

SPERLICH

Consulting, Inc.

821 Columbus St., Suite 1
Rapid City, SD 57701

March 23, 2007

City of Rapid City Growth Management
300 Sixth Street
Rapid City, South Dakota 57701-2724

Re: **The Villaggio @ Golden Eagle (Sewer Lift Station)**
Rapid City, South Dakota
Project #3077.01

To Whom It May Concern:

Introduction

Find attached our calculations relating to the design of the sewer lift station to service thirteen (13) single-family residential lots at the Villaggio @ Golden Eagle subdivision in Rapid City, South Dakota. The construction plans were submitted under separate cover.

Calculations

Sewage quantities were estimated assuming the following criteria:

1. Thirteen (13) single-family residences within the service area.
2. 3.5 occupants per dwelling unit.
3. 100-gallon per day design discharge per occupant.
4. A peaking factor of 4.

The aforementioned parameters suggest a peak hourly flow of 13-gallons per minute to be used for design. The attached calculations demonstrate wet well sizing, dynamic head, pump cycle time, and pipe velocity computations.

Additional Information

The following lift station components are specified. Supporting documentation is attached for reference.

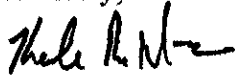
1. Hydromatic HPGFH300M2-4 Grinder Pumps, 230-volt, 1-phase
2. Hydromatic 3" x 4" PR Guide Rail System w/ Fiberglass I-Beam Rails
5. Haliday S1S (30" x 48") Aluminum Access Hatch (Wet Well)
6. Haliday S1S (36" x 36") Aluminum Access Hatch (Valve Pit)
7. Healy Ruff Control Panel, with listed options
8. Dayton Blower, Model #4C445A (Valve Pit)

The Villaggio @ Golden Eagle
Lift Station
Project #3077.01
March 23, 2007

Closure

If you have any questions or require additional information do not hesitate to contact me at (605) 721-4040.

Sincerely;



Kale R. McNaboe, P.E.

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FOR: City of Rapid City
300 Sixth Street
Rapid City, South Dakota 57701

BY: Sperlich Consulting, Inc

PROJECT: The Villaggio @ Golden Eagle
Sewer Quantities
Project: 3077

DATE: November 28, 2006
Revised March 19, 2007

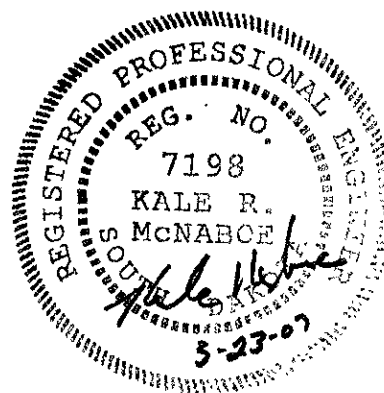
SEWAGE QUANTITIES

Dwellin Units (dwellings) = 13
Average Ocupants per dwelling unit = 3.5
Design Discharge per Occupant (gpd) = 100
Average Day (gallons/day) = 4550 gpd
Average Day (gallons/minute) = 3 gpm
Peaking Factor = 4
Peak Hour = 13 gpm

PIPE VELOCITY Q = AV
Q = 40 gpm
Pipe Diameter = 4 in
Pipe Area = 0.087 sf
Pipe Velocity = 1.0 ft/sec

Submersible Centrifugal Grinder Pumps = 2
Capacity = 40 gpm
Pump Outlet Elevation = 3683.5 ft
Gravity Man Outlet Elevaton = 3722.46 ft
Total Static Head = 39 ft

Wet Well Sizing $V = T \times q/4$
Minimum Time between starts (T) = 20 min
Pump Capacity (q) = 40 gpm
Volume between start and stop elevations = 200 gallons
Manhole Diameter = 6 ft
Volume per foot depth = 211.0 gal/ft depth
Drawdown (ft) = 0.95 ft
Max Operating Range @ 2 * Drawdown = 1.90 ft
Normal Storage Volume = 200 gallons
Max Storage Volume w/o Submergence = 400 gallons
Pump Cycle Time at Peak = 15.8 min
Pump Run Time = 5 min
Pump Cycle Time at Average = 63.3 min



DUCTILE IRON PIPE (ft)

Component	Quantity	Equivalent Length	Feet
Gate Valve	1	3.5	3.5
Check Valve	1	40	40
Te	1	30	30
90 Deg Elbow	3	14	42
Pipe Length	30	1	30
Total Equivalent Length			145.5

PVC PIPE (ft)

Component	Quantity	Equivalent Length	Feet
HDC Couplings	1	4.5	4.5
11.25 Deg Bends	1	4.5	4.5
22.5 Deg Bends	5	7.5	37.5
90 Deg Bend	1	14	14
Pipe Length	260	1	260
Total Equivalent Length			320.5

Friction Head Loss $H^L = 10.4397(L)[Q^{1.85}/C^{1.85}D^{4.8655}]$

DIP Equivalent L = 145.5 ft
Q = 40 gmp
C = 120
D = 4 in
DIP Head Loss = 0.23 ft

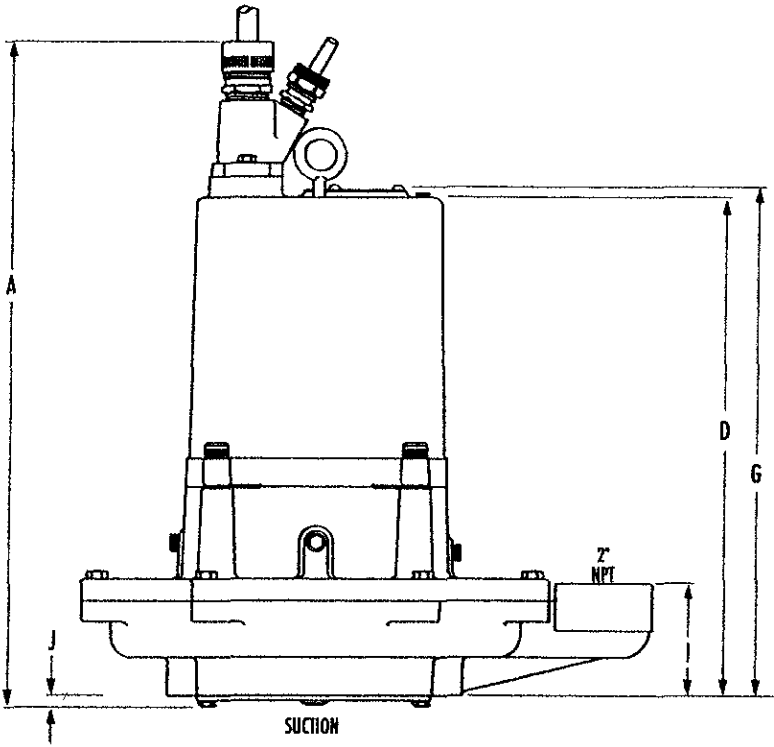
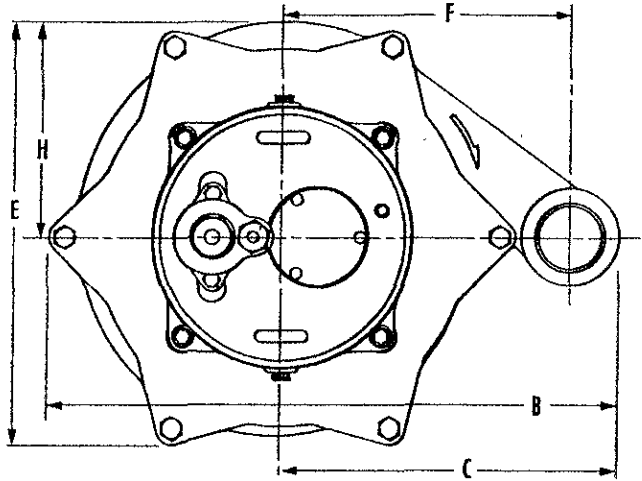
PVC Equivalent L = 320.5 ft
Q = 40 gmp
C = 150
D = 4 in
PVC Head Loss = 0.34 ft

Total Dynamic Head = 40 ft

Dimensional Data **HPGF**

Section **GRINDER** Page **203**
 Dated **JULY 2000**
 Supersedes **MAY 1999**

Vertical Discharge Standard



	A	B	C	D	E	F	G	H	I	J
HPGF	21-3/16	18-5/16	10-13/16	15-13/16	13-7/16	9-1/4	16-1/8	6-7/8	3-1/2	3/8

Vertical Discharge Standard

ALL DIMENSIONS IN INCHES
 NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"



Company: DAKOTA PUMP & CONTROL
 Name: VILLAGIO SUBDIVISION - RAPID CITY, SD
 Date: 2/21/2007



Pump:

Size: HPGF/H/X-300
 Type: GRINDER-SUBM
 Synch speed: 1800 rpm
 Curve:
 Specific Speeds:
 Dimensions:
 Speed: 1750 rpm
 Dia: 7.75 in
 Impeller:
 Ns: —
 Nss: —
 Suction: — in
 Discharge: 2 in

Search Criteria:

Flow: 40 US gpm Head: 40 ft

Fluid:

Water
 Density: 62.25 lb/ft³
 Viscosity: 1.105 cP
 NPSHa: — ft
 Temperature: 60 °F
 Vapor pressure: 0.2563 psi a
 Atm pressure: 14.7 psi a

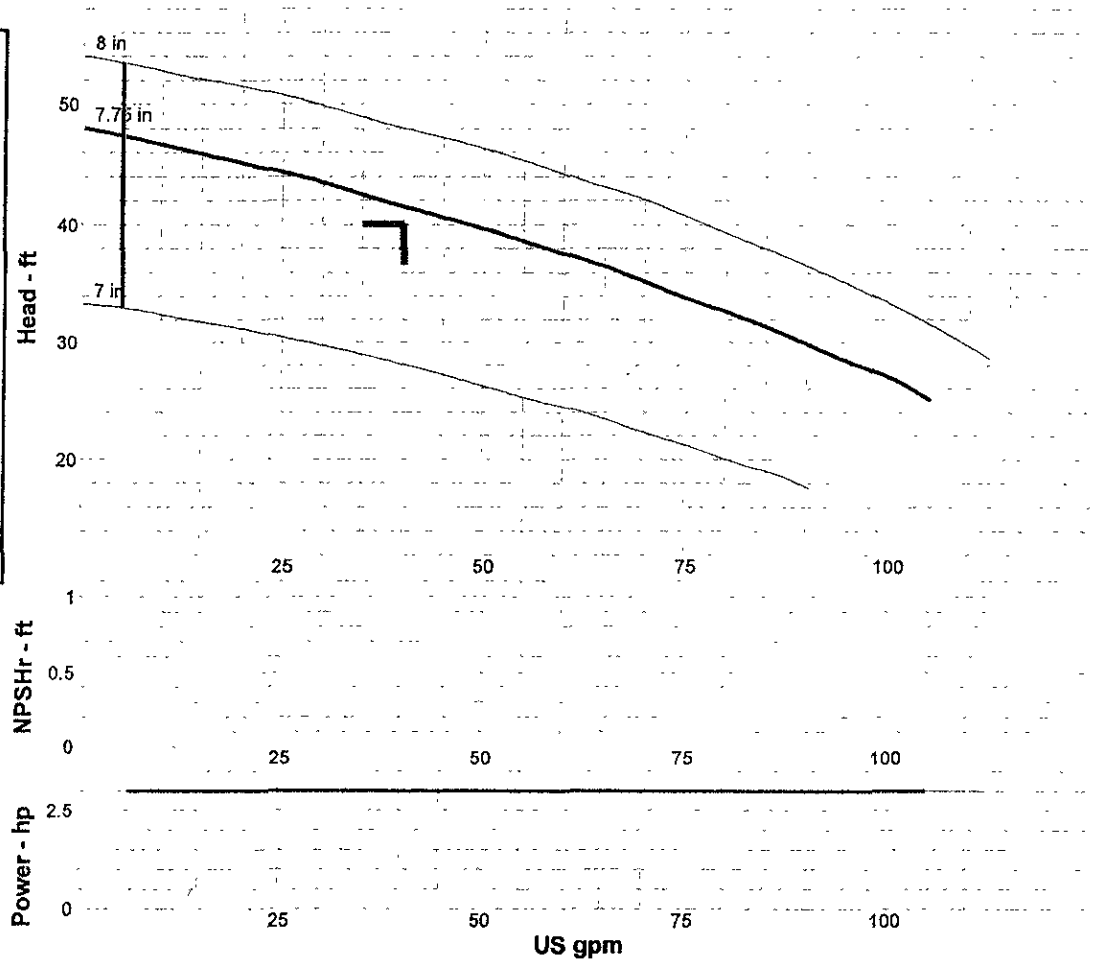
Motor:

Consult HYDROMATIC to select a motor for this pump.

Pump Limits:

Temperature: 140 °F
 Pressure: — psi g
 Sphere size: — in
 Power: — hp
 Eye area: — in²

Data Point:	
Flow:	40 US gpm
Head:	41.5 ft
Eff:	— %
Power:	3 hp
NPSHr:	— ft
Design Curve:	
Shutoff head:	48.1 ft
Shutoff dP:	20.8 psi
Min flow:	5 US gpm
BEP:	— %
NOL power:	3 hp @ 5 US gpm
Max Curve:	
Max power:	3 hp @ 5 US gpm



Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
48	1750	40	—	3	—
40	1750	41.5	—	3	—
32	1750	43.1	—	3	—
24	1750	44.5	—	3	—
16	1750	45.8	—	3	—

MODEL: HPGF/HPGFH — Standard Grinder Pumps

Physical Data:

DISCHARGE SIZE	2" NPT ON HPGF, 3" 125 LB. FLANGE ON HPGFH
IMPELLER TYPE	SEMI-OPEN 5 VANE
CABLE LENGTH	30' STANDARD
PAINT	PAINTED AFTER ASSEMBLY. DARK GREEN, ENAMEL, ONE COAT, AIR DRIED.

Temperature:

MAXIMUM LIQUID	140°F
MAXIMUM STATOR	311°F
OIL FLASH POINT	390°F
HEAT SENSOR	Open: 257°F MAX./239°F MIN. Closed: 194°F MAX./149°F MIN.

Technical Data:

POWER CORD TYPE	STW/STW-A WATER RESISTANT 600V, 60°C	
SENSOR CORD TYPE	16-4 STW-A WATER RESISTANT 600V, 60°C, 10 AMPS	
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON ASTM A-48 CLASS 30
	CASING	CAST IRON ASTM A-48 CLASS 30
	IMPELLER	RED BRASS #85-5-5-5 ASTM B584-836
	CUTTERS	Stationary: 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C Upper (Axial): 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C Lower (Radial): 440C STAINLESS STEEL HARDENED TO 55-60 ROCKWELL C
	MOTOR SHAFT	416 STAINLESS STEEL
	HARDWARE	300 SERIES STAINLESS STEEL
	"O" RINGS	BUNA N
MECHANICAL SEALS	Standard: UPPER AND LOWER CARBON/CERAMIC/BUNA-N, TYPE 21 Optional: LOWER TUNGSTEN CARBIDE/TUNGSTEN CARBIDE/BUNA-N, TYPE 21	
UPPER BEARING	(RADIAL) SINGLE ROW BALL (6303)	
LOWER BEARING	(THRUST) SINGLE ROW BALL (3307)	
MIN. B-10 BEARING LIFE	50,000 Hrs	

2. The motor and seal housing chambers shall be hi-potted to test for moisture content and/or insulation defects.
3. Pump shall be allowed to run dry to check for proper rotation.
4. Discharge piping shall be attached, the pump submerged in water and amp readings shall be taken in each leg to check for an imbalanced stator winding. If there is a significant difference in readings, the stator windings shall be checked with a bridge to determine if an unbalanced resistance exists. If so, the stator will be replaced.

5.01 **WARRANTY**

- A. The pump unit or any part there of shall be warranted against defects in material or workmanship within one year from date of installation or 18 months from date of manufacture, whichever comes first, and shall be replaced at no charge with a new or re manufactured part, F.O.B. factory or authorized warranty service station. The warranty shall not assume responsibility for removal, reinstallation or freight, nor shall it assume responsibility of incidental damages resulting from the failure of the pump to perform. The warranty shall not apply to damage resulting from accident, alteration, design, misuse or abuse.

CAST IRON HPGH/HPGHH/HPGF/HPGFH SUBMERSIBLE SEWAGE GRINDER PUMPS

1.01 GENERAL

A. Contractor shall furnish all labor, materials, equipment and incidentals required to provide _____ (Qty.) submersible centrifugal sewage grinder pump(s) as specified herein.

2.01 OPERATION CONDITIONS

A. Each pump shall be rated _____ H.P., _____ volts, _____ phase, _____ hertz, _____ R.P.M. The unit shall produce _____ U.S. GPM at _____ feet TDH.

3.01 CONSTRUCTION

A. Each pump shall be of the sealed submersible type, Model _____ as manufactured by Hydromatic Pumps, Inc. The pump volute, motor and seal housing shall be high quality gray cast iron, ASTM A-48, Class 30. All external mating parts shall be machined and Buna N Rubber O-ring sealed on a beveled edge. Gaskets shall not be acceptable. All fasteners exposed to the pumped liquids shall be 300 series stainless steel.

3.02 ELECTRICAL POWER CORD

- A. Electrical power cord shall be water resistant 600V, 60°C., UL and/or CSA approved and applied dependent on amp draw for size.
- B. The power cable entry into the cord cap assembly shall first be made with a compression fitting. Each individual lead shall be stripped down to bare wire, at staggered intervals, and each strand shall be individually separated. This area of the cord cap shall then be fitted with an epoxy compound potting which will prevent water contamination to gain entry even in the event of wicking or capillary attraction.
- C. The power cord leads shall then be connected to the motor leads with extra heavy connectors having brass inserts with a screwed wire to wire connection.

3.03 MOTOR

- A. The stator, rotor and bearings shall be mounted in a sealed submersible type housing. The stator windings shall have Class F insulation, (155°C. or 311°F.), and a dielectric oil filled motor, NEMA B design (3 phase), NEMA L design (single phase).
- B. The pump and motor shall be specifically designed so that they may be operated partially dry or completely submerged in the liquid being pumped.
- C. Stators shall be securely held in place with a removable end ring and threaded fasteners so they may be easily removed in the field, and must be capable of being repaired or rewound by a local motor service station. No special tools shall be required for pump and motor disassembly.
- D. Pump shall be equipped with heat sensors. The heat sensor(s) (one on single phase, two on three phase) shall be a low resistance, bi-metal disc that is temperature sensitive. It (they) shall be mounted directly in the stator and sized to open at 120°C. or 130°C. and automatically reset at 30-35°C. differential. The sensor shall be connected in series with the motor starter coil so that the starter is tripped if a heat sensor opens. The motor starter shall be equipped with overload heaters so all normal overloads are protected by external heater block.

MODEL: HPGF/HPGFH—Standard Grinder Pump

R.P.M.	1750			
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION			
MOTOR DESIGN NEMA TYPE	B (3 ϕ) L (1 ϕ)			
GENERAL INSULATION CLASS	F			
STATOR WINDING CLASS	F			
MAXIMUM STATOR TEMPERATURE	155°C – 311°F			
MOTOR PROTECTION	BI-METALLIC, TEMPERATURE SENSITIVE DISC, SIZED TO OPEN AT 120°C AND AUTOMATICALLY RESET @ 30–35°C DIFFERENTIAL, ONE IN SINGLE PHASE, TWO IN THREE PHASE			
ELECTRICAL RATINGS	HEAT	24VDC	115VAC	230VAC
	SENSOR	5AMPS	5AMPS	5AMPS
	SEAL FAIL	300VAC 5mA		
VOLTAGE TOLERANCE	±10%			

HP	VOLTAGE	PHASE	NEC CODE	BF	FULL LOAD AMPS	BF AMPS	LOCKED RTR. AMPS	RUN KW	START KVA	RUN KVA
3	200	1	G	1.2	19.6	22.9	91	3.3	18.2	3.9
	230				17.1	20	79			
5	230	1	G	1.2	29.5	34.2	125	5.7	28.8	6.8
3	200	3	J	1.2	10.9	12.8	64.5	3.1	22.3	3.8
	230				9.5	11.1	56			
	460				4.8	5.6	28			
	575				3.8	4.5	22.5			
5	200	3	J	1.2	17.6	20.6	108	4.8	37.4	6.1
	230				15.3	17.9	94			
	460				7.6	8.9	47			
	575				6.1	7.2	37.6			
7.5	200	3	J	1.2	29	32.9	194	7.2	67	10.1
	230				25.2	28.6	168			
	460				12.6	14.3	84			
	575				10.1	11.4	67.2			

3.04 BEARINGS AND SHAFT

- A. An upper radial bearing and a lower thrust bearing shall be required. These shall be permanently lubricated by the dielectric oil which fills the motor housing.
- B. The shaft shall be machined from a solid 416 stainless steel and be a design which is of large diameter with minimum overhand to reduce shaft deflection and prolong bearing life.

3.05 SEALS AND SENSORS

- A. The rotor and stator in the motor housing shall be separated and protected from the pumped liquid by an oil filled seal housing incorporating two type 21 carbon ceramic mechanical seals mounted in tandem. This seal housing shall be equipped with 2 moisture sensing probes installed between the seals, and the sensing of moisture in the seal chamber shall be automatic, continuous, and not require the pump be stopped or removed from the wet well.

3.06 IMPELLERS

- A. Impeller shall be brass multi-vane, semi-open, non-overloading design. They can either be factory or field trimmed to meet specific performance conditions. Impellers shall be hydraulically and statically balanced at the factory, and machined for threading on to the pump shaft. Wear or field trimming shall not deter the factory balance.

3.07 GRINDER CUTTERS

- A. The combination centrifugal pump impeller and grinder unit shall be attached to the common motor and pump shaft made of 416 stainless steel. The grinder unit shall be on the suction side of the pump impeller and discharge directly into the impeller inlet leaving no exposed shaft to permit packing of ground solids. The grinder shall consist of two stages. The cutting action of the second stage shall be perpendicular to the plane of the first cut for better control of the particle size. The grinder shall be capable of grinding all materials found in normal domestic sewage, including plastics, rubber, sanitary napkins, disposable diapers, and wooden articles into a finely ground slurry with particle dimensions no greater than 1/4 inch. Both stationary and rotating cutters shall be made of 440C stainless steel hardened to Rockwell 60C and ground to close tolerance.
- B. The upper (axial) cutter and stationary cutter ring shall be reversible to provide new cutting edges to double life. The stationary cutter ring shall be a slip fit into the suction opening of the volute and held in place by three (3) 300 series stainless steel screws and a retaining ring. The lower (radial) cutter shall macerate the solids against the I.D. of the cutter ring and extrude them through the slots of the cutter ring. The upper (axial) cutter shall cut off the extrusions, as they emerge from the slots of the cutter ring to eliminate any roping effect which may occur in single stage cutting action. The upper (axial) cutter shall fit over the hub of the impeller and the lower (radial) cutter shall be slip fit and secured by means of peg and hole and rotate simultaneously with the rotation of the shaft and impeller. The grinding mechanism shall be locked to the shaft by a 300 series stainless steel countersunk washer in conjunction with a 300 series stainless steel flat head cap screw threaded into the end of the shaft.

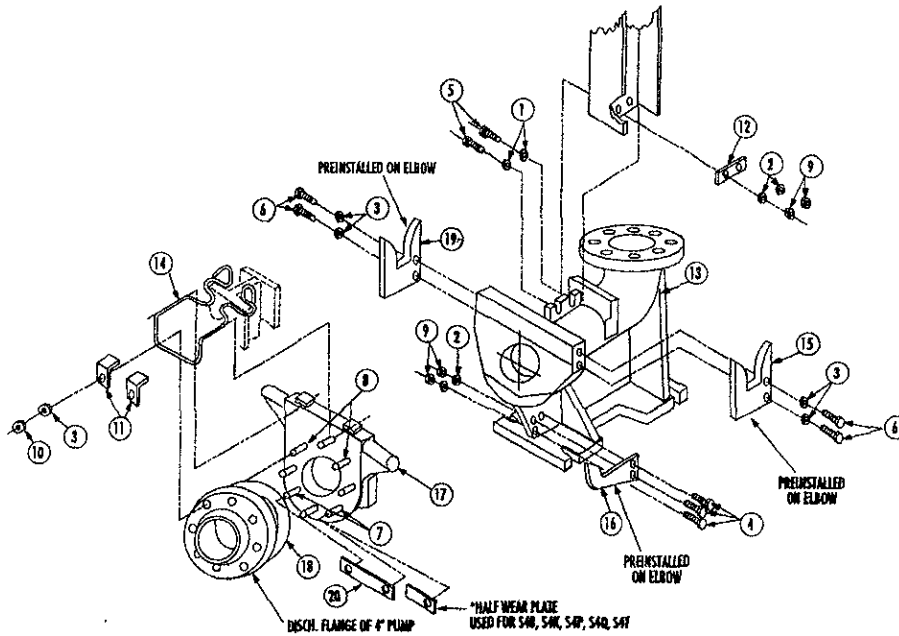
3.08 PAINTING

- A. The pump shall be painted after assembly, and testing, with a dark green water reducible air dry enamel. The paint shall be applied in one coat covering all exterior surfaces.

4.01 TESTING

- A. Commercial testing shall be required and include the following:
 - 1. The pump shall be visually inspected to confirm that it is built in accordance with the specification as to HP, voltage, phase and hertz.

4" PULTRUDED RAIL ASSEMBLY



ITEM NUMBER	PART NUMBER	DESCRIPTION	QUANTITY
1	00156-032-1	WASHER-FLAT 3/8 SST	2
2	00177-008-1	WASHER-LOCK 3/8 SST	4
3	00177-019-1	WASHER-LOCK 5/8 SST	12
4	00238-007-1	SCREW-HEX CAP 3/8-16 X 1-1/4" SST	3
5	00238-009-1	SCREW-HEX CAP 3/8-16 X 2" SST	2
6	00570-007-1	SCREW-HEX CAP 5/8-11 X 2" SST	4
7	01030-011-1	5/8" STUD X 2-1/2" SST	6
8	01030-015-1	5/8" STUD X 3" SST	2
9	01032-003-1	NUT-HEX 3/8-16 SST	4
10	01124-004-1	NUT-HEX 5/8-11 SST	8
11	14204-011-3	CLIP-RETAINER SST	2
12	12186-005-3	WASHER-GUIDE RAIL SST	1
13	12807-003-2	ELBOW-DISCHARGE CI	1
14	12942-003-5	CONNECTOR-GUIDE RAIL SST	1
15	13983-003-2	ARM-GUIDE RH	2
16	12950-018-3	GUIDE BOTTOM FLANGE SST	1
17	13021-000-5	FLANGE-HYDRAU. SEAL. ASSY.	1
18	02407-002-1	GASKET-RED RUBBER	1
19	1398-002-2	ARM-GUIDE LH	1
20	6752-004-3(STD.4")	WEAR PLATE	1
*	6752-005-3"	HALF WEAR PLATE	1

ALL DIMENSIONS IN INCHES

**RECOMMENDED SPECIFICATIONS
FLOMATIC IRON BODY, BRONZE
MOUNTED SWING CHECK VALVES
MODELS 92, 92LS, 92LW, 92CS**

Checks valves shall be of swing type and shall meet the material requirements of AWWA specification C508. The valve shall be iron body (epoxy coated), bronze mounted, single disc for nonshock working pressure 175 psi 2"-12" and hydrostatically tested at twice the working pressure.

The seat ring shall be bronze or stainless steel (renewable). The disc shall be bronze. The flange shall be Class 125. When specified, a Buna-N seal shall be furnished to provide zero leakage. The Buna-N seal shall be vulcanized to the flapper plate and may not be glued or chemically adhered.

The valve shall be so constructed that by simply unbolting and lifting off the cover, the internal working parts may be easily removed and replaced without removing the valve from the line.

The valve shall be of the conventional swing check style provided with a lever and weight or lever and spring assisted closure.

The valve shall be constructed to accept a pneumatic cylinder that effectively eliminates water hammer when properly applied.

The valve shall permit flow in one direction only; be tight seating when the outlet pressure exceeds the inlet pressure and be suitable for mounting in horizontal or vertical lines. (PLEASE SPECIFY FOR SERIES 92CS).

The valve shall have a stainless steel shaft (hinge pin) supported by bronze bearings and sealed by an adjustable packing gland with compression type packing.

The valve shall be equal in all respects to the Model 92, 92LS, 92LW or 92CS as manufactured by Flomatic Corporation.

SIZE:

TYPE: Conventional. Lever & Weight, Cushioned (Sealed Cylinder).

END TYPES: Flange Class 125.

SEAT SEAL: Bronze or Vulcanized Buna-N.

Swing Check Valve

125# Flange

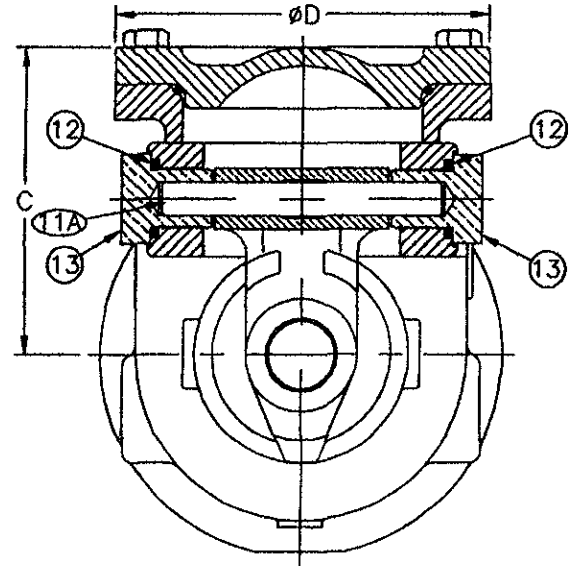
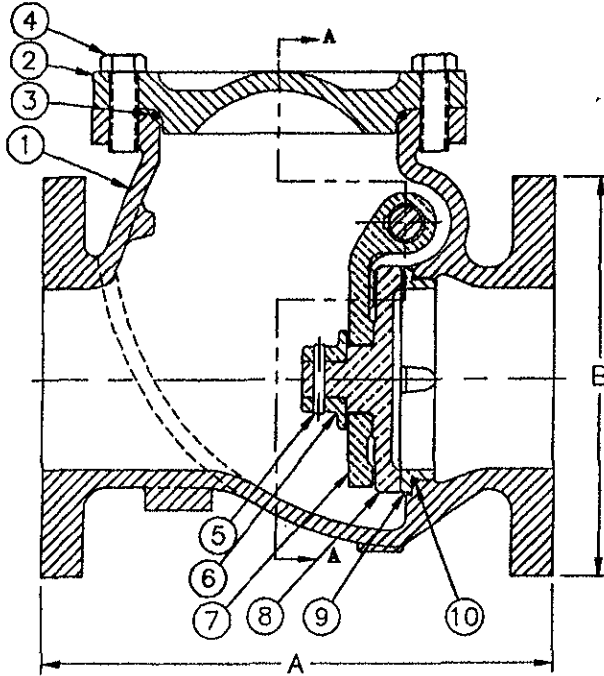
Model 92



Danfoss Flomatic

Sizes 4" & 6" / 100 mm & 150 mm

Materials



Item #	Qty	Description	Material	ASTM	Item #	Qty	Description	Material	ASTM
1	1	Body*	Cast Iron	A126	8	1	Flapper Plate	Federalloy	I-836-FL
2	1	Cover*	Cast Iron	A126	9	1	Seat Ring	Federalloy	I-836-FL
3	1	Cover O'Ring	Buna-n	---	10	1	Seat Ring O'Ring	Buna-n	---
4	4	Cover Bolt	Stainless Steel	18-8	11A	1	Flapper Support Shaft	Stainless Steel	17-4
5	1	Flapper Bolt	Stainless Steel	18-8	12	2	Bearing O'Ring	Buna-n	---
6	1	Flapper Nut	Federalloy	I-836-FL	13	2	Shaft Support Bearing	Bronze	B140
7	1	Hinge Lever Arm	Federalloy	I-836-FL					

*Epoxy Coated
Optional resilient seat (Nitrile) available, add "R" to the end of the part number

Dimensions

Size		Part #	A		B		C		D		Weight	
Inch	mm		Inch	mm	Inch	mm	Inch	mm	Inch	mm	lbs	kg
4	100	3707	11-1/2	292	8-57/84	226	7-7/32	183	8-3/8	213	109	50
6	150	3709	14	358	10-3/4	273	8-17/32	217	10-7/16	265	195	89

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MANUFACTURED IN COMPLIANCE WITH AWWA C508 STANDARD

DANFOSS FLOMATIC CORP.
GLENS FALLS, N.Y. 12801
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FAX (518) 781-8788

November 18, 2004
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FLOMATIC®

SERIES S1S ACCESS DOOR



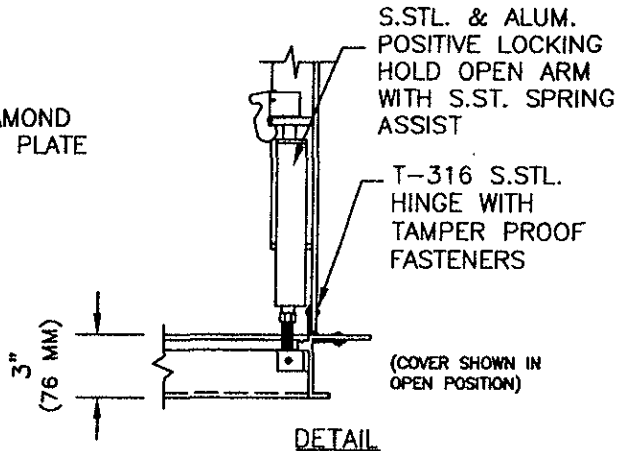
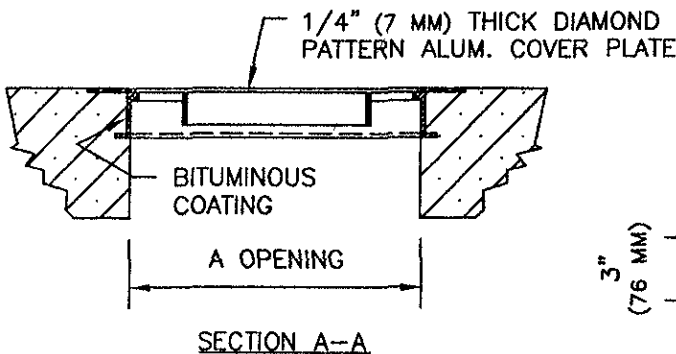
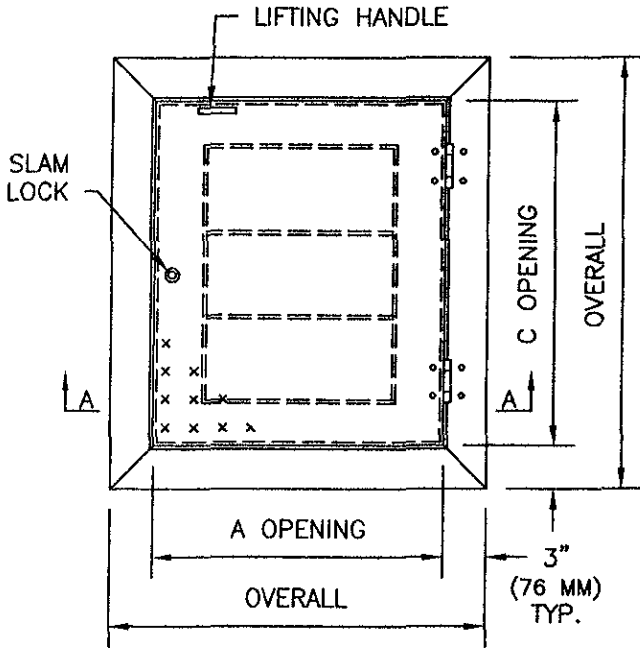
www.HallidayProducts.com
 Phone 800-298-1027
 Fax 407-298-4534
 Sales@HallidayProducts.com

STANDARD FEATURES:

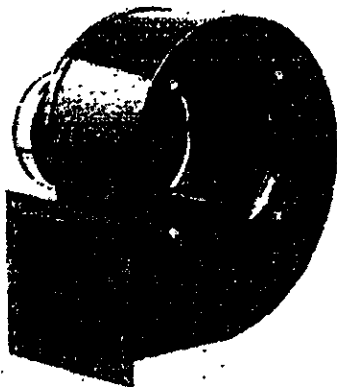
- AUTO-LOCK T-316 STAINLESS STEEL HOLD OPEN ARM WITH RELEASE HANDLE
- T-316 STAINLESS STEEL HINGES AND ATTACHING HARDWARE
- T-316 STAINLESS STEEL SLAM LOCK WITH REMOVABLE KEY
- STAINLESS STEEL COMPRESSION SPRING ASSIST
- BUILT-IN NEOPRENE CUSHION/GASKET
- NON-OZONE DEPLETING BITUMINOUS COATING
- SINGLE LEAF CONSTRUCTION
- 300 LBS. PER SQ. FT. LOAD RATING (1464 KG. PER SQ. METER LOAD RATING)
- EXTRUDED ALUMINUM FRAME
- RECESSED LIFTING HANDLE
- LIFETIME GUARANTEE

STANDARD SIZES

QTY.	MODEL NO.	A DIM. INCHES (MM)	C DIM. INCHES (MM)	UNIT WT. LBS. (KG.)
	SIS2424	24 (610)	24 (610)	37 (17)
	SIS2430	24 (610)	30 (762)	42 (19)
	SIS2436	24 (610)	36 (914)	48 (22)
	SIS2442	24 (610)	42 (1067)	55 (25)
	SIS2448	24 (610)	48 (1219)	61 (28)
	SIS3030	30 (762)	30 (762)	49 (22)
	SIS3036	30 (762)	36 (914)	57 (26)
	SIS3042	30 (762)	42 (1067)	64 (29)
	SIS3048	30 (762)	48 (1219)	71 (32)
	SIS3054	30 (762)	54 (1372)	79 (36)
	SIS3060	30 (762)	60 (1524)	87 (39)
	SIS3636	36 (914)	36 (914)	65 (25)
	SIS3642	36 (914)	42 (1067)	79 (36)
	SIS3648	36 (914)	48 (1219)	85 (39)
	SIS3654	36 (914)	54 (1372)	91 (41)
	SIS3660	36 (914)	60 (1524)	100 (45)
	SIS3666	36 (914)	66 (1676)	109 (49)
	SIS3672	36 (914)	72 (1829)	116 (53)
	SIS4242	42 (1067)	42 (1067)	93 (42)



350 to 1210 CFM Shaded Pole & Permanent Split-Capacitor Blowers



4C445A

Features/Benefits

- CSA listed and UL component recognized for construction, impedance, and thermal protection to assure you of electrical safety and quality. These features may be required to obtain agency approval on manufactured equipment
- Provides wide range of air delivery rates, from 350 up to 1210 CFM (Free Air) for economical operation in larger heating, cooling, ventilating and exhaust installations
- Forward curved wheels driven by Dayton motors are rated for continuous duty
- All position mount sleeve bearings make installation easy in a variety of mounting arrangements
- Energy-efficient permanent split-capacitor and shaded pole (single or dual speed) motors provide long term reliability in ambient temperatures up to 104°F
- Baked on gray enamel finish

A. Shaded Pole & PSC Blowers – provide air deliveries from 350 to 495 CFM; 115V or 230V, 50/60 Hz; single and dual speed

MODEL 4C445A Specifications

MODEL	WHEEL SIZE		MOTOR			OUTLET OPENING		OVERALL DIMENSIONS		
	DIA.	W	HP	SPD.	PWR. REQD.	H	W	H	W	D
4C445A	6 $\frac{5}{16}$	4 $\frac{3}{32}$	1/10	1	115V 50/60 Hz	4 $\frac{1}{4}$	5 $\frac{1}{16}$	11 $\frac{1}{8}$	9 $\frac{1}{2}$	10 $\frac{1}{16}$

Performance

MODEL	FREE AIR	CFM AIR DELIVERY AT SPEED AND STATIC PRESSURE (SP) SHOWN								FREE AIR		
		0.1" SP	0.2" SP	0.3" SP	0.4" SP	0.5" SP	0.6" SP	0.7" SP	0.8" SP	SPEED	WATTS	AMPS
4C445A	495	476	458	437	416	387	360	312	265	1570	225	3.25



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Email: info@healyruff.com ♦ Web: www.healyruff.com

BUDGETARY PROPOSAL

To: Mr. Dave Redlin **Date:** February 23, 2007
Company: Dakota Pump & Control **Quote #:** 070223JFS1
Job Name: Rapid City, SD
Villagio LS **Approval drawings:** 4 to 8 weeks after receipt of an acceptable order.
Bid Date: N/A **Delivery:** 8 to 12 weeks after receipt of approved drawings.
Bid Time: N/A

We are pleased to provide a budgetary proposal to furnish a Duplex, 3 HP, 230 Volts, 1 Ph D1P230 control panel as described in your Request for Quote via e-mail (2/21/07)

Addenda received: None

1) Specific Exclusions:

- A) Float Switches
- B) Soft Starters
- C) Building Intrusion Alarm Sensor (Contact Input to Control Panel is Included)

This proposal includes all items described below:

2) Duplex Single Phase 3 HP 230 VAC Control Panel:

- A) UL Type 3R Painted Enclosure
 - i) Inner Door
 - ii) 12" Legs with Skirts
 - iii) 3-Point Latch
- B) Lightning Arrestor
- C) UL 698A Intrinsically Safe Label
- D) Combination Starter(s)
 - i) Circuit Breaker
 - ii) NEMA Starter
 - iii) Class 10 Overloads
 - iv) Overload Reset Button
- E) Start / Run Capacitors
- F) Circuit Breakers



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- i) Control
- G) UPS/Battery Backup
- H) Seal Failure Relays
- I) Pilot Devices
 - i) H-O-A Switches
 - ii) Selector Switch
 - iii) Reset Button
 - iv) Elapsed Time Meters
- J) Pilot Lights
 - i) Run
 - ii) Over Temp
 - iii) Seal Failure
- K) Allen-Bradley SLC 5/04 Programmable Logic Controller (PLC)
 - i) SLC 5/04 Processor with 16K Memory
 - ii) Seven Slot Rack
 - iii) Rack Mount Power Supply
 - iv) 16 Channel Discrete Input Module
 - v) 8 Channel Discrete Output Module (Qty -2)
 - vi) 4 Channel Analog Input Module
 - vii) Operating Cable
- L) Allen-Bradley Panel View 600 Operator Interface
- M) Intrinsically Safe Barriers
- N) Contact Input for Intrusion Alarm (Sensor Not Supplied)

3) Provided for separate wiring and mounting by others

- A) Submersible Pressure Transducer (Qty - 2)
 - i) 0-34' Range
 - ii) 75' Cable
 - iii) 3" Diaphragm
 - iv) Cable Hanger
 - v) Vent Tube
 - vi) Aneroid Bellows

Factory start-up is not included.

YOUR PRICE - \$ 31,000.00



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IMPORTANT NOTES:

1) Mount & Wire Equipment

- A) When you provide equipment for us to mount & wire, YOU can help keep your costs down and ensure timely delivery by providing the information outlined below:
 - i) All components supplied to Healy-Ruff must meet UL approval.
 - ii) To build the submittal drawings in the allocated time, we need the exact part number, schematic diagrams, environmental data and reproducible catalog cut sheets and other pertinent data before we proceed.
 - iii) When the project is released for manufacturing, we need to know when your parts are going to be received in our facility before we can give you a production date.

2) Factory Startup

- A) If factory start-up service is purchased, Healy-Ruff will send a service representative to make final adjustments and start-up equipment.
- B) A Startup Request Authorization form must be completed to obtain start-up service installation of equipment. This form must be completed before our representative arrives at the job-site. If a Healy-Ruff representative arrives at job-site as requested and is delayed in performing the work due to an incomplete installation or any other cause beyond our control, the buyer agrees to pay Healy-Ruff standard rates for lost time or for a return trip if caused by the delay.
- C) Factory startup transportation expenses are priced based on receiving three weeks advance notice. If full fare tickets are required to meet a "short notice" startup request, we will require a purchase order for the difference between the allocated amount and the actual ticket cost before purchasing the tickets.

3) Proposal Acceptance

- A) If this proposal is accepted, please send the following information with your purchase order:
 - i) Motor FLA= _____
 - ii) Start and run capacitor sizing.
 - iii) Wet well depth
 - iv) Level set points (will be factory set if available prior to production release).
 - v) Additional submersible transducer cable required (standard length is 75'). Additional cable (over 75') is \$2.25/foot.
- B) This proposal is based on the payment terms as defined under "TERMS" in this proposal. If other payment terms are desired, it may be necessary to adjust the price to compensate for the change in cost of financing.
- C) The following terms and conditions are part of this proposal.



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CONDITIONS OF SALE

Delivery - The Company warrants that the equipment will be free of any damage at the time of shipment. The Purchaser must inspect the equipment at the time of delivery and note any damage on the carrier packing slips. The Purchaser must also, within 24 hours, call Healy-Ruff Company's General Manager and advise him/her of the damage. It is the responsibility of the Purchaser to file a claim with the carrier for the damage. The Purchaser should save all packing material until an authorized inspector from the carrier assesses the damages.

Delays - The Company will not be liable for delays in delivery due to (1) causes beyond its reasonable control (2) acts of God, acts of the Purchaser, acts of civil or military authority, priorities, fires, strikes or other labor disturbances, floods, epidemics, war, riot, delays in transportation or car shortages.

Changes to Contract - The purchase contract can be modified only after written acceptance by the company with a price adjustment to compensate for any change in the Company's costs due to the change. The purchase contract can be canceled upon written notice by the Purchaser, written acceptance by the Company and upon payment to the Company of reasonable and proper cancellation charges for work already completed prior to approval. Once project approval has been provided and material has been released for manufacture, the contract cannot be cancelled.

Limited Warranty - The Company warrants that the equipment will be free from defects in material and workmanship for 12 months after startup, not to exceed 18 months after shipment. Company will correct any defect in the field at its option either 1) in the field or 2) by shipping repaired or replacement parts to the job site. The liability of the Company will not exceed the cost of correcting defects in the equipment. This warranty is exclusive and in lieu of all other warranties. No warranty or fitness for purpose will apply. The Company will not pay the costs of repairs, service, adjustment or modification unless we agree in writing before the work is done.

Damages - The Company will not accept any liquidated damages or reductions in its invoice amount unless the damages/reductions have been agreed to in writing between the Purchaser and an Officer of Healy-Ruff. The Company will not participate in Purchasers agreement with second parties or the ultimate user. The Company will not be liable for any special or consequential damages.

Delays - If the Purchaser delays shipment after it is released to manufacturing, the Company will invoice on the date the equipment is ready to ship and payment will be due 30 days thereafter. Equipment so held will be stored on Company premises at the risk of the Purchaser. Partial shipments and billings will only be made by mutual agreement between the purchaser and the Company.

Taxes - Prices do not include sales, use, excise, occupation, processing, transportation or other similar taxes that we may be required to collect under existing or future law. You will pay such taxes or you shall provide us with a tax exemption certificate acceptable to the appropriate taxing authorities.

Applicable Law - The rights and duties of the parties will be governed by the laws of the State of Minnesota.

Healy-Ruff Company

Jack Schneewind
Application Solutions Team