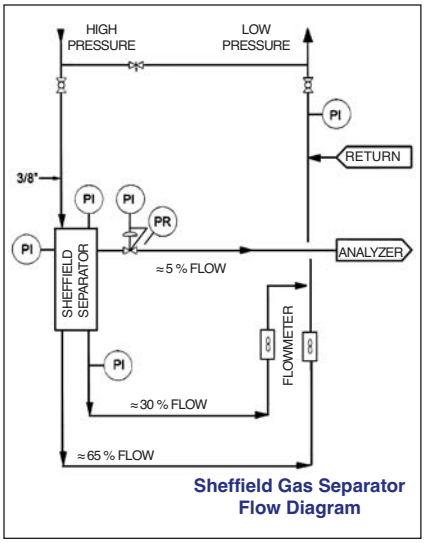
Sheffield Separator Co.

GAS & LIQUID SEPARATORS

Instruction / Installation Manual

SS700



Sheffield Gas Separator Flow Diagram

www.sheffieldseparators.com

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Table of Contents

The Sheffield Kinetic Separator -- SS-700 Series

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The Sheffield Kinetic Separator uses kinetic energy to separate the desired analyzer sample from impurities often found in a process stream. This is accomplished by establishing fast loop flow from a high pressure sample tap to a low pressure sample return and kinetic flow reversal of a relatively small slipstream sample. Condensate and particulates in gas samples and any heavy immiscible liquid phase (such as free water) and solid contaminants in liquid samples will not negotiate this reversal of flow direction. They are totally separated from the analyzer feed stream. To further effect this separation, a second kinetic chamber with a hydrophobic filter polishes the sample. Although kinetic energy will physically separate impurities, it will not alter the chemical composition of the sample.

How It Works

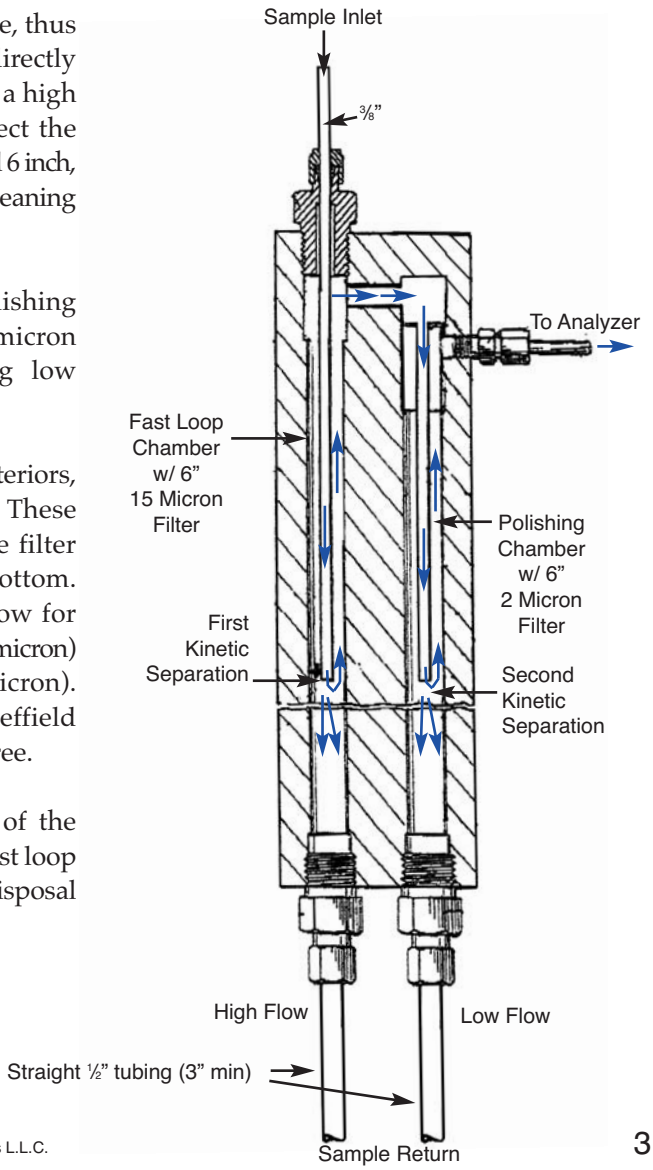
Initially, the fast flow path enters the first chamber. Here system pressure forces the analyzer feed slipstream in the reverse direction; the main stream flow continues through the first chamber and exits the bottom of the filter housing. Gravity and inertia cause kinetic separation of the analytical process components. These are lighter than condensate and solids (particulates) in a gas sample and lighter than immiscible liquids and solids (particulates) in a liquid sample.

The Sheffield Kinetic Separator is rated for high-pressure service, thus the first chamber of the separator is designed for installation directly in-line to the fast loop sample transport system. This results in a high flow rate and provides the inertia to effect the separation. This model embodies a special 6 inch, 15 micron Teflon®-lined (hydrophobic) self-cleaning low pressure drop filter.

The second chamber is a kinetic polishing chamber, aided by a special 6 inch, 2 micron Teflon®-lined (hydrophobic) self-cleaning low pressure drop filter.

Both filter elements have Teflon®-lined interiors, which repel water and particulates. These impurities pass through the center of the filter with the fast-loop sample and exit the bottom. The filters are configured in series to allow for graduated filtration i.e., high porosity (e.g. 15 micron) followed by a polishing filter (e.g. 2 micron). These attributes combine to make the Sheffield Kinetic Separator virtually maintenance free.

Finally, both chambers exit the bottom of the separator to a common juncture with the fast loop return flow. This avoids product loss and disposal cost of the separated components.



SHEFFIELD SEPARATOR MODEL SS700
SPECIFICATIONS 0310

MAXIMUM PRESSURE: 750 PSIG

MAXIMUM FLOW RATE:
GAS: 10 SCFM w/ 100 psig
LIQUID: 5 GPM w/ 100 psig

MINIMUM FLOW RATE:
GAS: 1.5 SCFH
LIQUID: 2.5 GPH

OPTIMUM FLOW RATE:
GAS: First Chamber Exit: 5 SCFH - 10 SCFM
Second Chamber Exit: 2 - 5 SCFH
LIQUID: First Chamber Exit: 3 GPH - 2 GPM
Second Chamber Exit: 3 - 6 GPH

MAXIMUM TEMPERATURE: 300° F (149° C)

PRESSURE DROP: 2 PSIG

MATERIALS OF CONSTRUCTION: 316L Stainless Steel (Other Materials Upon Request)

DIMENSIONS: 1.5” X 3” X 7”

INTERNAL VOLUME: 33 cu. cm.

INLET: 3/8” Tubing (3/4” Straight-F -SAE10)

OUTLET TO ANALYZER: 1/8” Tubing (1/8“ NPT-F)

OUTLET TO RETURN: ½: Tubing (1 1/16” Straight - SAE 12)
(3” Min. Straight Run)

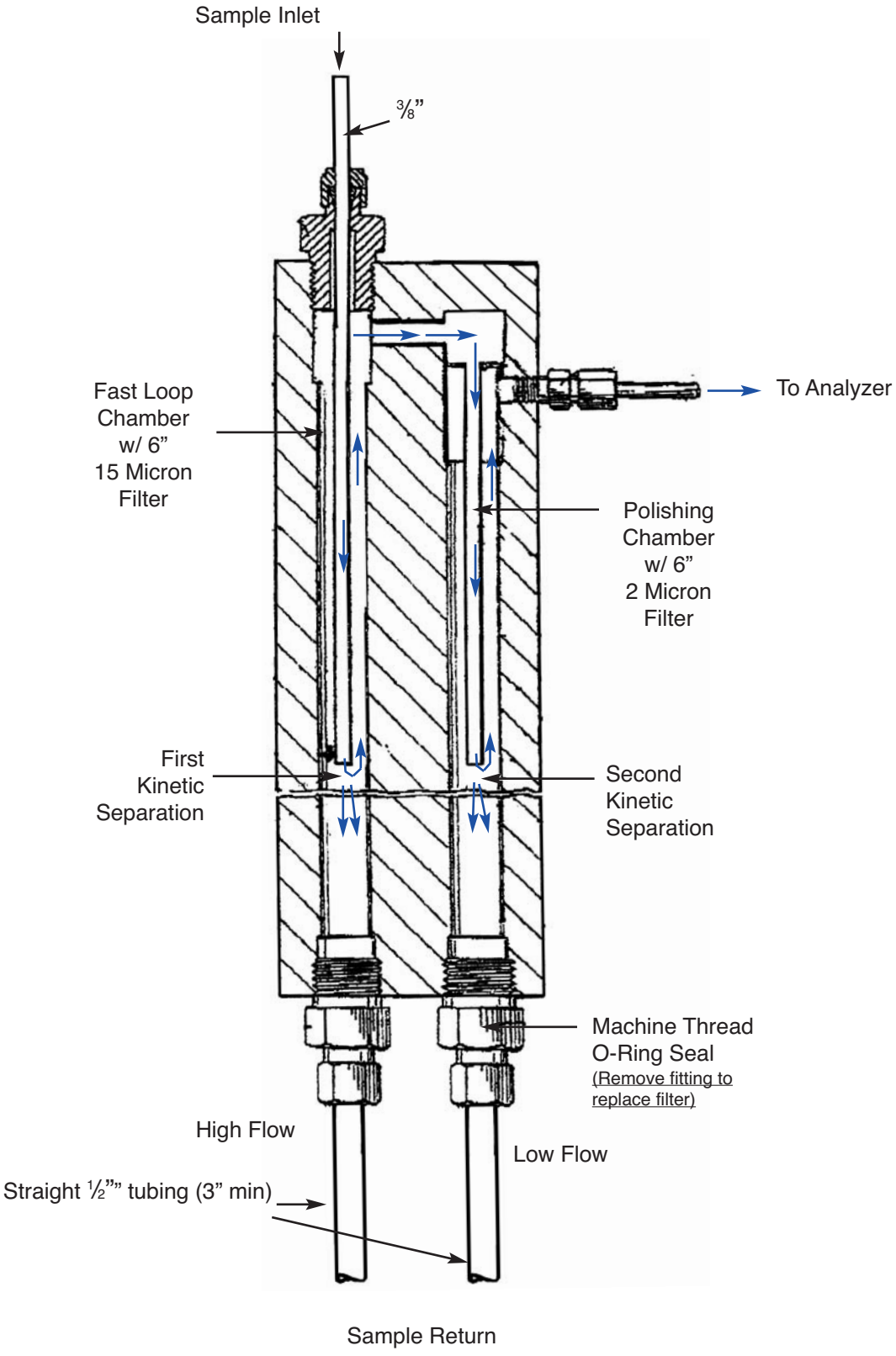
OTHER MODELS AVAILABLE WITH VARYING SPECIFICATIONS

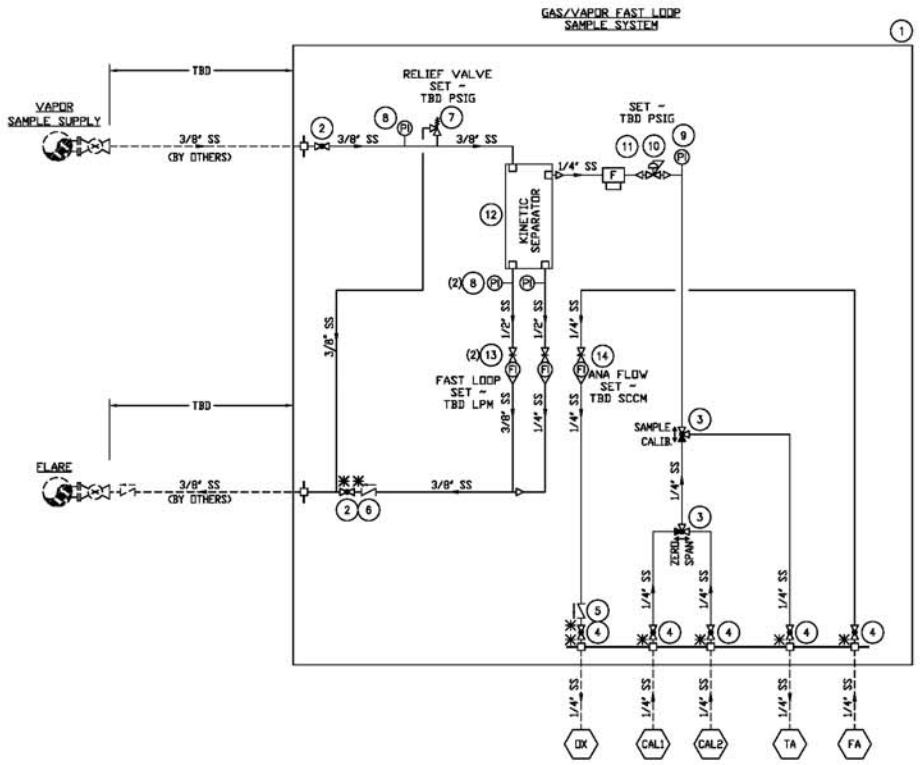
SERIES 700:
SS700GF: 7” Sheffield Kinetic Separator for gas service with 2 – 6” hydrophobic filter
SS700LF: 7” Sheffield Kinetic Separator for liquid service with 2 – 6” hydrophobic filter

SERIES 300:
SS300: 3” Dual Sheffield Kinetic Filter Housing with 2 – 2 ¼” filters in series and condensable removal

SERIES 1200:
SS1200 GF: 12” Sheffield Kinetic Separator for gas service with hydrophobic filter.
SS1200LF: 12” Sheffield Kinetic Separator for liquid service with hydrophobic filter.
SS1200LF-H2O: 12” Sheffield Kinetic Separator for removal of water from liquid hydrocarbon
SS1200PT: 12” Sheffield Kinetic Separator for removal of particulate in gas or liquid
SS1200G: 12” Sheffield Kinetic Separator for gas service with mist catcher

INSTALLATION NOTES





NOTE:
THIS DRAWING IS FOR REFERENCE ONLY AND
SHOULD NOT BE USED FOR FABRICATION.
CONSULT A ANALYZER SYSTEMS ENGINEER
FOR SPECIFIC APPLICATIONS AND REQUIREMENTS.

BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	MANUFACTURER	PART NUMBER
1	1	PLATE, ALUMINUM, 36" H X 30" W X 3/16" THICK	-	-
2	2	VALVE, BALL, 3/8" TF (SS)	-	-
3	2	VALVE, BALL, 3-WAY, 1/4" TF (SS)	-	-
4	5	VALVE, BALL, 1/4" TF (SS)	-	-
5	1	VALVE, CHECK, 1/3 PSIG, 1/4" TF (SS)	-	-
6	1	VALVE, CHECK, 1/3 PSIG, 3/8" TF (SS)	-	-
7	1	VALVE, RELIEF, ADJUSTABLE , 3/8" TF (SS)	-	-
8	3	GAUGE, PRESS., (2.5",GF), 100 PSIG, 1/4"TF-CBM (SS)	-	-
9	1	GAUGE, PRESS., (2.5",GF), 60 PSIG, 1/4"TF-CBM (SS)	-	-
10	1	REGULATOR, PRESS., 0-30 PSIG, 1/4"NPT-F, (SS)	-	-
11	1	FILTER, 2 MICRON 2-1/4" ELEMENT, 1/4" NPT-F (SS)	-	-
12	1	KINETIC SEPARATOR, 12" FOR VAPOR SERVICE (SS)	SHEFFIELD	SS1200GF
13	2	FLOW METER W/VALVE, (GLASS), TBD GPH, 1/4"NPT-F(SS)	-	-
14	1	FLOW METER W/VALVE, (GLASS), 30SCCM, 1/4"NPT-F (SS)	-	-

FILELD CONNECTION LEGEND

- CAL1 - VAPOR CALIBRATION 1
- CAL2 - VAPOR CALIBRATION 2
- TA - SAMPLE TO ANALYZER
- FA - SAMPLE FROM ANALYZER
- FL - FLARE
- DX - OXIDIZER

TUBE CONNECTION LEGEND

- - BULKHEAD FITTING
- - REDUCE TUBE SIZE
- - CLOSE COUPLE (AS SHORT AS PRACTICAL)

SAMPLE SYSTEM NOTES

1. TUBING SHALL BE TYPE 316 SEAMLESS, BRIGHT ANNEALED, STAINLESS STEEL WITH O.D. AS SHOWN AND WALL THICKNESS AS FOLLOWS:
   1/4" O.D. - 0.028" WALL
   1/4" O.D. - 0.035" WALL
   3/8" O.D. - 0.035" WALL
   1/2" O.D. - 0.049" WALL
2. TUBE FITTINGS SHALL BE 316 STAINLESS STEEL.
3. ALL MOUNTING HARDWARE (NUTS, BOLTS, WASHERS, ETC.) TO BE 316SS.
4. TUBING SHALL BE CUT SQUARE, REAMED TO THE INSIDE DIAMETER, AND FILED SMOOTH WITH NO BURRS OR SHARP EDGES. TUBING SHALL BE BLOWN CLEAN WITH DRY AIR TO REMOVE FILINGS AFTER CUTTING.
5. COMPONENTS SHALL BE INSTALLED WITH FRONT ACCESS ONLY TO ALLOW CONVENIENT REMOVAL.
6. NPT CONNECTIONS TO COMPONENTS SHALL BE MADE WITH TEFLON TAPE.
7. TUBING SHALL TERMINATE AT BULKHEAD FITTINGS.
8. TUBING SHALL BE SUPPORTED TO PREVENT DAMAGE (MAX. SPAN OF 3 FEET) BUT ALLOW CONVENIENT ACCESS FOR REMOVAL OF COMPONENTS.

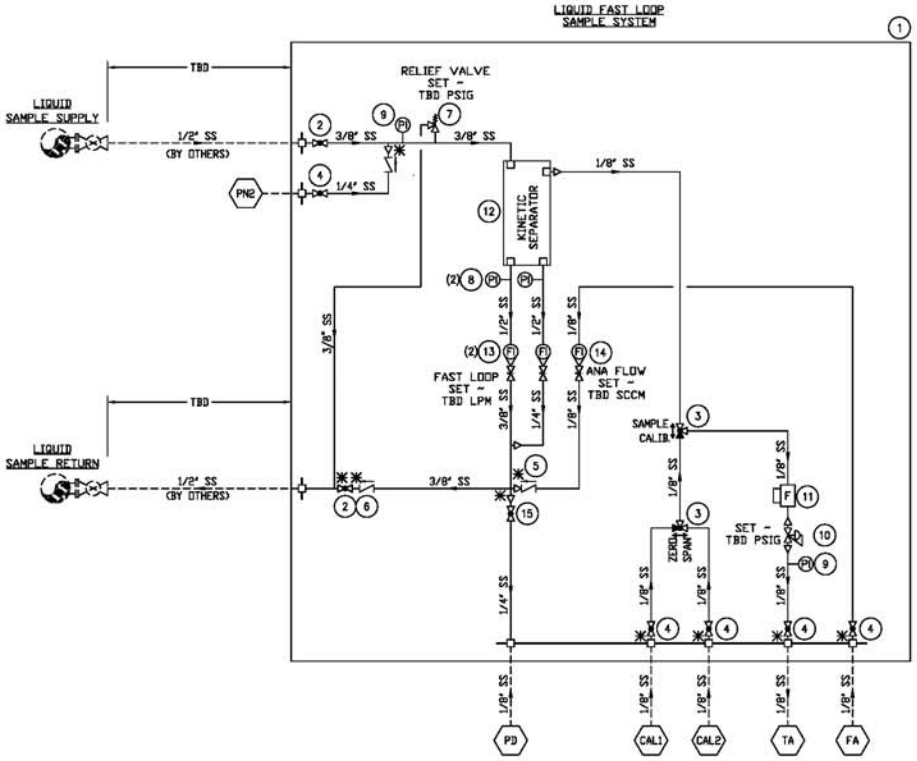
REV.	DESCRIPTION	BY	CHK	APP.	DATE
A	ISSUE FOR REFERENCE	X	X	X	1/08

SHEFFIELD SEPARATOR

TITLE: GAS/VAPOR FAST LOOP SCHEMATIC

JOB. NO. 0801 | SCALE N.T.S.

DWG. NO. 0801-01-502 | REVISION A



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BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	MANUFACTURER	PART NUMBER
1	1	PLATE, ALUMINUM, 36" H X 30" W X 3/16" THICK	-	-
2	2	VALVE, BALL, 3/8" TF (SS)	-	-
3	2	VALVE, BALL, 3-WAY, 1/8" TF (SS)	-	-
4	6	VALVE, BALL, 1/8" TF (SS)	-	-
5	1	VALVE, CHECK, 1/3 PSIG, 1/8" TF (SS)	-	-
6	1	VALVE, CHECK, 1/3 PSIG, 3/8" TF (SS)	-	-
7	1	VALVE, RELIEF, ADJUSTABLE , 3/8" TF (SS)	-	-
8	2	GAUGE, PRESS., (2.5",GF), 100 PSIG, 1/4"TF-CBM (SS)	-	-
9	1	GAUGE, PRESS., (2.5",GF), 60 PSIG, 1/4"TF-CBM (SS)	-	-
10	1	REGULATOR, PRESS., 0-30 PSIG, 1/4"NPT-F, (SS)	-	-
11	1	FILTER, 2 MICRON 2-1/4" ELEMENT, 1/8" NPT-F (SS)	-	-
12	1	KINETIC SEPARATOR, 12" FOR LIQUID SERVICE (SS)	SHEFFIELD	SS1200LF
13	2	FLOW METER W/VALVE, (GLASS), TBD GPH, 1/4"NPT-F(SS)	-	-
14	1	FLOW METER W/VALVE, (GLASS), 30SCCM, 1/4"NPT-F (SS)	-	-
15	1	VALVE, BALL, 1/4" TF (SS)	-	-

FILELD CONNECTION LEGEND

- CAL1 - LIQUID CALIBRATION 1
- CAL2 - LIQUID CALIBRATION 2
- TA - SAMPLE TO ANALYZER
- FA - SAMPLE FROM ANALYZER
- PN2 - PLANT NITROGEN
- PD - PROCESS DRAIN

TUBE CONNECTION LEGEND

- - BULKHEAD FITTING
- - REDUCE TUBE SIZE
- - CLOSE COUPLE (AS SHORT AS PRACTICAL)

SAMPLE SYSTEM NOTES

1. TUBING SHALL BE TYPE 316 SEAMLESS, BRIGHT ANNEALED, STAINLESS STEEL WITH O.D. AS SHOWN AND WALL THICKNESS AS FOLLOWS:
   1/8" O.D. - 0.028" WALL
   1/4" O.D. - 0.035" WALL
   3/8" O.D. - 0.035" WALL
   1/2" O.D. - 0.049" WALL
2. TUBE FITTINGS SHALL BE 316 STAINLESS STEEL.
3. ALL MOUNTING HARDWARE (NUTS, BOLTS, WASHERS, ETC.) TO BE 316SS.
4. TUBING SHALL BE CUT SQUARE, REAMED TO THE INSIDE DIAMETER, AND FILED SMOOTH WITH NO BURRS OR SHARP EDGES. TUBING SHALL BE BLOWN CLEAN WITH DRY AIR TO REMOVE FILINGS AFTER CUTTING.
5. COMPONENTS SHALL BE INSTALLED WITH FRONT ACCESS ONLY TO ALLOW CONVENIENT REMOVAL.
6. NPT CONNECTIONS TO COMPONENTS SHALL BE MADE WITH TEFLON TAPE.
7. TUBING SHALL TERMINATE AT BULKHEAD FITTINGS.
8. TUBING SHALL BE SUPPORTED TO PREVENT DAMAGE (MAX. SPAN OF 3 FEET) BUT ALLOW CONVENIENT ACCESS FOR REMOVAL OF COMPONENTS.

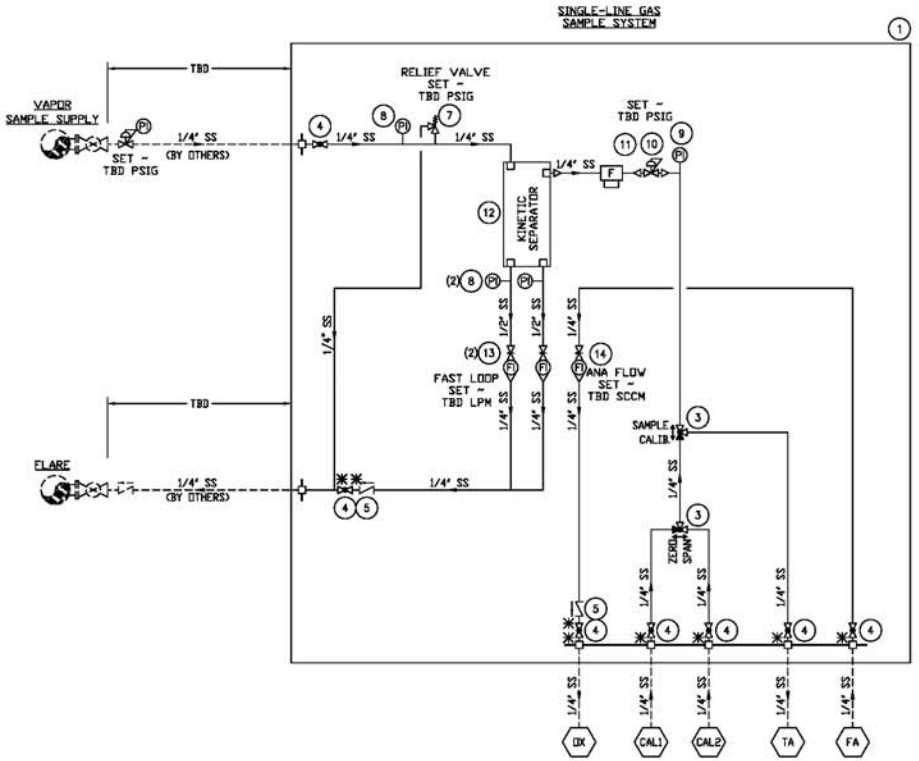
REV.	DESCRIPTION	BY	CHK	APP.	DATE
A	ISSUE FOR REFERENCE	X	X	X	1/08

SHEFFIELD SEPARATOR

TITLE: LIQUID FAST LOOP SCHEMATIC

JOB. NO. 0801 | SCALE N.T.S.

DWG. NO. 0801-01-501 | REVISION A



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BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	MANUFACTURER	PART NUMBER
1	1	PLATE, ALUMINUM, 36" H X 30" W X 3/16" THICK	-	-
2	-	-	-	-
3	2	VALVE, BALL, 3-WAY, 1/4" TF (SS)	-	-
4	7	VALVE, BALL, 1/4" TF (SS)	-	-
5	2	VALVE, CHECK, 1/3 PSIG, 1/4" TF (SS)	-	-
6	1	VALVE, CHECK, 1/3 PSIG, 3/8" TF (SS)	-	-
7	1	VALVE, RELIEF, ADJUSTABLE , 3/8" TF (SS)	-	-
8	3	GAUGE, PRESS., (2.5",GF), 30 PSIG, 1/4"TF-CBM (SS)	-	-
9	1	GAUGE, PRESS., (2.5",GF), 15 PSIG, 1/4"TF-CBM (SS)	-	-
10	1	REGULATOR, PRESS., 0-50 PSIG, 1/4"NPT-F, (SS)	-	-
11	1	FILTER, 2 MICRON 2-1/4" ELEMENT, 1/4" NPT-F (SS)	-	-
12	1	KINETIC SEPARATOR, 12" FOR VAPOR SERVICE (SS)	SHEFFIELD	SS1200GF
13	2	FLOW METER W/VALVE, (GLASS), TBD GPH, 1/4"NPT-F(SS)	-	-
14	1	FLOW METER W/VALVE, (GLASS), 30SCCM, 1/4"NPT-F (SS)	-	-

FILELD CONNECTION LEGEND

- (CAL1) - VAPOR CALIBRATION 1
- (CAL2) - VAPOR CALIBRATION 2
- (TA) - SAMPLE TO ANALYZER
- (FA) - SAMPLE FROM ANALYZER
- (FL) - FLARE
- (DX) - OXIDIZER

TUBE CONNECTION LEGEND

- ⊣ - BULKHEAD FITTING
- ▷ - REDUCE TUBE SIZE
- ⋇ - CLOSE COUPLE (AS SHORT AS PRACTICAL)

SAMPLE SYSTEM NOTES

1. TUBING SHALL BE TYPE 316 SEAMLESS, BRIGHT ANNEALED, STAINLESS STEEL WITH O.D. AS SHOWN AND WALL THICKNESS AS FOLLOWS:
   1/4" O.D. - 0.028" WALL
   1/4" O.D. - 0.035" WALL
   3/8" O.D. - 0.035" WALL
   1/2" O.D. - 0.049" WALL
2. TUBE FITTINGS SHALL BE 316 STAINLESS STEEL.
3. ALL MOUNTING HARDWARE (NUTS, BOLTS, WASHERS, ETC.) TO BE 316SS.
4. TUBING SHALL BE CUT SQUARE, REAMED TO THE INSIDE DIAMETER, AND FILED SMOOTH WITH NO BURRS OR SHARP EDGES. TUBING SHALL BE BLOWN CLEAN WITH DRY AIR TO REMOVE FILINGS AFTER CUTTING.
5. COMPONENTS SHALL BE INSTALLED WITH FRONT ACCESS ONLY TO ALLOW CONVENIENT REMOVAL.
6. NPT CONNECTIONS TO COMPONENTS SHALL BE MADE WITH TEFLON TAPE.
7. TUBING SHALL TERMINATE AT BULKHEAD FITTINGS.
8. TUBING SHALL BE SUPPORTED TO PREVENT DAMAGE (MAX. SPAN OF 3 FEET) BUT ALLOW CONVENIENT ACCESS FOR REMOVAL OF COMPONENTS.

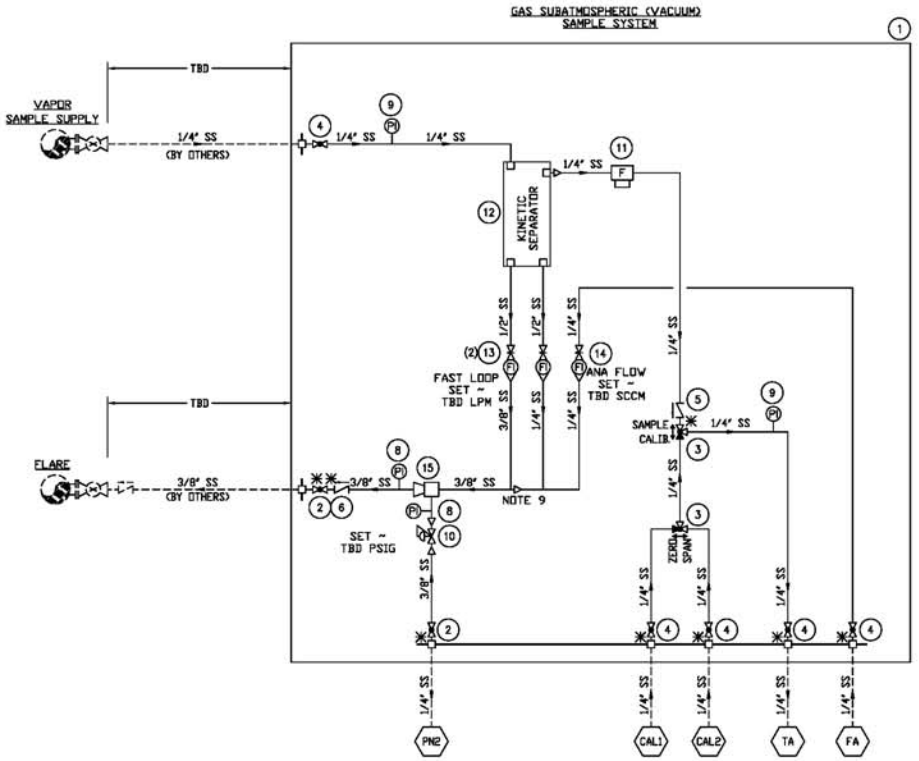
REV.	DESCRIPTION	BY	CHK	APP.	DATE
A	ISSUE FOR REFERENCE	X	X	X	1/08

SHEFFIELD SEPARATOR

TITLE: SINGLE-LINE GAS SCHEMATIC

JOB. NO. 0801 | SCALE N.T.S.

DWG. NO. 0801-01-504 | REVISION A



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BILL OF MATERIAL

ITEM	QTY	DESCRIPTION	MANUFACTURER	PART NUMBER
1	1	PLATE, ALUMINUM, 36" H X 30" W X 3/16" THICK	-	-
2	2	VALVE, BALL, 3/8" TF (SS)	-	-
3	2	VALVE, BALL, 3-WAY, 1/4" TF (SS)	-	-
4	5	VALVE, BALL, 1/4" TF (SS)	-	-
5	1	VALVE, CHECK, 1/3 PSIG, 3/8" TF (SS)	-	-
6	1	VALVE, CHECK, 1/3 PSIG, 3/8" TF (SS)	-	-
7	-	-	-	-
8	2	GAUGE, PRESS., (2.5",GF), 100 PSIG, 1/4"TF-CBM (SS)	-	-
9	2	GAUGE, COMPOUND, (2.5",GF), -3-0-15 PSIG, 1/4"TF-CBM (SS)	-	-
10	1	REGULATOR, PRESS., 0-100 PSIG, 1/4"NPT-F, (SS)	-	-
11	1	FILTER, 2 MICRON 2-1/4" ELEMENT, 1/4" NPT-F (SS)	-	-
12	1	KINETIC SEPARATOR, 12" FOR VAPOR SERVICE (SS)	SHEFFIELD	SS1200GF
13	2	FLOW METER W/VALVE, (GLASS), TBD GPH, 1/4"NPT-F(SS)	-	-
14	1	FLOW METER W/VALVE, (GLASS), 30SCCM, 1/4"NPT-F (SS)	-	-
15	1	EDUCTOR, 3/8 "NPT-F, (SS)	-	-
			-	-

FILELD CONNECTION LEGEND

- CAL1 - VAPOR CALIBRATION 1
- CAL2 - VAPOR CALIBRATION 2
- TA - SAMPLE TO ANALYZER
- FA - SAMPLE FROM ANALYZER
- PN2 - PLANT NITROGEN
- FL - FLARE

TUBE CONNECTION LEGEND

- ⏚ - BULKHEAD FITTING
- ▷ - REDUCE TUBE SIZE
- ✳ - CLOSE COUPLE (AS SHORT AS PRACTICAL)

SAMPLE SYSTEM NOTES

1. TUBING SHALL BE TYPE 316 SEAMLESS, BRIGHT ANNEALED, STAINLESS STEEL WITH O.D. AS SHOWN AND WALL THICKNESS AS FOLLOWS:
   1/4" O.D. - 0.028" WALL
   1/4" O.D. - 0.035" WALL
   3/8" O.D. - 0.035" WALL
   1/2" O.D. - 0.049" WALL
2. TUBE FITTINGS SHALL BE 316 STAINLESS STEEL.
3. ALL MOUNTING HARDWARE (NUTS, BOLTS, WASHERS, ETC.) TO BE 316SS.
4. TUBING SHALL BE CUT SQUARE, REAMED TO THE INSIDE DIAMETER, AND FILED SMOOTH WITH NO BURRS OR SHARP EDGES. TUBING SHALL BE BLOWN CLEAN WITH DRY AIR TO REMOVE FILINGS AFTER CUTTING.
5. COMPONENTS SHALL BE INSTALLED WITH FRONT ACCESS ONLY TO ALLOW CONVENIENT REMOVAL.
6. NPT CONNECTIONS TO COMPONENTS SHALL BE MADE WITH TEFLON TAPE.
7. TUBING SHALL TERMINATE AT BULKHEAD FITTINGS.
8. TUBING SHALL BE SUPPORTED TO PREVENT DAMAGE (MAX. SPAN OF 3 FEET) BUT ALLOW CONVENIENT ACCESS FOR REMOVAL OF COMPONENTS.
9. WHEN AN ANALYZER IS EQUIPPED WITH A SAMPLE PUMP, THE ANALYZER SLIP STREAM RETURN MUST TIE-IN TO THE DISCHARGE SIDE OF THE SAMPLE SYSTEM EDUCTOR.

REV.	DESCRIPTION	BY	CHK	APP.	DATE
A	ISSUE FOR REFERENCE	X	X	X	1/08

SHEFFIELD SEPARATOR

TITLE: GAS SUBATMOSPHERIC (VACUUM) SCHEMATIC

JOB. NO.: 0801 | SCALE: N.T.S.

DWG. NO.: 0801-01-503 | REVISION: A