

TRANSNET PIPELINES



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DRAWING OFFICE STANDARD (PL101)

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1. INTRODUCTION

The purpose of this standard is to establish a uniform means of designating and identifying plant and equipment installed on the respective pump station sites within Transnet Pipelines, a Division of Transnet Limited. The designation systems detailed below have been designed to cater for both technical as well as financial/management requirements and are proposed to be integrated on both the AutoCAD P&ID (technical) and SAP R3 (financial/management) platforms throughout Transnet Pipelines. (For details of integration onto the SAP R3 platform, the reader is referred to Addendum No.1 attached).

By ensuring a comprehensive, consistent and uniform means of plant and equipment designation, it is hoped that this Standard will assist in the rapid identification of plant and equipment installed at the respective Transnet Pipelines sites, assimilation of design information associated with the plant and equipment installed, and assistance with the maintenance and fault finding history of installed technology.

2. SCOPE

2.1. General

This document defines identification and tag numbering standards to be adhered to in the tagging and identification of the following instrumentation, plant & equipment as installed on the respective Transnet Pipelines Pump Station sites:

- Process Plant (e.g. receivers, strainers etc.)
- Process Equipment (e.g. valves, pumps, motors etc.)
- Electrical Distribution Equipment (e.g. transformers, breakers, etc.)
- Instrumentation
- Electrical and Instrument Panels (Switchgear, DB Boards, PLC Panels, Junction Boxes)
- Electrical & Instrument Cabling
- Process Piping

These Standards are required to be adhered to by both Client and Contractor alike, for and on behalf of Transnet Pipelines. Both Client and Contractor will be required to familiarise themselves with all applicable Standards and Codes of Practise listed herein, and to ensure compliance in the execution of any work in terms of this document. Failure to comply may render the provider liable for corrections at his own cost.

These Standards should be read in conjunction with all other specifications and drawings as issued for a particular contract. Where discrepancies occur, these must be brought to the attention of Transnet Pipelines in writing before commencement of work. In the event of any conflict between the contents of any documents forming part of a contract (as listed in the Schedule of Contract Documents) and this document, the former shall prevail.

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2.2. Application to Work Activities

The Standards contained herein are suitable for use whenever plant and equipment are required to be identified or tagged, for the purposes of engineering design or installation on any of the respective Transnet Pipelines Pump Station Sites. These Standards thus cover designation of the following plant and equipment:

- Process Plant (e.g. receivers, strainers etc.)
- Process Equipment (e.g. valves, pumps, motors etc.)
- Electrical Distribution Equipment (e.g. transformers, breakers, etc.)
- Instrumentation
- Electrical and Instrument Panels (Switchgear, DB Boards, PLC Panels, Junction Boxes)
- Electrical & Instrument Cabling
- Process Piping

3. REFERENCE DOCUMENTATION

3.1. Plant and Equipment can be identified on Transnet Pipelines Sites using two forms of Identifiers; namely, by Function using the Function Designation System (identified by the prefix " = "), or by Location using the Location Designation System (identified by the prefix " + "). In this regard the following documentation included in the Appendices (Appendix 1) attached details each Standard:

FUNCTIONAL DESIGNATION	PL 118736	Plant & Equipment
	PL 118737	Instrumentation
	PL 118738	Panels
	PL 118739	Cabling
	PL 118740	Process Piping
LOCATION DESIGNATION	PL 118741	Panels

3.2. The following standard specifications are to be used for reference purposes and need to be noted by Tenderers in order to signify familiarity and compliance with the requirements. It is expected of Tenderers that they be familiar with the applicable clauses and that these will be adhered to in the execution of any work in terms of this specification.

A. Standards and Recommended Practices for Instrumentation and Control, 11th Edition, Instrument Society of America.

- ANSI/ISA-5.1-2009 : Instrumentation Symbols and Identification
- ISA-S5.3-1983 : Graphic Symbols for DCS/Shared Display Instrumentation, Logic & Computer Systems
- ISA-S5.4-1991 : Instrument Loop Diagrams
- ANSI/ISA-S5.5-1985 : Graphic Symbols for Process Displays

B. Graphical Symbols for Electrical Diagrams NRS 002-2000 second edition

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- C. International Electro technical Commission Standards for Electrical Drawings
 - IEC Publication 27 : Letter Symbols to be used in Electrical Technology
 - IEC Publication 50 : International Electro technical Vocabulary
 - IEC Publication 617 : Graphical Symbols for Diagrams

D. SANS-10111-1-2011 Engineering Standard

E. TPL-TECH-I-POL-001 - Measurement Policy

F. TPL-TECH-I-POL-002 - Control Policy

G. TPL-TECH-I-POL-003 - Instrumentation Policy

4. ABBREVIATIONS

For the purpose of understanding these Standards, the following abbreviations apply.

ANSI	:	American National Standards Institute
C & I	:	Control and Instrumentation
IEC	:	International Electrotechnical Commission
ISA	:	Instrument Society of America
SABS	:	South African Bureau of Standards
ASA	:	American Standards Association

5. PLANT & EQUIPMENT IDENTIFIERS

The following types of plant and equipment may be identified by use of Plant and Equipment Identifiers, which are allocated to unique pieces of plant and equipment installed at functional locations within a Transnet Pipelines Site:

- Process Plant (e.g. receivers, strainers etc.)
- Process Equipment (e.g. valves, pumps, motors etc.)
- Electrical Distribution Equipment (e.g. transformers, breakers, etc.)

[Composition of Process Plant & Equipment Identifiers conform to the Ops Code Standard as adopted by Transnet Pipelines and as detailed in Control and Instrumentation Policy No. C&I 700/94/001 April 1994. Composition of Electrical Distribution Equipment Identifiers conform to HT Distribution Equipment Identification Schemas as determined by Transtel Control (SARS Distribution)].

The reader is referred to the following Plant & Equipment Identification Standard as is included in the Appendices:

FUNCTIONAL DESIGNATION PL 118736 Plant & Equipment

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5.1. Process Plant Identifier Assignment Rules

Used to identify process plant installed on the respective Transnet Pipelines Pump Station sites. Note that Process Plant usually comprises of a **grouping of process vessels, equipment, and instrumentation that combine to perform a common function** e.g. piping, valves and instrumentation that combine to form a piece of process plant called a Receiver.

Assignment Rules

- Each Plant item shall be identified by means of a two digit Station Identifier (and prefix "="), followed by a three digit alphanumeric Function Identifier (Ops Code) in compliance with PL 118736.
- The first letter of the Ops Code Identifier shall convey the function of the equipment in the plant.
- The second and third characters of the Ops Code Identifier shall comprise of a double-digit consecutive number used to uniquely identify the particular piece of process plant and shall be allocated per Pump station on a consecutive basis. (e.g. where three Auxiliary Pumps exist these shall be identified as X01, X02, X03 irrespective of their function).

In multiproduct dedicated manifolds, the third letter may be used to identify the product type associated with the particular piece of process plant as follows:

- 3 Diesel - 500ppm
- 6 ULP - 95 Octane
- 8 Avtur
- 14 ULP - 93 Octane
- 33 Diesel 50ppm
- 76 Crude oil

4. VALVES, ACTUATORS & SWITCHBOXES

Valve actuators and switchboxes are identified by the addition of a prefix to indicate function (in full compliance with ISA Standard S5.1), as follows:

- CV ANN Modulating/Control Valve Actuator
- XV ANN On/Off Valve Actuator
- ZV ANN Hand Valve with Switchbox
- HV ANN Hand Valve without Switchbox

Process Plant Examples: (Allocated on a Pump Station basis).

- Main PumpP01 Main Line Pump No. 1
- P02 Main Line Pump No. 2
- P03 Main Line Pump No. 3
- P04 Main Line Pump No. 4

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Accumulator Pump	A01	Accumulator Pump No. 1
	A02	Accumulator Pump No. 2
Booster Pump	B01	Booster Pump No. 1
	B02	Booster Pump No. 2
Auxiliary Pumps	X01	Sump Pump
	X02	Sump Pump
	X03	Lube Pump
	X04	Lube Pump
	X05	Inhibitor Pump
	X06	Inhibitor Pump
	X07	Petrol Blend Pump
	X08	Diesel Blend Pump
	X09	Petrol Prover Transfer Pump
	X10	Diesel Prover Transfer Pump
	X11	ULP Blend Pump
	X12	ULP Prover Transfer Pump
	Q01	Purge Air Fan 1
	Q02	Purge Air Fan 2
	Q03	Pressurisation Fan 1
	Q04	Pressurisation Fan 2
Meters	M01	Turbine/Positive Displacement Meter No 1.
	M02	Turbine/Positive Displacement Meter No 2.
Strainers	S01	Main Line Strainer
	S02	Main Line Strainer
	S03	Main Line Strainer
	S04	Main Line Strainer
	S05	Petrol Header Strainer (Delivery Station)
	S06	Petrol Header Strainer (Delivery Station)
	S07	Diesel Header Strainer (Delivery Station)
	S08	Diesel Header Strainer (Delivery Station)
	S09	ULP Header Strainer (Delivery Station)
	S10	ULP Header Strainer (Delivery Station)

5.2. Equipment Identifier Assignment Rules

Used to identify unique pieces of process equipment (e.g. valves, motors, actuators etc.) installed at functional locations within the respective Transnet Pipelines sites.

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Assignment Rules.

1. Each Plant item shall be identified by means of a two digit Station Identifier (and prefix "="), followed by a three digit alphanumeric Function Identifier (Ops Code) in compliance with PL 118736.
2. The first letter of the Ops Code Identifier shall convey the function of the equipment in the plant. Thus all equipment associated with the operation of the Receiver for example, shall be assigned the first letter "R".

For Example:

The Inlet Valve on Meter Prover Y01 shall be designated Y1A.
The Discharge Valve on Launcher L02 shall be designated L2E.

3. The second letter of the Ops Code Identifier shall comprise of a single digit consecutive alphanumeric used to uniquely identify a particular piece of equipment. This character may be used to identify either the product type or origination (company from where the product was supplied) associated with the particular piece of equipment as follows:

- 3 Diesel 500ppm
- 6 ULP - 95 Octane
- 8 Avtur
- 14 ULP - 93
- 33 Diesel - 50ppm
- 73 Crude oil
- C Caltex
- S Shell
- BP British Petroleum
- R Sasol
- T Total
- M Engen
- E Petro SA
- U Zenex
- W Vopak

For Example:

A Consignee Valve supplying Caltex shall be identified as CC1.
A Header valve on a ULP (95 Octane) manifold shall be identified as H6A.

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- The third letter of the Ops Code Identifier shall convey additional information regarding the function of the designated equipment.

For Example:

Receiver Inlet Valve shall be identified as R1A, with A indicating functionality (Inlet).

Where two Prover Drain valves exist on Meter Prover Y01, these shall be identified as Y1W and Y2W respectively, function as denoted by the third character taking precedence over the second alphanumeric indicating product type or origination.

5.3. Electrical Distribution Equipment Identifier Assignment Rules

Used to identify unique pieces of electrical distribution equipment (e.g. transformers, alternators, breakers, links etc.) installed at functional locations within the respective Transnet Pipelines sites.

Assignment Rules.

- Each Plant item shall be identified by means of a two digit Station Identifier (and prefix "="), followed by a three digit alphanumeric Function Identifier (Control Code) in compliance with PL 118736.
- The first letter of the Control Code Identifier shall convey the function of the equipment in the plant.

For Example:

Main Incomer Transformer shall be designated M1.

Incomer Breaker feeding the 3.3 kV MV Panels shall be designated F11.

- The second and third characters of the Control Code Identifier shall comprise of a double-digit consecutive number used to uniquely identify the particular piece of process plant and shall be allocated per Pump station on a consecutive basis.

The second and third characters may be used to convey additional information such as supply voltage in the case of Breakers and Links, where:

50 – 59 denotes 11 kV supply upwards

10 – 19 denotes 3.3 kV supply

30 – 39 denotes 380 V supply

Electrical Distribution Equipment Examples: (Allocated on a Pump Station basis).

3.3 kV Main Incomer Transformer No. 1 M1

3.3 kV Main Incomer Transformer No. 2 M2

380 V Aux Transformer No. 1 A1

380 V Aux Transformer No. 2 A2

3.3 kV Incomer Breaker No. 1 (MV Panel) F11

3.3 kV Incomer Breaker No. 2 (MV Panel) F12

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380 V Incomer Breaker No. 1	(LV Panel)	F31
380 V Incomer Breaker No. 2	(LV Panel)	F32
Incomer Supply No. 1 / 2	(3.3 kV AC)	E01/E02
Auxiliary Supply No. 1 / 2	(380 V AC)	E03/E04
Control & Tripping Supply	(110/50 V DC)	E05
Standby Generator	(380 V AC)	E06

6. INSTRUMENT IDENTIFIERS

Instrumentation may be identified by use of Instrument Identifiers, which are allocated to instrumentation installed at functional locations within a Transnet Pipelines Site.

Composition of these Identifiers conforms to the ISA Standard ANSI/ISA-S5.1-1984 Instrument Symbols and Identification.

The reader is referred to the following Plant & Equipment Identification Standard as included in the Appendices.

FUNCTIONAL DESIGNATION PL 118737 Instrumentation

6.1. Assignment Rules

1. Each Plant item shall be identified by means of a two digit Station Identifier (and prefix "="), followed by a four digit alphanumeric Function Identifier (ISA Standard S5.1) and three digit unique Item Identifier.
2. The Function Identifier shall comprise of a first letter, which is used to indicate the primary function of the instrument / equipment item (i.e. the measured or initiating variable), and one or more succeeding letters, covering the functions of the instrument. Where no identifiable functions exist, these succeeding letters may be omitted.
3. The Function Identifier shall be made according to function and not construction. Thus a differential pressure recorder used for flow measurement, shall be identified as FR and not PDR.
4. When used as part of an instrument loop, the first letter of the functional identifier shall be selected according to the measured or initiating variable and not according to the manipulated variable. Thus a control valve varying flow according to the dictates of a level controller shall be denoted LCV and not FCV.
5. The succeeding letters of the functional identifier shall be used to designate one or more readout or passive functions and one or more output functions or both. A modifying letter may be used, if required, in addition to the succeeding letters, to denote alarming features, provided that these alarm signals constitute separate signals fed back to the control system/controller. In the event of alarm signals being derived from within a control

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system/controller itself, this alarm functionality may be denoted by the attachment of alarm prefixes to the outside the device symbol bubble itself. (i.e. has no impact on the device tag number).

- The sequence of identification letters shall thus begin with the first letter (denoting primary function). Readout or passive function letters shall follow these in any sequence, and finally output letters in any sequence except for the output letter C (Control), that shall precede output letter V (Valve). All modifying letters, if used shall be interposed so that they immediately follow the letters they modify.
- A multiple function device may be symbolised on a diagram by as many multiple device bubbles as there are measured variables, outputs and/or functions. Thus a Coriolis Mass Flowmeter with dual outputs of flow and temperature and located on the Diesel LP Manifold, may be identified with two tangent bubbles, inscribed FT 821 and TT 821 respectively.
- The number of functional letters grouped for one instrument should be kept to a minimum according to the judgement of the user. The total number of letters within one group shall not exceed four.
- The unique Item Identifier shall comprise of a three-digit numeral, the first two digits indicating the Device Group to which the instrument belongs and the third letter a consecutive number unique to the device. Device Group selection shall be selected according to function and not location. Thus a densitometer located remotely from a launcher (e.g. near a receiver) and used for Interface Control shall be assigned the Launcher Device Group number and not the Receiver Device Group number.
- Item Identification digit allocations as detailed in Standard PL 118737 have been designed to cater for all applications as currently existing on Transnet Pipelines Pump Station Sites.
- Item Identifiers shall be allocated on an individual instrument/equipment basis and not on an instrument/equipment loop basis. (This represents a deviation from recommendations as contained in the ISA Standard S5.1.).
- Where two devices or sensors form part of a single measurement entity, and consequently have been assigned the same functional identification, a suffix may be appended to the Tag number to identify the respective devices or sensors.

For Example: Where dual turbine meter pickups return dual pulse trains 90 degrees out of phase for the purposes of calculating product flow, and where the resultant flow measurement has been assigned the Tag number FT 811, the dual pickup sensors may be identified as FE 811A and FE 811B respectively.

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13. PUMP STATION IDENTIFICATION.

As per ISA Standard S5.1, and in order to assist in integration with both the AutoCAD P&ID and SAP R3 Business Management Platforms, Tag numbers for all Instrumentation and Equipment carry a prefix, used to identify the Transnet Pipelines Pump Station at which the equipment is located. Integration into the SAP R3 Platform requires the identification of managerial/cost centres and consequently the Pump Station identifier comprises of a four digit alpha numeric prefix, whereas integration into the AutoCAD P&ID Platform requires the identification of only the Pump Station at which the equipment is installed and thus the identifier comprises of a two digit integer prefix.

14. SOFTWARE MNEUMONIC DESIGNATION. In order to assist in the identification of more than one signal fed back to a control system/controller from a unique instrument or piece of equipment, a three digit alphanumeric suffix may be appended to the Tag Number and used for both software mnemonic identification as well as core identification numbering of the respective signals.

Suffixes defined to date are as follows:

Actuated Valve signals

OP	Valve Open Feedback
CL	Valve Closed Feedback
SL	Valve in Local/Off
O	Open Valve command
C	Close Valve command

Pump Starter signals

IRC	Start Pump command
IRT	Stop Pump command
PTR	Pressure Trip command
TVR	Mechanical Trip command
TOP	Thermal Overload Trip feedback
ELP	Earth Leakage Trip feedback
ERP	Electronic Protection Relay Failure feedback
FBL	Fuse Blown Trip feedback
SLO	Switchgear in Local/Off
PON	Pump Running feedback
POF	Pump Stopped feedback
RES	Remote Emergency Stop Trip feedback
MTR	Master Trip Relay Active feedback
SPH	Max Starts per Hour Exceeded Trip feedback
VT	Control Voltage Failure feedback
VSF	VSD Fault f/b (equivalent to ERP)
VSR	VSD Ready f/b (equivalent to MTR)

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Fan signals

IRC	Start Fan command
IRT	Stop Fan command
TOP	Thermal Overload Trip feedback
FON	Fan Running feedback
FOF	Fan Stopped feedback

HV/MV Incomer signals

OP	Breaker/Link Open f/b
CL	Breaker/Link Closed f/b
SLO	Breaker in Local f/b
TCF	Trip Circuit Faulty f/b
MTR	Master Trip Relay f/b
BRS	Breaker Racked Out f/b
OCP	Over Current Trip f/b
ELP	Earth Fault Trip f/b
BEF	Balanced Earth Fault Trip f/b
BGF	Buchholtz Gas Fail Alarm f/b
OTP	Oil Temp Hi Alarm f/b
ERP	Electronic Protection Relay Fail f/b

Other signals

FB	Fault Bit
SB	Status Bit
PV	Process Variable
SP	Setpoint Variable
AHH	Process Trip High
AH	Process Alarm High
ALL	Process Trip Low
AL	Process Alarm Low

Instrument Identifier Examples:

PT	121	Pressure Transmitter located on HP Manifold (Routing Device Group)
PI	121	Pressure Gauge located on HP Manifold (Routing Device Group)
TE	121	Temperature Probe or primary measuring element
TT	121	Temperature Transmitter located on HP Manifold (Routing Device Group)
DX	811	Densitometer Source (Radioactive) located on Petrol LP Manifold.
DE	811	Densitometer Detector (Ionisation Chamber) located on Petrol LP Manifold.
FE	121	Flow element located on the HP manifold (Routing Device Group)
FT	121	Flow measurement located on the HP manifold (Routing Device Group)
ZI	101	Sphere detector located on the Receiver.

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7. PANEL IDENTIFIERS

Electrical & Instrument Panels shall be identified by use of unique Panel Identifiers (both by Function and Location), allocated to panels installed at functional locations within a Transnet Pipelines Site.

Composition of these Identifiers conforms to the International Electrotechnical Commission Standards IEC Publication 750 Table 1.

The reader is referred to the following Plant & Equipment Identification Standard as included in the Appendices.

FUNCTIONAL DESIGNATION	PL 118738	Panels
LOCATION DESIGNATION	PL 118741	Panels

7.1. Assignment Rules – Functional Designation

1. Each Panel (and components thereof) shall be identified by means of a Functional and Location Identifier. The Functional Identifier shall comprise of a two digit Station Identifier (and prefix " = "), followed by a five digit alphanumeric Panel Identifier. Panel components may be uniquely identified by the addition of a three digit alphanumeric suffix and design typicals identified by the addition of a four digit alphanumeric suffix.
2. The first three characters of the Panel Identifier shall be used to indicate the primary function of the panel (e.g. LV will indicate that the panel's primary function is that of LV Distribution, JB will indicate that the panel's primary function is that of Instrument marshalling etc.).
3. The last two digits of the Panel Identifier shall comprise of a two digit number used to uniquely identify the Panel in question. In all cases other than Instrument Junction Boxes and Control Panels, this unique integer number shall fall within the range as indicated in the Standard PL 118738, and shall be numbered in a consecutive manner. In the case of Instrument Junction Boxes and Control Panels however, this integer number shall be the same as the Instrument Group Identifier, thus identifying the Instrument Group to which the J/B has been associated. (Note that Instrumentation are marshalled in Junction Boxes on the basis of Device Groups).
4. Where Panels comprise of separate cubicles/tiers that contain equipment or marshalling unique to an individual piece of Process Plant/Equipment, these separate cubicles/tiers may be uniquely identified by means of an equipment identifier of the same format as detailed in Section 5 of this standard.

For example, an LV Panel LV 01 containing a cubicle housing a starter for auxiliary motor X01, may be uniquely identified by the Functional Identifier " = LV01 X01". In cases where only one LV Distribution Panel is likely to exist on the Station, this identifier may be shortened to read " = LV X01". In the case where an MV panel tier houses a starter for mainline pump set P01,

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the tier may be uniquely identified by the Functional Identifier "= MV01 P01". In cases where only one MV Distribution Panel is.

- Equipment components within panels may be uniquely identified using an additional Component Identifier, comprising of an alphanumeric first character (to identify component function) followed by a two digit integer number (used to uniquely identify the component). Component Identification is indicated by the addition of a minus sign "-" as a suffix to the identifier. Composition of these Identifiers conforms to the International Electrotechnical Commission Standards IEC Publication 750 Table 1.
- Where identical or typical design schemas exist, these may optionally be indicated by an additional Document Typical Identifier, comprising of an alphanumeric first character (to identify document type) followed by a two digit integer number (used to uniquely identify the design schema standard. Design Typical Identifiers are indicated by the addition of a full stop sign "." as a suffix to the identifier. Note that Document Typical Identifiers may only appear in Documentation Headers i.e. may never form part of the Panel or Component Identifier.

Panel Identifier Examples:

LV 01	LV Distribution Panel 01
LV 21	Control Voltage Distribution Panel (may reside in Panel LV01 as a separate cubicle)
LV01 X01	Sub Distribution Cubicle of Panel LV01 containing Aux Motor Starter X01
	OR
LV X01	Sub Distribution Cubicle of Panel LV01 containing Aux Motor Starter X01
MV01	MV Incomer Panel 01
MV01 F11	Sub Distribution Cubicle of Panel MV01 containing Incomer Breaker F11
	OR
MV F11	Sub Distribution Cubicle of Panel MV01 containing Incomer Breaker F11
MV01 P01	Sub Distribution Cubicle of Panel MV01 containing Motor Starter P01
	OR
MV P01	Sub Distribution Cubicle of Panel MV01 containing Motor Starter P01
ETM 01	PLC Remote I/O Distribution Panel associated with MV Switchgear P01
ETL 01	PLC Remote I/O Distribution Panel associated with LV Panel LV01
DH 11	Density Hut Control Panel associated with Launcher Device Group 11
JB 10	Instrument Junction Box associated with Receiver Device Group 10
JB P01	Instrument Junction Box associated with Mainline Pumpset P01

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FH01 Fire Hut Control Panel 01

7.2. Assignment Rules – Location Designation

Each Panel (and components thereof) shall be identified by means of a Functional and Location Identifier. The Location Identifier shall comprise of the Functional Identifier as detailed in Section 7.1 above (and prefix "+ "), followed by a three digit alphanumeric Tier/Row Identifier. Tier/Row Identification shall be indicated by the addition of a full stop sign "." as a suffix to the identifier.

Panel Identifier Examples:

LV01 X01.3F2 Aux Motor Starter Cubicle located in LV Panel LV01, Tier 3, Row 2
 MV01 F11.1F 3.3 kV Incomer Breaker F11 located in MV Panel MV01, Tier 1

8. ELECTRICAL & INSTRUMENT CABLE IDENTIFIERS

Electrical & Instrument Cabling may be identified by use of Cable Identifiers, which are allocated to cabling installed at functional locations within and outside of Transnet Pipelines Pump Station confines.

The reader is referred to the following Plant & Equipment Identification Standard as included in the Appendices.

FUNCTIONAL DESIGNATION PL 118739 Cabling

8.1. Assignment Rules

1. Each Cable shall be identified by means of a Cable Identifier comprising of the following components:
 - single digit Type Identifier used to identify whether the cable is used for power or control purposes
 - a Functional Descriptor of the equipment to which the cable is terminated (either source or destination)
 - a Signal Type Identifier which may be used to indicate additional information under the following circumstances only:
 - on Instrument Multicores to indicate signal type (discrete or analogue)
 - on Electrical Cables running to motors, to differentiate between functions (heater versus emergency stop)

2. For details on Functional Descriptors, the reader is referred to Transnet Pipelines Specification PL727 "Cabling, Racking, Trenching & Earthing Installation Codes of Practice" Section 8.5.

9. PROCESSING PIPING IDENTIFIERS

Process Piping may be identified by use of Piping Identifiers, which are allocated to piping installed at functional locations within and outside of Transnet Pipelines Pump Station confines.

The reader is referred to the following Plant & Equipment Identification Standard as included in the Appendices.

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FUNCTIONAL DESIGNATION PL 118740 Process Piping

9.1. Assignment Rules

1. Each Plant item shall be identified by means of a two digit Station Identifier (and prefix “= ”), followed by a nine digit alphanumeric Function Identifier.
2. The Function Identifier shall comprise of a first letter used to denote Pressure Rating, followed by a three digit ID used to identify Line Size, followed by a two digit ID used to identify Material Composition, followed by a three digit number used to uniquely identify the pipe in question.
3. Process Piping Identifiers shall be allocated to P & ID Diagrams below the process line where drawn on the horizontal, and to the right of process lines were drawn vertically.

10. APPENDICES

Plant and Equipment can be identified on Transnet Pipelines Sites using two forms of Identifiers; namely, by Function using the Function Designation System (identified by the prefix “= ”), or by Location using the Location Designation System (identified by the prefix “+ ”). In this regard the following documentation attached details each Standard:

FUNCTIONAL DESIGNATION	PL 118736	Plant & Equipment
	PL 118737	Instrumentation
	PL 118738	Panels
	PL 118739	Cabling
	PL 118740	Process Piping
LOCATION DESIGNATION	PL 118741	Panels

ADDENDUM No 1

EQUIPMENT, ELECTRICAL AND INSTRUMENT TAG NUMBERING STANDARDS - INTEGRATION INTO THE SAP/R3 BUSINESS MANAGEMENT PLATFORM.

Equipment/Electrical/Instrument Tag Numbering Standards have been integrated into a Structure **Indicator** defined within the SAP R3 Business Management platform and used for the purposes of equipment, electrical and instrument identification, specification, historic tracking and management reporting functionality. This Structure Indicator, as utilised by SAP R3, comprises of two separate parts, namely, a **Functional Location Identifier** which describes the specific location in the plant at which the equipment is installed, and an **Equipment/Instrument/Electrical Identifier** as defined in the respective Tag Numbering Standards attached. Incorporation of the Equipment,

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Instrument and Electrical Tag Numbering Systems into the Structure Indicator ensures integration between the AutoCAD P&ID Design and SAP R3 Business Management platforms.

Table A1. Structure Indicator.

<u>STRUCTURE INDICATOR</u>														
<u>FUNCTIONAL LOCATION IDENTIFIER</u>						<u>EQUIPMENT IDENTIFIER</u>								
X	-	X	-	XXXX	-	X	-	XXX	-	X	-	XXX	-	XXXXXXXXXX
1		2		3		4		5		6		7		8
where														
1.	Company Code	P for Transnet Pipelines.												
2.	District Code	H for Head Office, N for Northern District, S for Southern District.												
3.	Depot Code	Refer to Table A2 below.												
4.	Depot Sub-Code	O for Operational, N for Non Operational cost allocation.												
5.	Pipeline Code	Currently under investigation. PL1 for Multiproducts (12 inch), PL3 for Crude (16 inch), PL2 for Gas (18 inch), SHR for Shared.												
6.	Line Function Code	M for Mechanical, E for Electrical, C for Civil, I for Instrument, S for Services, T for Info Tech etc.												
7.	Process/Plant Code	Refer to Table A3 below.												
8.	Equipment Identifier	Refer to Tag Numbering Standards attached.												
P	-	N	-	ALR1	-	O	-	PL1	-	M	-	R01	-	XVR1A
P	-	N	-	ALR1	-	O	-	PL1	-	I	-	P01	-	TT011
P	-	S	-	HWK	-	O	-	PL2	-	E	-	X01	-	K01

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A.1 FUNCTIONAL LOCATION IDENTIFIER.

The Functional Location Identifier is used to define the exact location of equipment/ instrumentation on a Transnet Pipelines Pump Station site. As such the Identifier has been split into several parts called **codes** defined below.

A.1.1 **Company Code**

Used to identify the company to which the equipment belongs. This code is usually given the letter "P" to denote Transnet Pipelines.

A.1.2 **District Code**

Used to identify the District responsible for the management and maintenance of the equipment. The following options have currently been defined:

- N** for Northern Districts
- S** for Southern Districts
- H** for Head Office

A.1.3 **Depot Code**

Used to identify the Depot to which the equipment belongs. This code has been defined on managerial/cost centre basis. The following options have currently been defined:

Table A2. Depot Codes

Depot Name	Operations SAP R3	Technical SAP R3	M & I SAP R3	M & I AutoCAD P&ID
Airport	APT1			21
Alrode	ALR1	ALR2	ALR3	18
Benoni	BIR1			Not Allocated
Bethlehem	BEM1			13
Bethlehem TOP	BHT1			12
Coalbrook	CBK1	CBK2		17
Durban	DNR1			02
Duzi	Duzi			
Empangeni	EMG1	EMG2		32
Fort Mistake	FTM1			
Fynnlans	FYN1			01
Hillcrest	HLR1			03 (DJP) , 04 (DWP)
Hilltop	HTP1			
Howick	HWR1			07 (DJP) , 08 (DWP)
Jameson Park-1438	JMP			
Jameson Park TPL-1475	JMP1			
Klerksdorp	KRP1			20
Kendal	KDL1			36

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Table 2. Continued

Depot Name	Operations SAP R3	Technical SAP R3	M & I SAP R3	M & I AutoCAD P&ID
Kroonstad	KRO1	KRO2		14
Ladysmith	LAY1	LAY2		09 (DJP) , 10 (DWP)
Ladysmith TOP	LST1			Not Allocated
Langlaagte	LLA1			24
Magdala	MGA1			15
Mahlabatini	MAT1			33
Mnambithi	MBT1			
Mngeni	MGN1			
Mooi River	MRR1			
Newcastle	NCS1			28
Pietermaritzburg	PZB1	PZB2		05
Pietermaritzburg TOP	PMT1			06
Potchefstroom	PCM1			19
Pretoria West	PWT			23
Quagga	QGA1			35
Rustenburg	RTR1			26
Sasolburg	SBG1			16
Scheepersnek	SCN1	SCN2		34
Secunda	SEC1			31
Standerton	SNR1	SNR2		30
Tarlton	TLR1	TLR2		25
Twini	TNI1			
Van Reenen	VRN1			11
Villiers	VLR1			
Volksrust	VRR1			29
Vrede				
Waltloo	WAO1			22
Warden	WDN1			
Wilge	WIL1			
Witbank	WIR1			27
Transnet Pipelines Head Office	PHO9			Not Allocated
Transnet Pipelines Northern District	NDO9			Not Allocated
Transnet Pipelines Southern District	SDO9			Not Allocated

A.1.4 Depot Sub Code

Used to assign equipment costs into operational and non-operational cost categories. The following two options are available:

- O** for operational costs
- N** for non-operational costs

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A.1.5 Pipeline Code

Used to assign equipment to particular pipelines. Currently under evaluation by Transnet Pipelines. An initial proposal has been defined as follows:

- PL1** for the Multiproducts (12 inch) pipeline
- PL2** for the Gas (18 inch) pipeline
- PL3** for the Crude (16 inch) pipeline
- SHR** for shared equipment

A.1.6 Line Function Code

Used to define the Line Function responsible for the maintenance of the equipment. The following options have currently been defined:

- C** for Civil
- E** for Electrical
- F** for Fire and Effluent
- G** for General
- I** for Metering and Instrumentation
- M** for Mechanical
- S** for Services
- T** Information Technology

A.1.7 Process Plant Code

Used to define the location of process plant installed on the respective Transnet Pipelines sites. Note that Process Plant is defined as a **grouping of equipment and instrumentation that combine to perform a common function** e.g. piping, valves and instrumentation that combine to form a piece of process plant called a Receiver. Identification of Process Plant conforms to the Ops Code standard as adopted by Transnet Pipelines and detailed in PL 101 Section 5.1.

Table A3. Ops Code Definition (Process Plant)

X	X	X
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OPERATIONAL CODE					
A	Accumulator	A		A	Inlet
B	Booster	B		B	
C	Consignee/or	C	Caltex	C	
D	Distributor	D		D	
E		E		E	Discharge
F	ProverTransfer	F		F	
G	Blend	G		G	
H	Header	H	Shell	H	
I	Isolation	I		I	
J		J		J	Control
K		K		K	Bypass
L	Launcher	L		L	
M	Meter	M	Engen	M	
N	Reverse Pump	N	BP	N	Transfer
O		O		O	
P	Main Pumps	P		P	
Q	Purge/Press Fans	Q		Q	
R	Receiver	R	SNC	R	Reverse
S	Strainer	S		S	
T	Tank	T	Total	T	
U	Lube System	U	Zenex	U	
V		V		V	Vent
W		W		W	Drain
X	Aux Pumps	X		X	Launch
Y	Meter Prover	Y		Y	
Z		Z		Z	
		0		0	
		1	Petrol - 93 Octane	1	
		2		2	
		3	Diesel	3	
		4	ULP - 91 Octane	4	
		5	Petrol - 97 Octane	5	
		6	ULP - 95 Octane	6	
		7	Alcohol	7	
		8	Avtur	8	
		9		9	

Note: For an adequate understanding of the Table above, please refer to the Assignment Rules below.

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Assignment Rules.

1. Each Plant item shall be identified by means of a three digit alphanumeric identifier in compliance with Table 1.
2. The first letter shall convey the **functional location** of the equipment in the plant.
3. The second and third characters shall comprise of a double-digit consecutive number used to uniquely identify the particular piece of process plant and shall be allocated per Pump station on a consecutive basis. (E.g. where three Auxiliary Pumps exist these shall be identified as X01, X02, X03 irrespective of their function).

In multiproduct dedicated manifolds, the third letter **may** be used to identify the product type associated with the particular piece of process plant as follows:

3	Diesel 500ppm
6	ULP - 95 Octane
8	Avtur
14	ULP - 93
33	Diesel - 50ppm
73	Crude oil

4. No separators (e.g. Dashes) shall be used to separate characters in the identifier.

Process Plant Examples: (Allocated on a Pump Station basis).

Main Pump	P01	Main Line Pump No. 1
	P02	Main Line Pump No. 2
	P03	Main Line Pump No. 3
	P04	Main Line Pump No. 4

Accumulator Pump	A01	Accumulator Pump No. 1
	A02	Accumulator Pump No. 2

Booster Pump	B01	Booster Pump No. 1
	B02	Booster Pump No. 2

Auxiliary Pumps X01	Sump Pump	
	X02	Sump Pump
	X03	Lube Pump
	X04	Lube Pump
	X05	Inhibitor Pump
	X06	Inhibitor Pump
	X07	Petrol Blend Pump
	X08	Diesel Blend Pump
	X09	Petrol Prover Transfer Pump
	X10	Diesel Prover Transfer Pump
	X11	ULP Blend Pump
	X12	ULP Prover Transfer Pump

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	Q01	Purge Air Fan 1
	Q02	Purge Air Fan 2
	Q03	Pressurisation Fan 1
	Q04	Pressurisation Fan 2
Meters	M01	Turbine/Positive Displacement Meter No 1.
	M02	Turbine/Positive Displacement Meter No 2.
Strainers	S01	Main Line Strainer
	S02	Main Line Strainer
	S03	Main Line Strainer
	S04	Main Line Strainer
	S05	Petrol Header Strainer (Delivery Station)
	S06	Petrol Header Strainer (Delivery Station)
	S07	Diesel Header Strainer (Delivery Station)
	S08	Diesel Header Strainer (Delivery Station)
	S09	ULP Header Strainer (Delivery Station)
	S10	ULP Header Strainer (Delivery Station)

11. DOCUMENT CHANGE HISTORY:

The owner of this document is responsible for the revision and control of the document, including updating of the table below, which contains the history of the document with details of each revision.

Date	Previous Rev No.	New Rev No.	Details of Revision
15.01.99	00	01	Document approved for distribution.
23.05.00	01	02	Phase II revisions added.
15.04.01	02	03	Instrument Group ID Allocations revised. Plant & Equip Identification Stds clarified.
01.08.07	03	04	Transnet Pipelines logo added.
12.06.2012	04	05	New Transnet Standard Template Adopted Updating the Reference Documentation
25.05.2016	05	06	Document review & update & New Template

This table summarises what has been changed in the document so that it is easy to keep track of the effected changes.