









CONTRACTOR:  	300 KT POLYETHYLENE PLANT ARYA SASOL POLYMER COMPANY (ASPC)						OWNER:  شرکت پلیمر آریا ساسول ARYA SASOL POLYMER COMPANY اصفهان ۸۱۳۱۳	
	Project Numbering Procedure						MC: 	
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Project Numbering Procedure

Rev.	Date	Purpose of Issue	Prepared	Checked	Approved	AC Code
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Tabulation of Revised Pages

Page	Revision					Page	Revision					Page	Revision						
	00	01	02	03	04		00	01	02	03	04		00	01	02	03	04		
1	X	X	X	X	X	37	X	X											
2	X	X	X	X	X	38	X												
3	X	X				39	X		X										
4	X	X				40	X	X											
5	X	X				41	X		X										
6	X	X			X	42	X												
7	X	X				43	X		X										
8	X	X		X	X	44	X	X	X										
9	X	X				45	X	X											
10	X	X				46	X		X			X							
11	X	X				47	X	X	X										
12	X	X				48	X	X	X	X	X								
13	X	X	X			49	X	X											
14	X	X				50	X	X											
15	X	X				51	X	X											
16	X					52	X												
17	X					53	X												
18	X	X				54	X												
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1. Purpose

The Purpose of this procedure is to define the requirements for the numbering of all Project Documents/Drawings and Equipment/Device related to MD/HD Polyethylene Plant. Each document shall be coded/ numbered individually with its own unique number as per this procedure.

1.1 References

PBD-PR-0001-Rev.01 Numbering & Coding System

2. Definitions

Project Title	:	300 KT NEW POLYETHYLENE PLANT
PLANT	:	Means an integrated New Polyethylene Plant with Design Capacity of Product consisting of Process Unit/Units, Utilities and Offsite Facilities and interconnections.
Project	:	Means the performance of all work for implementation of the PLANT inclusive of all WORK.
OWNER	:	Arya Sasol Polymer Company (ASPC)
CONTRACT	:	Agreement Between OWNER and its CONTRACTOR
MANAGING CONTRACTING (MC)	:	NAMVARAN Consulting Engineers; Managers (NCE)
CONTRACTOR	:	Consortium of SAZEH Consultants and SAZEHPAD TEHRAN (SZP)





3. Responsibilities

3.1 Allocation

The allocation and control of project document and drawing numbers on this project shall be the responsibility of CONTRACTOR.

3.2 Monitoring:

Monitoring that this procedure is being correctly implemented shall be the responsibility of the CONTRACTOR document control center and audited by the Quality Management (QM) Coordinator in the specified periodic milestone.

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4. Documents and Drawings Numbering System for New Polyethylene Plant

Each project document shall be numbered according to the following format:

3944-	XXX-	XX-	XXX-	XXX-	XXXX	XX
A	B	C	D	E	F	G

- A : Owner Project Number
- B : Represent the CONTRACTOR code as per section 2 (SZP)
- C : Represent the originating discipline as per section 4.3
- D : Represents the Unit no. as per section 4.2 (2 or 3 digit)
- E : Represent the document code stated in section 4.4
- F : Represent the seq. no. starts from 0001 (for requisition preferred to use unique number according to section 4.1 & for construction documents start form 5000)
- G : Revision code as per section 4.5

Important Note: For New Off-site documents, refer to attached document numbering procedure (PBD-PR-0001-Existing offsite facilities) (ATTACHMENT#1). Unit number for all modified drawing/ documents based on existing offsite drawing/ documents have been kept in new generated documents.

4.1 Requisition Coding and Numbering





Requisition can be numbered according to the followings (The Technical Bid Evaluation number will be defined same as related material requisition number):

<u>Originating Department</u>	<u>Allowance Number</u>
MECHANICAL	0001 to 0099
FIRED EQUIPMENT	0101 to 0149
ROTARY	0151 to 0199
PROCESS	0201 to 0299
PIPING	0301 to 0399
ELECTRICAL	0401 to 0499
INSTRUMENTATION	0501 to 0599
SAFETY EQUIPMENT	0601 to 0699
STRUCTURE/CIVIL/ARCHITECTURE	0701 to 0799

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4.2 Plant Code





<u>Plant Name</u>	<u>Plant Code</u>
MD/HDPE Plant	44

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4.3 Unit No.

The following codes shall be used for the Process Unit No. and Civil Unit No.

Process Unit	Description	Construction Unit	Civil Unit	Description
000	General	HP00	-	General of the plant and over 2 building
100	Catalyst System	HP01	004	Polymerization
		HP02	003	Catalyst Building
		HP03	006	Extrusion
200	Powder Production	HP01	004	Polymerization
		HP03	006	Extrusion
300	Powder Degassing	HP01	004	Polymerization
	Recovery Gas	HP01	004	Polymerization
400	Powder Conveying	HP01	004	Polymerization
	Deodorizing	HP03	006	Extrusion
500	Palletizing	HP03	006	Extrusion
600	Steam and Condensate System	HP01	004	Polymerization
	Flare system	HP01	004	Polymerization
	Waste Treatment	HP03	006	Extrusion
	Refrigeration Unit	HP01	004	Polymerization
700	Raw Material Purification	HP01	004	Polymerization
800	Pellet Homogenization and Storage	HS01	005	Homogenization
		HS02	007	Storage silos, Bagging
	Palletizing	HS02	007	Storage silos, Bagging
810	Analyzer Equipment	HP01	004	Polymerization
820	Laboratory Equipment	HP03	006	Extrusion
		HB02	002	Control Room, Office and Laboratory building
840	AC	Distributed Over Several Buildings		
863	Fire Fighting	HF01	-	Foam Station
870	Safety Shower and Eyewash System	Distributed Over Several Buildings		

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Process Unit	Description	Construction Unit	Civil Unit	Description
900	Utility Distribution			
912	Emergency Diesel	HB01	001	Substation Building
930		Distributed Over Several Buildings		
975		Distributed Over Several Buildings		
00	Interconnecting	Offsite (Existing)		
50	Process/ Piping interconnecting utility distribution	Offsite (Existing)		
30	Hexene Storage Tank	Offsite (Existing)		
60	Cooling Water Exchanger Area	Offsite (Existing)		
009	Main Rack & Bagging Office			
010	Chemical Warehouse	Offsite (Existing)		
20		Offsite (Existing)		
40		Offsite (Existing)		

04

4.4 Discipline Code

The following codes shall be used for the Department's Code:

Discipline	Abbreviation
Building	BL
Civil	CV
Electrical	EL
Fired Equipment	FE
HVAC	HV
Instrumentation	IN
Mechanical	ME
Piping	PI
Project Management	PJ
Procurement, expediting, inspection, logistics	PL
Process	PR
Quality Control	QC
Rotary Equipment	RE





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Discipline	Abbreviation
Safety	SA
Structure	ST
Construction	CN

4.5 Document Coding and Types

Other than drawing, as a major category of project documents, the most usual technical documents are categorized and coded as following:

Document Type	Abbreviation
Block Flow Diagram	BFD
Bill of Material	BOM
Calculation Sheet (only for offsite)	CAL
Certificate	CER
Calculation Sheet	CSH
Design Basis	DBA
Design Criteria	DCA
Diagram	DIA
General Document	DOC
Data Sheet	DSH
General Drawing	DWG
Form	FRM
Heat & Material Balance	HMB
Interlock Description	ILD
Index	INX
Isometric	ISO
Inspection and Test Plan	ITP
Layout	LAY
List	LST
Material Flow Diagram	MFD
Manual	MNL





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Document Type	Abbreviation
Material Requisition	MRQ
Material Selection Diagram	MSD
Material Selection Report	MSR
Material Take Off	MTO
Process Description	PDC
Process Flow Diagram	PFD
Philosophy	PHL
Piping and Instrumentation Diagram (P&ID)	PID
Plot Plan	PLN
Purchase Order Requisition	POR
Procedure	PRC
Report	RPT
Schedule	SCH
Standard Drawing	SDG
Single Line Diagram	SLD
Specification	SPC
Technical Bid Evaluation	TBE
Utility Distribution Diagram	UDD
Utility Flow Diagram	UFD

Any other required category, not mentioned herein above, may be added but in the same manner, i.e. with a three-letter-code, nothing not to repeat the indicated cases. In case where the document category is changed during the project execution the document code shall change accordingly.

4.6 Revision Coding

The revision coding of document shall be starts from 00

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5. Electrical Numbering System (Designation of Electrical Equipment)

5.1 General:

Electrical equipment shall be coded according to NPC-SD-EL-02.

Electrical Equipment shall be numbered in accordance with the same rules as equipment with a four digit number.

The first three digits identify the abbreviated unit and subsection number to which the

Electrical equipment belongs and the last one the sequential number of the electrical equipment, beginning from "1".

Example:

44P-20002AM1 represents motor for pump no. 2A in unit 200 of plant no. 44 (new plant).

5.2 Cable Numbering

The cables are numbered as below:

XXX-XXXXXXXXXXXX

ABC D

A Indicates the purpose of the cable Indicates the voltage level

E= Electrical

B Indicates the voltage level

A >400VAC

B 230, 400 VAC/DC

C < 230 VAG/DC

C Indicates the type of cable according to consumption purposes

P Power cables





L lighting Branch cables

H Heat Tracing Branch cables

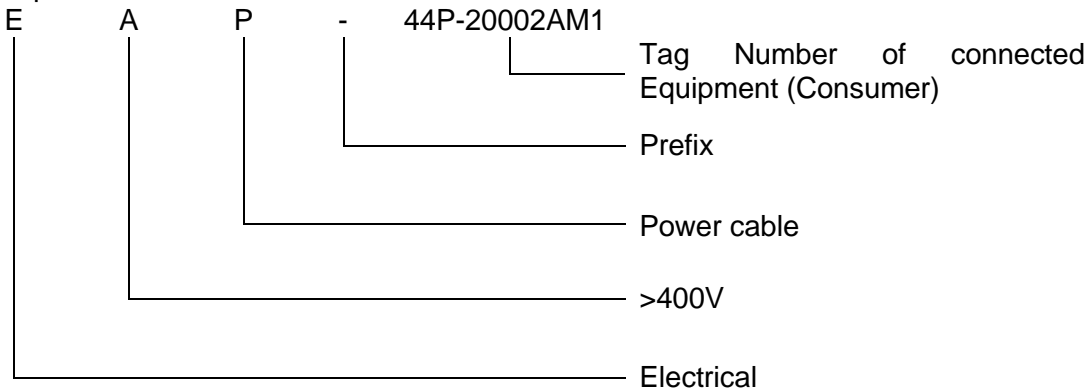
C Control cables

R Communication cables

D indicates the consumer tag number

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Example



Note:

Single core cables in parallel shall be identified by one cable number only
 Three core cables in parallel shall be identified by one cable number
 Example: EAP-44P-20002AM1/1, EAP-44P-20002AM1/2





5.3 Codes and Symbols

5.3.1 Symbols, General Legends and Notes

For symbols, general legends and notes see the legend of Symbols, Drwg. No. 3944-SZP-EL-000-SDG-0001, 3944-SZP-EL-000-SDG-0002 & 3944-SZP-EL-000-SDG-1110.





5.3.2 Abbreviations for Color Coding Of Conductors

Black	BK
Brown	BN
Red	AD
Yellow	YE
Green	GN
Blue	BU

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5.3.3 General Electrical Equipment Codes





CODES	DESCRIPTION	CODES	DESCRIPTION
A	Ammeter	EXCP	Excitation Circuit Panel Board
AB	Accumulator Battery	FCP	Frequency Changer Panel Board (Frequency Converter)
ALP	Aircraft Warning Light Panel	G	Generator
ANP	Annunciation Panel	GTP	Galvanic Test Point
ASP	Auxiliary Service Panel Board	HS	HV Switchgear >30 kV
BRS	Base Radio Station	HTP	Heat Tracing Panel
BT	Battery	IJB	Intercom Junction Box
CD	Control Desk	IST	Intercom Call Station
CH	Charger	JB	Junction Box
CJB	CCTV Junction Box	LP	Lighting Panel
CP	Control Panel	M	Electrical Motor
CPS	Cathodic Protection Station	MB	Marshalling Box
CS	Control Station (Local)	MCC	Motor Control Centre
CTP	Casing Test Point	MCJ	Main CCTV Junction Box
DC	Direct Current	MDF	Telephone Main Distribution Frame
DCP	Direct Current Panel Board	MIJ	Main Intercom Junction Box
DG	Emergency Diesel Generator	MIS	Main Intercom Station
DP	Distribution Panel	MMS	MV Switchgear >10 to 30 kV (Main Distribution)
EHS	Equipment Of HV Switchyard 30 kV	MS	MV Switchgear >1 to 10 kV (Main Distribution)
EJB	Emergency Junction Box	MVP	Motor Operated Valve Panel
ELP	Emergency Lighting Panel	NGR	Neutral Grounding Resistor

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CODES	DESCRIPTION	CODES	DESCRIPTION
EMS	Equipment of MV Switchboard 1 to30 kV	TCL	Telecom Cabinet
EPC	Existing Pipe Crossing	EPLC	Electrical Programmable Logic Controller
ETP	Emergency Turbine Generating Set	PDCS	Power Distribution Control System





5.3.4 General Electrical Equipment Codes (Cont.)

CODES	DESCRIPTION	CODES	DESCRIPTION
ACS	Access control system	SO	Socket Outlet
CCTV	CCTV System	STP	Simple Test Point
HTS	Hotline Telephone Set	SUB	Electrical Substation
IDF	Intermediate Distribution Frame	SWB	Switch Board
LAN	LAN System	SWG	Switch Gear
MPJB	Main Paging Junction Box	SWR	Switch Rack
MTJ	Main Telephone Junction Box	TEL	Telephone System
NTS	Normal Telephone Set	TJB	Telephone Junction Box
PABX	Private Automatic Branch Exchange	HTEL	HOT line telephone system
PAGA	Paging Intercom System	TL	Telephone
PCAM	Process CCTV Camera	HTL	Hot line telephone
PCEC	Paging Central Exchange Cabinet	TR	Transformer
PCP	Power Capacitor Panel Board	THL	HV/LV Power Transformer 20 kV/1 kV
PJB	Paging Junction Box (Also F&G Junction Box)	THM	HV/MV Power Transformer 20 kV/1 to 20 kV
SP	Paging Loud Speaker	TMM	MV/MV Power Transformer 1 to 11 kV/1 to 11 kV

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CODES	DESCRIPTION	CODES	DESCRIPTION
PRB	Photocell Relay Box	TML	MV/LV Power Transformer 1to 11 kV/>1 kV
R	Resistor	TMS	Transformer Measurement
Radio	Radio System	TAL	Lighting Transformer
RC	Protective Relay Cabinet	TAR	Transformer Rectifier
RPS	Radio Paging System	UPS	Uninterruptable Power Supply AC or DC
SCAM	Security CCTV Camera	VIP	Vital Instrument Panel
SH	Space Heater	VLP	Vital Lighting_ Panel
SL	Street Lighting Pole	WO	Welding Outlet
SLP	Street Lighting Panel	YL	Yard lighting Pole

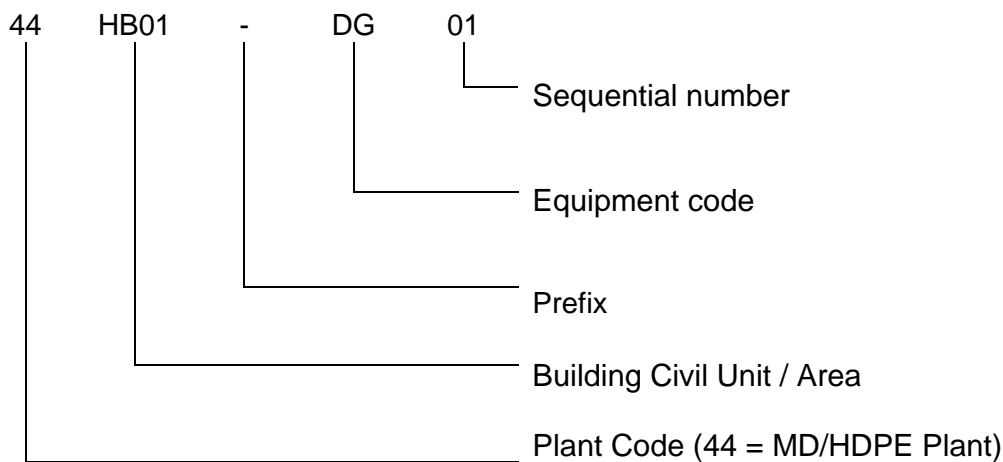
Equipment codes which not listed in the above list see annexes table 1 and table 2.

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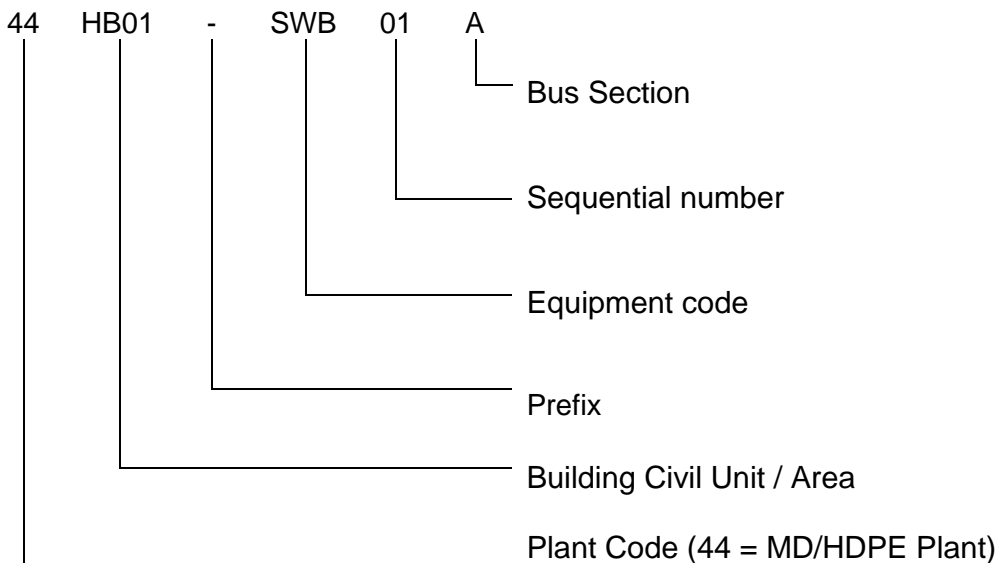
6. Example of Designation of Electrical Equipment





6.1 Main Electrical Equipment Numbering

6.1.1 Designation of Generator



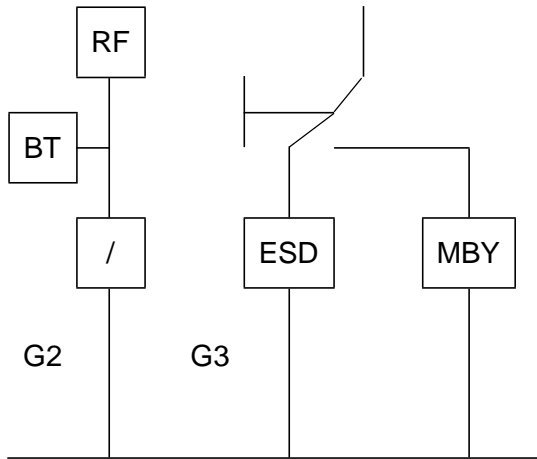
6.1.2 Designation of Switchboard



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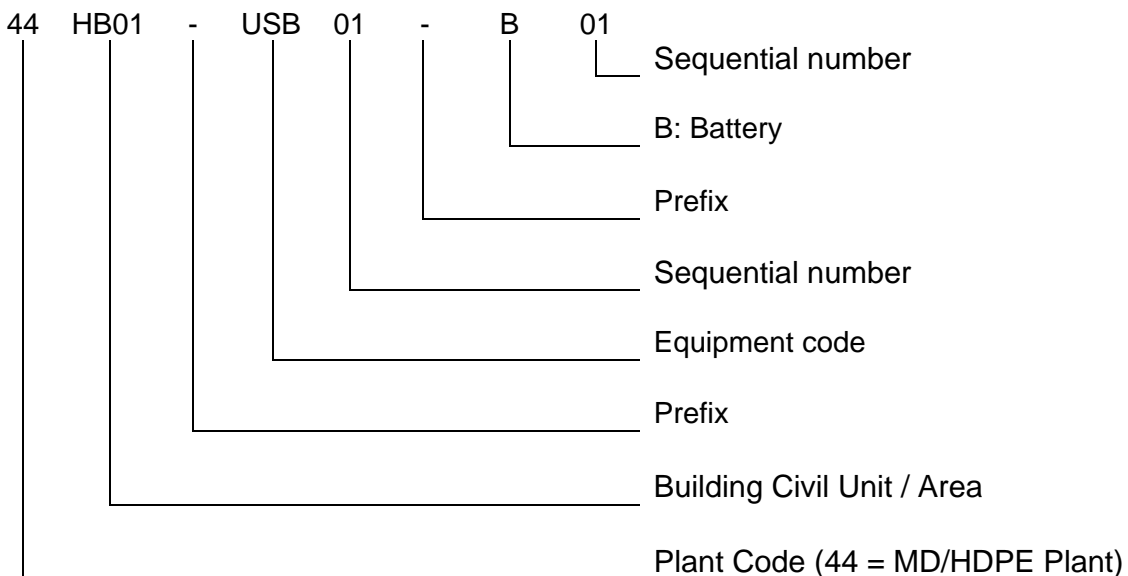
6.2 Uninterruptible Power Supply (Ups) System





6.2.1 Designation of Ups System 44hb01-Ups01



BT	Battery
RF	Rectifier
I	Inverter
ESD	Electronic switching device
MBY	Manual bypassing

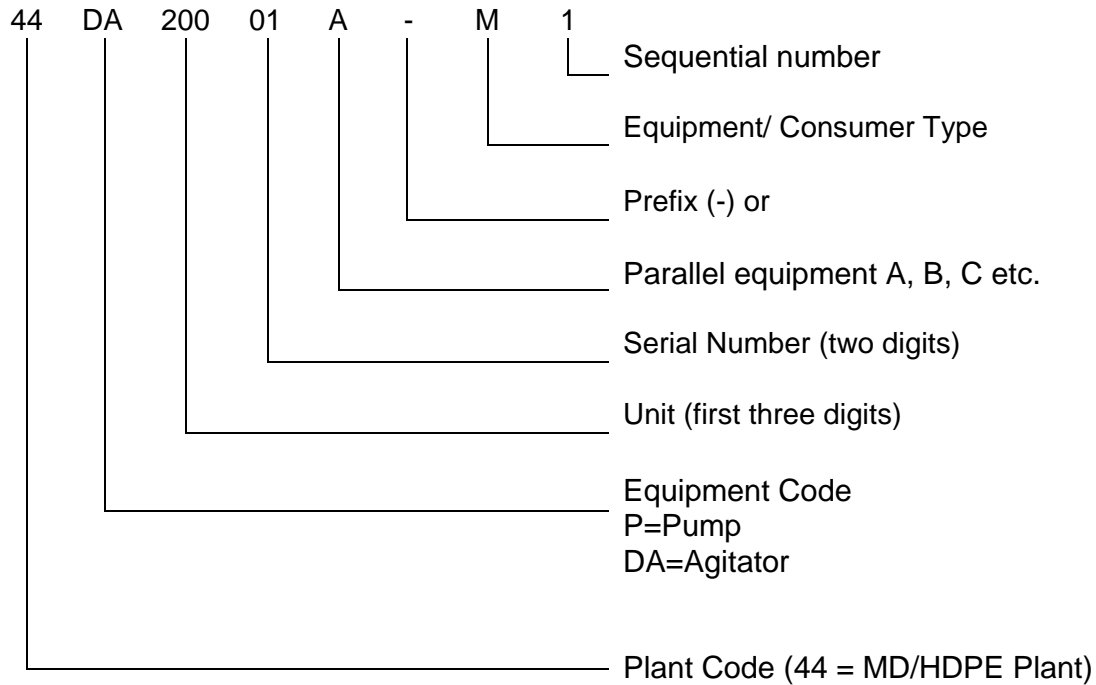
6.2.2 Designation of Battery for Ups System



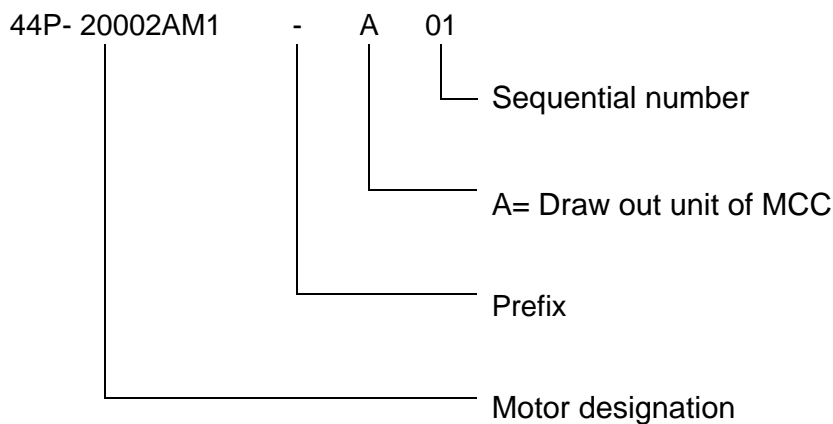
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6.3 Consumer Numbering

6.3.1 Designation of Motor No.

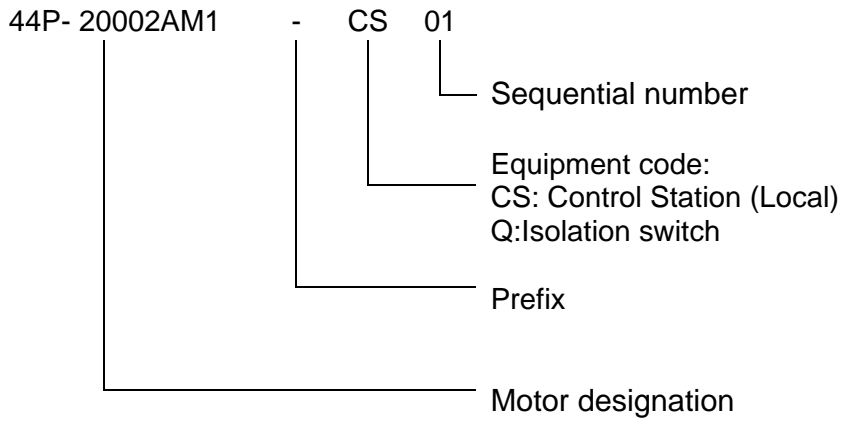


6.3.2 Designation of Motor Feeder of MCC

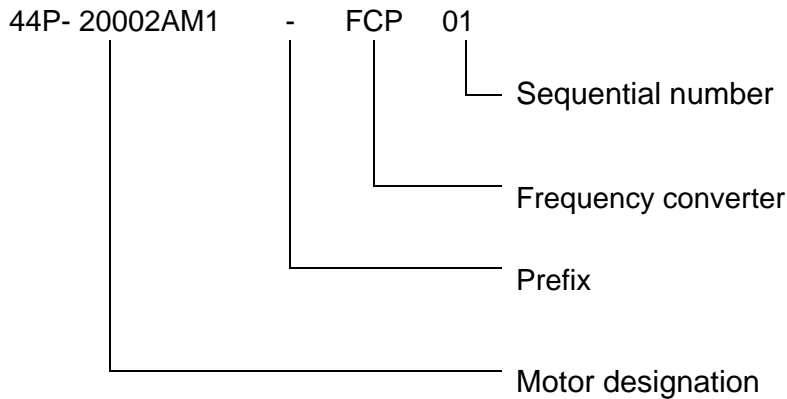


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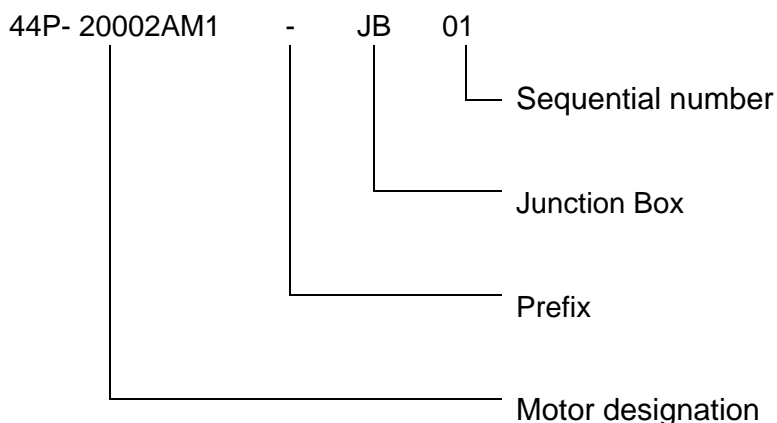
6.3.3 Designation of Local Control Switch for Motor







6.3.4 Designation of Frequency Converter for Motor



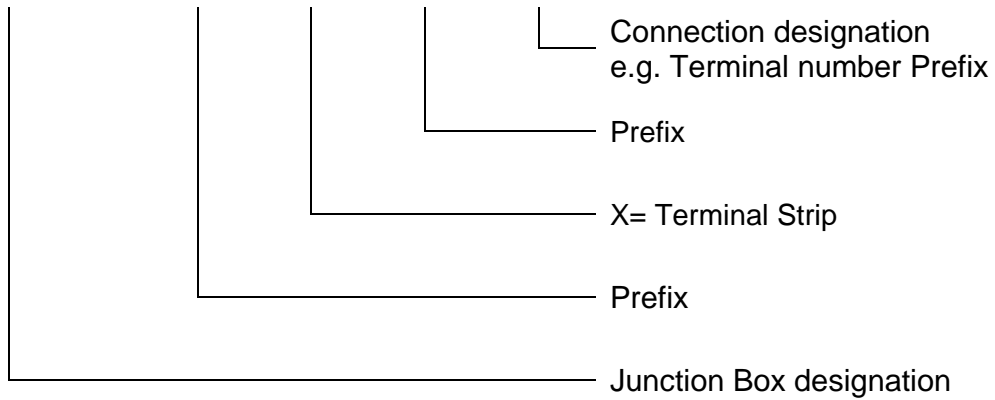
6.3.5 Designation of Field Junction Box



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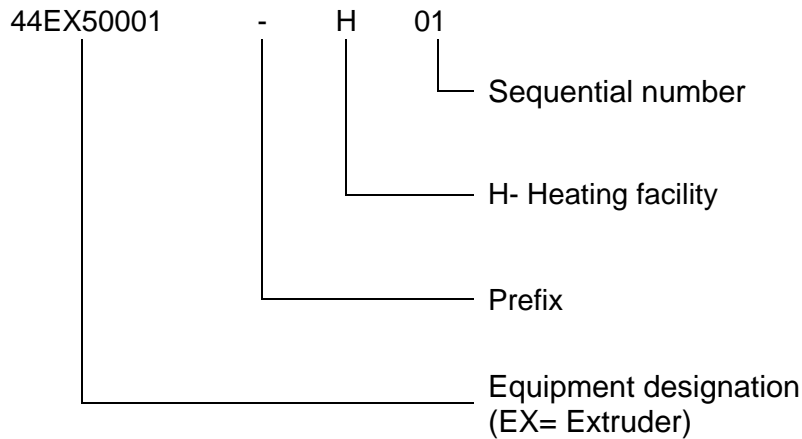
6.3.6 Designation of Field Junction Box





44P- 20001-M-JB0 - X1: - 21



6.4 Electric Heating Facilities

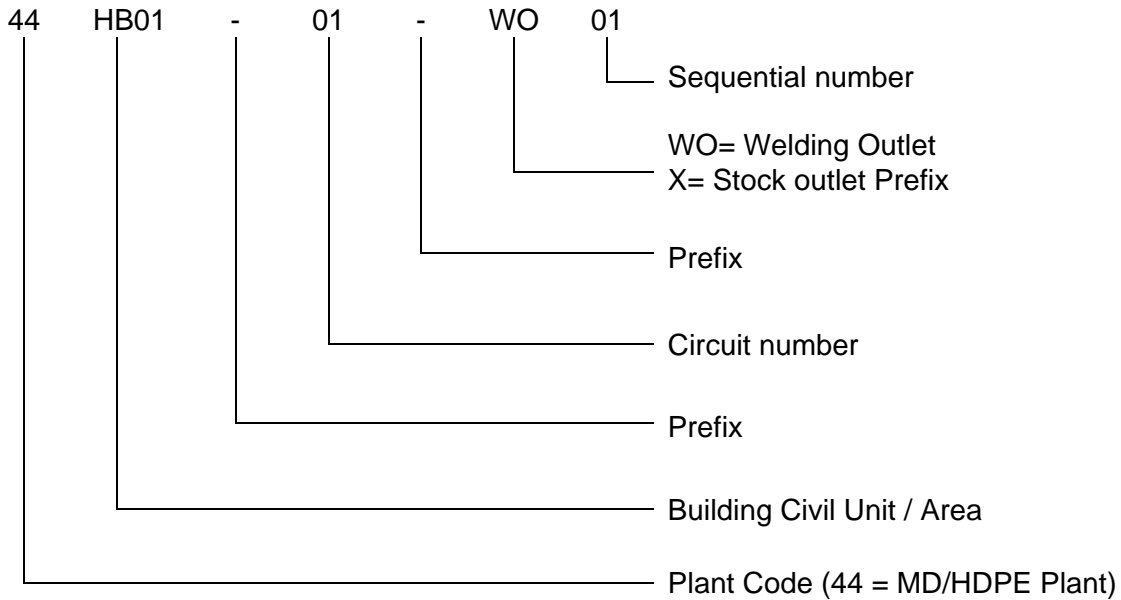
6.4.1 Designation of Heating Facility Circuit No.Ex5001-H01



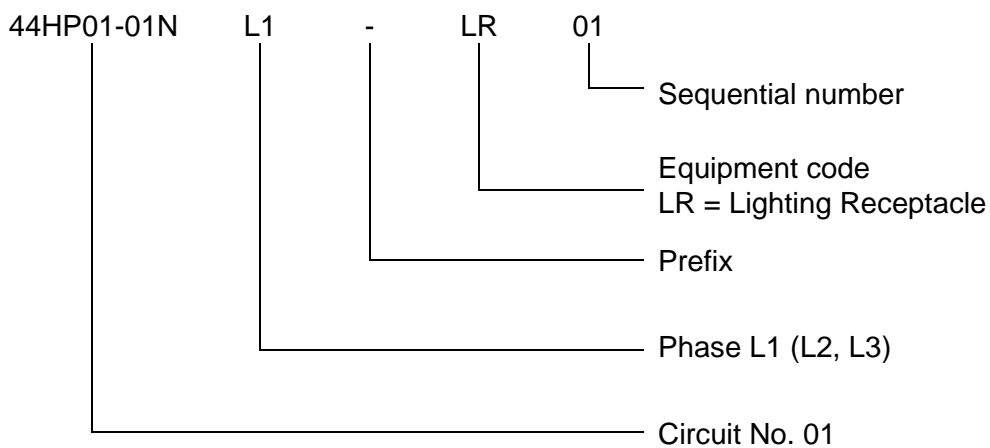
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Owner Document Number :	OWNER Project No.	Originator	Discipline	Unit	Type	Seq. No	Rev.:	Page
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6.5 Socket Outlet Circuits

6.5.1 Designation of Welding Outlet 400 V



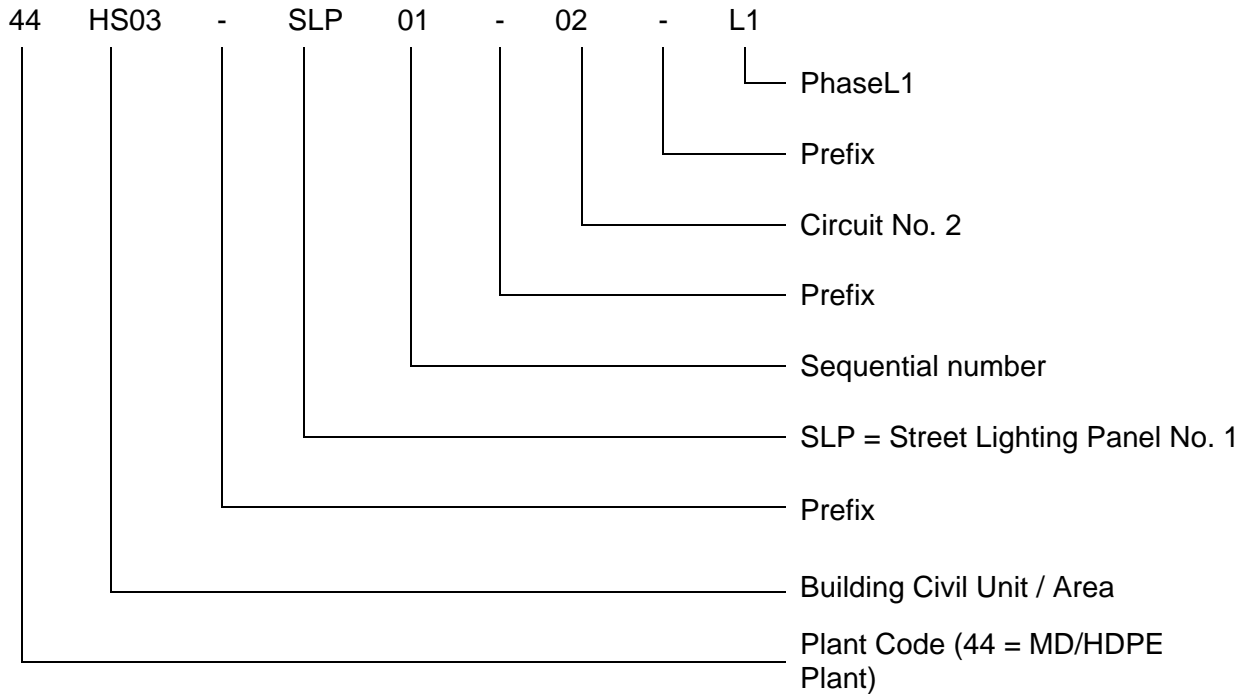
6.5.2 Designation of Lighting Receptacles 230 V



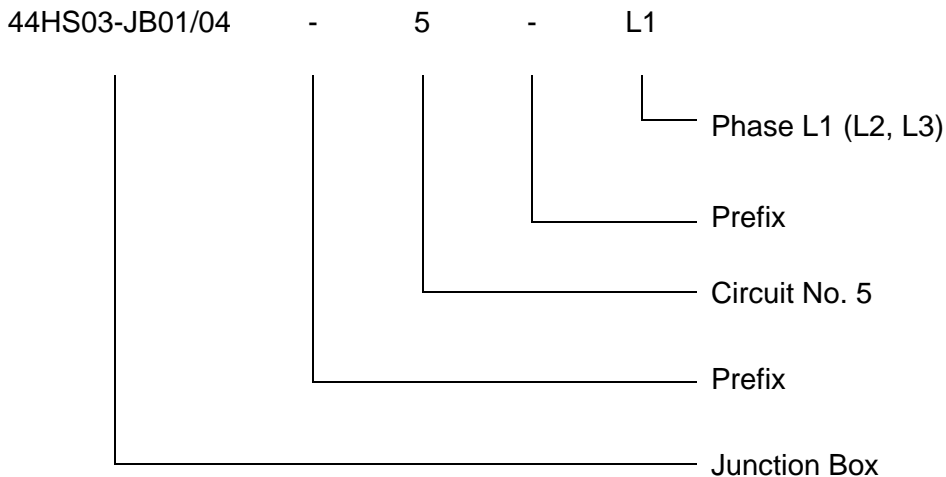
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Owner Document Number :	OWNER Project No.	Originator	Discipline	Unit	Type	Seq. No	Rev.:	Page
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6.6 Outdoor Lighting Fixtures

6.6.1 From Outdoor Lighting Panel



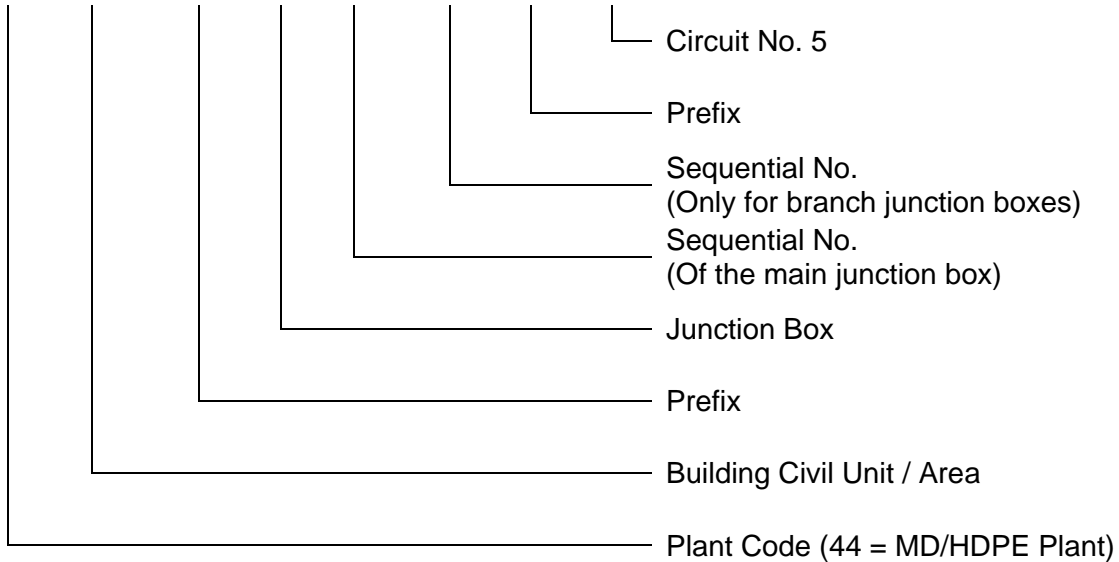
6.6.2 From Outdoor JB



CONTRACTOR:  	300 KT POLYETHYLENE PLANT ARYA SASOL POLYMER COMPANY (ASPC)						OWNER: 	
	Project Numbering Procedure						MC: 	
Owner Document Number :	OWNER Project No.	Originator	Discipline	Unit	Type	Seq. No	Rev.:	Page
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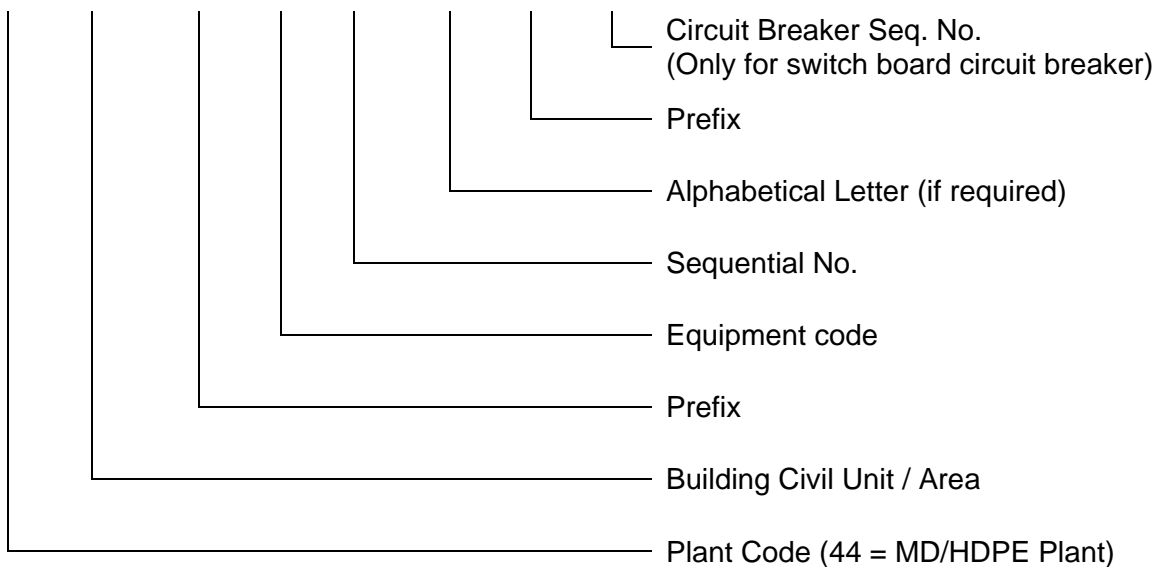
6.6.3 Junction Box Code and Number





44 HP01 - JB 01/ 04 - 5



6.6.4 Lighting Panel

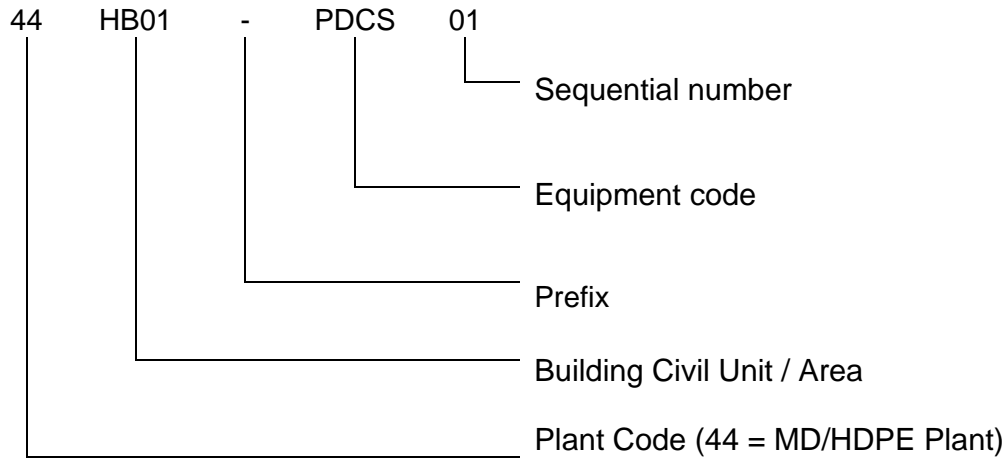
44 HP01 - LP 01 A - 01



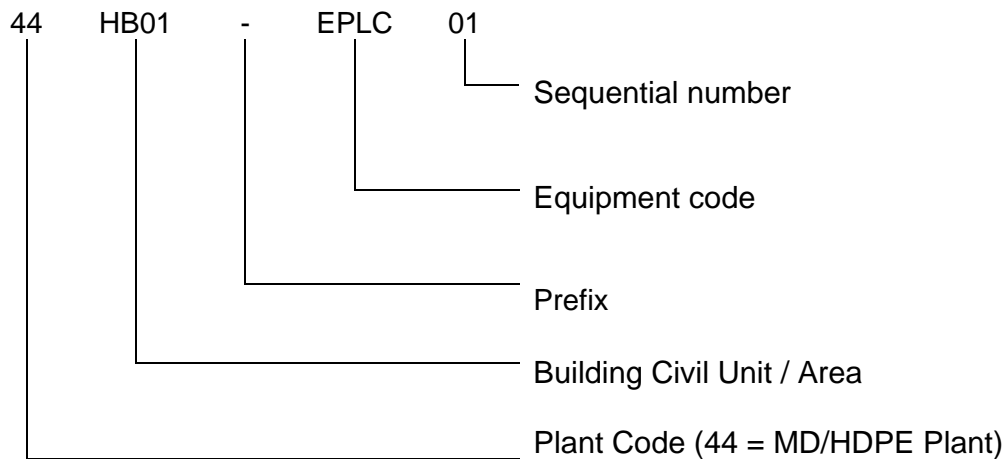
CONTRACTOR:  SAZEH CONSULTANTS Engineering & Construction  SAZEPAD TEHRAN ENGINEERING & CONSTRUCTION	300 KT POLYETHYLENE PLANT ARYA SASOL POLYMER COMPANY (ASPC)						OWNER:  شرکت پلیمر آریا ساسول ARYA SASOL POLYMER COMPANY تهران - ۱۳۸۴۱	
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6.7 Power Control System Numbering

6.7.1 Designation of Power Distribution Control System (PDCS)



6.7.2 Designation of Electrical Programmable Logic Controller (EPLC)



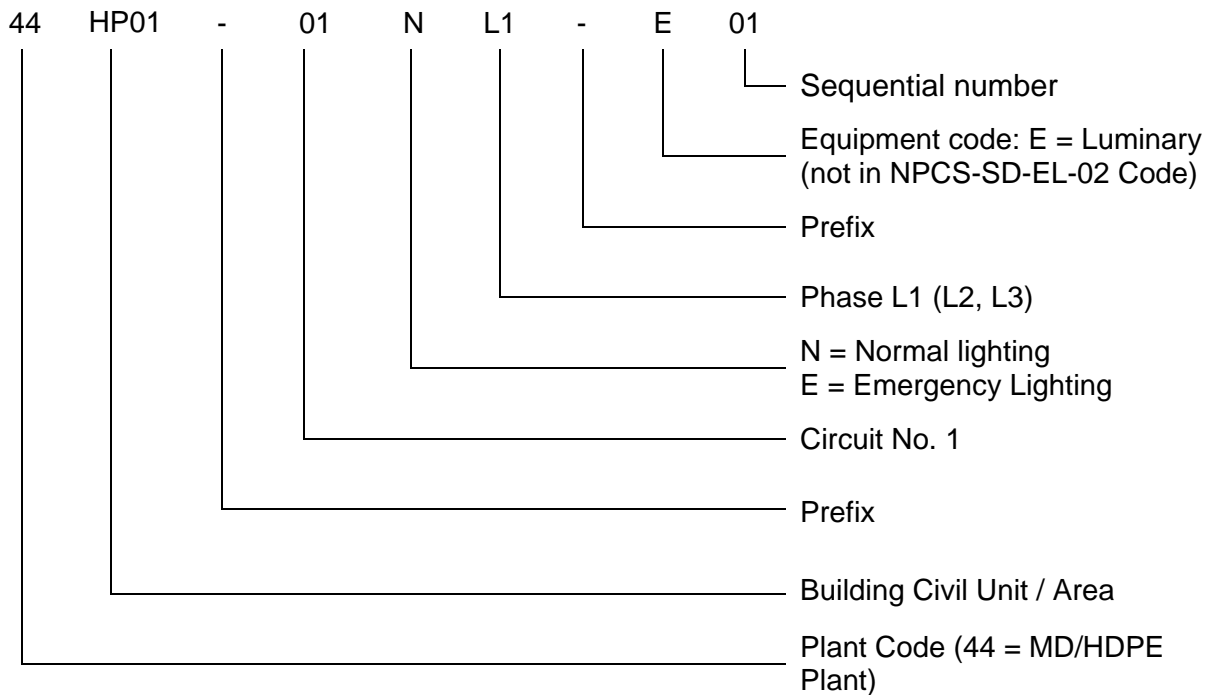
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6.7.3 Designation of Luminaries and Switches

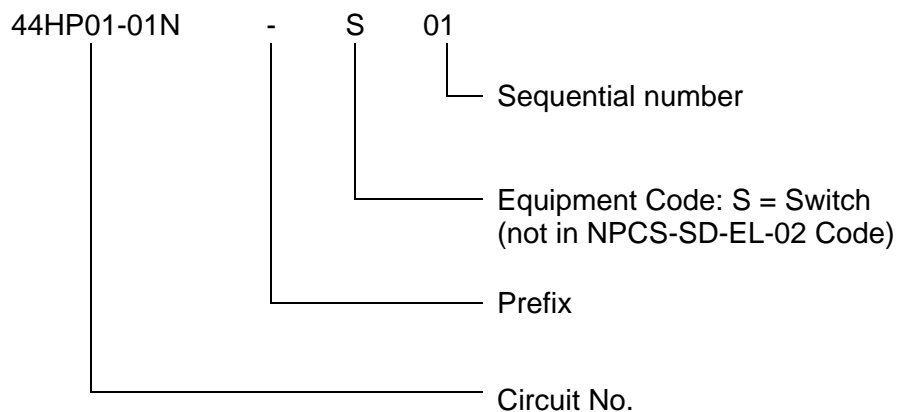
Lighting circuit cables will not be provided with a designation.





Only cables between the lighting panel (distribution panel in substation) and the first junction box will have a designation.

Luminaries



Switches

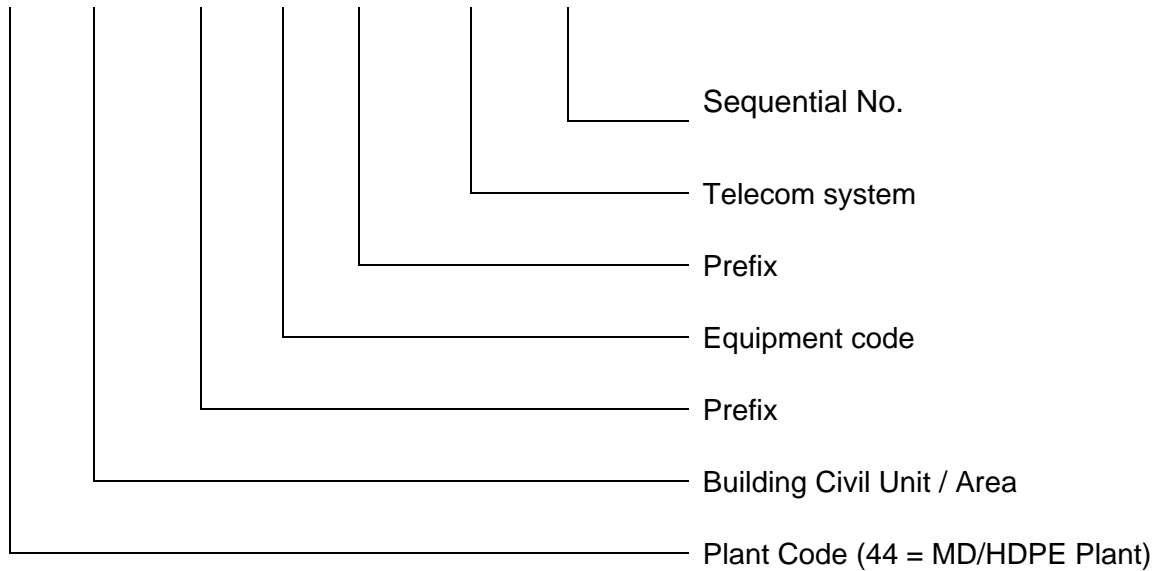


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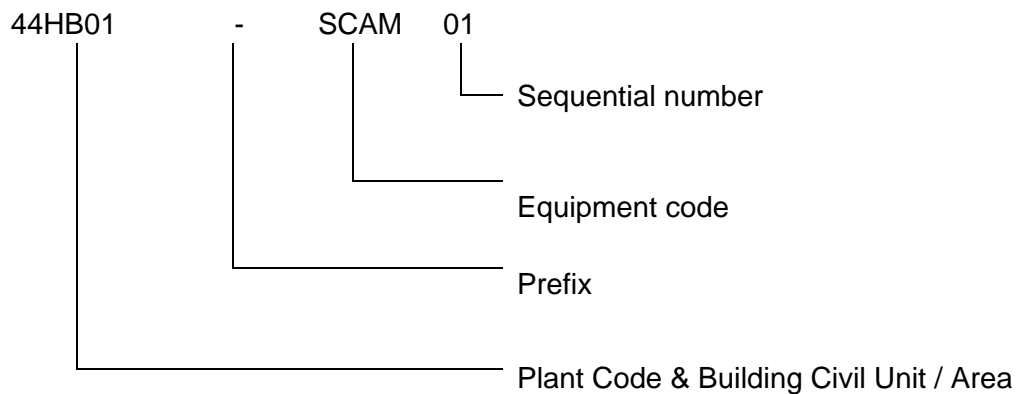
6.8 Telecom Systems





6.8.1 Telecom cabinets TCL

44 HB01 - TCL - CCTV 01



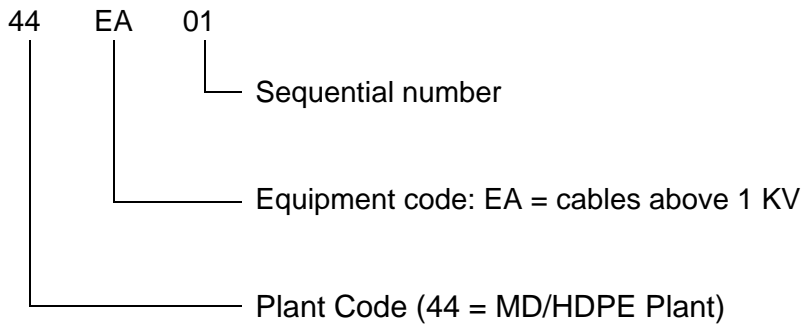
6.8.2 Telecom Equipment



CONTRACTOR:  SAZEH CONSULTANTS Engineering & Construction  SAZEPAD TEHRAN Sazepad Construction	300 KT POLYETHYLENE PLANT ARYA SASOL POLYMER COMPANY (ASPC)						OWNER:  شرکت پلیمر آریا ساسول ARYA SASOL POLYMER COMPANY تهران - ۱۹۸۴۸	
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7. Designation of Cable Trays / Ladder

7.1 Cable Trays/ Ladders for Electric



- EA = Electrical cables above 1 KV
- EB = Electrical cables up to 1 KV
- EC = Electrical control, signal cables
- TL = Telecom Cables

Cables for the electric used for the same application may be installed together.
 Annexes:

Table 1: Code letters for designation block 1 "EMR equipment" for main electrical equipment and common equipment for instrumentation (such as instrument cabinets, systems, local distribution boards, etc. If not in equipment code according to NPCS-SD-EL-02)	
Code letter	Designation
A	Power generation
AE	Static converters/Inverters
AF	Accumulators
AG	Battery chargers
L	Switchgears above 1 KV
BA	Switchgears above 110 KV
BB	Switchgears above 30 KV
BC	Switchgears above 10 KV





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Table 1: Code letters for designation block 1 "EMR equipment" for main electrical equipment and common equipment for instrumentation (such as instrument cabinets, systems, local distribution boards, etc. If not in equipment code according to NPCCS-SD-EL-02)

Code letter	Designation
BD	Switchgears above 1 KV
C	Switchgears up to 1 KV
CA	Low voltage main distribution center 400 V
CB	Low voltage sub distribution center 400 V
CF	Lighting main distribution center 400/230 V
CG	Lighting sub distribution center
CM	AC/DC distribution board 110 V
CN	DC distribution board 24 V (not applicable)
D	Transformers, capacitors, reactors
DA	Transformers 20,000/11,000 V
DB	Transformers 11,000/6,300 V
DC	Transformers 11,000/400 V
DF	Transformers 6,000/400 V (not applicable)
DK	Capacitors 380 V
E	Electric power utilization
EB	Local control panel
EC	Control panel
EH	Heating facilities, electric heat tracing, gas heaters, room radiators, transmitter heating systems
EL	Lighting systems
ER	Relay and electronic boards
ES	Other facilities {_e.g. 63 A socket outlets}
M	Motors (electrical) In the motor designation, the 1st letter "E" is omitted!
U	Plant equipment without process-related designation, e.g. ; package units
V	Field junction boxes
VB	Field junction boxes for electric signals (electrical engineering dept.)
VK	Field junction boxes for socket outlets, lighting systems, electric heating facilities, intercom systems





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Table 1: Code letters for designation block 1 "EMR equipment" for main electrical equipment and common equipment for instrumentation (such as instrument cabinets, systems, local distribution boards, etc. If not in equipment code according to NPCCS-SD-EL-02)

Code letter	Designation
X	Intercom systems
XB	Fire alarm systems
XF	Radio communication systems
XI	Intrusion alarm systems
XK	Access control systems
XP	Paging systems
XT	Telephone systems
XU	Clock and time recording systems
XM	Television systems
XW	Intercom systems

Table 2: Code letters for designation block 3A "Type" according to DIN 40719, part 2 (if not in equipment code according to NPCCS-SD-EL-02)

CODE LETTER	Type of electrical equipment item	Examples
A	Assemblies, subassemblies	Amplifiers with tubes or transistors, magnetic Amplifiers, lasers, masers Component combinations; assemblies and subassemblies that are a complete unit in themselves but cannot be given another code letter, such as plug-in units, sub frames, subunits, draw-out type modules, printed adapter cards, local control stations, etc.
B	Transducers, from non- electrical quantity to electrical quantity or vice versa	Thermoelectric sensors, thermo cells, photoelectric cells, dynamometers, crystal transducers, microphones, pick-ups, loudspeakers, synchros, resolvers Transducers, thermocouples; resistance thermometers, photoelectric cells, load cells, strain gauge cells, strain gauges, piezoelectric transmitters, speed transmitters, impulse transmitters, tachometer-generators, positioners, proximity initiators, Hall probes, Hall plate potentiometers; transmitters for pressure, flow rate, density, level, temperature





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Table 2: Code letters for designation block 3A "Type" according to DIN 40719, part 2 (if not in equipment code according to NPC-SD-EL-02)

CODE LETTER	Type of electrical equipment item	Examples
C	Capacitors	
D	Binary elements, delay devices, storage devices	Combinative elements, delay lines, bi stable elements, mono stable elements, core memories, registers, magnetic tape recorders, disk recorders Devices for binary and digital control and computing facilities, integrated circuits with binary and digital functions, time-delay devices, signal arresters, timers and memories, e.g. drum and magnetic tape memories, slide registers, logic circuits, such as AND/OR gates; digital devices, pulse counters, digital controllers and computers
E	Miscellaneous	Lighting devices, heating devices, devices not specified elsewhere in this table Electrostatic precipitators, electric fences, ventilators, instrument guards, calibrating vessels
F	Protective devices	Fuses (cartridge, screw-in and plug-in types), surge absorbers, arresters Communication-type protecting switches, protective relays, bimetal trips, magnetic trips, pressure monitors, flow detectors, centrifugal switches, Buchholz relays, electronic circuits for signal monitoring, safety circuits for signals, continuity monitors, functional safety Circuits, domestic reset fuses
G	Generators, supplies	Rotating generators, rotating frequency converters, batteries, supply devices, oscillators, quartz-oscillators Static generators and converters, battery chargers, mains power supply units, rectifiers, pulse generators
H	Signaling devices	Optical and acoustic indicators Pilot lights, danger alarms and time limit indicators, sequence indicators, sequence recorders, drop indicator relays
J		not allocated
K	Relays, contactors	Power contactors, auxiliary contactors, auxiliary relays, time-delay relays, flasher relays, Reed relays
L	Inductors	Induction coils, line traps
M	Motors	





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Table 2: Code letters for designation block 3A "Type" according to DIN 40719, part 2 (if not in equipment code according to NPC-SD-EL-02)

CODE LETTER	Type of electrical equipment item	Examples
N	Amplifiers, controllers	Devices for analogue control and computing facilities, electronic and electro-mechanical controllers, operational amplifiers, isolating amplifiers, impedance transformers, control devices, analogue controllers and computers, integrated circuits with analogue function, transducers
P	Measuring and testing equipment	Indicating, recording and totaling measuring devices, signal generators, clocks Analogue, binary and digital indicating and recording instruments (indicators, recorders, counters), mechanical counting mechanisms, binary operating state indicators, oscilloscopes, visual displays, simulators, test adapters, measuring, test and feed taps
Q	Mechanical switching devices for power circuits	Circuit-breakers, isolators Switches in main circuits, switches with protective devices, quick-acting switches, power breakers, star-delta switches, pole reversing switches, switching cams, isolating links, cell switches, fused circuit breakers, domestic switches, motor protective switches
R	Resistors	Adjustable resistors, potentiometers, rheostats, shunts, thermistors Fixed resistors, starters, brake resistors, NTC resistors, calibrating resistors, shunt resistors
S	Switches, selectors	Control switches, push-buttons, limit switches, selector switches, selectors, dial contacts, connecting stages Control switches, push-buttons, swivel switches, illuminated buttons, acknowledging buttons, selector switches, control cams, program timers, decade selector switches, coding switches, dials, uniselectors
T	Transformers	Voltage transformers, current transformers Mains, isolating and control transformers





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Table 2: Code letters for designation block 3A "Type" according to DIN 40719, part 2 (if not in equipment code according to NPC-SD-EL-02)

CODE LETTER	Type of electrical equipment item	Examples
U	Modulators, changers from one electrical quantity to another	Discriminators, demodulators, frequency changers, coders, inverters, converters, telegraph translators Frequency modulators/demodulators, current/voltage frequency converters, frequency/voltage (current) converters, analogue/digital converters, digital/ analogue converters, signal isolators, DC/DC converters, parallel-serial converters, serial-parallel converters, code converters, Opto couplers, telecommand equipment
V	Tubes, semiconductors	Electronic tubes, gas-discharge tubes, diodes, transistors, thyristors, indicator tubes, amplifier tubes, thyratrons; mercury vapour rectifiers, Zener diodes, tunnel diodes, variable capacitance diodes, triacs
W	Transmission paths, wave guides, aerials	Jumper wires, cables, busbars, waveguides, waveguide directional couplers, dipoles, parabolic aerials Light guides, coaxial cables, carrier frequency transmission through high-voltage lines, VHF beamed transmission and HF transmission paths. communication cables
X	Terminals, plugs, sockets	Disconnecting plugs and sockets, test jacks, terminal strips, soldering terminal strips Coaxial plugs, sockets, metering sockets, multi-pin plugs, plug distributors, terminal distribution boards, cable plugs, programming plugs, crossed-bar distributors, jacks
Y	Electrically operated mechanical devices	Brakes, clutches, pneumatic valves Actuators. solenoids, electromagnetic brakes, variable speed motors, blocking solenoids, mechanical locks, motor potentiometers, permanent magnets, teleprinters, electric typewriters, printers, plotters, data input terminals
Z	Terminations, hybrid transformers, filters, equalizers, limiters Equalizers, hybrid terminations	Cable balancing networks, compandors, crystal filters R/C and L/C filters, spark suppressors and spark arresters, active filters, high-pass, low-pass and band-pass filters, frequency filters, damping networks





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Table 3: Code letter for single function/signals	
Code letter	Designation
H	1. High Limit value 1, end position open HH
HH	2. High Limit value 2, end position open
HHH	3. High Limit value 3, end position open
L	1. Low Limit value 1, end position closed
LL	2. Low Limit value 2, end position closed
LLL	3. Low Limit value 3, end position closed
UA	Common alarm
USA	Common alarm with trip
UO	Status signal
YH	Actuator (or similar) open
YL	Actuator (or similar) close
Function of motor and consumer	
CC	Coupling relay control
ES	Emergency stop
FS	Fault signal
FT	Fault test
HI	Horn impulse
LA	Lamp acknowledgement
LT	Lamp test
MO	Manual on
MR	Manual release
MS	Manual stop
PO	Process on
POS	Process on I stop
PR	Process release
PS	Process stop
RL	Running light
RS	Running Signal
RSS	Restart signal
Function of power generation and distribution	
AO	Automatic on
AOS	Automatic on I stop





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Table 3: Code letter for single function/signals	
Code letter	Designation
AR	Automatic release
AS	Automatic stop
CA	Closed Acknowledge
Function of power generation and distribution	
FSU	Faun signal low voltage
FSI	Faun signal over current
FSF	Fault signal low frequency
OA	Opened Acknowledge
TA	Test Acknowledge
RFS	Ready for start
Measured quantities of electrical equipment	
F	Frequency
I	Current
P	Active Power
PF	Power factor
PS	Apparent power
A	Reactive Power
S	Speed
TB	Temperature bearing
TW	Temperature Winding
U	Voltage
W	Active energy
WA	Reactive energy
WS	Apparent energy
Common supplemented letter for further distinction	
L1	Phase L1
L2	Phase L2
L3	Phase L3
L+	DC-phase +
L-	DC-phase-
LE	Left
LO	Lower (e. g. set point)









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Table 3: Code letter for single function/signals	
Code letter	Designation
M	DC Middle conductor
N	AC Neutral conductor
PV	Process value
RA	Raise
RI	Right
S1	Speed 1
S2	Speed2
SP	Set Point

Supplementation by serial-no. in case of multiple use for one equipment

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8. Instruments Numbering System

8.1 Instrument Function Codes and Symbolization

8.1.1 On/Off Valves

Function codes for those valves will be as follows:

MOV :	Motor Operated Valve
XV :	Process actuated on/off Valve

8.1.2 Solenoid Valves

Solenoid valves attached to actuated valves will generally be tagged by adding the letter 'Y' to valve function code.

e.g.: XVY.

XVYA and XVYB For valves with two Solenoids

FVY, PVY, ... for control valve solenoid

8.1.3 Limit Switches

Limit switches attached to valves will start with the loop identification first letter, as the valve. e.g.:

FZSL = Limit switch close for a flow control valve FV

PZSH = Limit switch open for a pressure control valve PV

ZSL = Limit switch closed for an on/off valve XV

ZSH = Limit switch open for an on/off valve XV

8.1.4 Manual Command





All manual commands shall be identified with the letters "HS" including manual reset or manual overrides commands.

The following suffixes for manual commands to on/off valves shall be used:

Valve tags shall be suffixed according to their function:

- The first letter will be M for Motor Operated Valve and X for pneumatic on/off Valve.
- If there is not local open/close facilities for on/off valves, suffixes A or B will be removed from tag number.
- xxxxxxx : valve tag number.

Instrument List	IO Description
On/Off valve Hand Switches: (shown in P&ID as HS)	
XHSH.A-xxxxxxx	Remote Open (HMI)
XHSL.A-xxxxxxx	Remote Close (HMI)
XHSLR-xxxxxxx	Remote Local/Remote (HMI)
XHSH.B-xxxxxxx	Local Open
XHSL.B-xxxxxxx	Local Close

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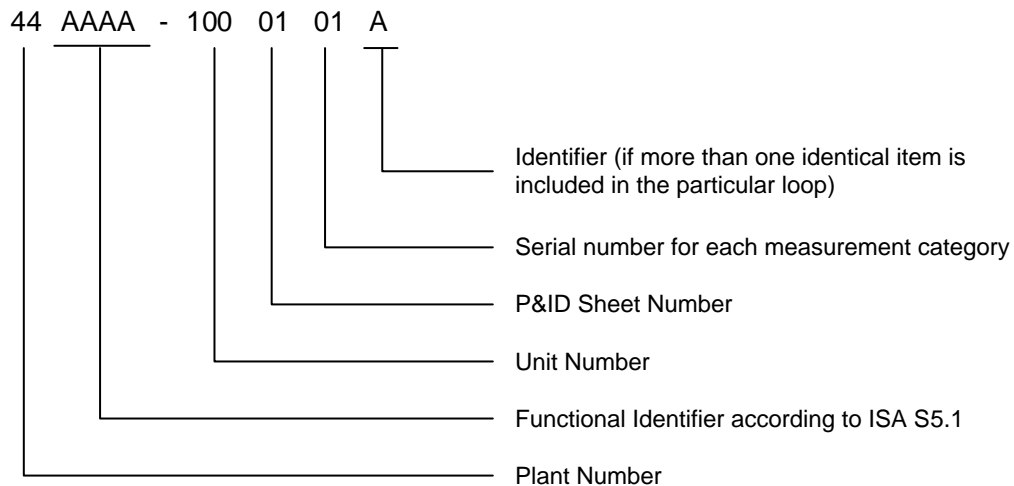
8.2 Instrument Tagging

8.2.1 Instrumentation Identification and Numbering on P&IDs

Instrument tag numbers, consisting of functional identification letter and loop identification number shall also comply with the requirements in ISA S5.1. Basic binary logic symbols shall comply with ISA S5.2.

Tag number includes Plant number, Functional identifier, dash (-) and sequential number.

The following system will be used to identify all instrument and control loops.



Example: 44PI-1000101A

Plant No. 44, Pressure indicator, Unit 100, PID 01, serial number 01(A)

8.2.1.1 Serial Numbering

Separate serial numbering will be used for the different type of loops: Flow loops, Pressure loops, Temperature loops, etc.





Separate serial numbering shall also be used for PSV, FG, LG, PG, TG (associated thermowell is included in TG). Separate TW will be included in the same serial numbering as the temperature loops

A single serial numbering will be used for the valves XV, MOV.

8.2.1.2 Number Allocation Rule

The following rules will be used for the allocation of numbers:

- The instruments belonging to the same loop will have the same sequential number.
- All instruments associated with a valve (limit switch, hand switch, solenoid valve, etc.) will have the same sequential number.
- When a temperature and a pressure instrument are used for the correction of the flow or when they are near the flow measurement, the three loops will have the same sequential number: e.g. 44FT-6003001, 44PT-6003001, 44TT-6003001.

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- When a pressure gauge is near a pressure loop, it will have the same sequential number.
- When a temperature gauge is near a TI or a TIC it will have the same sequential number.

8.2.1.3 Suffix

A suffix will be used in the following cases:

- When two instruments in a loop have the same function code, a suffix will be added so that they can be differentiated. For example:
 - If two valves are in split range, the smaller valve will have the suffix A and the larger valve the suffix B.
 - If a single on/off valve is controlled via two solenoid valves, the first one will be identified with a suffix A, the second one with a suffix B
- When several level gauges are required to satisfy the level visibility, a suffix will be added that indicates the location with A = bottom (to be completed by CONTRACTOR).
- Instruments attached to identical equipment identified with a same item number followed with a suffix A, B, etc. will be identified with the same sequential numbers completed with the suffix allocated to the equipment.

8.2.2 Loop Tag Numbering

The loop tag numbering shall follow the numbering procedure as identified above, except that the first letter of Function code shall be used.

8.3 Instrument Field Equipment Identification

8.3.1 Junction Boxes

Based on following structure:

SJBIK-UUUSSX

Where,

S : System type (F: FCS, E: ESD, P: PU, G: F&G)





JB : Junction Box

I : Instrument

K : Signal type as per below table

Signal Type	Abbreviation
Analog	A
Discrete (Switch , SOV)	D
Fieldbus	F
Solenoid valve (High Power)	V
Temperature elements	T

UUU : Process unit number (First three digits of instrument sequential no.)

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In addition, process unit number are same as below table according to "BASIS OF DESIGN", document number 3944-SZP-PR-000-SPC-0002.

Unit Name	Process Unit Number
Catalyst System	100
Powder Production	200
Powder Degassing	300
Recovery Gas	
Powder Conveying	400
Deodorizing	
Pelletization	500
Steam and Condensate System	600
Flare System	
Waste Treatment	
Refrigeration Unit	
Raw Material Purification	700
Pellet Homogenization and Storage	800
Palletizing	
Analyzer Equipment	810
Fire Fighting	863
Safety System	870

SS: Serial number (begins from 01)

X: Area classification

i	:	Intrinsically safe (Eexi)
d	:	Explosion proof (Eexd)
No suffix	:	Weather proof

Example: FJBIA-20001i = Analog junction box belonging to FCS located in Powder production unit, containing analog IS signals.

8.3.2 Cables





8.3.2.1 Individual cables

Same as instrument Tag number, 44FT-1001001

8.3.2.2 Multi cables

Same as junction box tag number without "JB" and last letter for area classification.

Example: FIA-20001

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8.4 Cabinets, Panels and Consoles Identification

Based on following structure:

UUYYYSS

Where,





UU : Civil Unit Number

Unit Name	Unit Number
Substation building	01
Control room, office and laboratory building	02
Cocatalyst building	03
Polymerization	04
Pellet Homogenization	05
Extrusion	06
Pellet storage silos	07
bagging and bulk loading	08
Container handling	

YYY : Type of cabinet

SS : Serial no. (begins from 01)

Type of Cabinet	Abbreviation
DCS System Cabinet	FCS
ESD System Cabinet	ESD
MMS Cabinet	MMS
Separation Cabinet	SPC
Instruments Cabinet	INC
Power Distribution Cabinets	PDC
Marshalling Cabinets Eexi	MPI
Marshalling Cabinets Eexe	MPO
Sequence of Event System	SES
Analyzer equipment	ANA
Operating Console Desk	OCD
Operating Console Station	OCS
Engineer Console Desk	ECD
Engineer Work Station	EWS
F&G System Cabinet	FGS

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8.5 Standard Terminal Block Identification

In marshalling cabinets and control panels, the multi-conductor terminal blocks will be identified as follows (only multi-core cables coming from the plant):

IK-UUSS





Where,

I : Instrument

K : Abbreviation for signal type

UU : Civil Unit Number

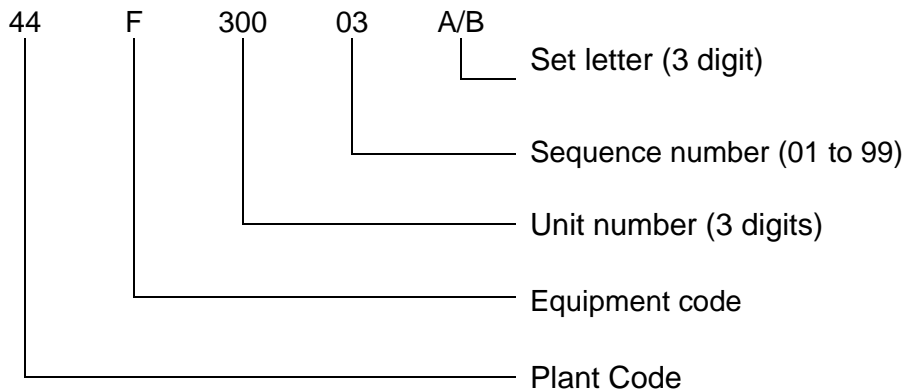
SS : Serial no. (begins from 01)

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9. Equipment Numbering System





9.1 Equipment Have To Be Numbered As Follows

The equipment Tag No. must be similar to existing MD/HD plant as much as possible







9.2 Contractor Equipment Code (As Per P&ID):

Contractor equipment code (Table #1)	
Equipment code	Equipment items
A	AGITATOR, STIRRER, MIXER
AS	ANTISTATIC AGENT DOSING UNIT
B	BIN, BURNER
BB	BAG BREAKER
BC	BELT CONVEYOR
BO	BOTLE
C	COMPRESSOR, BLOWER, FAN
D	SILO
DG	Diesel
DI	DIE HEAD
E	HEAT EXCHANGER, AIR COOLER, <i>ELECTRICAL HEATER</i>
EL	ELEVATOR
EX	EXTRUDER
F	FILTER, CYCLONE
FL/ML	Lift Truck
G	Gear
H	HEATER

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Contractor equipment code (Table #1)	
Equipment code	Equipment items
HO	HOIST
HG	HOT GAS GENERATOR UNIT
I	
J	
JP	Jack Pallet
K	
L	DIVERTER VALVE
LS	TELESCOPIC LOADING DEVICE
M	Electrical motor, Turbine
MD	METAL DETECTOR
MS	MATAL SEPARATOR
N	
O	
P	Pump
PN	CONVEYOR
PZ	PELLETIZER
Q	
R	Reactor
RC	ROLLER CONVEYOR
RF	REFRIGERATION UNIT
S	STRAINER, SEPARATOR
SC	POWDER MIXER
T	COLUMN, MOLECULAR SIEVE
TK	STORAGE TANK
TN	CRANE
U	
US	UNLOADING STATION, UTILITY STATION
V	VESSEL, DRUM, HOPPER
W	PACKAGE UNIT
WS	SCALE, LOADING DEVICE
X	SPECIAL EQUIPMENT
Y	CATCH POT
Z	CONVEYING STATION, ROTARY VALVE

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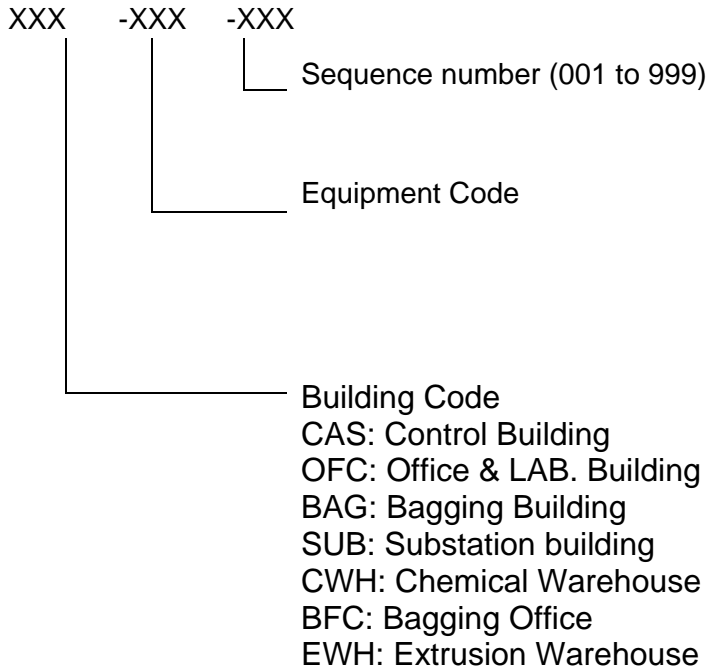
Unit number (Table #2)	
Unit number	Unit description
000	General
100	Catalyst, co-catalyst
200	Polymerization
300	Degassing , recovery
400	Powder conveying
500	Additives, Extrusion
600	Steam, condensate, Flare
700	Purification, regeneration, N2
800	Granule homogen., storage, bagging, <i>pellet conveying</i>

9.3 Unit / Area Codes Abbreviations

Description	Unit Code	Area code
General of the plant and over 2 building	HP00	
Substation Building	HB01	001 (T)
Control Room, office & LAB Bldg.	HB02	002 (M)
Co-catalyst Building	HP02	003 (C)
Polymerization	HP01	004 (P)
FOAM Station	HF01	004
Pellet Homogenization	HS01	005 (H)
Metering Station	HU01	005
Extrusion	HP03	006 (E)
Pellet Storage Silos, Bagging & Bulk	HS02	007 (S)
Container Handling (deleted)	HS03	
Metering Station (HAZARDOUS Media)	HU02	
Main Pipe Rack	HR01	
Pipe Rack-Silo Farm	HR02	





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10.2 Fire & Gas Tagging in Building



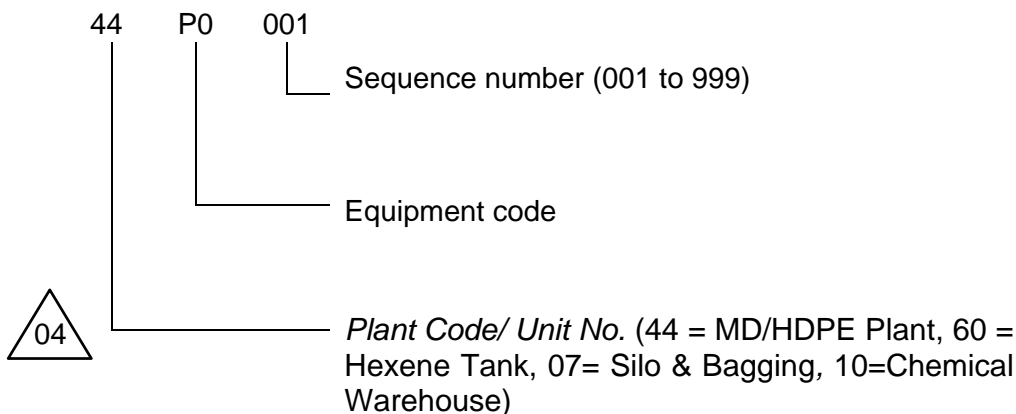
The Equipment Code for F&G System is as below Table:

Code	Equipment Name
FSP:	Fire Suppression Panel
FAP:	Fire Alarm Panel
FGD:	Flammable Gas Detector
TGD:	Toxic Gas Detector
HGD:	Hydrogen Gas Detector
OGD:	Oxygen Gas Detector
RFL:	Red Flash Light (For Fire Alarm)
AFL:	Amber Flash Light (For Gas Alarm)
BFL:	Blue Flash Light (For Toxic Gas Alarm)
H:	Multi-Stage Alarm Beacons/Sounders
FLD:	Flame Detector
HD:	Heat Detector
SHD:	Smoke/Heat Detector
SD:	Smoke Detector
SDC:	Smoke Detector Suspended Ceiling
SDF:	Smoke Detector False Floor
BG:	Break Glass Call Point
MRS:	Manual Release Station





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Code	Equipment Name
MSR:	Motor Siren
NEL:	No Entry Light
IEL:	Immediate Exit Light
MR:	Main Reserve Switch
PES:	Photo Electric Sensor
AMI:	Auto Manual Inhibit Switch
ZSI:	Zone Status Indicator
ZSP:	Zone Status Panel
EBL:	Electric Bell
ASD:	Air Sampling Smoke Detection System
HDL:	Linear Heat Detector
DRS:	Door Release Switch
DHM:	Door Holder Magnet
WMD:	Wind Measuring Device
FSD:	Fire Smoke Damper (HVAC Fire Damper)
BGD:	Beam Gas Detector
BEM:	Beam Smoke detector
HRN:	Alarm Horn
SFR:	Sounder & Red Flash Light
SFA:	Sounder & Amber Flash Light
SFB:	Sounder & Blue Flash Light

11. Fire & Safety Equipment Numbering Method







Code	Equipment Name
IGS:	Inert Gas Extinguishing System
WDV:	Water Deluge Valve
FDV:	Foam Deluge Valve
ACV:	Alarm Check Valve
FGP:	Foam Generation Package

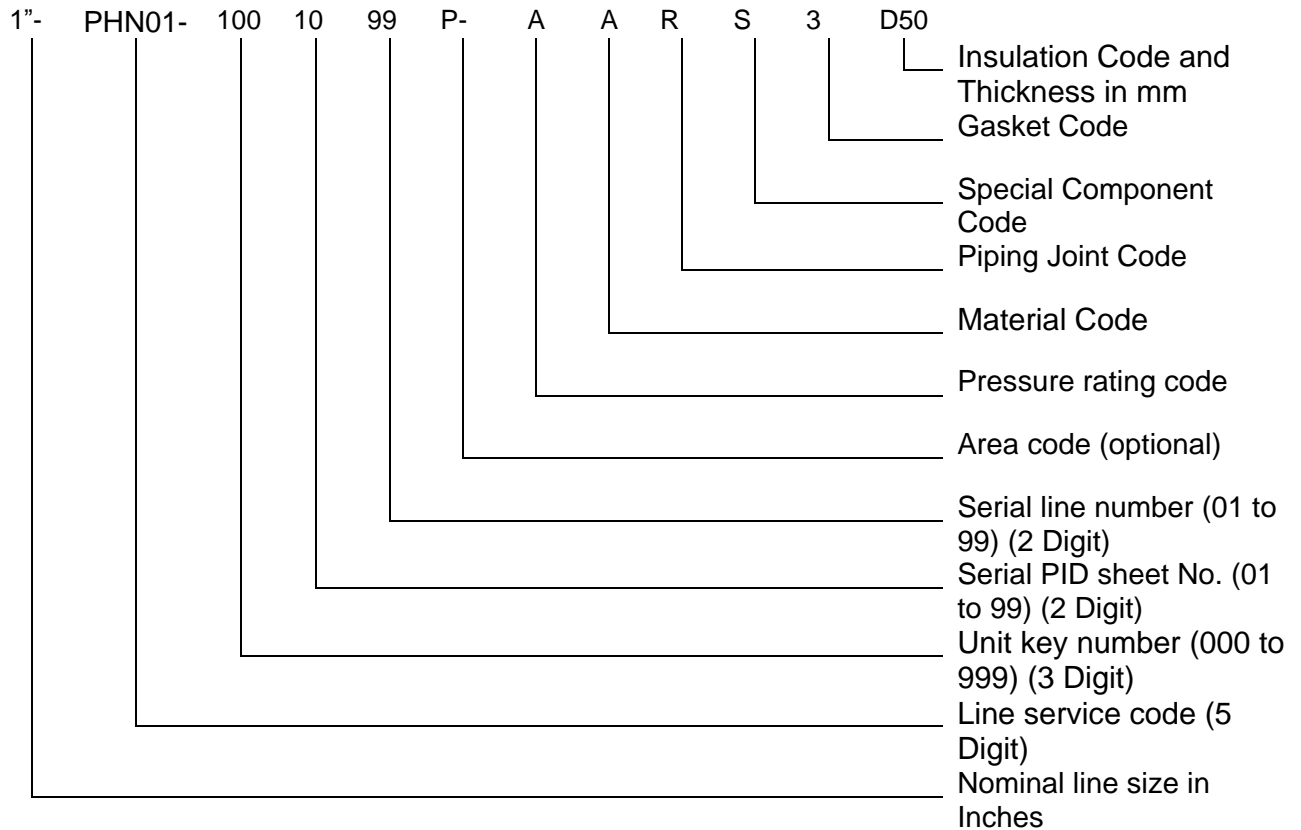
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Code	Equipment Name
PIV:	Post Indicator Valve
WHR:	Water Hose Reel
FHR:	Foam Hose Reel
WH:	Water Hydrant
HWM:	Hydrant with Water Monitor
HFM:	Hydrant with Foam Monitor
WHB:	Water Hose Box
FHB:	Foam Hose Box
WM:	Water Monitor
FM:	Foam Monitor
FMR:	Foam Maker
FCR:	Foam Chamber
FPR:	Foam Pourer
FSC:	Fire Department Siamese Connection
C05:	Carbon Dioxide Portable Extinguisher (5kg)
C30:	Carbon Dioxide Wheeled Extinguisher (30kg)
P12:	Dry Chemical Portable Extinguisher (12kg)
P50:	Dry Chemical Wheeled Extinguisher (50kg)
SCB:	Self-Contained Breathing Apparatus
ESE:	Emergency Shower & Eyewash
EEW:	Emergency Eyewash
FAK:	First Aid Kit
WSK:	Wind Sock

For numbering of F&G devices in each building, equipment codes are same as above mentioned and sequence number start from 001.

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12. Piping Numbering Method







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Pressure Rating Code	
Code	Description
A	150 lb
B	300 lb
C	600 lb
D	900 lb
E	1500 lb
S	Acc. To manufacturer standard
O	-10 / +250 mbar

Material Code	
Code	Description
A	Carbon steel
D	1.25% Cr 0.5% Mo steel
E	Cold resistant steel
F	316L stainless steel
K	304L stainless steel
L	316 stainless steel
M	ASTM B673 stainless steel
Q	Galvanized steel
S	Carbon steel, PE coated
T	304L SS, PE coated
U	Galvanized steel, PE coated

Piping Joint Code	
Code	Description
A	Type A (Facing see corresponding Pipe-Class)
B	Flange manufacturer standard
H	Special O-Ring
J	Ring joint ASME 16.5
K	Clamp – Coupling (MFG. SANDVIK or equal)
N	Tongue / Groove ASME 16.5
O	Compression Ring type
R	Raised face Acc. To ASME B16.5
U	Threaded ends Acc. To ANSI B1.20.1

Special Component Code	
Code	Description
A	Globe / Butterfly
B	Ball / Gate
C	Globe / Gate (White or Colourless)
D	Ball / Ball
E	Orbital valves
F	Ball / Gate-Flat-Type
G	Gate
H	Globe (Hydrogen Service)
I	(Core line)
K	Ball / Butterfly
M	(Jacket line)
N	Ball valves (NACE)
O	Without valves
P	Ball valves (Spec. pipe DIM)
S	Globe / Gate

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Gasket Code	
Code	Description
0	Manufacturer Standard
1	Flat Ring, CS/EPDM
2	Flat Ring, Aramid
3	Flat Ring, Graphite
4	Metallic / Soft copper
5	Spiral wound, SS / Graphite
6	Uncolored rubber
7	Flat ring, PTFE
8	Ring joint
9	Carbon fiber

Insulation Code	
Code	Description
A	Acoustical insulation
B	Solar protection
C	Cold Conservation (insulation)
D	Anti-Sweat Insulation
E	Electrical Tracing
F	Fire Protection
H	Heat Conservation
HC	Heat insulation for High Temperature
N	No Insulation
P	Personnel Protection
S	Steam tracing





Area Code	
Code	Description
B	Battery limit
C	Co-catalyst Building
E	Extrusion
H	Homogenization
P	Polymerization
R	Pipe rack
S	Silo
V	Vendor

Note:

Numbering of Pipe Racks, Buildings, Structures and platforms have considered in accordance with the reference project.





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Service			
Code	Description	Code	Description
A1	Antistatic Agent 1	HX	N-Hexane
A2	Antistatic Agent 2	HXE	1-Hexen
AD	Additives	IA	Instrument Air
AIR	Air	IG	Inert Gas
ALK	Co- Catalyst	IGP	Inert Gas Pilot
CG	Cycle Gas	IN	Impure Nitrogen
CCWR	Circulating Cooling Water Return	INC	Incineration
CCWS	Circulating Cooling Water Supply	LO	Lube Oil
CO	Carbon Monoxide	LOF	Lube Oil Feed
COC	Continuously Oily Contaminated Water	LS	Low Pressure Steam
CT	Catalyst (Activation)	LSC	Low Pressure Steam Condensate
CV	Conveying	O	Oil (Pump Seal)
CVA	Conveying Air	OG	Off Gas
CVN	Conveying Nitrogen	PA	Plant Air
CWR	Cooling Water Return	PE	Polymer
CWS	Cooling Water Supply	PEG	PE Granulates
DM	Demineralized Water	PHN	Pure High Pressure Nitrogen
DW	Desalinated Water	PN	Ptrge Nitrogen
ET	Ethylene	PO	Hydraulic Oil
FG	Fuel Gas	PR	Propane
FL	Flare Header	RG	Regeneration Gas
FO	Foam	SA	Sulphuric Acid
FS	Foam Solution	SRW	Service Water
H	Hydrogen	TW	Transport Water
HC	Cycle Gas	WF	Fire Fighting Water
HCC	Hydrocarbon Condensate	WP	Potable Water
HOR	Hot Oil Return	WW	Waste Water
HOS	Hot Oil Supply		
HS	High Pressure Steam		
HSC	High Pressure Steam Condensate		
HWR	Hot Water Return		
HWS	Hot Water Supply		

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13. Attachments

13.1 Attachment #1: Numbering and Coding System (PBD-PR-0001-Rev.01)

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Attachment # 1

Numbering and Coding System (PBD-PR-0001-Rev.01) (33 Sheets)



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1.pdf