Water Cooled Condenser
21	 Shell & Tube Exchanger
22	 Box Cooler (Single Coil)
23	Cooling Tower

REMARKS: Ref. ASA Z32.2.6–1950

Code No.	SUBJECT: HEAT TRANSFER (Cont'd)
24	 Reboiler (Kettle Type)
25	 Reboiler (Thermo Siphon)
26	 Superheater or Reheater
27	 Barometric Condenser

REMARKS: Side view of equipment may be shown for exchangers or reboilers

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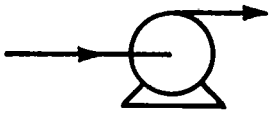
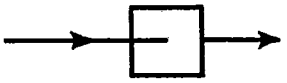
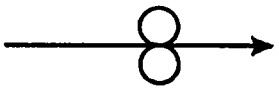
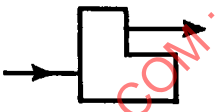
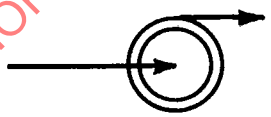
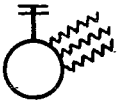
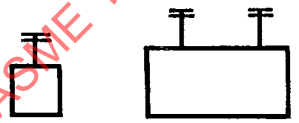
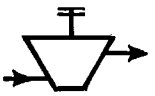
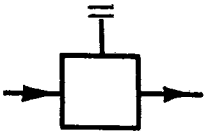
GRAPHICAL SYMBOLS FOR PROCESS FLOW DIAGRAMS

Code No.	SUBJECT: PUMPS & COMPRESSORS
28	 Centrifugal
29	 Reciprocating
30	 Rotary
31	 Proportioning
32	 Blower or Fan (Centrifugal)

REMARKS: Suggested Changes from ASA Z32.2.6—1950

Code No.	SUBJECT: DRIVERS
33	 Motor
34	 Engine Single Drive Dual Drive
35	 Turbine
36	 Steam Piston

REMARKS: Drivers may be shown, if desired, attached to prime mover. See: ASA Y32.2 for specific types of motors.

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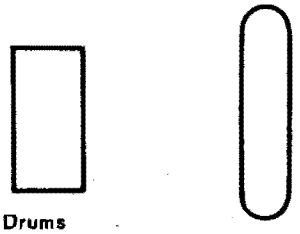
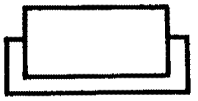
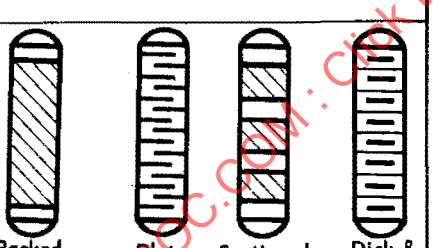
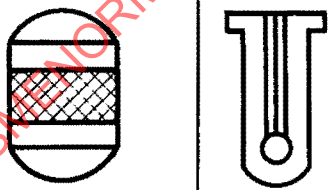
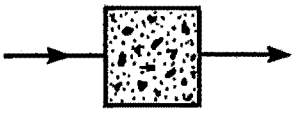
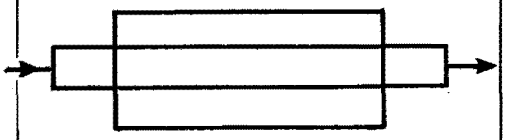
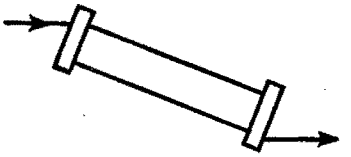
Code No.	SUBJECT: PROCESS PRESSURE VESSELS
37	Horizontal Drums
38	 Vertical Drums
39	 Jacketed Vessel (Partial)
40	 Packed Columns (Towers) Plate Sectioned Disk & Donut
41	 Reactor (Catalytic) Reactor (Nuclear)

REMARKS:

Code No.	SUBJECT: DRYERS
42	Batch Trays
43	Spray
44	 Desiccant
45	 Continous Tunnel
46	 Rotary Drum Dryer or Kiln

REMARKS:

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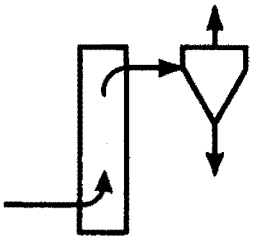
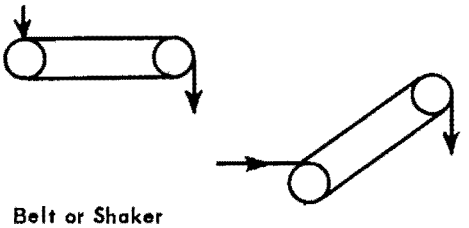
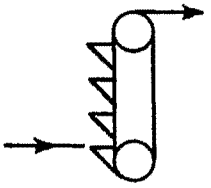
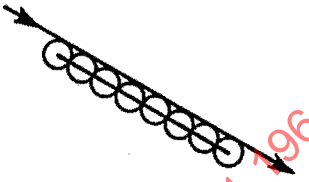
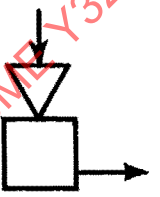
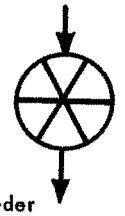
GRAPHICAL SYMBOLS FOR PROCESS FLOW DIAGRAMS

Code No.	SUBJECT: MATERIAL HANDLING EQUIPMENT
47	Air Lift 
48	Belt or Shaker 
49	Bucket or Flight Conveyor 
50	Screw Conveyor

REMARKS:

Code No.	SUBJECT: MATERIAL HANDLING EQUIPMENT (Cont'd)
51	Roller Conveyor 
52	Feeder & Hopper 
53	Rotary Feeder 

REMARKS:

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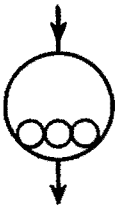
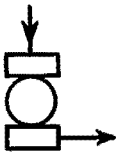
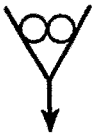
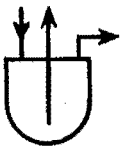
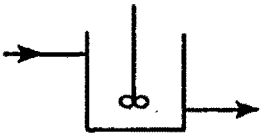
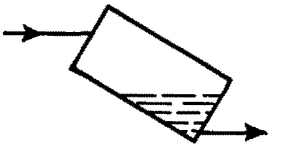
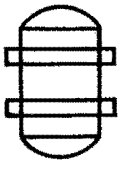
Code No.	SUBJECT: SIZE REDUCING EQUIPMENT
54	 Ball Mill
55	 Grinder
56	 Roller Crusher
57	Screener

REMARKS:

Code No.	SUBJECT: PROCESSING EQUIPMENT
58	 Blowing Egg
59	Extractor
60	 Mixer
61	 Settler
62	 Autoclave

REMARKS:

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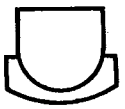
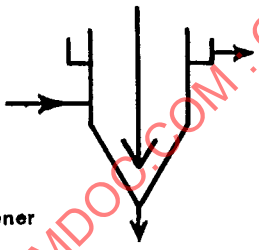
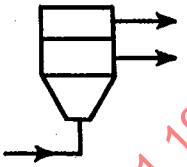
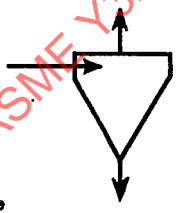
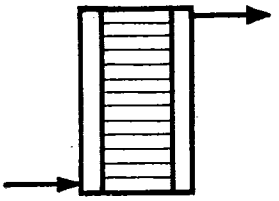
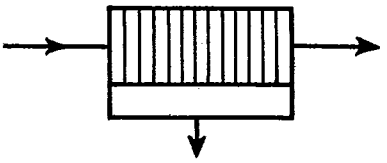
GRAPHICAL SYMBOLS FOR PROCESS FLOW DIAGRAMS

Code No.	SUBJECT: PROCESSING EQUIPMENT (Cont'd)
63	 Kettle-Jacketed
64	Rotary Film Dryer or Flaker
65	Jet Mixer Injector, Ejector, Eductor
66	 Thickener

REMARKS:

Code No.	SUBJECT: SEPARATORS
67	 Centrifuge
68	 Cyclone
69	 Electrical Precipitator
70	 Filter Press

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