



FAM Canada Inc.

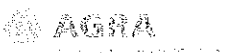
AGRIUM

KAPUSKASING PHOSPHATE OPERATIONS

INQUIRY NO. 22.20
PROJECT NO. T-014


ONE (1) CRUSHING PLANT DATA SHEETS

FAM OFFER NO.: 9104077
FAM REFERENCE NO.: FAM2000-043

	Technical Data Sheet To be completed by Equipment Vendor	Document Number	113330-DS03
		Section Number	
Subject: ROLL CRUSHER		Control No.	Page 1 of 4

	Data	Remarks
Seller	FAM	
Manufacturer	FAM	
Equipment No.		
Quantity Required	1	
OPERATING DATA		
Type of Ore	Phosphate Ore	
Ore bulk density (kg/m ³)	2000 – 2600	
Granite Rock (% found in feed)		
Compressive strength (Mpa): (Max.)	345	Occasionally
Unconfined compressive strength (Mpa) (Average Ore)	79.4 – 123.2	
Indirect tensile strength (Mpa)		
Point load strength (Mpa)		
Schmidt hardness		
Angle of Repose	45° - 65°	
Bond Work Index	12	
Moisture content (%)	13 – 15	
Max. sustained capacity (mtph for 12 hour shift average)	350	350
Normal operating capacity (mtph for 12 hours shift average)	300	300
Maximum lump		
Feed (mm)	-(915x915x700)	915x915x700
Product (mm)	-(200x200x150)	95%<200, max. 250
Environment	Harsh	
Operation	24 hrs/day	24 hr/day
DRIVE		
No. of Motors	2	2
Nameplate rating of motors (kW)	250 kw	
Motor Manufacturer/Supplier		To be supplied by Customer
Frame size		
Rated amps		

Project: Agrium KPO Crushing Plant			Job No. 113330	
Prepared By: SMG	Checked By:	Approved By:	Rev. Date: April 4, 2000	Rev. A

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Gearbox

Manufacturer Flender
 Type / Model H1 Gr. 11.1
 Rating: Mech / Thermal (kw) 714/656
 S.F. *
 RPM: Input / Output 1200/214
 Weight (kg) ~ 1516

High Speed Shaft Coupling

Manufacturer Flender
 Type/Size: Rupex RWM285
 Basic Rating / S.F. *
 Min./Max. bore dia.(mm) *

Low Speed Shaft Coupling

Manufacturer Flender RWM
 Type/Size: Rupex RWM
500
 Basic Rating / S.F. *
 Min./Max. bore dia.(mm) *

V-Belt Drive

Driver Sheave: Type/Size Ø 630x20x8V
 Driver Sheave: Type/Size Ø 2800x20x8V
 No. of V-Belts Each 20x8V
 V-Belt Type 8v Powerbelt

Drive Base

Size (mm) *

Air to oil cooler

Manufacturer _____
 Motor (kW) _____

Reservoir

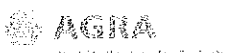
Manufacturer _____
 Capacity (litres) _____
 Heater type _____
 Heater rating (kW) _____

Motor

Manufacturer _____
 Rating (kW) 250
 Frame _____
 RPM 1200
 Volts/phase/Hz _____
 Rate Amps _____
 NEMA class _____
 Service factor _____

Rolls

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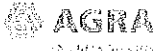
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Manufacturer	FAM	
Type	Hexagon roll core with rotor body with teeth segments	
Material	Rollcore: TSTE 355 weled; wear plates: hard manganese steel	
Diameter (mm)	Approx. Ø 2100	
Length (mm)	Approx. 1600	
RPM	Approx. 47	
Tip speed (m/s)	Approx. 5	
Maximum lump handled (m x m x m)	0.915x0.915x0. 70	

PILLOW BLOCKS AND BEARINGS

Manufacturer	FAM	
Type	Cast Steel – FAM Design	
Size (mm)		
Model No.		
Seal type	Labyrinth	
Housing material	Cast Steel	
No. of bolts		
Lubrication	Grease	
Bearing		
Type	232 76 CACK/W33+OH 3276H	
Rating (kN)	Each 9,150,000 (stat)	
L10 life (hrs)	>100,000	

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 AGRA <small>AGRICULTURAL GROUP OF RURAL AREA</small>	Technical Data Sheet To be completed by Equipment Vendor	Document Number	113330-DS03
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Crusher Frame and Chute

Material	TSTE 355	
Liner		
Thickness (mm)	40/30/20	
Material	Hardex 400	
Ave. unit weight (kg)	~400	
Carriage mounted?	No	
No. of wheels		
Dia. of wheels (mm)		
Bearing diameter (mm)		
Rail weight (kg/m)		


TEETH DESIGN

Teeth supply		Teeth segments directly connected to the rotor body
Teeth design		

WEIGHTS

Crusher frame (kg)	40,000	Incl. Wearliners
Crusher rolls (kg)	50,000	Incl. Bearings
Crusher roll flywheel (kg)		Approx. 5,800 kg. (each)
Drive (kg)		Approx. 21,000 incl. Motor (both)
Other (kg)		Approx. 4000

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kV Motor Control Center Required

Model/Style	Siemens, ABB or Equivalent
Main bus current rating	1000A
Main bus fault rating	350 MVA at 4160V Nema ICS- 2.324.20
Main switch ampacity	600A
Breaker/Contactor interrupting rating	350 MVA
Number of 400 amp starters	2
Number of 800 amp starters	Ø
Provide descriptive literature of switchgear	

kV Motor Protection Relay Required

Manufacturer	Multilin or Equivalent
Model/Style	269+
Provide descriptive literature of relay	To Follow


Wound Rotor Motor Secondary Controller

Quantity	2
Controller Manufacturer	Siemens, ABB or Equivalent
Model	N.A.
Number of symmetrical steps	To be advised after detailed engineering
Duty cycle	To be advised
Controller voltage	To be advised
Controller current rating	To be advised
Contactor Manufacturer	Siemens, ABB, Fumas, or Equivalent
Contactor type	To be advised

Wound Rotor Motor Resistors

Manufacturer	Gino or Equivalent
Model	To be advised
Time Rating	To be advised after drive requirements are available
Voltage	As required
Proposed installation location	E-House outside wall
Enclosure type	IP-23
Provide descriptive literature of resistors	To follow

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600 V Motor Control Centers

Manufacturer

Siemens, ABB, Fumas System
89, or Equivalent

Model/Style

1200A System 89 (AFD option)

Main horizontal bus current rating (A)

1200A AFD Option Only

Main vertical bus current rating (A)

As required

Main bus fault current rating (kA)

42 kA

Main disconnect current rating (A)

800A AFD Option

Number of size 1 starters

As required

Number of size 2 starters

"

Number of size 3 starters

"

Number of size 4 starters

"

Number of size 5 starters

"

Size 5 starter type

NA

Number of size 6 starters

NA

Size 6 starter type

NA

Number of fused disconnects

Ø

Starter interrupting rating (kA)

42kA

Proposed installation location

E-House

kV - 600 V Transformer Required

Manufacturer

Hammond, Virginia Transformer
or Equivalent

Model

OA

kVA rating (kVA)

500 KVA Base / 1100 KVA
Option

Temperature rise (°C)

65°C

Transformer type

Mineral Oil Cooled

Indoor or outdoor installation

Outdoor

600 V System Grounding Resistor

Manufacturer

To be advised - IPC resistors

Model

To be advised

Time Rating

To be advised - Continuous

Voltage (V)

347 V

Resistance (ohms)

69.5 ohms


Enclosure type (CEMA)

Outdoor inst. enclosure

Proposed installation location

On transformer

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Lighting Transformers

Number required
 Manufacturer
 Model
 Primary Voltage
 Secondary Voltage
 Single or 3 phase
 Proposed installation location
 Estimated rated quantity and capacity

	1
	Hammond, Marcus or Equivalent
	To be advised
	600V 3ph 60Hz
	208/120V 3ph 60 Hz
	3 ph
	E-House
30	kVA Qty 1
	kVA
	kVA

Heat Trace Transformers

Manufacturer
 Model
 Primary Voltage
 Secondary Voltage
 Single or 3 phase
 Proposed installation location
 Estimated rated capacity and quantity

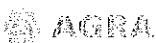
	Not included
	NA
	NA
	NA
	NA
	NA
	NA
	NA
	NA
	NA

Process Control/Instrument Transformers

Manufacturer
 Model
 Primary Voltage
 Secondary Voltage
 Single or 3 phase
 Proposed installation location
 Estimated rated capacity and quantity

	Hammond, Marcus or Equivalent
	To be advised
	600V
	208/120V
	3 ph
	E-House-MCC
15	kVA Qty 1
	kVA
	kVA

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Isolation Transformer 600 - 600/347 V (for use by Purchaser)

Manufacturer	Hammond, Marcus Equivalent
Model	To be advised
Rated capacity	5 kVA
Primary voltage	600V
Secondary voltage	208/120V
Proposed installation location	E-House

Liner Heater Element (Truck Dump Hopper)


Manufacturer	High-Q Design Ltd. or Equivalent
Model/Style	HQ2011-1500-575-24-12-Cr-90
Voltage of each heater	600V
Wattage of each heater	1500W
Total heater wattage	65 Heaters Total x 1500w = 97.5 kW
Number of heating pads	65
Number of heating zones	3
Manufacturer of heater zone contactors	Siemens, ABB, Fumas, or Equivalent
Model of heater zone contactors	To be advised
Location of heater control contactor control box	On Crusher Structure
Location of heater fuse/terminal junction box	On heater
Manufacturer of heater zone ground fault relay	To be advised
Model of zone ground fault relay	To be advised
Manufacture of heater zone current transformer	To be advised

Liner Heater Element (Apron Feeder discharge hopper)

Manufacturer No additional heaters, total qty as above with identical data

Model/Style	
Voltage of each heater	
Wattage of each heater	
Total heater wattage	
Number of heating pads	
Number of heating zones	
Manufacturer of heater zone contactors	
Model of heater zone contactors	
Location of heater control contactor control box	
Location of heater fuse/terminal junction box	
Manufacturer of heater zone ground fault relay	
Model of zone ground fault relay	

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Manufacture of heater zone current transformer

Demand Loading

Summer peak 30 minute demand loading

To be advised

Winter peak 30 minute demand loading

To be advised

E-house

Size (Length x Width x Height)

9100 mm x 3500 mm x 3300 mm

Minimum isle space

Lighting level

To be advised

Emergency Lights - number

2

Emergency light Manufacture and model

Lumacell or Equivalent

Number of fire extinguishers

2

Size and type of extinguishers

Handheld, powder type

Inside ambient temperature range

°C Adjustable

Air conditioner capacity

Cable entry method to E-house

Bottom Entry, cable , vault

Proposed location of E-house

<5000 mm from crusher
structure

E-house manufacturer

Surround, Brytex BRS or
Equivalent

Crusher Areas

Estimated number of light fixtures on crusher

10

Estimated average lighting level

To be advised

Light fixture type

High pressure sodium vapour

Light fixture wattage

150 watts 120V 60Hz


Emergency lighting manufacturer

Lumacell

Estimated number of Emergency lighting fixtures

2

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Subject: RECEIVING HOPPER		Control No.	Page 1 of 2

	Data	Remarks
Seller	FAM	
Manufacturer	FAM	
Equipment No.		
Quantity Required	1	


OPERATING DATA

Type of Ore	Phosphate Ore	
Ore bulk density (kg/m ³)	2000-2600	
Angle of repose	45° - 65°	
Moisture content (%)	13 - 15	
Maximum lump (mm)	915x915x700	
Maximum loader bucket size	6m ³	
Usable capacity of hopper (tonnes)	50	
Abrasion	Extreme	

HOPPER

Weight of structural steel & platework (kg)	Approx. 35 000	
Thickness (mm)	20	
Material	350 WT	
Average unit weight (kg)		
Total weight (kg)	Approx. 48 000	
Minimum slope angle (deg)	65°	
Minimum valley angle (deg)	60°	
Liners		
Thickness (mm)	20	
Material	CHT 360	
Average unit weight (kg)	20 - 480	
Total Weight (kg)	Approx. 13 000	
Total Area of Liners Heated (m ²)		
Apron Feeder Skirt Boards, Plate Thickness (min. mm)	20	
Apron Feeder Skirt Boards, Liner Plate Thickness (mm)	20	
Liner Material	CHT-360	
Skirts Bottom, Material	Domite	


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Hopper Stationery Grizzly Slots (mm)	915x700	_____
Hopper Design		_____
Side wall length for front-end loader dump (mm)	See Drawing	_____

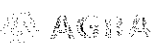
Minimum live load with load not protruding above the hopper rim(tonne)		_____

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	Technical Data Sheet To be completed by Equipment Vendor	Document Number:	113330-DS02
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	Data	Remarks
Seller	FAM	
Manufacturer	FAM	
Equipment No.		
Quantity Required	1	
GENERAL		
Design Feed Rate Range (mtph 12 hour shift average)	300-350	
Bed Depth (mm)	600	
Design Deck Speed (m/s)	0.06	
Deck Speed Range (m/s)	0 – 0.3	
Pan Width (inside pan lips)(mm)	1680	Usable Width
Feeder Horizontal Length (centre to centre)(m)	15 m	
Incline (deg)	18	
Environment		
Material Description:		
Type of Material		
Bulk of Density (kg/m ³)	1800 – 2200	
Size (mm)	915x915x700	
Moisture Content (%)	15 – 18%	
Angle of Repose	45 - 65°	
Abrasion Index	-	
Conveying Pans:		
Pitch (mm)	2440	Real Width
Material of Construction	St52-3	
Thickness (mm)	35	
Design and Construction	FAM	
Gap between Pans (mm)	2	
Grousers: required		
Chain:		
Manufacturer: CAT	CAT D10	
Type / Pitch (mm)	260.35	
Number of Strands	2	
Length per Strand (m)	33.325	
Chain Mounting	Outboard	
Main Support Frame:		

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	Data	Remarks
Material / Size of Structural Shapes	St52-3 or equal	
Type of Construction	FAM Welded	
Cold Weather Steel		
Number of Support Rails	3	
Access for Greasing Rollers	No, life time Lubricant	
Carrying Rollers:		
Roller Diameter (mm)	268	
Roller Type	D10R Track	
Shaft diameter (mm)	105	
Bearing Lubrication	Life	
Return Rollers:		
Roller Diameter (mm)		
Roller Material	42Cr Mo 4V	
Shaft Diameter (mm)	80	
Bearing Type	FAM	
Bearing Lubrication	Life	
Head Shaft:		
Shaft Diameter (mm)	560	
Shaft Material	34 Cr Ni Mo 6V	
Bearing Diameter (mm)	430/680	
Bearing Type	23 192	Spherical roller bearing with clamping sleeve
Sprockets:		
Type	D 10 R	
Number of Teeth	25	
Pitch Diameter (mm)	260.35	
Number of Segments	5	
Sprocket Hub Diameter (mm)	1046.9	
Tailend Station:		
Heavy Duty Take-up Frame	Yes	
Guide Wheels	D 10 R idler	
Bearing Type	CAT	
Bearing Lubrication	Life	
Chain Take-up	-	
Automatic Lubrication Unit:		
Impact Rails	3	

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HYDRAULIC PIPING


AC Motor: (Hydraulic Pump Unit)

Manufacturer		Out of Scope
Rated Power Output (kW)		
Frame		
RPM		
Volts/Phase/Hz		
Rated Amps		
NEMA Design Class		
Service Factor		

WEIGHTS

Weight of Head Shaft Assembly (kg)	12 993	
Weight of Support Structure (kg)		
Weight of Feeder Girder Structure (kg)	26 200	
Weight of Apron Feeder Pans (kg)	48 000	
Weight of Chains (kg)	12 185	
Weight of Carry Rollers (kg)	8 640	
Weight of Return Rollers (kg)	6 192	

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	Data	Remarks
Manufacturer	FAM	
Description	Electrical	
Lube Piping	Steel	

HYDRAULIC DRIVE

Hydraulic Motor:

Manufacturer		Out of Scope
Model No.		
Model		
Gear Reduction Ratio		
Shaft Configuration		
Torque at Design Operation (N-m)		
Torque Rating (N-m)		
Variable Speed Range (rpm)		
Shaft-mounting Device		


Hydraulic Pump Unit:

		Out of Scope
Manufacturer		
Model No.		
Type		
Design Operating Pressure (kPa)		
Peak Operating Pressure (kPa)		
Power Draw (kW)		
Air-to-Oil Cooler		
Air Cooler Motor (kW)		

Reservoir:

		Out of Scope
Manufacturer		
Capacity (litres)		
Oil Heater (kW)		

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Machine Vibration Monitoring System

Manufacturer N/A
 Model / Type _____
 Quantity _____
 Locations _____
 Services _____

Speed Monitoring System

Manufacturer Milltronics or equal
 Model / Type DSD3 / MSP12
 Quantity 2
 Services -

Side Travel Switches

Manufacturer N/A
 Model / Type _____
 Quantity _____
 Services _____

Pull Cords

Manufacturer Dittelbach & Kerzler or equal
 Model / Type LHPw
 Quantity 4
 Services Emergency off

Position Switches

Manufacturer Dittelbach & Kerzler or equal
 Model / Type LHP - 10/4-R2
 Quantity 4
 Services Limit positions, emergency limit position

Level Monitoring System

Manufacturer Ramsey or equal
 Model / Type 21/39 21/38/4
 Quantity 1
 Services Plugged chute switch

Roll Relief System

Hydraulic Package Included in FAM supply

Lubrication Systems

Greasing Package Included in FAM supply

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