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FAM Canada Inc.

AGRIUM

KAPUSKASING
PHOSPHATE OPERATIONS

INQUIRY NO. 22.20
PROJECT NO. T-014

ONE (1) CRUSHING PLANT

TECHNICAL DESCRIPTION

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

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1 Technical Data

1.1 Technical data of crushing

Feed material:	Phosphate Ore
Bulk density:	2000 – 2600 kg/m³
Unconfined compressive strength (Average ore):	79,4 – 123,2 MPa
Granite rock compressive strength:	Max. 345 MPa
Moisture content:	13 - 15 %
Feed size:	0 - 915 mm, unsorted muck
Max. lump size:	915 x 915 x 700 mm
Loader bucket size:	6 m³
Usable capacity of hopper:	50 tonnes
Feed capacity:	max. 350 tph
Product size:	0- 200 mm, 95 %

1.2 Technical description

The following plant conception will be offered by FAM for the project planning and preparation of the Phosphate Crushing Station on the basis of the technical data as per para. 1.1 of this technical part and as seen on above mentioned drawings.

The material to be crushed will be fed into the feed hopper, by means of a loader bucket size 6m³ (to be provided by the client). An apron feeder, discharges the material constantly from the feed hopper and conveys it to the double roll crusher. The double roll crusher will be used to crush the material to a grain size fraction of smaller than 200 mm (95 %). Even the hard crushable granite pieces will be comminuted and reduced easily and constantly.

A belt conveyor (supplied by customer) installed adjacent to this crusher and the apron feeder, transports the material crushed in the double roll crusher and the spillage to the sag mill located in the plant.

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2 Scope of supply

An exact and detailed description is given in the technical Data sheets.

2.1 Feed hopper

Hopper volume:	Approx. 35 m³
Opening:	Approx. 3.0 x 4.9 m
Hopper height:	Approx. 3.5 m
Thickness of lining:	20 mm

The feed hopper is thus designed that the material can be discharged into the hopper from loaders (see attached drawing).

The feed hopper is made of a robust steel construction with solid webs with wear resistant lining and grizzly with a 700 x 915 mm spacing.

Base frame access ladders, supporting structure of sectional steel members to accommodate the feed hopper.

2.2 FAM - Apron feeder

Type:	AF 2440 x 15
Apron width: :	2.440 mm
Effective width:	1.500 mm
Centre distance:	Approx. 15 m
Conveying speed:	Adjustable by hydraulically drive (supplied by costumer)

Consisting of:

- The wear resistant aprons with drive and tail sprocket wheels
- The conveyor steel structure
- The supporting rollers
- The take-up unit
- The drive unit (Supplied by customer)

Comprising:

The conveyor steel structure, a welded steel construction, with longitudinal and transverse girders and supports/brackets for the driving and return sprocket wheels;
Head drive sprockets with the interchangeable tooth segments and pillow blocks with self-aligning roller bearings;
Take-up sprockets with sliding blocks with self-aligning roller bearings;

The complete conveying chains with complete sets of aprons with overlapping lateral slats mounted on the conveying chain on both sides, chains with chain joints to disconnect and connect the chain links;
The chain and the rollers are maintenance-free and lubricated for life;
The set of track rollers to support the aprons of the carrying strand;
The set of track rollers to support the aprons of the return strand;
At the feeding bin impact rails will be arranged beneath the apron strand in order to absorb the impact loads resulting from the feeding operations;
These rails will be lubricated by a central lubricating device;
The set of protective gratings installed laterally at the supporting conveyor structure and behind the take-up unit;

2.3 FAM - Double roll crusher

Type:	ZWB 2015 HS
No. of rolls:	Two
Roll diameter:	2,000 mm
Roll width:	1,500 mm

with hydraulically gap adjustment

Consisting of:

- The divided and lined housing,
- The fixed crushing roll and the movable crushing roll,
- The big fly wheels, designed as V-belt pulleys,
- The two drive units,
- The inlet chute with scalping grizzly,
- The outlet chute.

Description:

The heavy duty design of the crusher guarantees that there will be no mechanical deflection at all, even by the effection of hard crushable rocks.
The housing is a solid steel plate welded construction with maintenance openings, lined with exchangeable wearing plates in the area of the crushing chamber.
The lateral lining of the housing with welded-on skimmers in hard steel is fixed with screws.
Each crushing roll consists of the roll core and the special exchangeable crushing teeth segments. This teeth arrangement enables a great strength which purpose is to contribute to grasping material into the gap and crush it constantly.

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The roll core is connected to the shaft, 400 mm, by tensioning elements. The crushing segments with ground contact surfaces are made of special cast steel and are fixed formclosed at the roll core.
The bearings are self-aligning roller bearings of the heavy class and run in dust-tight housings with labyrinth sealings.
The two fly-wheels made of cast iron, with high inertia design for a regular rotation of rolls, are designed as V-belt pulleys and are releasably connected to the shaft by tensioning sets.
The link brackets of the movable crushing roll are supported and adjusted by a hydraulically unit. This unit enables the movable roll to be set in the right position easily.
The size of the crushing gap is adjusted by hydraulic and can be varied to crush the hard granite stones. This unit is located just near the double roll crusher and is easily accessible.

The drive units consisting of:

- The drive frame of movable crushing roll,
- The drive frame of fixed crushing roll,
- The gearboxes and couplings,
- The high-capacity narrow V-belts,
- The drive pulleys,
- The spring tensioning device for the V-belts of the movable roll,
- The protection devices,

- The two electric motors (supplied by customer)

Rating each:	250 kW
Speed:	1,200 r.p.m.
Voltage:	4,16 kV
Frequency:	60 Hz
Design:	B3
Other:	Built-in temperature probes

2.4 Electric Equipment

The whole crushing-station seen in our drawing is electrically connected and ready to start except the E-motors and drive of the apron feeder.

2.5 Exclusions from the Scope of Supply and Service

Our offer does not include:

- As per Item 5.0 – Work not included , Scope of Work Specifications Crushing Plant – Rev. B
- All building works and any works related to civil engineering
- Buildings, concrete and steel foundation
- Anchor bolts
- Any kind of hoisting/lifting equipment
- All other items not expressly described and mentioned in the technical and commercial parts of this offer.

2.6 Terminal Points

- As per Item 6.0 – Terminal Points , Scope of Work Specifications Crushing Plant – Rev. B

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