Scoop of Supply of longwall for the Lunckefjell Mine

Store Norske Spitsbergen Grubekompani AS – JOY Global (UK) Ltd.

2. Technical parts of Contractors Tender

Roof Supports Scope of Supply

Qty	Description
132	**2/1075 Tonne Face supports for installation at 1756mm centres.** Drg. Ref 5100021211 Rigid catamaran base. Range 1300mm closed to 3000mm open 3505mm projection canopy. 380mm bore Double telescopic leg, bronze plating on external bearing surfaces. Fixed Side shielding on both sides of the Rear Shield. 150mm bore advancing ram, suitable for 850mm web with chrome on bronze plating on Rod. Solid relay bar to suit 850mm web. 200mm bore stabilising ram with bronze plating on rod 130mm bore base lift ram arrangement with chrome on bronze plating. Compak valve c/w 10 solenoids & 9 spools, ancillary valves, including all hoses & fittings. Including leg and canopy foams. RS20s Electronic Control Equipment, including all cables & power supplies which include the following features: – Full face automation including gate ends – Automated face straightening – Personal Proximity detection – Longwall Information system screens (LIS) to provide 2D real time data and replay – Anti-Collision – Tilt sensors on the RS – Shearer to PRS Handshaking – Active Set – Camera

4	**2/1075 Tonne Tailgate Face End / Transitional Supports** Drg Ref 5100021236 Rigid catamaran base. Range 1300mm closed to 3000mm open 3505mm projection canopy. 380mm bore Double telescopic leg , bronze plating on external bearing surfaces. Side shielding Hydraulic operated on both sides of the Canopy and Rear Shield. 180mm bore advancing ram, suitable for 850mm web with chrome on bronze plating on Rod. Solid relay bar to suit 850mm web. 200mm bore stabilising ram with bronze plating on rod 130mm bore base lift ram arrangement with chrome on bronze plating. Compak valve c/w 10 solenoids & 9 spools, ancillary valves, including all hoses & fittings. Including leg and canopy foams. RS20s Electronic Control Equipment, including all cables & power supplies which include the following features: – Full face automation including gate ends – Automated face straightening – Personal Proximity detection – Anti-Collision – Tilt sensors on the RS – Shearer to PRS Handshaking – Active Set – Camera
3	2/1075 Tonne Maingate Face End Supports Drg Ref 5100021234 Rigid catamaran base. Range 1300mm closed to 3000mm open 4355mm projection canopy. 380mm bore Double telescopic leg , bronze plating on external bearing surfaces. Side shielding Hydraulic operated on both sides of the Canopy and Rear Shield. 200mm bore advancing ram, suitable for 850mm web with chrome on bronze plating on Rod. Solid relay bar to suit 850mm web.

	200mm bore stabilising ram with bronze plating on rod 130mm bore base lift ram arrangement with chrome on bronze plating. Compak valve c/w 10 solenoids & 9 spools, ancillary valves, including all hoses & fittings. Including leg and canopy foams. RS20s Electronic Control Equipment, including all cables & power supplies which include the following features: – Full face automation including gate ends – Automated face straightening – Personal Proximity detection – Longwall Information system screens (LIS) to provide 2D real time data and replay. – Anti-Collision – Tilt sensors on the RS – Shearer to PRS Handshaking – Active Set – Camera
1 set	1 set leg gaiters for all supports
1 set	**Installation Layout Equipment Comprising:** Tool Kit Off Face Hydraulics Off Face Electrics Dump System 6 off Anti-Topple & Anti-Slew Assy's 1 x DN50 feed line & 1 x DN63 return line to cover 240 M (Ring Main) hose run 2 x DN50 feed lines & 2x DN63 return lines to cover 100 M (Gate) hose run
1	**Wireless system to work in conjunction with the PRS Camera system**
1	**LANDMARK INS (Inertia Navigation System)** Item 1. Shearer Position Measurement System (SPMS) Licence Fee for the INERTIAL NAVIGATION SENSOR, fitted into the Shearer Controller Royalty Payment for the above payable for 5 years operation Item 2. Automated Face Alignment Licence Fee for the Automated Face Alignment software Royalty Payment for the above payable for 5 years operation

Shearer 7ls1d Electrical Motor Powered Shearer

1- Contractor Model 7LS1D Shearer, 3300volts 50Hz

Contractor Model 7LS1D double ended ranging arm shearing machine suitable for Ultratrac 2000 consisting of the following elements:

2- Ranging Arms J450E. These are handable.

2- Butt Plates (right &left hand)

2- 1450mm Cutting Drums (right & left hand) including bit holders and bits

1- Set of water sprays including hoses and connectors, including Ranging Arm Sprays

2- haulage sections (right &left hand)

2- Final Drives equipped for Ultratrack 2000 (right &left hand, direct)

1- Set Face and Goaf side trim, trapping shoes and sliding shoes to suit Ultratrack 2000 and the AFC

1- Lubrication System

2- Cowls to fit 1450mm cutter drums.

1- Electrical Controller Section containing the Faceboss Electronic Controls including the JNA CCU unit and Display Computer. In both Norwegian and English

2- AC Cutter Motors 375 kW each

2- AC Pump Motor 11Kw

2- AC Haulage Motors 65 kW each

1- Set of SIRSA equipment for monitoring the location and direction of travel of the shearer. This will be of the digital type.

1- Set of Two Way Radio remote control equipment, comprising eight (8) transmitters, and two (2) radio receivers. One receiver mounted in the controller and one spare. Each transmitter includes a display to indicate machine speed and boom height and is powered with a removable battery pack. Two (2) additional spare battery packs are included

With each set of radio control equipment there are two (2) charging racks. Each charging rack is capable of re-charging up to 4 transmitters at any one time. A Diagnostic unit is included which performs a procedure to determine faults within the radio transmitter circuitry

1- set of speed control AFC feedback system

1- Hydraulic Pick Sleeve Extractor

1- Camera System comprising：

4- Mine duty cameras and two lights mounted on the Shearer.

Camera enclosures and mounts.

Water spray system and software.

Tele-remote station selector switch.

Remote interface for the head-gate side (mounted in controller), integrated with the JOS unit.

A tele-remote connection that will use an existing remote station and allow Shearer operation from Gate End.

1- Victor Socket and Plug suitable for trailing cable

1- Methane Monitor System to be supplied by customer

This machine will be equipped with Advanced Shearer Automation (ASA) and has a fully automated shearer cutting program. ASA permits the user to design complete cutting sequences for their longwall face profile offline, which includes gate end cutouts. An offline tool, referred to as GOLP (Graphic Offline Planner), is a software program, which is used to develop the cutting sequences via a PC. This program allows the user to fully test the cutting sequences in a simulation mode prior to loading on the machine. ASA requires new FACEBOSS control hard ware, which is intended to improve the overall accuracy of the automated cutting sequences. The new control hardware includes:

Haulage encoders which replace the D-gear sensors, and improves machined position accuracy about face.

Ranging arm proportional valves. Valve banks incorporate proportional valves to improve position accuracy

Hydraulic control modules to operate proportional valves and all other hydraulically controlled valves.

Sensor for LANDMARK Automated Face Alignment

1- Shearer Face Cable Handler

One Hundred and Thirty Meter's (130m) of Shearer Face Cable Handler specified including retention of Fibre Optic Cable

1- Set 650m of DN40 water hose for Shearer complete with Adaptors

1- Shearer Tool Kit

Longwall AFC Conveyor Equipment

1- 38mm Broadband Armoured Face Conveyor, 244 Metres long, suitable for use with 2 x 400kW VFD Drive, Ultratrac 2000

1- 38mm BB Complete Stage Loader, 1 x 250kW VFD Drive

1- Heavy Duty "V" Belt Crusher, 1 x 200kW single speed

1- Matilda Belt Tail end

1- 30Kw Electrically operated Dust Scrubber

Scope of Supply – VFD Prime Offer

One Set of AFC, Ultratrac 2000, Beam Stage Loader, Crusher and Belt Tail End, containig the following elements:-

Armoured Face Conveyor – VFD Prime Offer – 800kW.

1- 38mm Broadband Twin Centre Strand Longwall Conveyor approximately 244 metres long, having a 400kW Inline VFD Transmission Unit and 400Kw Right Angle VFD Transmission unit at the Delivery End and a Non Driven Return End.

The Conveyor to handle a continuous load of 1400 tonnes per hour of sheared coal on a downhill gradient of 5 degrees and to run at a nominal chain speed of 1.40 metres per second.

The Conveyor to handle a continuous load of 1400 tonnes per hour of sheared coal on a Uphill gradient of 2 degrees and to run at a nominal chain speed of 1.40 metres per second

The Conveyor is arranged for use with a Ultratrac 2000 Shearer Haulage System, comprising:-

Delivery End Drive

1- 800kW conventional Side Discharge Delivery End Drive Unit, suitable for 38mm BB Twin centre strand chain assemblies and 900mm inside raceway width line pans, comprising:-

1- Re-Handable Framework Unit complete with Ramp Pan, Plough and Detachable Lump Breaker

1- 7 Tooth 38mm Broadband Sprocket Unit – Oil filled

2- Gear Coupling Units

1- Remote Fill Kit

1- Guard Unit

1- 400kW In-Line Transmission Unit, incorporating:-
- 1- L500BP Bevel Planetary Gearbox Unit
- 1- Hydraulic Pivoting Tensioner (including Hyd. Motor, valve, hosing, limit switch, gauge, etc.)
- 1- ATR36 Coupling
- 1- Coupling Guard

1- 400kW Right Angle Transmission Unit, incorporating:-
- 1- L500EP Epicyclic Gearbox Unit
- 1- Output Wheel
- 1- ATR36 Coupling
- 1- Coupling Guard

1- Kit, Water
1- BP Transmission Cover
1- EP Transmission Cover
1- D.E. Ancillary Unit
1- D.E. Re-Handing Kit
1- D.E. System, Integration Equipment
1- Remote Operations Centre (ROC)

Electrical Equipment:

2- Breuer 400Kw VFD Motors

Stage Loader Inbye Equipment

1- SBL Inbye Unit to suit 38mm Broadband Chain assemblies and 900mm inside raceway, comprising:

Non-Driven SBL Return End incorporating:
- 1- NDRE Framework
- 1- 5 Tooth 38mm Broadband Sprocket Unit – Oil filled
- 1- Adaptor Pan
- 1- Articulating Pans Unit [4 x 750mm lg Pans]

Run of Conveyor Units 1756mm long

101- Composite ROC Unit incorporating 900mm inside raceway width x 1756mm long closed bottom line Pans with 40mm thick Deckplate and 25mm thick Underplate, having a Face Side TOE Riding Ramp Plate and a Goaf Side Rising Slot Clevis Attachment, complete with Ultratrac 2000 Spine Plate and two Rack holder Clogs welded to the goaf side casting.

21- Inspection type ROC Units as previously specified for Standard Pan but incorporating Draw Plate type Water Inspection Door

1- Set of D.E. Re-Routing ROC Unit (5 off, One Pan Being Male/Male, one pan having inspection water door).

1- Set of R.E. Re-Routing ROC Unit (5 off, one pan having inspection water door)
266- 360 Tonne Enhanced Dumbell Connectors
132- Cable Handling Spillplate complete with fittings.

Non-Driven Return End

1- Non Driven Tensionable Automatic DCM operation Return End, suitable for 38mm Broadband Twin centre strand chain assemblies and 900mm inside raceway width line pans, comprising:-

1- Auto Tensionable Framework Unit
1- 7 Tooth 38mm Broadband Sprocket Unit – Oil filled
1- Remote Fill Kit
1- Panel, Hydraulic, Control
1- Kit, Safety, Labels
1- R.E. ancillary Unit
1- R.E. Re-Handing Kit
1- R.E. System, Integration Equipment

Chain Assemblies:

493.20 Metres of 38mm x 126/148mm Broadband Twin Centre Strand Chain complete with Connectors, 600 Flight Bars to suit 900mm inside raceway width line pans.

Set of Ultratrac 2000 Chainless Haulage Equipment, comprising:-

269- 6 Pin Ultratrac 2000 HD Forged Rackbars (2 per Pan + Drives)
269- Haulage Pin Retaining Block (1 per Bar)
538- Pin, Retainer (2 per Bar)

1 Set of Special Tools for AFC/SBL, comprising:-

1- Tool Kit
1- Tensionmaster Chain Tensioner – 38mm BB AFC
2- Pairs AFC Chain Sprag
1- SBL Chain Sprag
1- Tensionmaster Chain Tensioner – 38mm SBL
1- Heavy Duty Powerfill kit for sealed filling of AFC Gearboxes.
1- Gauge, Chain Extension.
1- Set of Safety Labels

AFC Electrical Controls for VFD Prime offer :

1- Set of Electrical Control Equipment

Stage Loader – VFD Prime Offer- 250kW

1- 38mm Broadband x 900mm inside raceway width Twin Midboard Stageloader apprximately 30 metres long, having a 2700mm overlap over the Belt Tail End.

The Conveyor having a single 250kW VFD inline transmission Unit at the Delivery End and a Non-Driven Return End.

The Conveyor to transport 1750 tonnes per hour of sheared coal from the face conveyor and torun at a nominal chain speed of 1.90 metres per second, comprising:-

1- 250kW Delivery End Drive Unit to suit 38mm Broadband Twin mid-board strand chain assemblies and 900mm inside raceway width line pans, comprising:-

1- Framework Unit c/w Hydraulic Cylinder and Valve
1- 6 Tooth 38mm Broadband Sprocket Unit – Oil filled
1- Gear Coupling Unit
1- Kit, Lubrication

1- 250Kw VFD Inline Single Speed Transmission unit, comprising:-

1- S300E Gearbox Unit
1- Hydraulic Pivoting Tensioner (including Hyd. Motor, valve, hosing, limit switch, gauge, etc.)
1- Cover for Piv. Tens.
1- P.T.Tech Coupling Unit
1- Coupling Guard Unit

Electrical Equipment:

1- Breuer 250Kw VFD Motors

1- Ramp and Beam Unit to suit 38mm BB Chain assemblies and 900mm inside raceway width, comprising:-

1- Convex Line Pan Module
1- Convex Line Pan module
1- Hinged Line Pan module
1- Beam Line Pan module
1- Set of cable handling brackets and cable trays
1- Set of cover plates for stage loader

Note:

SBL Inbye Unit included with AFC Equipment

64.116 Metres of 38mm x 126/148mm Broadband Twin Centre Strand Chain complete with Connectors, 78 Flight Bars to suit 900mm inside raceway width line pans.

Heavy Duty Crusher – 200Kw

1- Heavy Duty Impact Breaker complete with 900mm inside raceway width breaker pan, “V” Belt

Pulley Drive .The high inertia heavy duty impact rotor incorporates 8 replaceable impact tips.

Electrical Equipment:

1- Crusher 200kW, Single speed Electric Motor

Matilda Belt Tail End

1- Steerable Matilda Belt Tail End with advancing, levelling and side shifting facilities to Suit 1024mm inside raceway width stageloader and 2700mm Overlap.

Matilda to suit belt width of 1400mm.

Dust Scrubber – 30Kw

1- Electrically operated Dust Scrubber

Electrical Equipment:

1- Scrubber 30kW, Single speed Electric Motor

Remote Operating Centre (ROC)

The Remote Operating Centre is a computer-based data acquisition and control system. Operators can use the ROC to operate and monitor data from the AFC, Shearer, PRS and Switchgear.

If required the system can also be linked to additional display computers, or customer PCs for either additional underground or surface monitoring.

The system comprises,

4 x Display computer inside four XP boxes
JOS
RPE (Remote Power Line Enclosure)
2 x Central Control Unit (CCU)
Communication gateway
Certified Mouse Assembly.
Media Converters
Optical fibre cable, to connect Shearer to JOS.
Connection to provide Ethernet data and video out to surface PC via Mine Provided Fibre Network
Transceiver and aerial mounted to control the Shearer from the JOS.

The ROC is fitted with a minimum of three display computers, which are used to view real time video feeds from shearer mounted cameras, area cameras, and to view operational and diagnostic information for the shearer, PRS, and AFC control systems. This concept enables the ROC Operator to steer the Drum(s) by using the Outbye hand-held radio with reference to the images on video monitors. It is envisaged that Automation will normally be active, thus reducing the input required by the Operator. As with the traditional local machine Operator, the primary role is to follow the coal seam based on the images.

The Contractor Remote Operating Centre (ROC) is a computer-based data acquisition and control

system. This means that information is passed from the Contractor AFC system, Contractor shearer and Contractor roof support system to a central processor. The information received by the processor is then available for display on a colour screen.

Contractor machines connected to the JOS system, such as the shearer, AFC, and roof supports are treated as individual units and are displayed as such on the screen. The data that is collected from individual systems can be observed almost instantly. This includes such things as motor currents, motor temperatures, tram rates and system fluid flows and pressure. Equipment information such as events, warnings, alarms and shearer position information are stored within the system to provide historic data for later reference. This information is also available for display, via a surface link, on a remote PC that is located on the surface.

Monorail

1. SYSTEM OVERVIEW

- Overall extended length : 395 metres
- Overall compressed length: 195 metres
- System travel: 200 metres
- Gradient capabilities: 1:7
- Operating height parameters: 2000mm

2. SCOPE OF SUPPLY

GENERIC COMPONENTS	**QTY (TOTAL)**
Beams	255 off (510 metres)
Curved Beams	2 sets
Transportation Sleds	1 x set of 4
INBYE MODULES - R1 AND R2	**QTY (TOTAL FOR INBYE SECTIONS)**
Services Protection Sleeve	1 off
Loop-free area	1 off
ROC Suspension Trolleys	2 off
Beam Storage Trolleys and Cassette	2 off
Traction Drive Units	2 off
Services Trolleys	3 off
Lanyard Chains	2 off
Filter Pod Suspension	1 off
Cable Breaks	1 off
Hose Breaks	1 off
CONCERTINA MODULES – 6 OFF (IDENTICAL) C1 THROUGH C6	**QTY (TOTAL FOR CONCERTINA SECTIONS)**
Traction Drive Units	12 off
Services Trolleys	90 off
Lanyard Chains	84 off

Cable Breaks	6 off
Hose Breaks	6 off
INSTALLATION PLATFORM (MALIBU)	**QTY (TOTAL FOR PLATFORM)**
Malibu Unit c/w Suspension Trolleys	1 off
Traction Drive Units	1 off
Beam Cassette Trolleys	1 off
Consumables Storage Cassette Trolleys	1 off
Trailing Trolleys	67 off
Trailing Trolley Lanyards	66 off

Scope of supply for the Electrical System

Description	
The electrical equipment comprises the following • 4MVA 10kV/3.3kV/1kV skid mounted transformer. • 19 drive skid mounted Loadcentre. • All interconnecting cables and connectors for operation with: Longwall Shearer AFC Maingate EP Motor 1 AFC Maingate BP Motor 2 Stageloader Motor Crusher Motor Scrubber Fan Motor Water Pump Motor 1 Water Pump Motor 2 Water Pump Motor 3 Water Pump Motor 4 Water Pump Motor 5 PRS Pump 1 PRS Pump 2 PRS Pump 3 • Face, Stageloader, Power Train lighting cables and 120V supply cable. 1 x set Signalling and Communication Equipment for a 244m AFC and 25m Stageloader	

Specification of Electrical Equipment for Longwall

4MVA 10kV/3.3kV/1kV (+/- 5%) ATEX Certified Transformer

- **a) THVC HT circuit breaker** with:
  - Incoming Cable Socket - Victor 11kV 400A adaptor + Half Coupler
  - Thro-going Cable Socket - Victor 11kV 400A adaptor + Exd blank

- 12kV isolator – off/on/earth
- 12kV vacuum circuit breaker
- B&F XPS protection relay with display and communications to loadcentre for SCADA with protection for:
    - Overload
    - Earth Leakage
    - Short Circuit
    - Winding over temperature
- Surge Suppression
- General Indication
    - Incoming line volts accurate to within 1%
    - Circuit breaker status
    - Control voltages (led only)

- **b) BMT 4 MVA flameproof transformer, 10kV Primary with one 1.3MVA 3.3kV Secondary and two 1.35MVA 1kV Secondaries (including a 30° phase shift between the two 1kV outputs)**

- **c) TLVC LT section with:**
    - B&F XPS transformer secondary neutral protection
    - B&F XPS protection relay with display and communications to loadcentre for SCADA with protection for:
        - Overload
        - Earth Leakage
        - Short Circuit
    - Victor 33ASBA outlet adaptors

TCS 33/2-10/17 ATEX Certified Loadcentre

- **a) Isolator Section**
    - Handle 1 - 1 x 3.3kV 1000A Isolators for 1 x 3.3kV inlet
    - Handle 2 – 1 x Auxiliary Supply Isolator
    - Handle 3 - 2 x 1.1kV 1000A Isolator for 2 x 1kV inlets
    - 1x 5kVA 1k/230V transformer with 6 x 230V outputs
    - Control Transformers

- **b) 3.3kV Loadcentre Section**
    - 2 x 400A Vacuum Contactor circuits with XPS motor protection units
    - 2 x Victor Type A43 Bolted Sockets
    - B&F power panel PLC with 15” colour display with suitable Input/Output for the control of the 3.3kV drives and AFC 1kV Drives

- **c) 1kV Loadcentre Section**
    - 2 x 1000A Isolators
    - 3 x 400A Vacuum Contactor circuits with XPS motor protection units for AFC Drives
    - 3 x Victor Type A40SR 350A Restrained Sockets for AFC Drives
    - 14 x 160A Vacuum Contactor circuits with XPS motor protection units
    - 14 x Victor Type A41SR 250A Restrained Sockets
    - B&F power panel PLC with 15” colour display with suitable Input/Output for the control of the 160A Drives

Cables and Connectors

The following Power Cables are supplied including all necessary plugs and glands as required.

- 1kV supply cables from Transformer to Loadcentre — ***Type TBC***
- 3.3kV supply cable from Transformer to Loadcentre — ***Type TBC***
- Shearer — Type 307S (or equiv)
- AFC Motor (MG1) — Type 7M (or equiv)
- AFC Motor (MG2) — Type 7M (or equiv)
- Stageloader Motor — Type 7M (or equiv)
- Crusher Motor — Type 7M (or equiv)
- Scrubber Fan — Type 7M (or equiv)
- Water Pump 1 — Type 7M (or equiv)
- Water Pump 2 — Type 7M (or equiv)
- Water Pump 3 — Type 7M (or equiv)
- Water Pump 4 — Type 7M (or equiv)
- Water Pump 5 — Type 7M (or equiv)
- PRS Pump 1 — Type 7M (or equiv)
- PRS Pump 2 — Type 7M (or equiv)
- PRS Pump 3 — Type 7M (or equiv)
- Face and Stageloader lighting cables and 120V supply cable. — Type 62 (or equiv)
- Cable Plugs for 3.3kV equipment
- Cable Plugs for 1kV equipment
- Cable Couplers for 3.3kV equipment
- Cable Couplers for 1kV equipment
- Glands for Type 62 cable
- Plugs for Type 62 cable
- Couplers for Type 62 cable

Signalling, Communication and Control System

Signalling and Communication Equipment for a 244m AFC and 25m Stageloader

Includes equipment for the signalling, communications and pre-start warning along the Stageloader and AFC, also signalling interfaces for connection to the tensioners and also for the devices to provide Stageloader blocked chute protection and Stageloader to gate conveyor sequence.

It is assumed that the Coal Face Minewatch PC21-3 control unit will be positioned at a maximum distance of 20m from the delivery of the S/LDR and with power supply and pilot cables connected to the electrical switchgear approximately 150m away.

- Dual Pilot Minewatch PC21-3 Face Controller c/w FLP Relay Interface/Power Supply
- DIS5 Console Unit

- Face Signal Keys
- Face Communication Loudspeakers
- 2 x Stageloader Key Amplfiers
- 3 x Stageloader Signalling Keys
- 13 x Face Key Amplfiers
- 23 x Face Signalling Keys
- 1 x Chain Tensioner Monitoring Interface Unit
- 1 x Stage Loader Blocked Chute Probe
- 1 x Bottom Belt Conveyor sequence Unit c/w Namur Sensor
- 4 x Crusher Emergency Stop Buttons (I.S. with 2 x 6 Pole C/R sockets)
- 2 x Pre-start Warning Alarm / Signalling Termination Unit
- All Cables and connectors
- Mounting Brackets

Scope for the Pump System

The pump system shall be installed on a pump train skid configuration identical to the setup in existing mine in Svea Nord. All water system valves and fittings shall be made from corrosion resistant material (stainless steel or equal). The pump systems and pipes shall be designed for easy emptying and flushing with compressed air and anti-freeze solution in emergencies during power failures. The pup skids shall be design as heavy duty and suitable for transport of complete train by pulling of front of skid. The sides of the skids shall be prepared to be heavy duty with steel protection plates for sideways pushing into the rib after move. Quick couplings at end of pump train skid for electrical and hose connections as well as connections for fire hydrant piping and dust suppression solution.

Item	Description	Qty
1	**High pressure pump station** The pumps and tanks are designed for skid mounted assembly. They are equipped with correspondent frame and holder. consisting of:	1
1.020	**Pump unit EHP-3K 200/53 FL** flange type mounted on a skid mounted frame, with: -main control valve H 30 pre controlled by the hydro-mechanics valve V 300/20, switching hysteresis S20% of adjusted outlet pressure -2,51 bladder accumulator with two safety valves S 301/97, opening pressure S 301 = 400 bar - oil pressure switch with manometer to control the lubricating circuit from the pump - temperature control switch for oil - motor/pump console, coupling pump and motor side - electrical motor 200kW 1140V, 50 Hz, 1500 rpm, design B5 air cooled (with ATEX-approval)	3

TECHNICAL DATA
Type: EHP-3K 200/53
Plunger diameter: 53 mm
Number of plunger: 3
Plunger stroke: 70 mm
Crankshaft Pump R.P.M. 660 min-1

OPERATING DATA
max. operating pressure: 360 bar
nominal flow rate: 309 Ilmin

HYDRAULIC MEDIUM
Fluid: HFA I Water
Filtration: < 100 urn
max. temperature: 45°C

POWER TRANSMISSION
Motor r.p.m.: 1500 min-1
Power requirement: 200 KW(at 360 bar)

Emulsion tank 3700/ litre

1.030 Skid mounted unit made of stainless steel 1

Consisting of:
- level switch preventing dry running of the pumps and level control (3 binary switch-points)
-1x breather filters
- 3x butterfly valves in the suction line to pumps

Concentrate tank 2600litre 1
Skid mounted unit made of stainless steel consisting of:
Inlet filter for fresh water, 25 micron manually operated double back flushing filter.
Manufactured size 800l per min
For the filtration and emulsion mixing procedure a minimum inlet pressure at the inlet filter of 6 bar is necessary during operation at full opened inlet valve.
(Inlet port 1 x Steck-O DN50 for fresh water)
The inlet control of fresh water for emulsion mixing by a 2/2 way valve DN 25 (control voltage 12V DC)
Level switch in the connection tank (3 binary switch points)
(1 switch point will be used)
1 x breather filters
Automatic emulsion mixing system to generate 20% glycol, 3% HFA concentrate, 77% water operating liquid.

Note: the glycol – HFA – concentrate mixture will be filled in by Purchaser into the tank.

1.04 Accumulator with safety valve 1.00
with:
- 1x bladder accumulator 32 l-40 MPa (400 bar) with fastening clamp and safety valve S 301/97 (safety valves adjusted and plumbed;
reaction pressure 400 bar
- 1x high-pressure hose DN40, PN420, length aprox 3500 mm to connecting the bladder accumulator to the pipeworks at G 1 W

1.05 **Piping parts and hoses**
At the internal hydraulic connection between pumps and emulsion tank.
For the internal connection between the three pumps and the pipework Pipework to consumer.

Each pump has one high-pressure hose DN40, PN420, length 3500 mm to go at a G 1 W' connection port on the pipework.

2 **Tools for maintenance and repairing the EHP-3K**
Special tools for mounting work at the EHP-3K 200/53 pump.

3 **Spraying pump station**
The pumps and tanks are design for skid mounted unit.
They are equipped with corresponding frame and holder.
consisting of:

3.001 **Pump unit EHP-3K 125/62**
flange type skid mounted unit on a pump ground frame.

with:
- overflow valve U 504/400 as operating valve
(preset at 60 bar)
- overflow valve U 504/400 as pressure relive valve
(preset at 80 bar)
- oil pressure switch with manometer to control the lubricating circuit from the pump
- motor/pump console, coupling pump and motor side
- temperature control switch for oil
Air cleaning ball valve at pressure side
- electrical motor 1140V, 50 Hz, 55kW 1500 rpm, design B5 (air cooled with ATEX-approval)

TECHNICAL DATA
Type: EHP-3K 125/62
Plunger diameter: 62 mm
Number of plunger: 3
Plunger stroke: 50 mm
Crankshaft Pump R.P.M.: 660 min-1

OPERATING DATA
max. operating pressure: 220 bar (pump construction pressure)
nominal flow rate: 310 Ilmin

HYDRAULIC MEDIUM
Fluid: Water I HFA
Filtration: s 100 pm
max. temperature: 45 deg

POWER TRANSMISSION
Motor r.p.m.: 1500 min-1
Pump power requirement: 55 KW (at 100 bar)
Recommended motor power: 55 KW

3.002 **2600 liter water-tank made of stainless steel** 1

with:
(1700l water and 900l antfreeze mixture, split tank chamber)
Skid mounted unit made of stainless steel
Consisting of
- inlet filter for fresh, 100 µm, manually operated double
back flushing Filter, manufactured size 800 l/min.
For the filtration procedure an minimum inlet
pressure at the inlet filter of 6 bar is necessary during operation
at full opened Inlet valve.

(Inlet port 1x Steck-O DN50 for fresh water)
- The inlet control of fresh water for emulsion mixing by a 2/2 way valve DN 50 (control voltage 12 V DC)
- level switch preventing dry running of the pumps and level control (3 binary switch-points)
- 1x temperature control
- 1x butterfly valve in the suction line to pump and in tank inflow
- 2/2-way-valve 12 V DC for water temperature regulation (by water draining out of the tank)
- 2x breather filter
- tank-return connection 1 x G2"
Pump suction switch water/antifreeze mixture

3.003 **Piping parts and hoses** 1

hoses, fittings and return valves for internal hydraulic connection of the spraying station. For the internal connection between the two pumps tank and the pipework. Pipework to consumer.
Each pump has one high-pressure hose DN40, PN420, length 3500 mm to go at a G 1 W' connection port on the pipework.
- 1x non-return valves DN 32 with G 1 Y." in the pumps pressure line

4 **Tools for maintenance and repairing the EHP-3K** 1
Special tools for mounting work at the EHP-3K 125/62 pump.

Centrifugal pump unit to glycol tank 1
Mounted on an under frame with
Electro motor 3 kW 1140V 50Hz 3000rpm
Coupling (motor and pump side) protection cover to coupling
Manometer 0-10 bar suction port for hose DN40
Pressure port Steck-O DN32

Technical Data
Type-centrifugal pump ATEX certification
Fluid – Glycol
Operating pressure – 4.8 bar
Flow rate – 84l per min (by 4.4 bar)

Power transmission
Motor rpm – 1500rpm power requirement (at 357 bar) – 200k