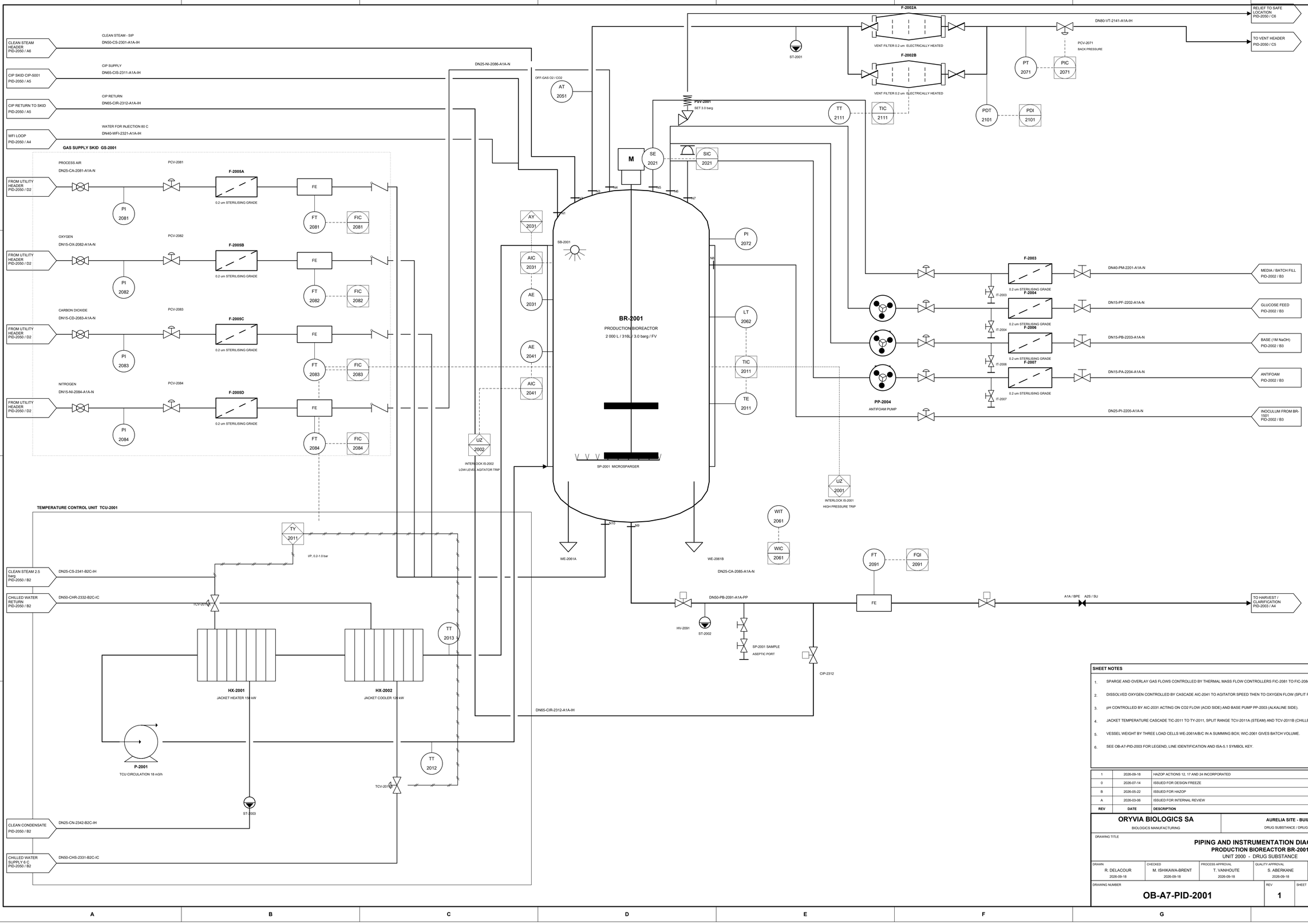


SHEET NOTES

1. SPARGE AND OVERLAY GAS FLOWS CONTROLLED BY THERMAL MASS FLOW CONTROLLERS FIC-2081 TO FIC-2084.
2. DISSOLVED OXYGEN CONTROLLED BY CASCADE AIC-2041 TO AGITATOR SPEED THEN TO OXYGEN FLOW (SPLIT RANGE).
3. pH CONTROLLED BY AIC-2031 ACTING ON CO2 FLOW (ACID SIDE) AND BASE PUMP PP-2003 (ALKALINE SIDE).
4. JACKET TEMPERATURE CASCADE TIC-2011 TO TY-2011, SPLIT RANGE TCV-2011A (STEAM) AND TCV-2011B (CHILLED WATER).
5. VESSEL WEIGHT BY THREE LOAD CELLS WE-2061A/B/C IN A SUMMING BOX; WIC-2061 GIVES BATCH VOLUME.
6. SEE OB-A7-PID-2003 FOR LEGEND, LINE IDENTIFICATION AND ISA-5.1 SYMBOL KEY.

REV	DATE	DESCRIPTION	BY	CHK	APPROVED
1	2026-09-18	HAZOP ACTIONS 12, 17 AND 24 INCORPORATED	RD	MIB	SA
0	2026-07-14	ISSUED FOR DESIGN FREEZE	RD	MIB	TV
B	2026-05-22	ISSUED FOR HAZOP	RD	MIB	TV
A	2026-03-06	ISSUED FOR INTERNAL REVIEW	RD	MIB	TV

ORYVIA BIOLOGICS SA
BIOLOGICS MANUFACTURING

AURELIA SITE - BUILDING 7
DRUG SUBSTANCE / DRUG PRODUCT

DATE: **2026-09-18**

DRAWING TITLE

PIPING AND INSTRUMENTATION DIAGRAM
PRODUCTION BIOREACTOR BR-2001
UNIT 2000 - DRUG SUBSTANCE

DRAWN	CHECKED	PROCESS APPROVAL	QUALITY APPROVAL	ENGINEERING CONTRACTOR
R. DELACOUR 2026-09-18	M. ISHIKAWA-BRENT 2026-09-18	T. VANHOUTE 2026-09-18	S. ABERKANE 2026-09-18	**VELDRAN ENGINEERING PARTNERS** ILLUSTRATIVE DOCUMENT - NOT FOR CONSTRUCTION

DRAWING NUMBER	REV	SHEET	SCALE	SIZE
OB-A7-PID-2001	**1**	**1 OF 3**	**NONE**	**ANSI D**

SEED TRAIN EXPANSION: N-2 (50 L) - N-1 (200 L) - N (2 000 L, SHEET 1 OF 3)

ALL PRODUCT CONTACT PIPING TO ASME BPE, 316L, Ra <= 0.5 um, ORBITAL WELDED, DRAINABLE 1:100 TO LOW POINT.

SHEET NOTES

1. SEED EXPANSION N-2 (BR-1001, 50 L) TO N-1 (BR-1501, 200 L) TO N (BR-2001, 2 000 L, SHEET 1).
2. TRANSFERS ARE PRESSURE DRIVEN WITH STERILE NITROGEN OVERLAY; NO TRANSFER PUMP IS USED.
3. MEDIA IS PREPARED IN MP-2101, 0.2 um FILTERED THROUGH F-2101A AND HELD FOR NOT MORE THAN 24 h.
4. ALL SEED VESSEL JACKETS ARE SERVED BY LOCAL SKID MOUNTED TEMPERATURE CONTROL UNITS, NOT SHOWN.
5. EVERY TRANSFER LINE IS STEAMED IN PLACE AT 121 C FOR 30 min BEFORE AND AFTER USE.
6. SEE OB-A7-PID-2003 FOR LEGEND, LINE IDENTIFICATION AND ISA-5.1 SYMBOL KEY.

REV	DATE	DESCRIPTION	BY	CHK	APPROVED
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0	2026-07-14	ISSUED FOR DESIGN FREEZE	RD	MIB	TV
B	2026-05-22	ISSUED FOR HAZOP	RD	MIB	TV
A	2026-03-06	ISSUED FOR INTERNAL REVIEW	RD	MIB	TV

ORYVIA BIOLOGICS SA
BIOLOGICS MANUFACTURING

AURELIA SITE - BUILDING 7
DRUG SUBSTANCE / DRUG PRODUCT

DATE: **2026-09-18**

DRAWING TITLE

PIPING AND INSTRUMENTATION DIAGRAM
SEED TRAIN BR-1001 / BR-1501 AND MEDIA PREPARATION
UNIT 2000 - DRUG SUBSTANCE

DRAWN	CHECKED	PROCESS APPROVAL	QUALITY APPROVAL	ENGINEERING CONTRACTOR
R. DELACOUR 2026-09-18	M. ISHIKAWA-BRENT 2026-09-18	T. VANHOUTE 2026-09-18	S. ABERKANE 2026-09-18	VELDRAN ENGINEERING PARTNERS ILLUSTRATIVE DOCUMENT - NOT FOR CONSTRUCTION

DRAWING NUMBER	REV	SHEET	SCALE	SIZE
OB-A7-PID-2002	1	2 OF 3	NONE	ANSI D

INSTRUMENT SYMBOLS (ISA-5.1)

- TIC 101 — DISCRETE INSTRUMENT, FIELD MOUNTED
- TIC 101 — DISCRETE INSTRUMENT, PRIMARY LOCATION, OPERATOR ACCESSIBLE
- TIC 101 — DISCRETE INSTRUMENT, BEHIND PANEL, NOT ACCESSIBLE
- TIC 101 — DISCRETE INSTRUMENT, LOCAL PANEL / AUXILIARY LOCATION
- TIC 101 — SHARED DISPLAY / SHARED CONTROL (DCS), OPERATOR ACCESSIBLE
- TIC 101 — SHARED DISPLAY / SHARED CONTROL, FIELD MOUNTED
- TIC 101 — PROGRAMMABLE LOGIC CONTROL (SAFETY PLC), ACCESSIBLE
- TIC 101 — COMPUTER FUNCTION / MES BATCH RECORD INTERFACE

EQUIPMENT SYMBOLS

- CARTRIDGE FILTER (STERILISING GRADE)
- CENTRIFUGAL PUMP
- PERISTALTIC / HOSE PUMP
- STEAM TRAP (CLEAN STEAM SERVICE)
- RUPTURE DISC IN HOLDER
- SPRING LOADED RELIEF VALVE
- CIP SPRAY DEVICE / ROTARY SPRAY BALL

LINE SYMBOLS AND SIGNAL TYPES

- MAJOR PROCESS LINE
- SECONDARY PROCESS / UTILITY LINE
- FUTURE / EXISTING (NOT IN THIS SCOPE)
- ELECTRICAL SIGNAL (4-20 mA / DIGITAL)
- PNEUMATIC SIGNAL
- SOFTWARE / DATA LINK (FIELDBUS)
- CAPILLARY TUBE (FILLED SYSTEM)
- ELECTROMAGNETIC / SONIC (GUIDED)
- HYDRAULIC SIGNAL
- MECHANICAL LINK

LINE NUMBER IDENTIFICATION

DN50 - PB - 2091 - A1A - PP

DN50	NOMINAL SIZE (DN, mm)
PB	SERVICE CODE (SEE TABLE)
2091	UNIQUE LINE SEQUENCE NUMBER
A1A	PIPING CLASS / MATERIAL SPECIFICATION
PP	INSULATION CODE (SEE TABLE)

ANNOTATION SYMBOLS

- TO / FROM DWG / ZONE — OFF-SHEET CONNECTOR, DRAWING AND ZONE REFERENCE
- PIPING SPECIFICATION BREAK
- N3 — EQUIPMENT NOZZLE WITH NOZZLE MARK
- UNCONNECTED CROSSING, HORIZONTAL RUN BROKEN
- FLOW DIRECTION
- PI 1 — INSTRUMENT PROCESS CONNECTION
- DN25-CA-2081 — LINE NUMBER LABEL

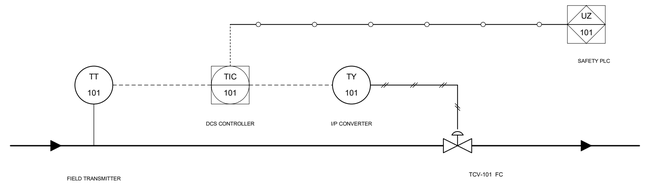
VALVES, FITTINGS AND SPECIALITIES

- GATE VALVE
- GLOBE VALVE / CONTROL VALVE BODY
- BALL VALVE
- BUTTERFLY VALVE
- SANITARY DIAPHRAGM VALVE (ASME BPE)
- CHECK VALVE (FLOW LEFT TO RIGHT)
- NEEDLE / THROTTLING VALVE
- PRESSURE REGULATOR, SELF ACTUATED
- ZERO DEAD LEG POINT OF USE VALVE
- THREE WAY / DIVERT VALVE

ACTUATORS AND FAIL POSITIONS

- DIAPHRAGM, SPRING RETURN — FC FAIL CLOSED
- PISTON / CYLINDER — FO FAIL OPEN
- M — MOTOR OPERATED — FL FAIL LAST
- S — SOLENOID OPERATED — FI FAIL INDETERMINATE
- HAND / MANUAL OPERATOR

TYPICAL CONTROL LOOP - JACKET TEMPERATURE, WITH SIS TRIP



ISA-5.1 IDENTIFICATION LETTERS

A	ANALYSIS
B	BURNER / COMBUSTION
C	CONDUCTIVITY / CONTROL
D	DENSITY / DIFFERENTIAL
E	VOLTAGE / SENSING ELEMENT
F	FLOW / RATIO
G	GAUGING / GLASS, VIEWING
H	HAND / HIGH
I	CURRENT / INDICATE
J	POWER / SCAN
K	TIME / CONTROL STATION
L	LEVEL / LIGHT, LOW
M	MOISTURE / MIDDLE
P	PRESSURE / TEST POINT
Q	QUANTITY / TOTALISE, INTEGRATE
R	RADIATION / RECORD
S	SPEED / SWITCH, SAFETY
T	TEMPERATURE / TRANSMIT
U	MULTIVARIABLE / MULTIFUNCTION
V	VIBRATION / VALVE, DAMPER
W	WEIGHT, FORCE / WELL
Z	POSITION / DRIVER, ACTUATOR

INSULATION AND TRACING CODES

IH	HEAT CONSERVATION
IC	COLD CONSERVATION / ANTI CONDENSATION
PP	PERSONNEL PROTECTION
ET	ELECTRICAL TRACING, SELF LIMITING
ST	STEAM TRACING, CLEAN STEAM
N	NOT INSULATED

SERVICE CODES

PB	PROCESS BROTH / HARVEST
PM	PREPARED MEDIA
PF	CONCENTRATED FEED
PA	ANTIFOAM
PI	INOCULUM TRANSFER
CA	COMPRESSED AIR, STERILE
OX	OXYGEN
CD	CARBON DIOXIDE
NI	NITROGEN
VT	VENT / OFF-GAS
CS	CLEAN STEAM (PURE STEAM)
CN	CLEAN CONDENSATE
CIS	CIP SOLUTION SUPPLY
CIR	CIP SOLUTION RETURN
WFI	WATER FOR INJECTION
PW	PURIFIED WATER
CHS	CHILLED WATER SUPPLY
CHR	CHILLED WATER RETURN
HWS	HOT WATER SUPPLY
DR	DRAIN, POINT OF USE

PIPING CLASSES

A1A	316L, ASME BPE, Ra<=0.5 um, EPDM SEALS
A2S	SINGLE USE, GAMMA IRRADIATED, C-FLEX
B2C	304L UTILITY, SCH 10S, PTFE GASKETS
C1P	PP-H / PVDF, CHEMICAL DOSING
D3G	ASTM A106 B, GALV., PLANT STEAM

LOGIC AND INTERLOCK SYMBOLS

- AND - OUTPUT TRUE WHEN ALL INPUTS TRUE
- OR - OUTPUT TRUE WHEN ANY INPUT TRUE
- NOT - INVERTS THE INPUT
- INTERLOCK / LOGIC REFERENCE
- A / B — OPERATOR STATION / HMI ACTION
- FINAL CORRECTING ELEMENT

GENERAL NOTES

1. ALL PRODUCT CONTACT SURFACES 316L, MECHANICALLY POLISHED AND ELECTROPOLISHED TO Ra <= 0.5 um.
2. ALL PRODUCT PIPEWORK ORBITALLY WELDED, SLOPED 1:100 MINIMUM TO A LOW POINT DRAIN.
3. ALL DEAD LEGS LIMITED TO 2D MEASURED FROM THE INSIDE WALL OF THE MAIN RUN.
4. STERILE BOUNDARY IS DEFINED BY THE 0.2 um FILTERS F-2002, F-2003 TO F-2007 AND F-2101.
5. FILTER INTEGRITY TEST CONNECTIONS IT-xxxx TO BE TESTED PRE-USE AND POST-USE.
6. STEAM-IN-PLACE AT 121 C FOR 30 MIN MINIMUM, ALL TRAPS DISCHARGE TO AN OPEN FUNNEL.
7. INSTRUMENT AIR SUPPLY AT 6 barg, OIL FREE, DEW POINT -40 C.
8. INTERLOCKS IS-2001 AND IS-2002 ARE IMPLEMENTED IN THE SAFETY PLC, SIL 1.
9. SET PRESSURE OF PSV-2001 IS 3.0 barg; RUPTURE DISC RD-2001 BURSTS AT 2.7 barg AT 20 C.
10. ALL INSTRUMENT LOOP NUMBERS ARE UNIQUE WITHIN UNIT 2000.
11. VALVE FAIL POSITIONS ARE NOTED ADJACENT TO EACH ACTUATOR.
12. THIS DRAWING IS AN ILLUSTRATIVE SPECIMEN. ALL TAGS, QUANTITIES AND NAMES ARE FICTIONAL.

ABBREVIATIONS

BPE	BIOPROCESSING EQUIPMENT	CIP	CLEAN-IN-PLACE
SIP	STEAM-IN-PLACE	WFI	WATER FOR INJECTION
DO	DISSOLVED OXYGEN	MFC	MASS FLOW CONTROLLER
TCU	TEMPERATURE CONTROL UNIT	FV	FULL VACUUM
ZDL	ZERO DEAD LEG	POU	POINT OF USE
N-1	PENULTIMATE SEED STAGE	N-2	SECOND SEED STAGE
SIL	SAFETY INTEGRITY LEVEL	PLC	PROGRAMMABLE LOGIC CONTROLLER
EM	ENVIRONMENTAL MONITORING	HEPA	HIGH EFFICIENCY PARTICULATE AIR
OEL	OCCUPATIONAL EXPOSURE LIMIT	RABS	RESTRICTED ACCESS BARRIER SYSTEM

DRAWING INDEX - THIS ISSUE

OB-A7-PID-2001	PRODUCTION BIOREACTOR BR-2001
OB-A7-PID-2002	SEED TRAIN AND MEDIA PREPARATION
OB-A7-PID-2003	LEGEND AND SYMBOL KEY (THIS SHEET)
OB-A7-PID-3001	ASEPTIC FILLING - PRODUCT PATH
OB-A7-PID-3002	ASEPTIC FILLING - ISOLATOR AND EM
OB-A7-GA-4001	GENERAL ARRANGEMENT, FILLING SUITE
OB-A7-UTL-5001	UTILITY DISTRIBUTION SCHEMATIC
PID-2050	UTILITY HEADERS (REFERENCE ONLY)

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ORYVIA BIOLOGICS SA
BIOLOGICS MANUFACTURING

AURELIA SITE - BUILDING 7
DRUG SUBSTANCE / DRUG PRODUCT

DATE: **2026-09-18**

DRAWING TITLE

P AND ID LEGEND AND SYMBOL KEY
INSTRUMENT, LINE, VALVE AND EQUIPMENT SYMBOLS
UNIT 2000 - DRUG SUBSTANCE

DRAWN	CHECKED	PROCESS APPROVAL	QUALITY APPROVAL	ENGINEERING CONTRACTOR
R. DELACOUR 2026-09-18	M. ISHIKAWA-BRENT 2026-09-18	T. VANHOUTE 2026-09-18	S. ABERKANE 2026-09-18	VELDRAN ENGINEERING PARTNERS

ILLUSTRATIVE DOCUMENT - NOT FOR CONSTRUCTION

DRAWING NUMBER	REV	SHEET	SCALE	SIZE
OB-A7-PID-2003	1	3 OF 3	NONE	ANSI D