



NATIONAL PETROCHEMICAL COMPANY
STANDARDS

ENGINEERING STANDARD
FOR
PFD/P & ID SYMBOLS

NPCS-ES-PR-01

REVISION : 0

OCTOBER 1992



1 INTRODUCTION

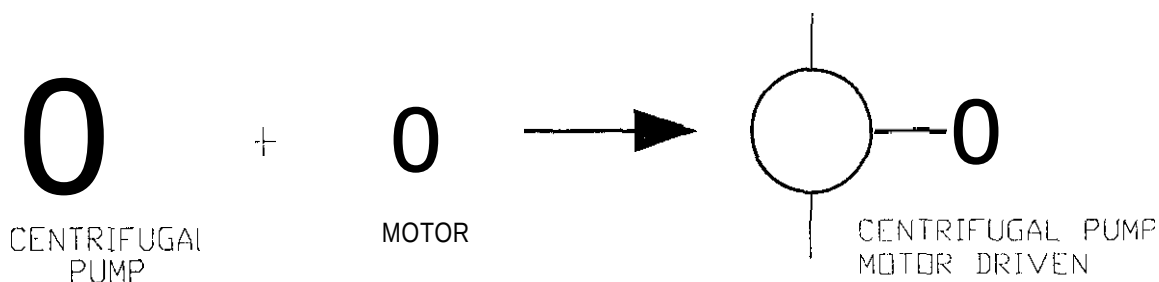
Process flow diagrams (PFD's), utility balance diagrams (UBD's), Piping and Instrumentation diagrams (P&ID's) as well as utility distribution diagrams (UDD's) are key design documents using for engineering design and construction of process and utility plants and/or parts thereof, it is therefore of great importance that the information on these diagrams is correct and consistent.

2 PURPOSE

The purpose of this standard is to establish uniform symbols for equipment, piping and instrumentation on PFD's, UBD's, P&ID's and UDD's throughout the NPC projects.
This includes also vendor drawing with the same purpose.

3 COMBINATION OF SYMBOLS

The symbols are basic symbols and can be combined e.g.:



4 EQUIPMENT CODE

The applicable equipment codes are shown as much as possible with the equipment symbols. The following rules shall be followed if it concerns special equipment:

4.1 PACKAGE UNITS

Definition : a combination of completely prefabricated equipment with their accessories on a skidframe or delivered as prefabricated components for further field erection.

- Such units are generally tagged with the letter V.
The extend of a package is shown in a box with lines.



- In some cases e.g. compressors one can also use the tag no. of the main equipment for the whole box.

- Tag No's of the individual equipment shall be given within the package units.

4.2

SPECIAL EQUIPMENT SHALL BE TAGGED WITH "Z"



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Part A	<u>STANDARD SYMBOLS FOR PROCESS FLOW DIAGRAMS AND UTILITY FLOW DIAGRAMS</u>
Part B	<u>STANDARD SYMBOLS FOR P&I DIAGRAMS</u>



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PART A

STANDARD SYMBOLS FOR PROCESS FLOW DIAGRAMS AND UTILITY FLOW DIAGRAM



SYMBOL

CODE

DESCRIPTION



MAIN PROCESS LINES



SECONDARY PROCESS AND
UTILITY LINES



BURIED PIPELINE



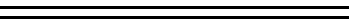
HEAT TRACED PIPELINE



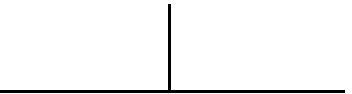
FUTURE PIPELINE



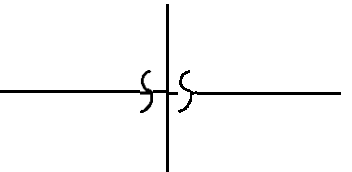
VENDOR PACKAGE



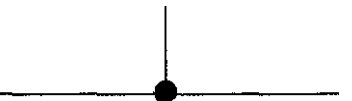
JACKETED OR DOUBLE CONTAINMENT
PIPELINE



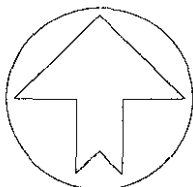
LINE CROSSING (CONNECTED)



LINE CROSSING (UNCONNECTED)



LINES JUNCTION



STANDARD ARROW



SYMBOL

CODE

DESCRIPTION

0

STREAM NUMBERS

MW

-

HEAT DUTY

kg/h

-

MASS FLOW

Sm³/h

=

VOLUME FLOW IN STANDARD Sm³/h
(15°C ; 1.01325 bar)

TEMPERATURE

0

PRESSURE

D a l

-

VALVE GENERAL BLINDED OFF



GLOBE VALVE

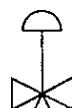


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THREEWAY VALVE

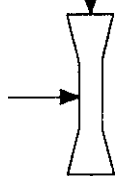


CONTROL VALVE



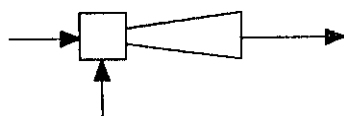
-

THREEWAY CONTROL VALVE



DS

DESUPERHEATER



J

EJECTOR

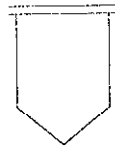
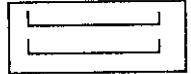
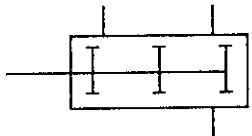
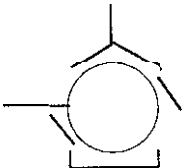


Documents

Document Sharing Hub



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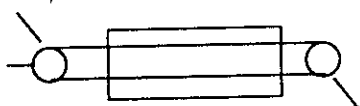
SYMBOL	CODE	DESCRIPTION
	-	ATMOSPHERIC VENT
	-	RESTRICTION ORIFICE
	FT	FILTER (GENERAL)
	FT	CARTRIDGE FILTER
	FT	FILTER PRESS
	DR	BATCH TRAY CRIER
	DR	AGITATED BATCH DRIER
	DR	DRUM DRIER



SYMBOL

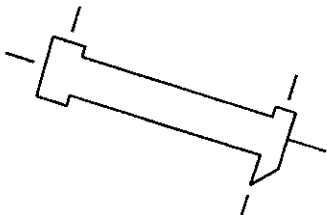
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DESCRIPTION



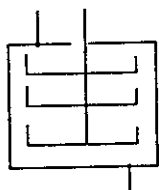
DR

BELT DRIER



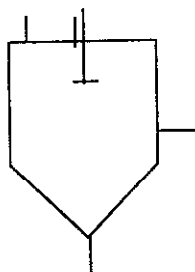
DR

ROTARY DRIER



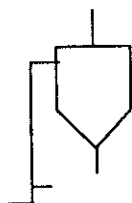
DR

CONTINUOUS TRAY DRIER



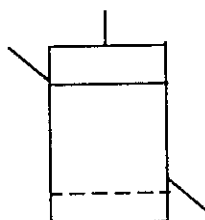
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SPRAY DRIER



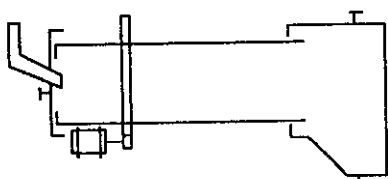
DR

FLASH DRIER



DR

FLUID BED DRIER



RK

ROTARY KILN



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SYMBOL	CODE	DESCRIPTION,
	- - PI	INSTRUMENT LOCAL MOUNTED INSTRUMENT BOARD MOUNTED INSTRUMENT LOCAL OR PANEL MOUNTED X STANDS FOR: = PRESSURE INDICATOR PIC = PRESSURE INDICATOR CONTROL PR = PRESSURE RECORDER PRC = PRESSURE RECORDER CONTROL PS = PRESSURE SWITCH TI = TEMP. INDICATOR TIC = TEMP. INDICATOR CONTROL TR = TEMP. RECORDER TRC = TEMP. RECORDER CONTROL TS = TEMP. SWITCH AR = ANALYZER RECORDER ARC = ANALYZER RECORDER CONTROL (NOTE 1)
	-	FLOW INSTRUMENT LOCAL OR PANEL MOUNTED X STANDS FOR: FI = FLOW INDICATOR FIC = FLOW INDICATOR CONTROL FR = FLOW RECORDER FRC = FLOW RECORDER CONTROL FS = FLOW SWITCH (NOTE 1)
	-	TURBINE FLOW METER LOCAL OR PANEL MOUNTED X STANDS FOR: SEE ABOVE. (NOTE 1)
	-	VENTURI FLOW METER LOCAL OR PANEL MOUNTED X STANDS FOR: SEE ABOVE. (NOTE 1)
	- - - -	LEVEL INSTRUMENT LOCAL OR PANEL MOUNTED X STANDS FOR: LI = LEVEL INDICATOR LIC = LEVEL INDICATOR CONTROL LR = LEVEL RECORDER LRC = LEVEL RECORDER CONTROL LS = LEVEL SWITCH (NOTE 1)
	-	GENERAL SYMBOL

1. IDENTIFICATION ACC. ISA-S-5.1 OUTSIDE SYMBOL



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SYMBOL	CODE	DESCRIPTION
	E	HEAT EXCHANGER (GENERAL)
	E	SHELL & TUBE EXCHANGER (VERTICAL)
	E	SHELL & TUBE EXCHANGER (KETTLE TYPE)
	E	VAPORIZER
	E	STAB-IN HEAT EXCHANGER
	E	DOUBLE PIPE HEAT EXCHANGER



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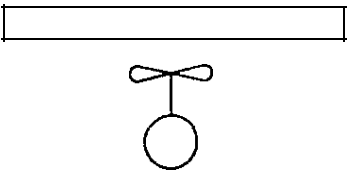
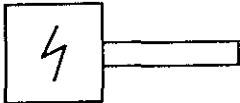
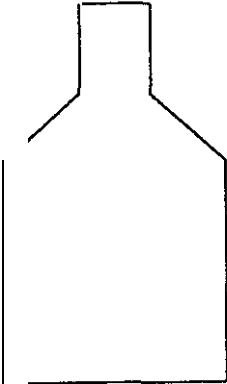
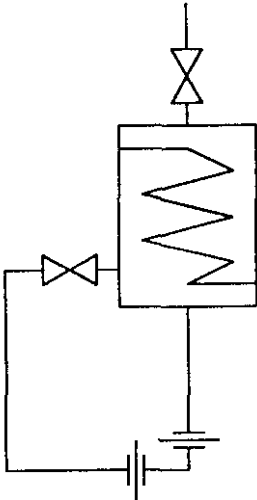
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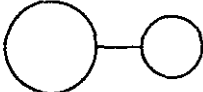
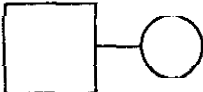
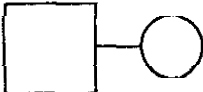
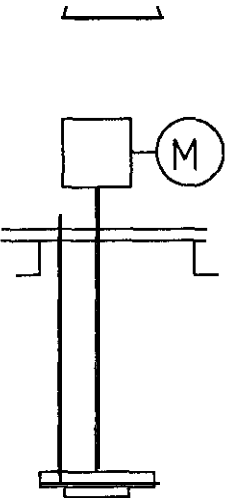
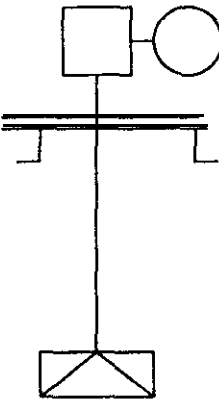
SYMBOL	CODE	DESCRIPTION
	E	PLATE TYPE EXCHANGER
	CY	CYCLONE AND HYDROCLONE
	CE	CENTRIFUGE
	EX	EXTRUDER
	GH	GAS HOLDER
	AU	AUTOCLAVE



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SYMBOL	CODE	DESCRIPTION
	AE	AIRFIN COOLER
	H	ELECTRICAL HEATER
	H	FURNACE (BASIC SYMBOL)
		COIL (BASIC SYMBOL)
	SC	SAMPLE COOLER



SYMBOL	CODE	DESCRIPTION
	P	CENTRIFUGAL PUMP WITH MOTOR
	P	RECIPROCATING PUMP WITH MOTOR
	P	ROTARY PUMP WITH MOTOR
	P	SUMP PUMP WITH MOTOR (CENTRIFUGAL TYPE)
	P	VERTICAL LIFT PUMP (RECIP.) WITH MOTOR AND FOOTVALVE

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SYMBOL

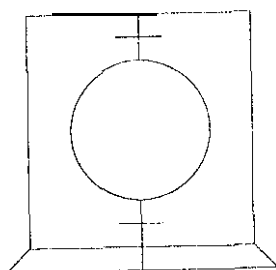
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DESCRIPTION



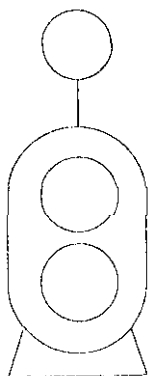
C

CENTRIFUGAL COMPRESSOR
WITH MOTOR



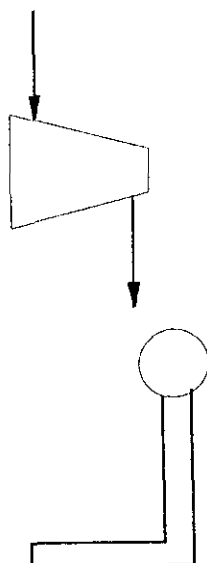
C

RECIPROCATING COMPRESSOR
WITH
PULSATION SUPPRESSION BOTTLES



C

ROTARY COMPRESSOR WITH MOTOR



T

TURBINE (GENERAL)

WEIGHING MACHINE

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SYMBOL

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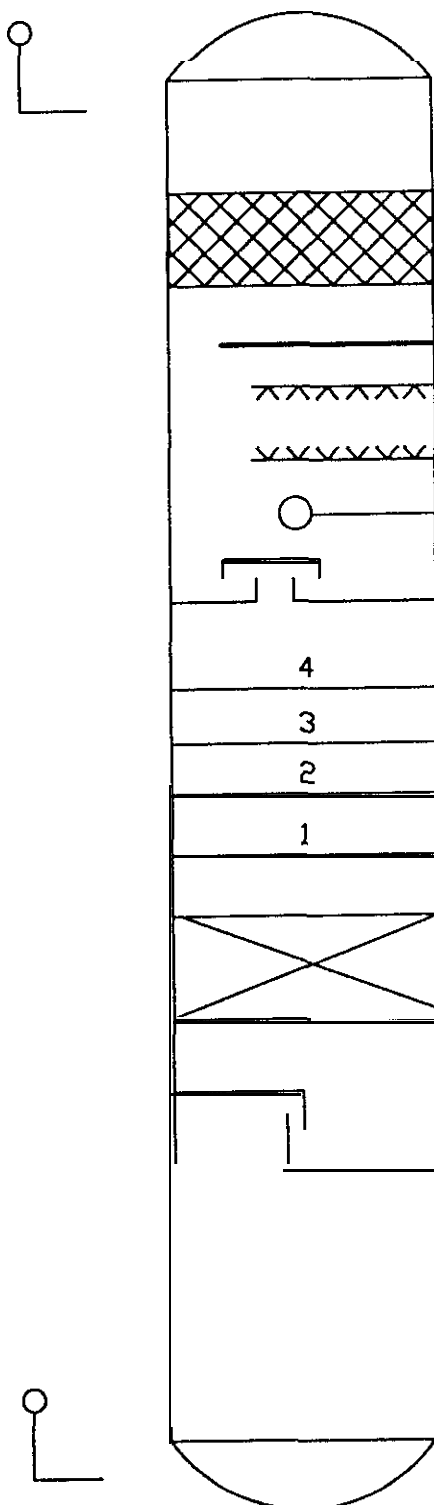
TOWER. COLUMN, VESSEL OR REACTOR

~~EQUIPMENT E~~ :

PRESURE VESSEL : D

REACTOR : R

PLATFORM TOWER/COLUMNS : T



DEMISTER

DISTRIBUTOR EXAMPLES

BUBBLE CAP TRAY

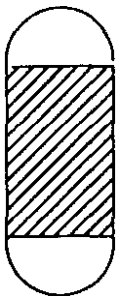
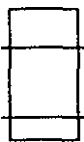
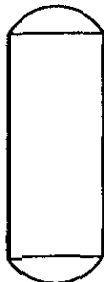
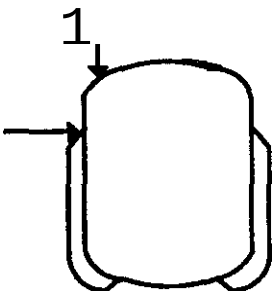
TRAY
(ONLY SHOWN WHERE SIGNIFICANT
AND NUMBERED FROM BOTTOM TO TOP:

PACKED COLUMN

BAFFLE WITH PARTITION PLATE

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SYMBOL	CODE	DESCRIPTION
	T	SWAGED TOWER
	D	REACTION OR ABSORPTION VESSEL
		PORTABLE DRUM
	D	VERTICAL VESSEL
		VESSEL WITH HEATING AND COOLING JACKET



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SYMBOL	CODE	DESCRIPTION
	D	HORIZONTAL VESSEL
	D	DISTRIBUTOR 1. } DISTRIBUTOR 2. } WITH 3. } CLOSED END 4. } DISTRIBUTOR 5. } WITH 6.SPARGER WITH OR WITHOUT H O L E S
	D	HORIZONTAL VESSEL WITH BOOT
	D	DEAERATOR
	D	VESSEL WITH DOME & SUMP
	TK	DOME ROOF TANK