

**SPF**Water Engineering, LLC
water resource consultants

August 30, 2007

Idaho Department of Water Resources
The Idaho Water Center
322 E Front Street
Boise, Idaho 83720-0098d. A.
RECEIVED

AUG 31 2007

DEPARTMENT OF
WATER RESOURCES

Attention: Shelley Keen,

Subject: Beneficial Use Field Exam for 72-7573, Thompson Creek Mining Company

Dear Mr. Keen,

A Beneficial Use Field Exam for water right permit number 72-7573 was conducted on June 5, 2007. Bert Doughty, Environmental Manager for Thompson Creek Mining Company, accompanied me during the field exam. The field exam report and supporting documents are enclosed. The Proof of Beneficial Use form is currently en-route to Mr. Doughty for signature and I anticipate submitting this form to your office shortly.

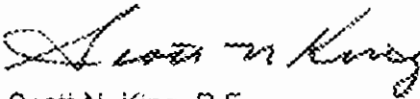
The water diversion and use system is very similar to the system described in the earlier field exam report for water right number 72-7414. Major differences and changes since this earlier exam include:

- **Points of diversion:** A new point of diversion has been developed in the pit. This point is located at 11N 16E Section 3 NENE, northwest of the original Section 2 SWNW point of diversion. Actual diversion points will migrate along the axis of the mine between these two locations as the mine is developed.
- **Pumps:** Larger pumps with greater flow and lift capacity are now required to maintain adequate dewatering for continued mine operation. These pumps are described in my field exam report.
- **Place of use:** Water is pumped from the mine pit to a pit booster station and from this pit booster station to holding tanks and/or to the tailings pond. Water is subsequently diverted from the tanks and/or tailings pond to the mill for final use. The holding tanks, located at 11N 16E Section 1 SWSE, are included as a place of use in the enclosed report.

I understand that Dylan Lawrence or Scott Campbell of Moffatt Thomas will submit an application amending the permit to include the new point of diversion and place of use described above. Based on my discussions with Mr. Lawrence, the amended application will be consistent with my findings during the exam and as documented in the field exam report. I do not anticipate that the amended permit application will affect the results of the beneficial use field exam and subsequent report. I further understand that Mr. Lawrence or Mr. Campbell will submit proof of beneficial use for this permit.

Please contact me with any questions regarding this field exam and report

Sincerely,



Scott N. King, P.E.
Senior Project Engineer



Copy: Dylan Lawrence / Moffatt Thomas Barrett Rock & Fields
Bert Doughty / Thompson Creek Mining Company

File: 272.0050

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No. 72-7573

1. Owner: THOMPSON CREEK MINING COMPANY Phone No. (208) 838-3511

Current Address: PO BOX 62 CLAYTON, ID 83227

2. Accompanied by: Bert Doughty EXAM DATE: June 5, 2007

Address: same Phone No same

Relationship to Permit Holder: Environmental Manager

3. Source: Ground Water tributary to _____

B. OVERLAP REVIEW

1. Other water rights with the same place of use: 72-7193, 72-7257, 72-7414

2. Other water rights with the same point of diversion: 72-7414

C. DIVERSION AND DELIVERY SYSTEM

1. Point(s) of Diversion:

Ident No.	Gov't Lot	¼	¼	¼	Sec	Twp.	Rge.	County	Method of Determination/Remarks
Lower Pit			SW	NW	2	11N	16E	Custer	2004 NAIP imagery, GPS, and GCDB spatial layer
Mid Pit			NE	NE	3	11N	16E	Custer	2004 NAIP imagery, GPS, and GCDB spatial layer

2. Place(s) of Use:

Indicate Method of Determination: Field examination. Same Use as 72-7414

TWP	RGE	SEC	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
11N	16E	12	I	I															
		1															I		

I = Industrial

3. **Delivery System Diagram:** Indicate all major components and distances between components. Indicate weir size/ditch size/pipe i.d. as applicable.

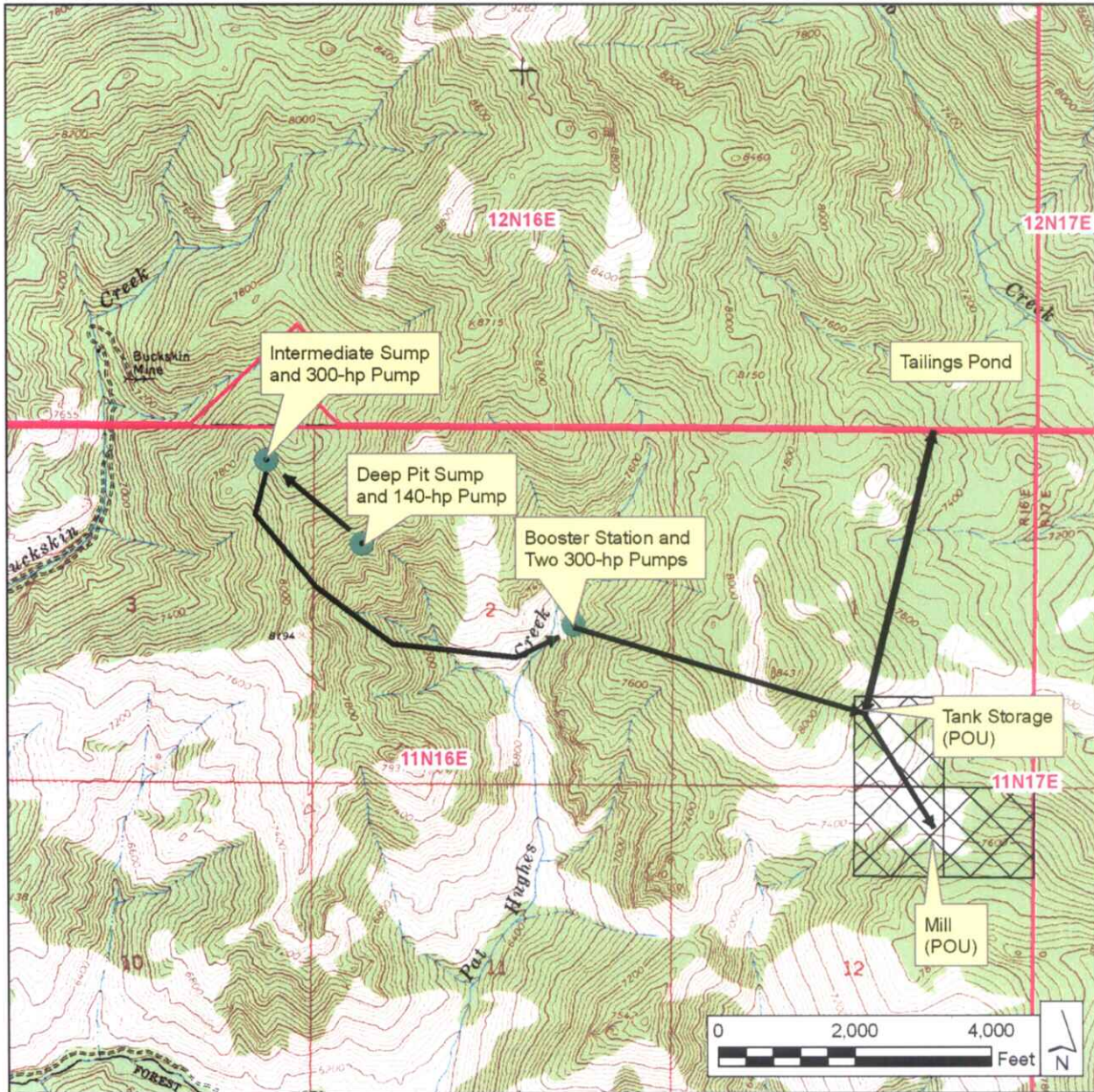


Figure 1: Delivery System Diagram on USGS Quadrangle

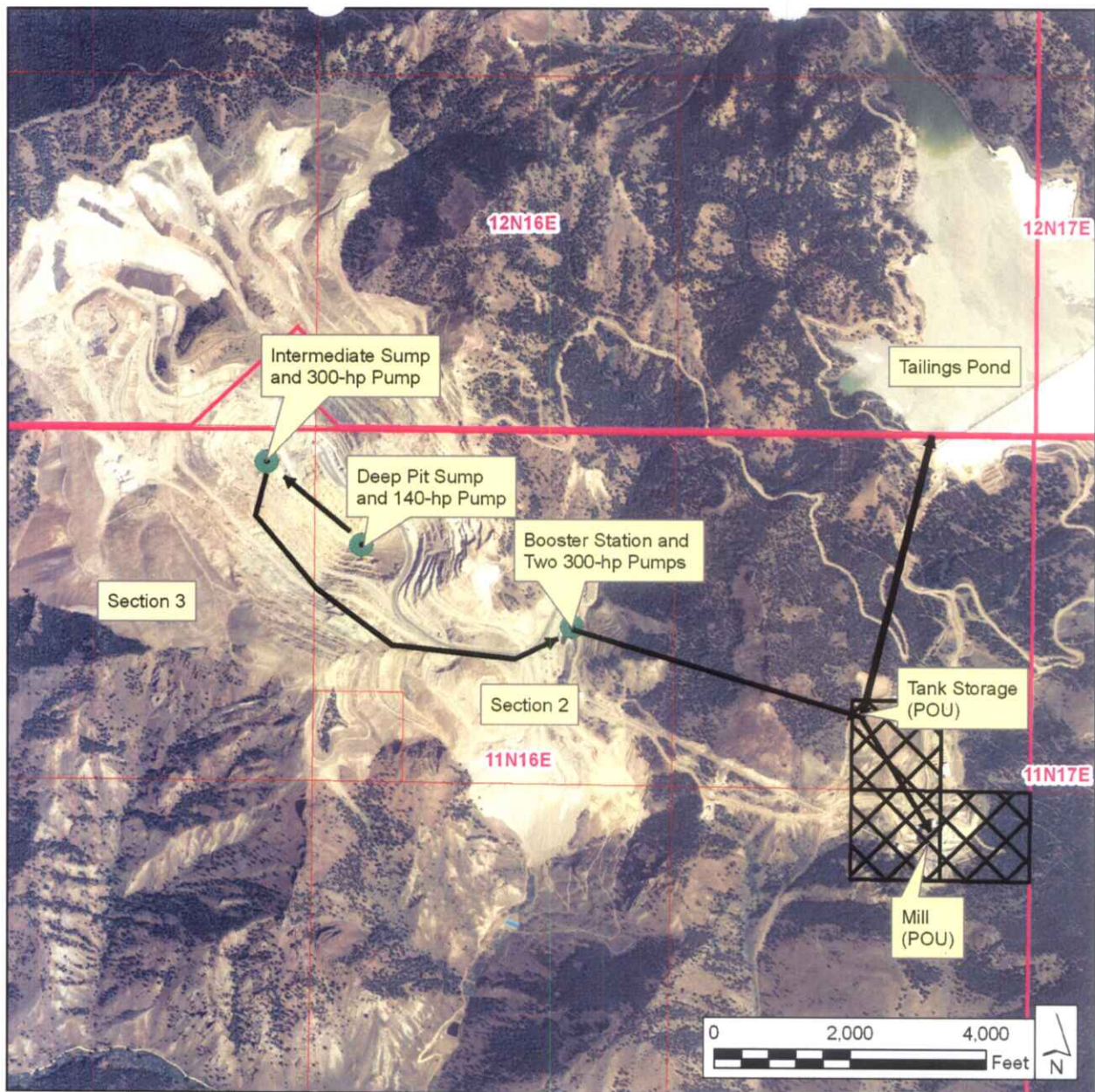


Figure 2: Delivery System Diagram on 2004 NAIP Aerial Imagery.

☒ Copy of USGS Quadrangle Attached Showing location(s) of point(s) of diversion and place(s) of use (required).

☒ Aerial Photo Attached (required for irrigation of 10+ acres)

☒ Photo of Diversion and System Attached

4.

Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
Lower sump	Unknown	140	2400.402 9460015	Flygt	2400.402 9460015
Upper sump	Unknown	300	Unknown	Floway	1770 RPM, Model 12JKH

*Code to correspond with No. on map and aerial photo

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
Permanently Installed Magnetic Flowmeter	Mag	Krohne	Altometer Mag Flowmeter	8546624	10"	Unknown

2. Measurements:

Krone Altometer Mag Flowmeter: $(2,275,000 - 2,272,700 \text{ gallons}) / 1 \text{ min } 48 \text{ seconds} = 1278 \text{ gpm}$

Instantaneous readout = 1280 gpm +/- 20 gpm

E. NARRATIVE/REMARKS/COMMENTS

The diversion system is very similar to that described in the May 6, 1992 Beneficial Use Field Report for water right no. 72-7414 with the primary differences being larger pumps, increased pumping capacity (lift and discharge), and the addition of an intermediate-level sump booster station. A 140-hp Flygt submersible pump diverts water from the lowest elevation mine pit sump and discharges to an intermediate-level sump about 1/3 mile to the northwest. When lift is not as great, trailer-mounted Gorman-Rupp self priming diesel engine pumps (model 16C2-F4L, 6"x6") are used in place of the Flygt submersible for pumping to the intermediate-level sump. This intermediate sump receives water from the lower pit pump and also from other ground water seepage within the pit. A 300-hp vertical turbine motor and Floway model 12JKH pump lifts water from the intermediate-level sump to the pit booster station located about one mile to the east-southeast. The pump curve for this 300-hp intermediate-level sump pump indicates a capacity to divert 2.61 cfs at 650 feet of head. The pit booster station receiving water diverted from the pit is equipped with a storage tank and two 300-hp Floway model 12JKH vertical turbine pumps which send water to either the fresh water or reclaim water head tanks or to the tailings pond. A permanently-installed Krohne magnetic flowmeter located in the discharge piping of the pit booster station averaged 1278 gpm (2.85 cfs) during the field exam. Water can be diverted from the tailings pond to the reclaim water head tank. The mill receives water from the fresh water and/or reclaim water head tanks.

Water right 72-7414 authorizes diversion of 1.11 cfs. The intermediate sump pump has sufficient capacity to divert 2.61 cfs, thereby fully developing permit 72-7573.

The intermediate-level sump in Section 3 NENE was not included as a point of diversion in the original permit, but is now used as point of diversion; this sump intercepts water that would otherwise accumulate before flowing down to the lower sump. I understand that an application

to amend this permit to include the Section 3 sump and pump as a point of diversion and the water tanks as a place of use will be submitted, and I anticipate that this amended permit application will be consistent with field exam findings as documented in this report.

Have conditions of permit approval been met? ☒ yes ☐ no

F. FLOW CALCULATIONS

_____ Additional Computation Sheets Attached

Measured Method:

Flow Measurement: Permanently installed Krone Altometer Mag Flowmeter averaged 1278 gpm (2.85 cfs)

Pump Curve: Floway 1770 RPM Model 12JKH designed to deliver 1171 gpm (2.61 cfs) at 650 ft (with eight stages, assumed)

G. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) =$$

$$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation Season}) \times 1.9835 =$$

$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} =$$

2. Volume Calculations for Other Uses:

$$\text{Industrial: } 1.5 \text{ cfs} \times 1.9835 \times 365 = 1086 \text{ afa}$$

H. RECOMMENDATIONS

1. Recommended Amounts

Beneficial Use	Period of Use		Rate of Diversion Q (cfs)	Annual Volume V (afa)
	From	To		
Industrial	1/1	12/31	1.5	1086

Totals: _____ 1.5 _____ 1086

2. Recommended Amendments

___ Change P.D. as reflected above X Add P.D. as reflected above ___ None

___ Change P.U. as reflected above X Add P.U. as reflected above ___ Other

I. AUTHENTICATION

Field Examiner's Name Scott N King Date 8/30/2007

Reviewer _____ Date _____



Attachment A – Photographs



Photo 1: Low-elevation mine pit sump. The 140-hp Flygt submersible pump is located at the far end of this pond. The pump was not accessible during field exam due to excessive falling rock.



Photo 2: Intermediate level mine pit sump. Water from the lower elevation pit (in the background) is diverted to this pond.



Photo 3: Pumping station at intermediate level pit lifts water to upper pit booster station.



Photo 4: Upper pit booster station with two 300-hp vertical turbines receives water from pit and discharges to fresh water or reclaim water head tanks and/or tailings pond, and then to the mill.



Photo 5: Krone 10-inch Altometer Magnetic Flowmeter.



Photo 6: Digital display for mag meter located inside pit booster pump house.

Attachment B – Pump Curves
Flygt Lower-Pit Pump
and

Floway Model 12JKH vertical turbines in intermediate sump and upper booster station

NUMBER OF STAGES 1 2 3
EFFICIENCY CHANGE (NO. OF POINTS) -2 -1 -0
HORSEPOWER WILL BE AFFECTED BY CHANGE IN EFFICIENCY

PUMP DATA

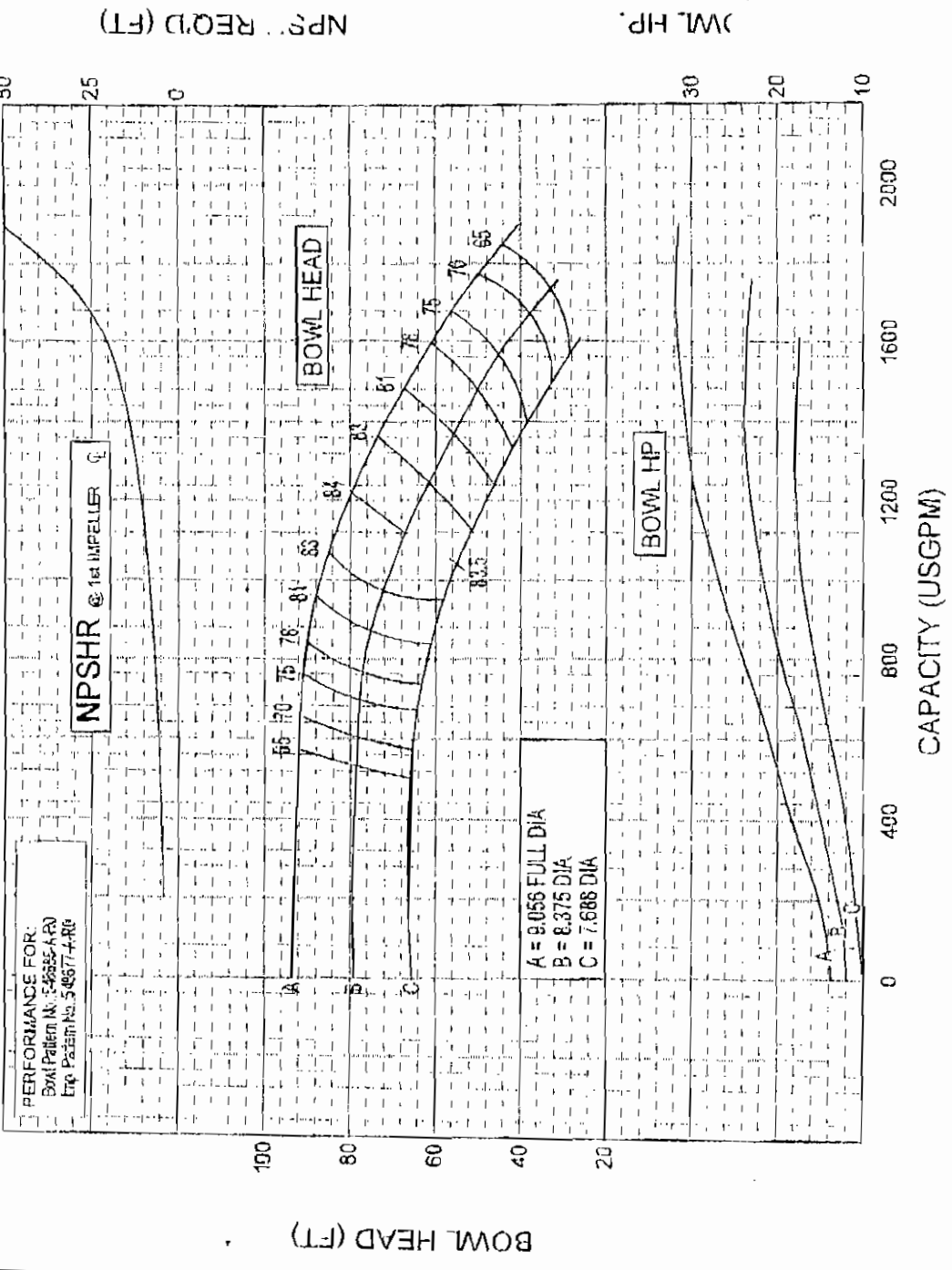
Shaft Dia. (IN.)	1 11/16
Maximum Sphere (IN.)	3/4
Maximum Head (FT)*	808
Min. Submergence (IN)**	22
Impeller Weight (LBS)	23.5
Thrust Constant (K)	9.5
Thrust Bal Const. (K)	2.8
Bowl O.D. (IN.)	11 15/16
Bowl Height (IN.)	10 3/4
Bell Dia. (T) (IN.)	11 1/4
Strainer height (IN.)	9 3/4
Impeller C-line (X) (IN.)	8 5/8
Eye Area (IN ² 2)	21.1

NOTES

Performance indicated based on cold water with specific gravity of 1.0.
* Standard Construction.
** Minimum submergence over lip of bell to prevent vortexing.
Efficiency improvements are available in certain instances. Please contact the factory.

1770 RPM 12JKH ENCLOSED TYPE IMPELLER

PER STAGE PERFORMANCE



PRODUCT

Serial No.	400.402	9460015	Performance curve No.	63- 234-00-1950	Motor module/type	119	Voltage (V)	460
Base module	055	Impeller No.	382 82 00	Gear type	Gear ratio	Imp.diam/Blade angle	Water temp °C	15

TEST RESULTS

Pump total head H (ft)	Volume rate of flow Q (USGpm)	Motor input power P (kW)	Voltage U (V)	Current I (A)	Overall efficiency η (%)
748.89	2	69.88	464	100.3	
685.61	238	86.51	463	120.7	
570.26	514	101.98	463	140.0	
402.77	744	104.25	463	142.7	
237.74	931	97.39	464	134.0	

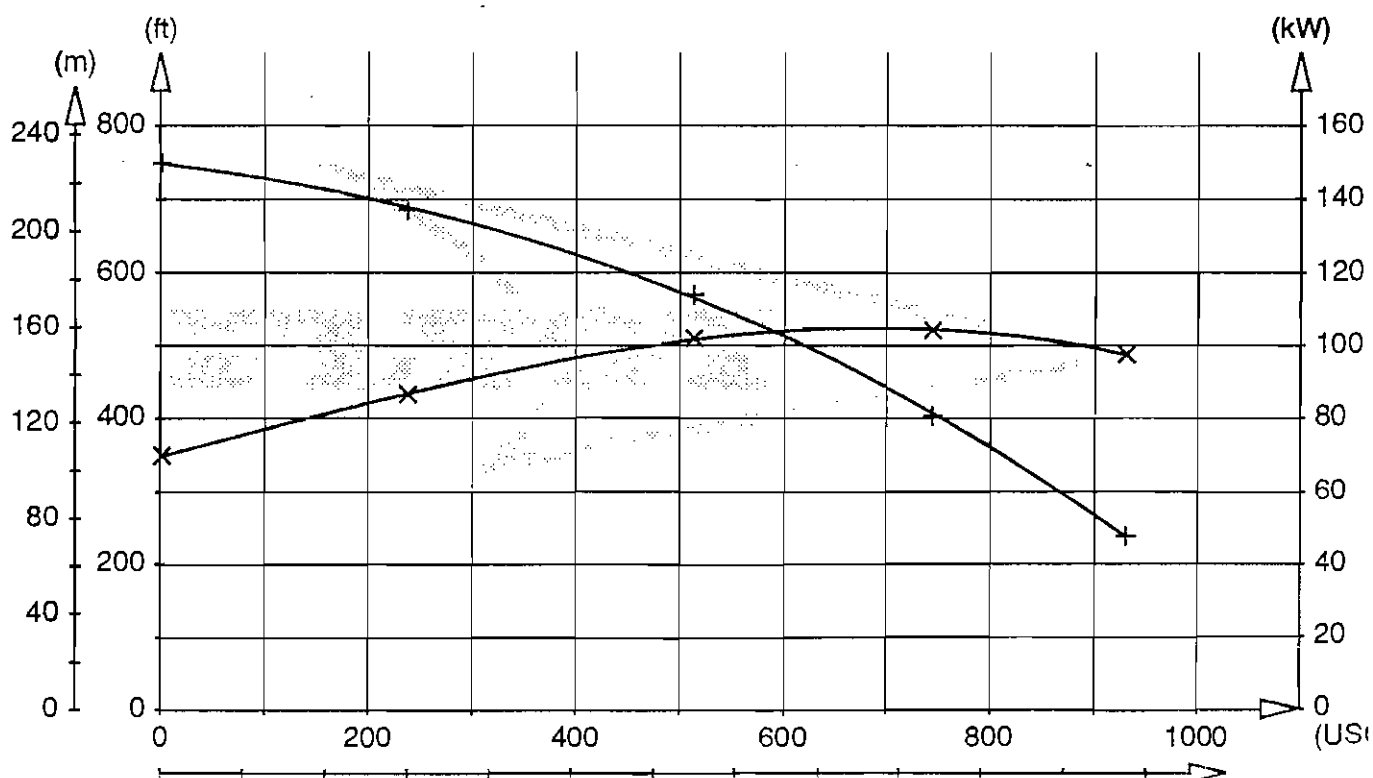
Accepted after	Test facility	Test date	Time	Chief tester
ISO2548C/B	LINDAS Sweden	2 94-10-10	13:04	2050 <i>Christophe</i>

PLOTTED TEST RESULTS

Measured point : $+$ = Q/H
 $\times$ = Q/P
Duty point : $\diamond$ = Q/H
 $\square$ = Q/P
 $\triangle$ = Q/ETA overall
Calculated point : $\wedge$ = Q/ETA overall
1

TOTAL HEAD

INPUT POWER



Attachment C – Krone Flowmeter Specifications

Pit water flow meter

Make: Krone

Model: Altometer Mag Flowmeter

Serial #: 8546624

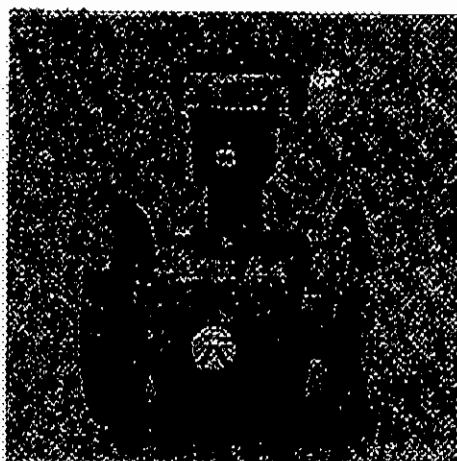
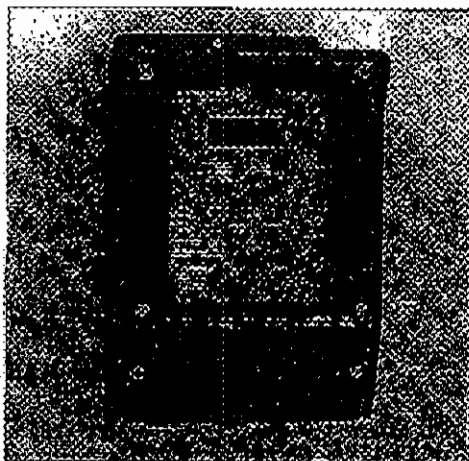
KROHNE

(1/05)

Magnetic inductive flowmeters

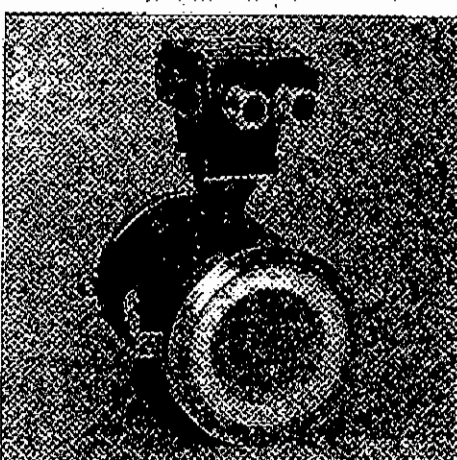
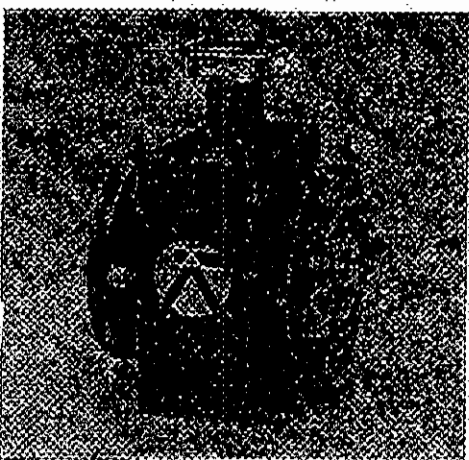
Installation and
operating
instructions

ALTOFLUX
IFM 2100 F
IFM 4100 F
IFM 5100 F
IFM 9100 F



Signal converter
SC 100 AS/F
SC 100 AS/HPC/S

Primary heads
IFS 2000
IFS 4000
IFS 5000
M 900



How to use these Installation and Operating Instructions

- For easy reference these Instructions are divided into 5 parts.
- Only **Part A** (pages 6-20) is needed for **installation and initial start-up**.
- All electromagnetic flowmeters are factory-set to your order specifications. Therefore, no further adjustments are necessary prior to start-up.

Part A Install flowmeter in the pipeline (Sect 1), connect up (Sect. 2), power the flowmeter (Sect. 3), that's all!

The system is operative.

Part B Operator control and action of the SC 100 (pages 21-38) AS/F signal converter.

Part C Special applications, service, and functional checks (pages 39-59).

Part D Technical data, dimensions, block diagram (pages 60-77) and measuring principle.

Part E Index (pages 78-80).

Condensed instructions between pages 42 and 43, pull out form.

Product liability and warranty

These electromagnetic flowmeters are suitable solely for measuring the volumetric flowrate of electrically conductive liquids, slurries and pastes.

For use in hazardous areas, special codes and regulations are applicable which are specified in the special "Ex installation and operating instructions" (supplied only with hazardous-duty equipment).

Responsibility as to suitability and intended use of our instruments rests solely with the operator.

Improper installation and operation of the flowmeters (systems) may lead to loss of warranty.

In addition, the "General conditions of sale" forming the basis of the purchase contract are applicable.

If ALTOFLUX flowmeters have to be returned to Krohne, please note the information given on page 83!

System designation

The IFM 2100 F, IFM 4100 F, IFM 5100 F and IFM 9100 F electromagnetic flowmeters are precision instruments designed for the linear flow measurement of electrically conductive liquids, pastes and slurries with a minimum conductivity of $> 5 \mu\text{S/cm}$ ($\mu\text{mho/cm}$) or $> 20 \mu\text{S/cm}$ ($\mu\text{mho/cm}$) for demineralized cold water:

The full-scale range is adjustable between 6 liters per hour and 305 000 m³ per hour, or 0.02 to 1342 800 US gallons per minute, dependent on the meter size DN 2.5 to 3000 or 1/16" to 120". This corresponds to a flow velocity of 0.3 to 12 m/s or 1 to 40 ft/s.

Example of type designation

IFM 5 100 F

- F Separate flowmeter, primary head with terminal box, SC 100 AS/F signal converter, field housing
- 100 Signal converter designation for SC 100 AS
- 2000 IFS 2000 primary head
4000 IFS 4000 primary head
5000 IFS 5000 primary head
9000 M 900 primary head
- IFM Electromagnetic flowmeter (system)
IFS Primary head (sensor)
IFC Signal converter

Available versions

System	Primary head				Signal converter	Power driver
	Type	Liner	Meter size			
			Measuring section	DN mm		
IFM 5100 F	IFS 5000	Fused aluminium oxide	25 - 100	1/10 - 4	SC 100 AS/F	-
IFM 2100 F	IFS 2000	Fused aluminium oxide	150 - 250	6 - 10	SC 100 AS/F	-
IFM 4100 F	IFS 4000	PTFE (Teflon)	10 - 20	3/8 - 3/4	SC 100 AS/F	-
		PFA	25 - 150	1 - 6		
		Varions	200 - 1200	8 - 48		
		Varions	1300 - 3000	52 - 120	SC 100 AS/F	NB 900 F
IFM 9100 F		M 900	PTFE (Teflon)	10 - 20	3/8 - 3/4	SC 100 AS/F
		Varions	25 - 300	1 - 12		

Items included with supply:

● Separate system flowmeter as ordered

- SC 100 AS/F signal converter, field housing
- primary head with installation material according to the following table/list
- signal cable (field current cable not supplied, to be provided by customer)

- Installation and operating instructions with pull-out condensed instructions for operation of the SC 100 AS/F signal converter

- Certificate of system calibration data

- Report on factory setting of the signal converter

IFS 2000 and IFS 5000 Primary head

Primary head				Supplied...		X = Standard		O = Option		Size of gaskets		
Type	Meter size to...	Max. operating pressure 1)		...with centering material	...with stud bolts	...with grounding rings E and gaskets		...w/o grounding rings but with gaskets D3 and cable V		D1, D2 + D3 in mm (inches) 3)		
		bar	psig			D1	D1 + D2			da	di	s
IFS 5000	DN 2.5, 4, 6, 10	40	580	2x rings	4x M12	X				D1 are special O-rings 2)		
	DN 15	40	580	2x rings	4x M12	X				D1 are special O-rings 2)		
	DN 25	40	580	2x rings	4x M12		O	X		46 (1.81)	26 (1.02)	1.6 (0.06)
	DN 40	40	580	4x sleeves	4x M16		O	X		62 (2.44)	39 (1.54)	1.6 (0.06)
	DN 50	40	580	4x sleeves	4x M16		O	X		74 (2.91)	51 (2.01)	1.6 (0.06)
	DN 80	40	580	6x sleeves	6x M16		O	X		106 (4.17)	80 (3.15)	1.6 (0.06)
	DN 100	16	230	6x sleeves	6x M16		O	X		133 (5.24)	101 (3.98)	1.6 (0.06)
IFS 2000	DN 150	16	230			X				D1 are special O-rings 2)		
	DN 200	10	145			X				D1 are special O-rings 2)		
	DN 250	10	145			X				D1 are special O-rings 2)		
IFS 5000	1/10, 1/8, 1/4, 3/8, 1/2"	<20	<290	2x rings	4x 1/2"	X				D1 are special O-rings 2)		
		<40	<580	2x rings	4x 1/2"	X				D1 are special O-rings 2)		
	1"	<20	<290	4x sleeves	4x 1/2"		O	X		46 (1.81)	26 (1.02)	1.6 (0.06)
		<40	<580	2x rings	4x 5/8"		O	X		48 (1.81)	26 (1.02)	1.6 (0.06)
	1 1/2"	<20	<290	4x sleeves	4x 1/2"		O	X		62 (2.44)	39 (1.54)	1.6 (0.06)
		<40	<580	4x sleeves	4x 3/4"		O	X		62 (2.44)	39 (1.54)	1.6 (0.06)
	2"	<20	<290	4x sleeves	4x 5/8"		O	X		74 (2.91)	51 (2.01)	1.6 (0.06)
		<40	<580	6x sleeves	6x 5/8"		O	X		74 (2.91)	51 (2.01)	1.6 (0.06)
	3"	<20	<290	4x sleeves	4x 5/8"		O	X		106 (4.17)	80 (3.15)	1.6 (0.06)
		<40	<580	6x sleeves	6x 3/4"		O	X		106 (4.17)	80 (3.15)	1.6 (0.06)
	4"	<20	<290	6x sleeves	6x 5/8"		O	X		133 (5.24)	101 (3.98)	1.6 (0.06)
		<25	<360	6x sleeves	6x 3/4"		O	X		133 (5.24)	101 (3.98)	1.6 (0.06)
IFS 2000	6"	<20	<290			X				D1 are special O-rings 2)		
	8"	<20	<290			X				D1 are special O-rings 2)		
	10"	<20	<290			X				D1 are special O-rings 2)		

1) With ANSI pipe flanges, the max. admissible operating pressure is dependent on the product temperature

2) Gaskets D2 not supplied with flowmeter, to be provided by customer!

3) da = outside diameter

di = inside diameter

s = thickness of supplied gaskets

For arrangements of gaskets D1, D2 and D3 see "grounding diagrams" in Sect. 1.2.3!

IFS 4000 and M 900 Primary heads

- Interconnecting cables V, see grounding diagrams in Sect. 1.3.11
- Grounding rings E (option), if ordered.

Supplied without installation material (stud bolts, gaskets), to be customer supplied!