PIPING & VALVE SYMBOLS

- MAIN PROCESS LINE
- PRODUCT UTILITY LINE
- GENERAL UTILITY LINE
- HOSE OR FLEXIBLE TUBING
- DOUBLE CONTAINED PIPE
- ET — ELECTRICALLY TRACED
- ST — STEAM TRACED
- WALL
- INSTRUMENT ELECTRICAL SIGNAL
- QUICK DISCONNECT (ELECTRICAL)
- INSTRUMENT AIR SUPPLY (SPECIFY PRESSURE IF OTHER THAN 1 BARG)
- INSTRUMENT (PNEUMATIC) SIGNAL
- INSTRUMENT (HYDRAULIC) SIGNAL CAPILLARY TUBE
- CONTROL SIGNAL (SOFT WIRED)
- FLOW ARROW
- E — EXISTING EQUIPMENT BOUNDARY
- F — FUTURE EQUIPMENT BOUNDARY
- S — SKID EQUIPMENT BOUNADRY
- P — PACKAGE EQUIPMENT BOUNDARY
- LINE SLOPE DIRECTION
- FLANGED CONNECTION WITH BLIND FLANGE
- CLAMP TYPE SANITARY FITTING
- SCREWED OR SOCKET WELDED PIPE CAP
- HOSE COUPLING / ASEPTIC CONNECTOR
- HOSE COUPLING - SINGLE BED SHUT OFF QUICK DISCONNECT
- HOSE COUPLING - DOUBLE END SHUT OFF QUICK DISCONNECT
- LINE CONTINUATION
- HOSE BARB / LEUR
- BUTT WELD CAP
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- INGOLD FITTING
- COMPRESSION FITTING
- ST — STEAM TRAP
- T — TRAP
- PIPE UNION
- THREADED CONNECTION
- "Y" STRAINER
- DIAPHRAGM VALVE
- GATE VALVE
- GLOBE VALVE
- BALL VALVE
- PLUG VALVE
- BALANCING VALVE
- PINCH CLAMP VALVE
- CHECK VALVE
- DOUBLE CHECK VALVE
- BUTTERFLY VALVE
- NEEDLE VALVE
- 3 WAY GLOBE VALVE
- 3 WAY BALL VALVE (T-PORT)
- 3 WAY BALL VALVE (L-PORT)
- 4 WAY BALL VALVE (T-PORT)
- 4 WAY BALL VALVE (L-PORT)
- 4 WAY BALL VALVE (X-PORT)
- ANGLE VALVE
- ANGLE BALL VALVE
- FLUSH BOTTOM DIAPHRAGM VALVE
- PRESSURE REDUCING VALVE (SELF CONTAINED)
- PRESSURE REDUCING VALVE (LINE ACTUATED)

INSTRUMENT SYMBOLS

- ? / ? — DISTRIBUTED CONTROL SYSTEM INSTRUMENT
- ? / ? — FIELD MOUNTED INSTRUMENT

ABBREVIATIONS

AAV	AIR ADMITTANCE VALVE
AFF	ABOVE FINISHED FLOOR
CO	CLEAN OUT
DFU	DRAINAGE FIXTURE UNIT
IC	ICE MAKER
WFSU	WATER FIXTURE SUPPLY UNIT
VTR	VENT THROUGH ROOF
EWS-X	EMERGENCY WASH STATION
F.C.O.	FLOOR CLEAN OUT
FC-X	FAUCET
FD-X	FLOOR DRAIN
H-X	HOSE BIB
LAV-X	LAVATORY
LS-X	LAB SINK
MSB-X	MOP SINK BASIN
RD-X	ROOF DRAIN
S-X	SINK
UR-X	URINAL
WC-X	WATER CLOSET
WH-X	ELECTRIC WATER HEATER
FWR	FIRE WATER RETENTION
SAN	SANITARY
ST	STORM
STO	STORM OVERFLOW

MISCELLANEOUS SYMBOLS

- DWG NO. / DESCRIPTION — LINE CONTINUED ON ANOTHER DWG.
- DWG NO. / DESCRIPTION — LINE CONTINUED FROM ANOTHER DWG.
- AREA BREAK
- FLAME ARRESTOR
- P (UFD) — DRAIN HUB: P = PROCESS, UFD = UTILITY FLOOR DRAIN
- STERILE TUBING WELD

LINE NUMBERING SYSTEM

1 1/2" - WFI - 100101 - SST4 - HC

- INSULATION
  - HC - HEAT CONSERVATION
  - CC - COLD CONSERVATION
  - PP - PERSONNEL PROTECTION
  - AS - ANTI SWEAT
  - CH - COLD CONSERVATION BUT STEAMABLE
- PIPE SPECIFICATION
- SEQUENTIAL NUMBER
- P&ID DRAWING NUMBER
- SERVICE
- LINE SIZE

MANUAL VALVE IDENTIFICATION

V-01

- SEQUENTIAL NUMBER
- VALVE CODE

FLOW SHEET & PIPING SYMBOLS

- CW — DOMESTIC COLD WATER
- HW — DOMESTIC HOT WATER
- HWR — DOMESTIC HOT WATER RECIRCULATION
- TEPS — TEPID WATER SUPPLY
- TEPR — TEPID WATER RETURN
- SAN — SANITARY DRAIN
- PD — PROCESS DRAIN
- VENT — VENT
- ST — STORM
- PITCH OF PIPE DOWN
- CO — CLEANOUT
- EXISTING PIPING
- NEW PIPING
- POINT OF CONNECT, NEW TO EXISTING
- KEYED NOTE

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE PRESIDING LOCAL AND NATIONAL CODES.
2. PROVIDE HANGERS, CLAMPS, ANCHORS AND GUIDES AS NECESSARY TO PREVENT STRESS ON PIPING.
3. INSTALL PIPING IN A NEAT ORGANIZED LAYOUT COORDINATING WITH OTHER TRADES.
4. MODIFICATIONS OR ALTERATIONS TO EXISTING SYSTEMS SHALL BE ACCOMPLISHED SO AS TO NOT DISTURB ADJACENT AREAS.
5. COORDINATE WITH OWNER & CONSTRUCTION MANAGER (CM) FOR ACCESS AND SHUTDOWNS TO AREAS WHICH ARE OCCUPIED.
6. MODIFICATIONS OR ALTERATIONS TO EXISTING SYSTEMS, WALLS OR FLOORS ARE TO BE REPAIRED TO 'AS NEW' CONDITION. PENETRATIONS THROUGH EXISTING WALLS SHALL BE SEALED AND MADE FIRE SAFE TO MATCH WALL OR FLOOR FIRE RATING.
7. NEITHER ACCURACY OR COMPLETENESS OF EXISTING CONDITIONS SHOWN ARE GUARANTEED. DETERMINE EXACT LOCATIONS OF EXISTING UTILITIES IN FIELD. IF DISCREPANCIES DEVELOP BETWEEN DRAWINGS AND FIELD CONDITIONS, NOTIFY CM PRIOR TO STARTING WORK.
8. CONTRACTOR SHALL COORDINATE HIS WORK WITH THE WORK OF OTHER TRADES PRIOR TO THE START OF INSTALLATION OF SYSTEMS.
9. IF CONTRACTOR IS IN THE PROCESS OF INSTALLING NEW WORK AND CONFLICTS WITH EXISTING CONDITIONS OR OTHER TRADES ARISE, NOTIFY CM AND DETERMINE REVISED COURSE OF ACTION BEFORE CONTINUING WORK IN THAT AREA.
10. COORDINATE LOCATIONS OF EQUIPMENT PADS WITH OTHER TRADES.

NOT ALL SYMBOLS AND ABBREVIATIONS MAY BE REQUIRED FOR THIS PROJECT

INSTRUMENT AND CONTROL LOOP TAGGING

FIRST LETTER		SUCCEEDING LETTERS		ADD'L LETTERS FOR CONTROL EQUIPMENT IDENTIFICATION
		MODIFIER	FUNCTION	
A	ANALYSIS, QUALITY		ARRESTOR, ALARM	MIDDLE (INTERMEDIATE)
B	BURNER FLAME			
C		CONTROL	CONTROLLER	CLOSED
D	DEW POINT, DENSITY	DIFFERENTIAL		
E	VOLTAGE, ENTHALPY, CURRENT, POWER		SENSOR (PRIMARY ELEMENT)	
F	FLOW RATE, FLAME	RATIO		
G	SMOKE		GLASS, GUAGE	
H	HAND, AUTOMATIC			HIGH, OPEN
I	CURRENT (ELECTRICAL)		INDICATOR	
J	POWER	SCAN		
K	TIME, SCHEDULE	TIME RATE OF CHANGE	CONTROL STATION	
L	LEVEL		LIGHT (PILOT)	LOW, CLOSED
M	MOTOR	MOMENTARY	ENERGIZE	MIDDLE
N				
O	NOT USED		ORIFICE, RESTRICTION	OPEN
P	PRESSURE OR VACUUM			
Q	QUANTITY	TOTALIZE, INTEGRATE		
R	RADIATION, RESTRICTION		RECORDER (HARDWIRE)	
S	SPEED, FREQUENCY, RPM	SAFETY	SWITCH	
T	TEMPERATURE		TRANSMITTER	
U	MUTLIVARIABLE		MULTIFUNCTION	
V	VIBRATION, VISCOSITY		VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL	
X	COMMON			
Y	EVENT, STATE, OR PRESSURE	Y AXIS	RELAY, TRANSDUCER, CONVERTER	UNCLASSIFIED
Z	POSITION, DIMENSION	Z AXIS	UNCLASSIFIED FINAL CONTROL ELEMENT, ACTUATOR	

PIPING SERVICE DESIGNATION

SERVICE	CODE	MATERIAL	MECHANICAL AREA SPEC	PROCESS AREA SPEC
WATER				
WATER PLANT	PW	COPPER (3" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
WATER POTABLE COLD	CW	COPPER (3" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
WATER POTBALE HOT	HW	COPPER (3" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
WATER TEPID SUPPLY	TEPS	COPPER (3" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
WATER TEPID RETURN	TEPR	COPPER (3" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
WATER TOWER SUPPLY	TWS	COPPER (3" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
WATER TOWER RETURN	TWR	COPPER (3" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
WATER RO	RO	POLYPROPYLENE TUBING / 316L S.S. TUBING 25 RA M.P.	PPP1/SF2	SSP4
WATER USP PURIFIED	USP	316L S.S. TUBING 25 RA M.P.	SF2	SF2
WATER PLANT SOFTENED	SW	COPPER TYPE L	CPL1	-
CHILLED GLYCOL SUPPLY	CGS	COPPER (2" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
CHILLED GLYCOL RETURN	CGR	COPPER (2" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
HEATING HOT GLYCOL SUPPLY	HGS	COPPER (2" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
HEATING HOT GLYCOL RETURN	HGR	COPPER (2" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
HEAT RECOVERY GLYCOL SUPPLY	HRS	COPPER (2" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
HEAT RECOVERY GLYCOL RETURN	HRR	COPPER (2" & UNDER) / SCH40 C.S. / 304L S.S. SCH40S M.F.	CPL1 / CSP4	SSP4
PROCESS				
PROCESS	PW	316L S.S. TUBING 25 RA M.P.	SF2	SF2
CLEAN-IN-PLACE SUPPLY	CIPS	316L S.S. TUBING 25 RA M.P.	SF2	SF2
CLEAN-IN-PLACE RETURN	CIPR	316L S.S. TUBING 25 RA M.P.	SF2	SF2
CONCENTRATED CAUSTIC (50%)	OHC	POLYPROPYLENE TUBING / 316L S.S. TUBING M.F.	PPP1	SF0
DILUTED CAUSTIC (0-10%)	OHD	POLYPROPYLENE TUBING / 316L S.S. TUBING M.F.	PPP1	SF0
VENT RELIEF	RV	AS SPECIFIED BY P&ID		
VENT GENERAL	V	150 LB C.S. / 304L S.S. TUBING M.F.	CSP8/SST8	SSP4
VENT PROCESS	PV	POLYPROPYLENE TUBING / 316L S.S. TUBING M.F.	SF2/SF0	SF2
STEAM/CONDENSATE				
STEAM PLANT (PRESSURE - 100#)	S100	CARBON STEEL, SCHEDULE 40 / 304L S.S. SCH40S M.F.	CSP4	SSP4
STEAM PLAN (PRESSURE - 15#)	S15	CARBON STEEL, SCHEDULE 40 / 304L S.S. SCH40S M.F.	CSP4	SSP4
CONDENSATE, LOW PRESSURE	LPC	CARBON STEEL, SCHEDULE 80 / 304L S.S. SCH40S M.F.	CSP8	SSP4
CONDENSATE, HIGH PRESSURE	HPC	CARBON STEEL, SCHEDULE 80 / 304L S.S. SCH40S M.F.	CSP8	SPS4
STEAM CLEAN (PRESSURE - 25#)	CS35	316L S.S. TUBING 25 RA M.P.	SF2	SF2
CONDENSATE CLEAN STEAM	CSC	316L S.S. TUBING 25 RA M.P. / MILL FINISH	SF0	SF0
PUMPED CONDENSATE	PC	CARBON STEEL SCHEDULE 80	CSP8	SSP4
BOILER FEED WATER	BFW	CARBON STEEL SCHEDULE 80	CSP8	-
BOILER CHEMICAL TREATMENT	CHT	304L S.S. TUBING M.F.	SSP4	-
AIR				
AIR INSTRUMENT	IA	CLEAN COPPER / 316L S.S. TUBING	CPK2	SF0
AIR COMPRESSED	CA	CLEAN COPPER / 316L S.S. TUBING	CPK2	SF2
GASES				
GAS NATURAL GAS	NG	BLACK STEEL SCHEDULE 40	BST4	-
DRAINS				
DRAIN DOMESITC	DD	AS SPECIFIED BY P&ID	-	-
DRAIN CONTAINED	SD	316L S.S. TUBING, BW, MILL FINISH	SF0	SF0
DRAIN UTILITY	UD	AS SPECIFIED BY P&ID	-	-
DRAIN PROCESS	PD	316L S.S. TUBING, BW, MILL FINISH	SF0	SF0
SANITARY DRAIN	SAN	PVC SCHEDULE 40	PVC4	-

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ImmuCell

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1039 Riverside Street
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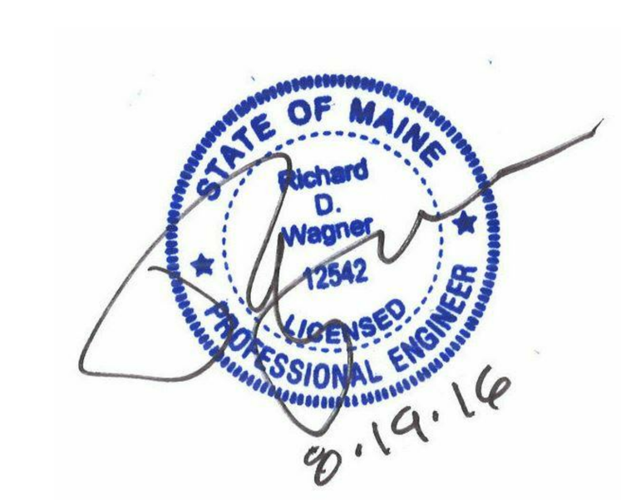
Consultants



Revision	By	Appd	DD.MM.YYYY
0 INTERIOR FIT OUT - ISSUED FOR CONSTRUCTION			08/19/2016

Issued	By	Appd	DD.MM.YYYY
PACKAGE C - INTERIOR FIT-OUT			**08.19.2016**
PACKAGE B - SUPERSTRUCTURE & SHELL			08.05.2016
PACKAGE A - FOUNDATIONS & BELOW SLAB			07.22.2016

Permit-Seal

Client/Project
IMMUCELL

Lot 11 - Second Tee Business Park
1039 Riverside Street
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Title
PLUMBING AND PROCESS LEAD SHEET

Project No. 191504176
Scale 12" = 1'-0"
Revision 0
Drawing No. **P-000-C**