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Best Practice Guide to:

Valve Tagging

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CONTENTS

Contents of the Best Practice Guide to Valve Tagging by Graphic Products, Inc.

1 How do you know what each pipe contains and what the emergency response crew needs to know?

5 Use printable DuraTag™ tag stock to easily and efficiently mark valves.

Please feel free to share this with someone else who could use it.

Thank you!

INTRODUCTION

The following pages provide basic instructions for valve tag design, printing, and placement. These recommended practices will help improve facility efficiency and increase safety through visual communication.

Valve tag placement is not explicitly required by the American Society of Mechanical Engineers (ASME) or the American National Standards Institute (ANSI). What both require is the proper marking of all piping systems. Valves are a part of a piping system and the standard is generally interpreted to mean that valves must also be properly labeled.

Since valves rarely have flat surfaces appropriate for applying labels, a label is typically applied to a tag that is then attached to the valve.

Tags should be made of a material appropriate for the application. In most cases a rigid material is best, as it provides a flat, easy-to-read surface. However, in some cases, such as when a large amount of information needs to be included on the tag, a flexible tag stock material works better. In both cases a material able to withstand the environment must be selected, and in the case of rigid valve tags, the material must provide a surface that promotes label adhesion. This guide will provide recommendations for appropriate materials.

Valve tags pack a lot of information into a little space. For example, valve tags should be color coded to identify the type of material flowing through the valve. Information on the tag identifies the valve by number and may provide more information about the pipe contents. In addition, chemical safety labels may be included, as well as operating instructions and contact information. Barcodes can be included for electronic identification of valves, and for use during inspections and as a part of Lockout/Tagout procedures.

Valve tags play a vital role in safety. They can provide information for emergency responders and save lives of on-site workers.

FACILITY EVALUATION

As defined by the ANSI/ASME A13.1 – 2007 standard, piping systems should be labeled to identify contents. A "pipe" is a conduit used to convey, distribute, mix, separate, discharge, meter, control, or snub fluid flows. A pipe system is piping of any kind, including valves. Thus this standard also applies to labeling valves.

Inspecting your Facility

When beginning a valve tag evaluation project, you should walk through your facility and take notes on the labels that are needed. This walk-through can be combined with your normal maintenance inspections, but you will need to pay extra attention to markers and labels. Look for:

- Existing valve tags
  - Are they still legible? (Damaged, deteriorated, etc.)
  - Are they accurate? (Name, flow, label color)
- Valves with missing tags
- New equipment
  - Identify new pipes or valves
  - Identify changes to other systems that may have resulted from the installation of the new equipment
  - Inspect the other systems to ensure valves are properly labeled
- Areas where maintenance was recently performed for damaged or missing valve tags
- Traffic areas

Although the ANSI and ASME standards suggest labeling all pipes, they require pipes and valves to be labeled in the following situations:

- Pipe contents could affect procedures during emergency situations
- Pipe contents are hazardous
- Direction of flow is unknown
- Destination of contents is unknown
- Flow requires redirection for maintenance
- One or more valves must be shut off for maintenance

In conducting your inspection, use a pipe schematic and piping drawings to plan your inspection. Be sure to consult your facility's pipe schematics to ensure accurate labeling of contents.

Valve tags should be used if:

- Surface area cannot accommodate the label size
- Congested area results in obstructed view
- Labels cannot adhere to surface
- Labels frequently change or are in cycles or rotations
- Labels cannot conform to uneven surface
- Surface has a temperature higher than 160°F

VALVE TAG CREATION

Information Included on Valve Tags

Since there is no defined standard for valve labeling, there is flexibility as to what type of information can be put on a valve tag. Use what best fits the work area, facility, or company standards.

Many valve tags often have the following:

- Pipe contents
- Valve identifier
- Barcode
- Serial number
- Valve function
- Valve's normal position
- Valve actuator type
- Chemical safety information

At a minimum, a valve tag should include the valve identifier and a description of what the valve does. The valve identifier may also be represented by a barcode and/or alphanumerical characters. Because of limited space the description may use abbreviations. An abbreviation chart is included in the Reference Materials section of this guide.

Type Of Lettering

Although common practice is to use all capital letters, for best legibility use a combination of upper and lower case for long text, such as a description. This also saves space allowing more information to be printed on the valve tag. Typically an Arial or Verdana font (sans-serif font) should be used. These plain-looking fonts are easier to read.

Recommended: sans-serif font

Not recommended: serif font

One-Sided or Two-Sided?

Because a valve tag can move, valve tags are typically made with the same information on both sides of the tag. This allows the tag to be read from any angle. However, some facilities include chemical safety information on the backside of the tag.

What Color Should Valve Tags Be?

Valve tag colors should follow recommended ANSI/ASME A13.1 pipe marking color standards.

FLUID SERVICE	COLOR CODE
Fire quenching fluids	White text on red
Toxic and corrosive fluids	Black text on orange
Flammable fluids	Black text on yellow
Combustible fluids	White text on brown
Water	White text on green
Compressed air	White text on blue
USER DEFINED	White text on purple
USER DEFINED	Black text on white
USER DEFINED	White text on gray
USER DEFINED	White text on black

Table 1 Valve Tag Colors - ANSI/ASME A13.1 Pipe Colors[2]

[2] Valve tags should use the same color code as pipe marking to aid in quick identification of the contents. These are only recommendations. In addition, your insurer may require different valve tag color-coding requirements.

What Material Should Be Used To Make Valve Tags?

There are two options: rigid valve tags and flexible tag stock.

A rigid valve tag is made by applying a vinyl label to a rigid plastic backing producing a durable, rugged tag. Two of the most common tag sizes are: 2 ¼" x 3 ¾" and 3" x 5".

A flexible valve tag is made by using a material such as DuraTag™ tag stock. DuraTag tag stock comes on a continuous roll and can be printed just like vinyl tape. The advantage is that the tag can be made to whatever size is needed, providing sufficient room for whatever information needs to be on the tag.

DuraLabel Heavy-Duty Valve Tags are a great way to color code facilities.

Creating Your Valve Tags

An easy way to generate the large quantity of customized labels required for a valve tagging project is to use an industrial-quality label printer, such as the DuraLabel line of labeling systems from Graphic Products. This printer line offers a broad range of valve tagging supplies, including DuraTag Tag Stock, Heavy-Duty Valve Tags, labels for challenging surfaces, and signs that can be clamped onto pipes.

Option 1: Printing DuraLabel Heavy-Duty Valve Tags (Rigid)

DuraLabel Heavy-Duty Valve Tags provide superior durability and longevity in outdoor and industrial environments. Because they are rigid, they can be easier to read.

1. Load the DuraLabel printer with the appropriate color and size of labeling tape.
2. Open a compatible word processing program.
3. Set page size to match the label size.
4. Design your valve tag with custom information.
5. Print and apply the label to an appropriate size heavy-duty valve tag.
6. If adding a chemical safety label to the back side of the tag, print and apply that label.

Option 2: Printing DuraTag™ (Tag Stock)

DuraTag™ tag stock is an extremely durable material that resists tearing, moisture, chemicals, and extreme temperatures. DuraTag comes in various widths and colors. DuraTag tag stock is flexible and may be directly printed on like vinyl tape.

1. Load the DuraLabel printer with a roll of DuraTag stock as you would vinyl tape.
2. Open your word processing program.
3. Set the page format according to DuraTag width and required tag size.
4. Enter the information you want printed on the tag.
5. Print the tag.
6. Hole-punch the DuraTag to allow the threading of a cord, tie, or cable.

Just punch a hole

Attach to valve

VALVE TAG PLACEMENT

Tags require a cord, zip tie, chain, or cable tie to complete the labeling process. See Table 2 (Cable Length) to determine how long the length of cord or cable should be.

Valve Tag Placement

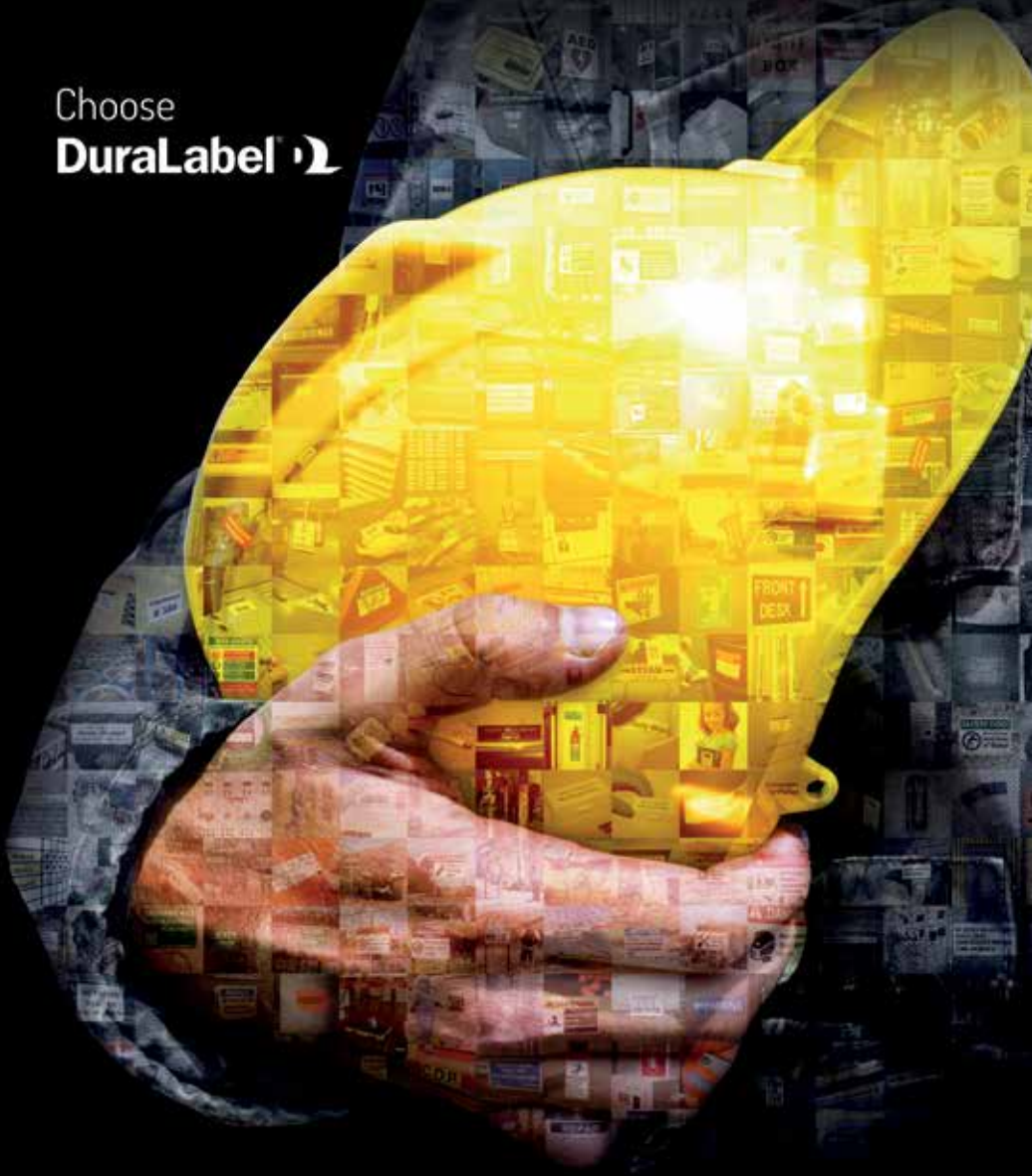
- Typically valve tags are placed directly on the valve. If the valve is too small or there is no way to attach the tag to the valve body, it may be necessary to attach it to the stem of the hand wheel.
- Never attach valve tags directly onto a hand wheel, valve stem, electric actuator, or hydraulic drive. Tags may interfere with operation. Actuators should be labeled separately.
- Valve tags need to be visible from the point of normal approach.
- Tags should be attached using a secure method such as a steel wire, brass chain, or plastic tie.

WRAPPING CIRCUMFERENCE	STANDARD CABLE LENGTH
Less than 2"	4"
2"	4"
3"	5"
4"	6"
5"	7"
6"	8"
Greater than 2"	Use discretion

Table 2: Cable Length

Tags should be strategically placed for visibility and not to interfere with operations or maintenance.

Choose
DuraLabel



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VALVE TAG MAINTENANCE

Valve tags need to be properly maintained to ensure legibility and readability. Under normal conditions valve tags will last five to seven years in outdoor locations. Environmental conditions can result in a variance of label life-span.

Valve tags should be inspected on a periodic basis. Replace missing or deteriorated tags at all locations. Any accumulation of debris, grease, oil, or other materials should be cleaned off. DuraLabel supplies are chemical resistant. Solvents and cleaning agents may be used when necessary to clean off dirt, grime, oil, etc. Set up a schedule to reevaluate on a regular basis. The frequency of inspections will vary depending on the environment within your facility. Refer to the “Facility Evaluation” section of this guide for help.

For more information, please call 877.534.5157 or visit *DuraLabel.com*.

Tags may become deteriorated over time and will need to be replaced to keep up with safety codes.

REFERENCE MATERIAL

Standard Abbreviations

The following are abbreviations you may see used on valve tags. When a definition includes a slash, the abbreviation has two meanings.

ABED	Aux. Building Equip. Drains
ABEDT	Aux. Building Equip. Drain Tank
ABFD	Aux. Building Floor Drain
ABFDT	Aux. Building Floor Drain Train
ACB	Air Circuit Breaker
ACK	Acknowledge
ACT	Actuate
ADJ	Adjust
AFW	Auxiliary Feedwater
ALM	Alarm
AMB	Ambient
ANAL	Analyzer
AO(V)	Air Operated (Valve)
AVG	Average
BA	Boric Acid
BAR	Bar Graph
BAT	Boric Acid Tank/Battery
BD	Blow Down
BIST	Bistable
BIT	Boron Injection Tank
BKR	Breaker
BL	Black Liquid
BOP	Balance of Plant
BTM	Bottom
BTU	British Thermal Unit
BUP	Backup
C	Celsius
C/CB	Condensate/Cond. Booster
C1M	Cumulative One Minute
CAB	Cabinet
CAL	Calibration/Calorie
CAUS	Cause
CCW	Component Cooling Water/Closed Cooling Water

CD	Condensate
CDB	Condensate Booster
CDT	Chemical Drain Tank
CHAM	Chamber
CHAN	Channel
CHNG	Change
CHRG	Charging
CJB	Cold Junction Box
CKT	Circuit
CL	Cold Leg
CLNG	Cooling
CMPT	Computed
CNMT	Containment
COM	Common
COMP	Component
CONC	Concentration
COND	Condenser/Condensate
CONDTY	Conductivity
CONT	Controller
CONT ROD	Control Rod
CONTR	Control
COR	Correction
CORR	Correlation
COUNT	Count
CPM	Counts Per Minute
CPU	Central Processing Unit
CPUS	Central Processing Units
CR	Control Room
CRB	Chemical Recovery Boiler
CRDM	Control Rod Drive Mechanism
CS	Containment Spray
CSR	Cable Spreading Room
CST	Condensate Storage Tank

CW	Circulating Water
CWP	Circulating Water Pump
CYL	Cylinder
D/G	Diesel Generator
DEG	Degrees
DEMIN	Demineralizer
DET	Detector
DEV	Deviation
DIV	Division
DO	Diesel Fuel Oil
DOT	Dirty Oil Tank
DSCH	Discharge
DT	Delta Temperature
ECCS	Emergency Core Cooling System
EDT	Equipment Drain Tank
EFCT	Effect
EFLNT	Effluent
EHC	Electro Hydraulic Control
ELEC	Electrical
EQ	Equipment
EQUIP	Equipment
ES	Extraction Steam
ESF	Engineered Safety Feature
ESS	Essential Service
EXH	Exhaust/Exhauster
EXPANS	Expansion
EXTR	Extracted Extractor/Extraction
F	Fahrenheit
FCV	Flow Control Valve
FD	Forced Draft
FH	Fuel Handling
FLW	Flow
FO	Fuel Oil
FREQ	Frequency
FRNT	Front
FW	Feed Water

GOV	Governor
GPM	Gallons Per Minute
GRP	Group
GSC	Gland Steam Condenser
GV	Governor Valve
HG(A)	Mercury (absolute)
HGHT	Height
HIDP	High Differential Pressure
HL	Hot Leg
HOV	Hydraulic Operated Valve
HP	High Pressure
HR(S)	Hour
HRSG	Heat Recovery Steam Generator
HT RT	Heat Rate
HTNG	Heating
HU/CD	Heatup/Cooldown
HUT	Hold up Tank
HYD	Hydraulic
I/P	Current to Pressure
I/V	Current to Voltage
IA	Instrument Air
ID	Identification/Inside Diameter
INBO	Inboard
INC	Increase
INF	Influent
INIT	Initial
INL	Inlet
INSERTIN	Insertion
INST	Instrument/Instantaneous
INT	Internal
INTERM	Intermediate
IOD	Iodine
ISOL	Isolation
JUNCT	Junction
K	Kilo
LNG	Long/Liquified Natural Gas

REFERENCE MATERIAL

LO FLW	Low Flow
M/G	Motor Generator Sets
MAINT	Maintenance
MAX	Maximum
MCR	Main Control Room
MFP	Main Feed Pump
MIN	Minutes/Minimum
MOIST	Moisture
MPH	Miles Per Hour
MPS	Miles Per Second
MS	Main Steam/Moisture Separator
MSIV	Main Steam Isolation Valve
MSR	Moisture Separator Reheater
MTR	Motor
MU	Makeup
MVBL	Moveable
NAOH	Sodium Hydroxide
NAR	Narrow
NAR RNG	Narrow Range
NBL	Noble
NEG	Negative
NEUT	Neutron
NIS	Nuclear Instrumentation System
NR	Narrow Range
NUC	Nuclear
OG	Off-Gas
OOS	Out of Service
OP	Over Pressure
OPER	Operator/Operating
OT	Over Temperature
OT-OP	Over Temp-Over Pressure
OUT	Output
OUTBD	Outboard
OUTLT	Outlet
OVERLD	Overload
OVERTEMP	Over Temperature

OVRPWR	Overpower
PART	Partial
PARTIC	Particulate
PCT	Percent
PCV	Pressure Control Valve
PENET	Penetration
PMG	Permanent Magnet Generator
PNEU	Pneumatic
PORV	Power Operated Relief Valve
POS	Positive
POT	Potentiometer
PPB	Parts per Billion
PPM	Parts per Million
PR58	Process Radiation Monitor 58
PREAMP	Preamplifiers
PRG	Purge
PRI	Primary
PROC	Process
PRT	Pressurizer Relief Tank
PS	Power Supply
PSI	Pounds Per Square Inch
PSIA	Pounds Per Square Inch Absolute
PSIG	Pounds Per Square Inch Gauge
PSID	Pounds Per Square Inch Differential
PT	Point
PTL	Pull-To-Lock
PUL	Pulverizer
PW	Primary Water
PWR RNG	Power Range
PRV	Pressure Relief Valve
PZR	Pressurizer Relief Tank
RC	Reactor Coolant
RCDT	Reactor Coolant Drain Tank
RCFC	Reactor Containment Fan Cooler
RCL	Reactor Coolant Loop
RCS	Reactor Coolant System

RDT	Reheater Drain Tank
RECOMB	Recombiner
REGEN	Regenerative
REL	Relative
RESID	Residual
RH	Residual Heat
RHR	Residual Heat Removal
RHT	Reheat
RLY	Relay
RNG	Range/Running
ROC	Rate of Change
RTD	Resistance Temp. Detector
RTN	Return
RVLIS	Reactor Vessel Level Indication System
RW	Radwaste
RWST	Refueling Water Storage Tank
S/G	Steam Generator
SA	Service Air
SB	Service Building
SEC	Second
SEL	Select
SEP	Separator
SERV	Service
SFP	Service Fuel Pump
SGTR	Steam Generator Tube Rupture
SI	Safety Injection
SPEC	Specification
STDY	Steady
STNBY	Standby
STOR	Storage
SUPPR	Suppressed
SUPRESS	Suppression
SW	Service Water/Switch
SWST	Secondary Water Storage Tank
T/C	Thermocouples
TAMB	Ambient Temperature
TAVG	Average Temperature
TB	Turbine Building/Terminal Box/Block
TC	Cold Leg Temperature
TCV	Temperature Control Valve
TD	Turbine Drain
TG	Turbine Generator
THER	Thermal
THRT	Throttle
THST	Thrust
TREP	Reference Temperature
TRNA	Train A (B, C, etc.)
TRNSNT	Transient
TRP	Trip
TTD	Terminal Temp. Difference
TURBS	Turbines
UNCONT	Uncontrolled
VAC	Vacuum
VALS	Values
VAP	Vapor
VAR	Variance
VCT	Volume Control Tank
VIB	Vibration
VNT	Vent
VOL	Volume
WR	Wide Range
XFR	Transfer
XMTR	Transmitter

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